DDA 80-1888/2

5 September 1980

MEMORANDUM FOR: Director of Central Intelligence
Deputy Director of Central Intelligence
Executive Committee Members

FROM: Don I. Wortman
Deputy Director for Administration

SUBJECT: Final Report of the Information Handling Task Force (IHTF)

REFERENCE: Memo dtd 13 Aug 80 to EXCOM and IHTF Members fr DDCI, subj: EXCOM Guidance for IHTF Final Report (EXCOM 9106-80)

1. Attached for Executive Committee review and action is the final report of the IHTF. Section 6.0 of the report contains final recommendations of the Task Force and represents an agenda for decision-making. A copy of the recommendations section has been attached (Att 1) to this memorandum. [redacted] 25X1

2. Section 5.0 contains an expanded discussion of the Architect's mission and function, a suggested appeal mechanism, a description of the Staff, and discussion of possible organizational positions for the Architect considering the Office of the DCI and the Office of the DDA. [redacted] 25X1

3. When the Executive Committee considers the report, I would like them to review a proposed revision to the mission and function statement of the Architect that appears in Section 5.2, Architect of Information Services. A revised mission and function statement is attached (Att 2). I believe this revised statement is consistent with [redacted] discussion and the DDCI's memorandum of August 13
25X1 (reference) implementing those decisions. [redacted] 25X1

4. Section 4.1.5, Career Management, has been expanded to include statistical information on the population of information specialists within each Directorate and to provide discussion of alternatives for Directorate management. [redacted] 25X1

5. Attachment C to the final report, Description of Management Alternatives, contains a description of the organizational options we discussed [redacted] I 25X1 believe this is responsive to the DCI's annotation on the referenced memorandum requesting that alternatives be included in the final report. As you recall from our discussions [redacted], the Agency-level options for change were the creation
25X1

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[redacted]

of a new directorate containing the bulk of our IH resources, or the creation of a Systems Architect to deal only with planning at the Agency level. While the Task Force tended to lean toward bold structural change, the Executive Committee was doubtful about the effectiveness of such a large bureaucracy in maintaining user satisfaction. Also noted in our discussion was the great administrative upheaval such a decision would entail. [redacted]

25X1 6. Another factor considered and revisited at several points in our discussions was how to organize to ensure we are making the best use of available technology. The consensus was again that the larger the organization and associated capital plant, the less capable we would be at staying current with technology and the more inhibiting that central organization would be to individual unit innovation. [redacted]

7. In the final analysis, we achieved unanimity on the need for a strong 25X1
centralized planning function to better direct the development of information services. The Task Force recommendation to implement this planning function in a technically oriented staff was found agreeable. [redacted]

25X1 8. Having reached a consensus on the nature of Agency-level management changes, there is still the question of what, if any, Directorate-level changes should be undertaken. As I stated [redacted], I plan to proceed with additional changes involving communications, ADP, printing and information security. These changes will
25X1 be aimed toward building an organization and management system more in tune with the Information Handling goals and developing technologies. I also hope to minimize the number of DDA elements the Agency user deals with in getting our complete support. I anticipate presenting a plan for initial changes in the existing DDA structure six months after the Architect is on board. [redacted]

9. There may be similar thoughts of change in other Directorates, prompted by 25X1
the results of this study. If this is the case, I would recommend that our mutual efforts be closely coordinated to ensure that the final results are in harmony and supportive of the goals. [redacted]

25X1 10. Unless directed to the contrary, the remaining Task Force members will move to new assignments by mid-September. They will remain available in Headquarters for further consultation and discussion as required. They are to be commended for a job well done. Their work can be judged a success already in terms of moving the Agency to agreement on a strong Architect function.

[redacted] 25X1

Don I. Wortman

Attachments:
As stated

SECRET

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6. RECOMMENDATIONS

6.1 Organizational Changes

6.1.1. Create an Information Services Architect to maintain and publish an Agency strategic plan for the development of information services. (ref. 4.1.2)

Approve: Disapprove:

6.1.2. Assign the Information Services Architect to the Deputy Director for Administration. (ref. 5.)

Approve: Disapprove:

6.1.3. Charge the Deputy Director of Administration with responsibility for accomplishing within six months:

A. Establishment of a joint planning mechanism to produce a unified plan for information services of OC, ODP, and OL/P&PD.

B. Creation of a plan and time table for restructuring DDA line components in accordance with the needs of this strategic plan and with due consideration of the issues raised by this report. (ref. 4.2.2, 4.2.3, 4.2.4, 4.2.6, 4.2.7, 4.4.2)

Approve: Disapprove:

6.2 Management Change

6.2.1. Expand the scope of the current EXCOM ADP review to incorporate all information services and charge the Architect for Information Services with management of the preparation and presentation of that review. (ref. 4.1.4)

Approve: Disapprove:

6.2.2 Mission components should program, budget and defend capital investments required to provide dedicated information services. (ref. 4.1.3)

Approve: Disapprove:

6.2.3 Directorates should develop and implement plans to centralize career management of personnel devoted to provision of information services. Early attention should be given to centralized management of ADP and registry personnel. (ref. 4.1.5)

Approve: Disapprove:

6.3 Programmatic Objectives

6.3.1 Assign responsibility to the DDA for design and implementation of a unified information distribution network whose nodes are conveniently located throughout Agency facilities and which contain facilities for storage, transmission, printing and sorting of electrical information. Management of those nodes will emphasize security, compartmentation and accountability for information. Estimated costs are $15M for a ten year program. (ref. 4.2.6) (C 3d(3))

Approve: Disapprove:

6.3.2 Assign responsibility to the DDA for evolutionary development of a universal terminal network that will provide wide electrical interconnectivity with compartmentation and command privacy enforced through cryptographic separation. Estimated costs are $40M for a ten year program. (ref. 4.2.7) (C 3d(3))

Approve: Disapprove:

6.3.3 Charge the Architect for Information Services with developing a concept and commissioning the design of a centralized data base of dissemination requirements that allows controlled, shared access to all Agency disseminators. Estimated costs are $500K with expected completion in 1985. (ref. 4.2.8) (C 3d(3))

Approve: Disapprove:

6.3.4 Place Agency priority on modernization of the communications plant to expand capacity, quality and interconnectivity required to support increased electrical flow. Estimated costs $20M with completion at Headquarters by 1985; completion world wide by 1990. (C 3d(3))

Approve: Disapprove:

6.3.5 In the interests of security, legality, and public image, there needs to be a central, easily accessed repository of data regarding information released to the public, the media, and outside the Executive Branch. A central system should be useable by and responsive to users concerned with FOIA and Privacy requests, Public Affairs Office, OLC, OGC, Office of Comptroller, DCI and DDCI Staffs. The purposes of this repository would be consistency of judgements with regard to releasability, maintenance of operational integrity, and more efficient administration. It is recommended that analysis of alternative means for establishing such a system, including use of commercial bibliographic reference services, be commissioned by EXCOM. (ref. 3.8.e.)

Approve: Disapprove:

6.4 Security Procedures

6.4.1 Establish systems of control and accountability for all transportable, machine writeable, non-human readable storage media, e.g., magnetic cards, tapes and disks. Such media must be presumed to contain information of the highest sensitivity. (S 3d(5))

Approve: Disapprove:

6.4.2 With increasing application of technology comes enhanced ability to positively account for sensitive information. This opportunity should be exploited to implement complete audit trails on all Top Secret and compartmented information within Agency computer data bases. The Office of Security should implement systems and procedures to frequently review audit information for anomalous accesses. (S 3d(5))

6.4.3 As classified databases more and more exist on-line, encouragement should be given to on-line queries from a terminal. Second-hand queries made via telephone should be discouraged. Accesses via terminal are easily recorded and audited. Most important, the terminal provides a more positive authentication of the requestor than the telephone. (S 3d(5))

Approve: Disapprove:

6.5 Personnel Activities

6.5.1 The gradual extension of information handling technology into the office environment creates a need for more informed users. It is recommended that all career services incorporate some form of familiarization training in career development plans. Such training might include ADP familiarization, Office Automation, and information management depending upon the nature of the service and the level of the employee.

Approve: Disapprove:

6.5.2 The Task Force has observed instances of user ignorance or apathy with respect to current information services. It is recommended that an indoctrination program be designed for all employees. This indoctrination, which can be integrated into other Agency-wide programs, should provide information on available services with emphasis on the user responsibility to the service, e.g., establishing and maintaining dissemination profiles.

Approve: Disapprove:

6.6 Policy and Administrative Action

6.6.1 There needs to be a definitive policy statement for contingency planning. This policy should cover a range of eventualities from brown-outs to natural disaster and nuclear conflict. (ref. 4.1.6)

Approve: Disapprove:

6.6.2 Future programs and budgets should address contingency planning by separately identifying added costs.

Approve: Disapprove:

6.6.3 It is recommended that this report be given wide distribution within the Agency as a means of publicizing the goals program and the rationale underlying the accompanying management decisions.

Approve: Disapprove:

ALL PORTIONS THIS ATTACHMENT UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

Architect of Information Services:

Mission:

Performs Agency level planning for Information services with particular emphasis on application of technology.

Functions:

1. Publishes Strategic goals and objectives for purpose of program guidance.
2. Monitors progress toward goals and objectives and reports state of Information Handling to EXCOM (incorporates ADP review).
3. Provides final approval for all agency information handling systems architecture.
4. Consolidates requirements for IH to maximize commonality and minimize unique development.
5. Conducts design reviews during conceptual design phase.
6. Maintains technology forecast and reports trends to management.
7. Acts as Agency focal point to Community on matters of IH.
8. Commissions system designs to fulfill architecture.
9. Initiates studies and analyses for the purpose of identifying ways to improve effectiveness and efficiency of IH.
10. Maintains a current data base on the status of information systems and their interrelationships.

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ExCom 9120-80

22 September 1980

MEMORANDUM FOR: Executive Committee Members

FROM : [redacted]
SA/DDCI

STAT

SUBJECT : Minutes of Executive Committee Meeting, 10 September 1980

STAT

1. The Executive Committee met on 10 September 1980 to review the recommendations in the Information Handling Task Force (IHTF) final report. Participants included the DCI, DDCI, and Messrs. Dirks (DDS&T), McMahon (DDO), Wortman (DDA), Clarke (D/NFA), Lipton (Compt.), Ware (D/EEO), [redacted] (D/ODP), [redacted] (C/IHTF), and the remaining task force members.

STAT

2. Mr. Carlucci reviewed the activities leading up to the IHTF final report and suggested that the Committee first consider Recommendations 6.1.1 and 6.1.2. The Committee approved 6.1.1 establishing an "Information Services Architect" but suggested that the title be revised. They also approved Recommendation 6.1.2, assigning the architect to the DDA.

3. Mr. Wortman suggested that the Committee spend the rest of the meeting considering the proposed mission and functions of the "architect" and postpone reviewing the remaining recommendations until affected offices had an opportunity to comment on them. Mr. Carlucci agreed, stipulating that Mr. Wortman should identify those recommendations that could be handled appropriately at his level and the rest could be brought back for Committee review by late October. He also asked that the basis for the resource estimates in the recommendations be explained.

4. Mr. Wortman highlighted preliminary discussions regarding potential candidates for the "architect" position. Five internal candidates and a number of external candidates are being considered. The subsequent discussion of the mission and functions of the "architect" included the appropriate grade level (about GS-17, possibly GS-18) and the appropriate boundary line between the "architect's" general planning functions and the detailed operational responsibilities of line managers. The Committee agreed to adopt the proposed mission and function statements for the time being and review them for possible revisions after the "architect" has been in operation long enough to evaluate them.

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5. Admiral Turner thanked the task force for its efforts. The meeting was adjourned.

STAT

cc: IG
D/ODP
C/IHTF

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8 September 1980

VINCE:

The attached notes are for your/DDCI background for 10 September meeting.

Think we should follow foreign liaison model:

- opening remarks from Wortman (needs to be told)
- brief highlights from IHTF
- go through recommendations.

[redacted] will be available Tuesday and Wednesday AM for briefings. STAT
Call with any questions.

Dianne

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8 September 1980

NOTE FOR: DDCI

SUBJECT : EXCOM Meeting, 10 September, 3:00 P.M., Information Handling Final Report

- Concentrate on Don Wortman's covering memo, and its attached recommendations and Mission and Functions statement for the systems architect. (Note: Latter is different and better than one in text.)

- Don will want

  - as much agreement as possible on the role of the new architect.

  - both DCI/DDCI support for organizational changes he needs to make (steps toward OC/ODP merger) and flexibility in how he approaches these changes.

- Of the nineteen recommendations, the task force considers nine of them critical:

  6.1.1 - systems architect

  6.1.3 - DDA joint planning and consequent restructuring

  6.2.3 - career management centralized at Directorate level (MS model)

  6.3.1 - unified information distribution network

  6.3.2 - universal terminal network

  6.3.3 - centralized dissemination requirements data base

  6.3.4 - priority modernization of communications plant

  6.4.1 - establish security control and accountability procedures

  6.6.1 - contingency planning policy

- Recommendations are generally consistent with consensus [redacted] STAT
  Comments on each below note importance, expected contention, and any deviation from [redacted] STAT

  6.1.1 - Create systems architect

    - critical

    - no dissension expected (Wortman has been laying foundation with DDs re: choice of architect).

    - consistent with [redacted] STAT

*At this point, you may want to turn to architect mission and function statement to get agreement here. Consistent with [redacted] discussion. STAT

6.1.2 - Assign Architect to DDA

- not critical

- no opposition expected (some hallway speculation is skeptical that any change will result if function is placed in DDA; will depend on individual chosen; you and/or DCI may want final approval of choice).

- consistent with [redacted] STAT

* Appeal mechanism to DCI/DDCI spelled out in text but not recommendations; you may want to emphasize that here.

6.1.3 - DDA (A) joint planning mechanism, and
(B) plan for restructuring

- critical: will provide first aid for present problems/user dissatisfaction while architect is being established. This is area Don will need both your support and some flexibility.

- no opposition expected outside of DDA; some apparent within OC and ODP.

- consistent with Don's comments [redacted] and in his memo. STAT

6.2.1 - Architect charged with EXCOM ADP review

- not critical; should be helpful in focusing and streamlining this exercise.

6.2.2 - Mission budgeting for dedicated information services (SAFE current example)

- not critical, but contentious

STAT - [redacted] consensus: be receptive to it when to our advantage;

(you were persuaded that it could be helpful in a tight budget climate when support activities are more vulnerable.)

6.2.3 - Centralize info handling career management at the Directorate level (IMS model)

- IHTF believes will be necessary in long run

- all but DDO/DDA will disagree

- [redacted] DDCI/DCI seemed to favor centralization at Agency level; DDA agrees with Directorate centralization as a minimum and has taken first steps; DDO will want to keep "their model"; NFAC and S&T will see no value in centralizing.

6.3.1-6.3.4 - IHTF believes all

are critical for implementing the proposed Agency information handling goals. Will all be controversial. May want to have new architect consider pros and cons in-depth rather than make decisions now.

6.3.1 - DDA design and implement uniform distribution network

- critical

- cost very soft estimate

6.3.2 - Universal terminal network

- critical

- some opposition based on incorrect perception that only one kind of terminal will be used; proposal is only for standard terminals at key points to minimize required user training, increase commonality among systems, etc.

6.3.3 - Centralized data base of dissemination requirements

- critical

- DDO may object on security/compartmentation grounds.

- IHTF emphasizes controlled access and strongly enforced need to know.

6.3.4 - Priority on modernizing communications plant

- critical

- ranked outside of guidance in FY-82 program.

- costs ($20 M) are differential costs; difference

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between what is already being discussed/proposed and what would actually be needed to do the job.

6.3.5 - MIS for information being released to public

- not critical in this context

- Wortman pursuing separately
  IHTF believes previous analyses of this problem not technically sound; an MIS would be "doable" if all participants could agree on requirements.

6.4.1 - Security systems of control, accountability for all non-human readable storage media (mag cards, tapes, disks)

- critical; without it, control over paper documents meaningless.

- Opposition will depend on how much homework principals do.

6.4.2 - Audit trails for sensitive information

- neither critical nor controversial

- will evolve with or without approval; private industry already moving in this direction.

6.4.3 - Discourage second-hand terminal queries; encourage only on-line terminal queries.

- neither critical nor contentious

- Policy statement best can get

6.5.1 - User familiarization training

- Motherhood

6.5.2 - Employee information services indoctrination

- Motherhood

6.6.1 - Policy statement for contingency planning

- critical

- not discussed at Beechtree

- IHTF believes too much money already invested in systems without any backup

6.6.2 – Identify contingency planning costs in future programs/budgets

6.6.3 – Distribute widely

- Pro forma

- Executive summary can be detached if desired.

STAT

Information Handling Study

28 August 1980

INFORMATION HANDLING STUDY - '80

This document constitutes the final report of the Information Handling Task Force submitted to the Executive Committee, CIA.

Team members:

[redacted] 25X1

CAVEATS:

1. This report follows the convention that he is to be interpreted as he or she.

2. Classification marking & handling - unmarked portions of this report are unclassified; some portions, while unclassified, are designated for administrative use only.

[redacted] 25X1

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1. EXECUTIVE SUMMARY

This report sets out the procedure and conclusions of CIA's Information Handling Task Force. In a year, the five member team investigated the ways in which information services, broadly defined, are now provided, and gauged the impact of a rapidly changing technology. Their goal was to produce the Agency's first strategic plan for information handling.

The "Problem"

One cannot but be dazzled by the pace of computer technology. If automobile technology were improving at the same rate, a Rolls Royce would cost $2.50 and get 200,000 miles to the gallon. Correspondingly, the demand for computer and related services is ever growing. However, Agency buying power is constricting and we are enjoined to "do more with less". Two problems thus pertain:

- Computers promise to "do more with less" ... at the cost of capital spending. Senior managers find they must make major resource decisions, often unprogrammed, with insufficient background in a rapidly changing technical area. Seemingly related projects are considered (and apparently designed) in isolation. The absence of a "Master Plan" precludes optimization.

- Traditional institutions providing information services may become less effective as new technologies evolve, demand grows and resources shrink. There needs to be a reconciliation of demand vs. supply, a strategy for investment, and appropriate institutions to execute the strategy.

In addition: there was widespread belief at the inception of the study that there was an "information explosion", ill defined; there was scattered enthusiasm for appointing an information processing "Czar"; and finally, some sentiment prevailed that the Offices of Communications and Data Processing could profitably be merged as the technological distinctions blurred.

Launching the Study

The Executive Committee of the Agency -- the Director of Central Intelligence, his deputies, comptroller and EEO director -- commissioned the study in the winter of 1979. Recommended severally by the Comptroller, and the Deputy Director for Administration and his Directors of Data Processing and Communications, the study had two predecessors, the SCIPS and CHIVE studies. The more proximal antecedent was a survey and catalog of information handling issues compiled by the Director of Data Processing, a recap of which can be found in Chapter 3.

The Study Team

Although it was decided that the study team should be collegial rather than representative, it turned out to be both. While non-partisan (the inevitable result of a year of close habitation) team members came from each of the directorates: one each from NFAC, S&T, and DO, and two from the DDA. Skills embodied in the team ranged from computer science and human factors, across traditional computing and communication, to records management.

The Charge to the Task Force

The Task Force was asked to draft a Strategic Plan for the use and provision of Information Handling Services, and to recommend management and institutional changes needed to carry out the plan. The definition of a "Strategic Plan" agreed upon:

- Sets out clearly the goals and objectives toward which we must strive;
- Starts from a clear appraisal of where we now stand;
- Charts, in general terms, the (alternative) routes by which we get from here to there;
- Publicizes major observables by which we measure our progress and projects a timetable of these milestones;
- Fixes the responsibility for fulfillment of the various objectives and subobjectives; and,
- Estimates the magnitude of resources required.

In the terms of reference on which the study was based (Attachment A) the Task Force was also invited to "...define a management structure for more formal continuing coordination of the Agency's information handling activities." In toto, then, the proposed elements of the strategy were to include: "management, organization, operation, security, technology, and personnel."

The terms of reference directed the attention of the Task Force to the following issues:

Management "... To what degree can central management of information handling contribute to the provision of information services? While there is popular enthusiasm for further centralization of management functions associated with information handling, there needs to be a careful assessment of what functions need to be centralized to improve provision and use of information services.

Standards "... To what degree can standardization contribute to the efficiency and effectiveness with which information services are provided? Standards could cover equipment, programming, engineering, documentation, or management systems.

Structure "... To what degree should technology influence Agency organization? The apportionment of missions to some components is based, in part, on historic technological definitions which may now be obsolete. As technology evolves, a reallocation of the division of labor might be useful and even necessary to clarify roles. However, the value of organizational realignment must be weighed against the employee morale, personnel management, and budgetary impact of change.

Compartmentation "... To what degree can systems and data bases be shared without jeopardy to security and compartmentation? Increased efficiency will often result from aggregation of user needs and resource sharing. Strategies need to be identified that will maximize efficiencies within constraints imposed by security and compartmentation.

Scope of "Information Services"

The study focused on the provision and use of information services within the Agency. Information services were defined as those disciplines and technologies whose purpose is to facilitate information handling. The study addresses the interface of the Agency information systems with collection and processing systems, not the collection systems, themselves.

The definition of Information Handling contained in EXCOM-19-79 was accepted as the most appropriate for the purposes of this study:

> "Information handling in CIA is the systematic creation, movement, use, storage, retrieval, and disposal of intelligence and management information with the support of automated or other clearly identifiable processes and with due regard for control of sensitive and compartmented data."

For purposes of this study, information handling services were categorized as:

- **Recording of Information,** including all facilities or services which enable the generation or capture of information in a media that will support subsequent storage and exploitation of that information.

- **Acquisition of Information,** referring to the receipt of information which has been collected or generated by non-CIA resources and acquired for Agency use.

- **Dissemination of Information,** the process of determining the component or individual that should be made aware of recorded or acquired information. This "intellectual" dissemination process is contrasted with the distribution function.

- **Distribution of Information,** referring to the physical movement of information (in whatever media) and to related registry, mail, courier, electrical and pneumatic tube services provided by various information support units.

- **Information Reference Services,** including those services that store documents and/or information for subsequent retrieval.

- **Reproduction of Information,** including all facilities which enable the production of one or more copies of an information item in the same media as the original.

- **Security, Control & Accountability,** referring to those facilities or procedures designed to enforce the need-to-know principle and to prevent unauthorized access to, or unauthorized release of classified information. Information control implies accountability. Information accountability refers to facilities or procedures to determine the location of information and to identify the components or individuals who have been exposed to that information.

- **Computing Support Facilities,** including all computers and the peripheral devices attached to those computers which support the storage and processing of information. This support includes the operation and maintenance of these facilities and the provision of any systems (non-application) software needed to insure efficient utilization of the hardware devices.

- **Information Systems Development & Maintenance,** including the analysis, design, implementation, and subsequent maintenance of systems used to support specific user requirements in information handling. This activity is primarily related to the development and maintenance of hardware and software but can involve non-automated systems as well.

- **Miscellaneous Services,** including two services which warrant some discussion but which do not logically reside in the nine categories described above. They are: Formal training to support the various disciplines that constitute the IH services; and, Data Base Management and Support.

Study Procedures

Offices in the Agency were asked to provide structured responses to a set of questions regarding current information services. These responses were categorized by components whose mission is to provide services (providers) and those components whose missions make them users of services (users).

Using this data base, the Task Force then analyzed the information to identify and define issues among providers, among users, and between provider and user communities. The purpose of these preliminary steps was to define the "benchmark" in information services from which future plans necessarily depart.

Thirdly, the Task Force compiled a current technology forecast by literature searches and discussions with Government and industry representatives. The purpose of the forecast was to allow estimation of those innovations in information services likely to become attractive to the Agency in coming years.

With a data base containing the present state of services and the predicted future developments, attention was turned to formulation of goals. Goals and objectives were identified by applying the technology forecast in a fashion that would allow information services to develop in ways that met requirements while contributing optimally to Agency goals.

The goals and objectives were presented to the Executive Committee for review and comment. Based on the generally favorable response, approval was requested and received to use these goals for further analysis and development of a strategic plan.

The issues concerning management and organization were approached in a non-traditional manner. A decision analysis model was created by identifying a broad range of organizational options, identifying the most important factors to be considered in choosing among options and then inviting senior management to utilize the model by a process technically termed Multi-attribute utility analysis.

Provided with the preliminary report of the Task Force and the insight developed through the Decision Analysis model, the Executive Committee developed a consensus on the future direction of organization and management of information services. This consensus was used by the Task Force in developing the final report.

The State of the "System"

Current information services in the Agency continue to be provided largely by manual processes. Technology has historically been applied to increase the efficiency and effectiveness of these manual processes, not to achieve true automation. That these trends continue is evidenced by continued growth of stand-alone word processing, copiers, and registry automation.

Computer applications continue to grow both because of growing familiarity with computer applications and the rapidly decreasing costs of system capacity. Increasing communications capacities are making it possible to extend the convenience of automation to employee workstations by installation of remote terminals and high quality printing devices. This growing intimacy of end users with the technology produces added pressures for more and better technology. The pressures result in increasing strains on the human resources of the providers since requirements grow more rapidly than the available work force. The management problem that results is the user perception that providers are less and less responsive to their needs.

To gain relief from the short falls in central services, users are leaning more toward "do-it-yourself" programming, establishing component positions for dedicated programmers, and arguing more intensely for local resources such as minicomputers. These initiatives provide local relief to components that are successful, but raise Agency level questions regarding their impact on higher level priority and resource allocation decisions. These initiatives also raise questions from providers of central services who tend to view part of their management role as fostering development of coherent Agency-wide systems.

Providers of technologically based services are facing issues and frictions amongst themselves. As digital logic rapidly diffuses through communications and printing, traditional definitions of ADP, communications and printing fail to adequately categorize new devices and concepts of service. This leads to frequent disagreement over delineation of responsibilities. The astute user occasionally gains advantage from this confusion by shopping in what appears to him a competitive marketplace.

Despite the increased confusion and discontent, the Agency's priority needs continue to be satisfied. A comparison of Agency systems and their management with those of other Government and industry organizations allows one to conclude that the same information handling issues and problems are the contemporary focus of many organizations.

Scheduled Advances in Technology

Forecasting computer technology is chancey but not hopeless. A high degree of accuracy is not needed for our strategic planning purposes. Sadly, because of the long development cycles of our major systems, our plans will seldom intersect technology at its leading edge. Moreover, predicting the "where to?" of the technologies can be separated from the "when?" of those technologies. Finally, it is even useful to document those expectations which will prove wrong, as plans, spoken or unspoken, will be based on those expectations, right or wrong.

Even in the absence of major scientific breakthroughs, an increasing rate of change will occur in computer technology because of better communication among engineers, the availability of methods for exploiting scientific knowledge, the increasing priority given to R&D. The driving force will be profitable exploitation by the private commercial sector, particularly burgeoning sales of sophisticated consumer goods. At a price, the government will reap the fruits of cheaper computing elements. The price will be an industry less and less responsive to unique government needs as manifest by formal programs like MULTI-LEVEL SECURITY, TEMPEST, COMSEC, MILSPEC, etc. The price will also be disadvantageous competition with industry for trained personnel.

The rapidly declining cost of computer components will cause explosive growth in new computer applications and in the quantities of units produced. There will be great demand for, and shortages of, computer system designers, programmers, and technicians. There will also be a critical shortfall in management personnel to oversee system development.

The capability which may be incorporated in a single chip doubles roughly every two years and this growth will continue throughout the planning period. The resulting reductions in price, weight, and power consumption of semiconductor memories and logic elements will open the possibility of many new applications and for great improvements in present applications.

Sensor and communications systems will increasingly be designed to output digital information and the rates of data flow can be expected to increase greatly. Computers will be utilized to transform this data glut into useful information. Increased data processing at the sensor location will reduce the complexity of the problem at the central processor.

As has been pointed out [redacted] 1979), micro's and mini's promise 25X1 computing power to the end user, but do not compete with terminals connected to traditional data processing systems. Who wants to use a terminal to do a job which could be done on a pocket calculator? Properly used, however, the computer does not compete with the pocket calculator. The computer collects and stores information. Where and how the information should be stored are important questions. Questions as important as where the data should be processed.

Most pertinent of the major new applications areas in the commercial sector is office automation. It is hard to think of an advance in office automation, broadly conceived, which is not directly applicable to information handling in the CIA.

As computers become cheaper and smaller, the tendency to use separate computers to perform specific functions in large systems will increase. Some may operate individual sensors or input/output devices, some may share the computational tasks, and some may perform test and diagnostic functions.

Because of budgetary and political constraints, system acquisition cycles and operational lifetimes will continue to be long (10-15 years) in comparison with the period of significant technological change (2-5 years). Because of the disparity in these periods, changes of requirements, modifications for using the improved technology, and additions to capability will be commonplace. Considerable stress will be placed on the requirements, analysis, and design phases.

Goals for the Next Decade

In the face of fast-paced technological development, a wise investment policy must be based upon a relatively stable set of long range goals and objectives. Early in the study, a tentative set of interlocking goals were developed for EXCOM approval. And, while never officially adopted, the goals were approved provisionally as the basis for developing the strategic plan. Throughout the course of the study, the goals have had to be modified only slightly, to improve their readability and make more easily understandable their interelation.

The set of goals and objectives is presented graphically in the accompanying figure. A distinction is made between "goals" and "objectives". Objectives are viewed as action items whereas goals are understood to be ideals toward which we strive. There is no guarantee that goals are achievable, but there is the sense that the future will be better if we work collectively toward common ends, even if those ends are not completely achieved. A further structure imposed on the set of goals and objectives is their division into primary and secondary objectives and intermediate and strategic goals. Thus, a continuum of sorts is developed from the short-term, achievable, to the long-term ideals.

The Task Force developed three primary objectives:

PO-1 Develop effective top-level **coordination among managers of components which provide information services...** vital if we are to proceed in step on the secondary objectives.

PO-2 Develop effective top-level **coordination among managers of components that use information services...** to make hard decisions on resources.

PO-3 Establish the means to **accelerate the integration of communications and** centralized information services, particularly **ADP services**.

Assuming successful completion of the Primary Objectives and the resultant establishment of an Agency IH planning and coordination mechanism, the secondary objectives become the work plan of this "Systems Architect".

SO-1 **Develop overall investment and resource guidance for Agency information handling...** needed for two reasons: pursuit of some of the goals involve large up-front costs; and many of the information handling goals are in conflict because of their resource implications.

SO-2 **Establish a career service** which will be responsible **for** recruiting, developing, ranking, promoting and assigning **Information Handling specialists.** Design a Career Development Plan to overcome the forecast shortfall of skilled information handling specialists.

SO-3 **Establish system management standards...** vital to the attainment of goals IG-5 and IG-6.

SO-4 **Achieve a consistent and natural Agency-wide standard for access to information services...** tailored to the needs of the person, not the peculiarities of the system. Consistency is needed to reduce training costs.

SO-5 **Store information more efficiently...** multiply-accessed, single-copy file storage can improve accuracy, consistency, and economy.

SO-6 **Aggregate information for managers and analysts.** Better means must be found to meet their information needs with the available data by processing stored data into higher-level forms on an ad hoc basis.

SO-7 **Provide multilevel security access to data bases...** essential to achieving better access control for those systems that are not single-level and compartmented.

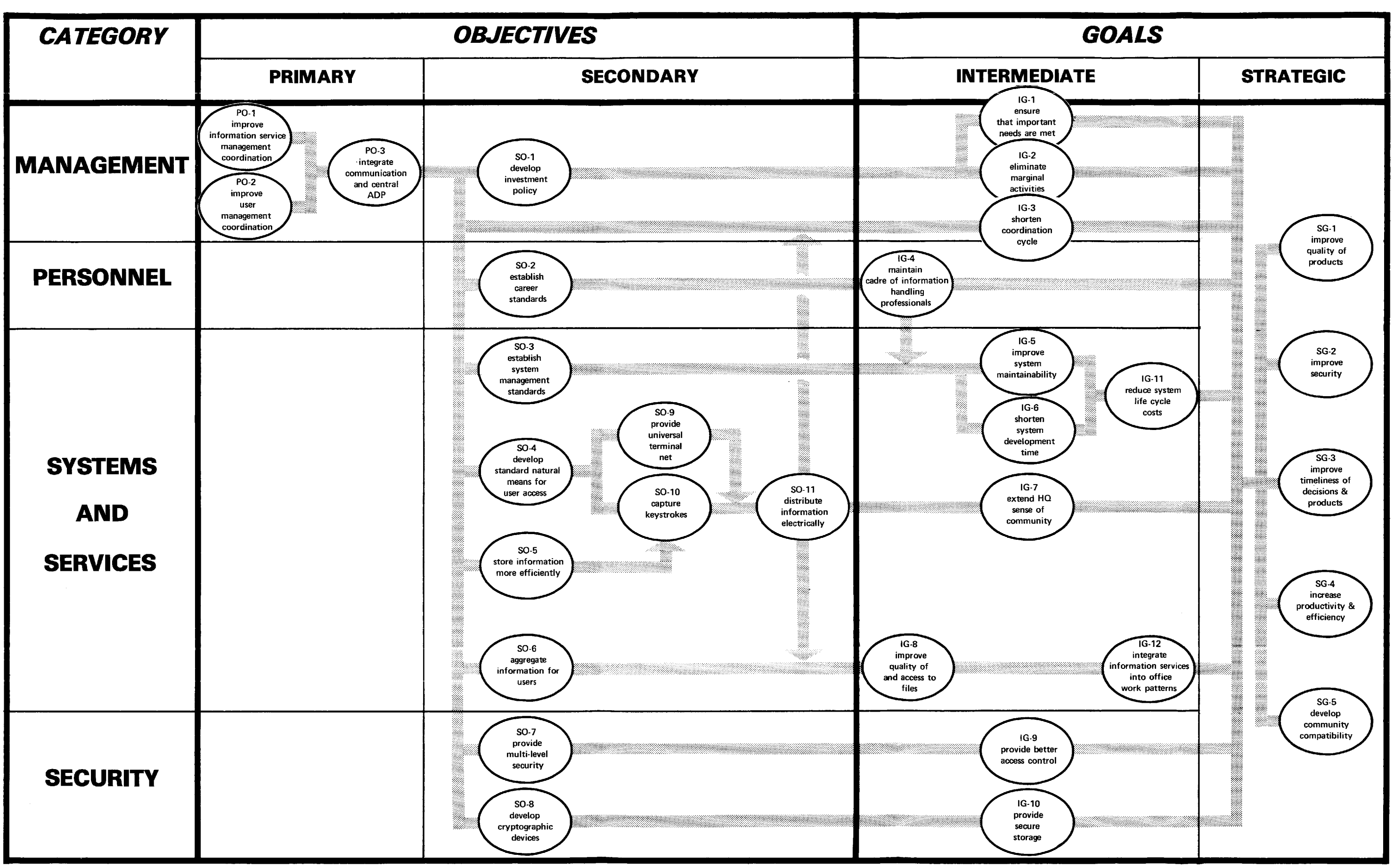
SO-8 **Develop cryptographic devices for user terminals and storage devices...** not only for end-to-end secure electrical transmission but also for additional information storage security (goal IG-10).

SO-9 Provide a single, **universal network of user terminals.** The information user should have one and only one terminal at his/her desk.

SO-10 Provide the means to **capture keystrokes.** to eliminate tedious and error-prone retyping.

SO-11 **Communicate most information electrically between people,** wherever they may be. This includes Headquarters-field communication, sending products to consumers, etc. This goal is

Goals for Information Handling



central to the achievement of several others: achieving a sense of community (IG-7), integrating information tools into office work patterns (IG-12), and improving data base accessibility (IG-8). The movement of information by means of paper is slow, inefficient, and presents unique security risks. Still, paper has singular virtues as a medium for the reader, so electrical distribution implies the availability of conveniently positioned printing and facsimile devices.

The set of Intermediate goals will enable an evaluation of progress on the above objectives. They would be used to measure the effect or benefit of the completed objectives. The Architect would be required to develop measurement criteria for each of the intermediate goals and report progress to EXCOM.

IG-1 **Ensure,** in the face of competing demands, that information services are directed to the **most important** intelligence and administrative **needs.**

IG-2 **Eliminate** information handling **activities of marginal value** vis-a-vis their cost.

IG-3 **Shorten the coordination, approval, and release cycle** of both intelligence and administrative actions.

IG-4 **Maintain a cadre of information handling professionals** with the requisite skills to meet the needs over the next decade... finding and keeping people who can reduce the life-cycle information systems costs through goals IG-5 and IG-6.

IG-5 **Improve maintainability** of information handling systems, both existing and planned... to stabilize the cost of keeping production systems working effectively.

IG-6 **Shorten information system development time.** With a rapidly changing technology we cannot tolerate a 7-12 year development cycle with the attendant risks of having systems unwanted or outmoded at IOC.

IG-7 **Improve and extend the sense of Headquarters community** to all Agency components in all locations, overseas and domestic.

IG-8 **Improve the accessibility of data bases** and their quality with regard to consistency and completeness.

IG-9 **Provide better control over access to classified information,** including provision of individual accountability.

IG-10 **Provide more secure storage** for sensitive material.

IG-11 **Reduce the life-cycle costs** of existing and planned information systems.

IG-12 **Make information handling tools a natural, well-integrated part of the office work pattern.**

Finally, the Task Force has identified five strategic goals which should be used to channel and justify Information Handling activities over the next decade. While nebulous, they are worth emphasizing lest we forget the real purpose of advances in information handling: Information Handling Technologies are a means to the real ends.

SG-1 Improve the **quality** of the Agency's products.

SG-2 Improve the **security** of our activities.

SG-3 Improve the **timeliness** of decisions **and** the **responsiveness** of our products.

SG-4 Increase the **productivity and efficiency** of our people and components.

SG-5 Agency systems should be developed with consideration for **community compatibility...** future systems should be capable of efficient and cost-effective interconnection.

The Architect would report periodically to EXCOM on the status of these goals and objectives and identify additional ones as needed.

Information Systems Development Recommendations

It is recommended that five information system developments be undertaken in the coming decade. In some cases these are not wholly new activities but, instead, reconceptualizations of programs already forecast. The system development activities recommended are:

A unified information distribution network whose nodes are conveniently located throughout Agency facilities and which contain facilities for storage, transmission, printing and sorting of electrical information. Management of those nodes will emphasize security, compartmentation and accountability for information. Estimated costs are $15M for a ten year program. (recommendation #6.3.1, ref. 4.2.6) (C 3d(3))

A universal terminal network that will provide wide electrical interconnectivity with compartmentation and command privacy enforced through cryptographic separation. Estimated costs are $40M for a ten year program. (recommendation #6.3.2, ref. 4.2.7) (C 3d(3))

A centralized data base of dissemination requirements that allows controlled, shared access to all Agency disseminators. Estimated costs are $500K with expected completion in 1985. (recommendation #6.3.3, ref. 4.2.8) (C 3d(3))

Modernization of the communications plant to expand capacity, quality and interconnectivity required to support increased electrical flow. Estimated costs $20M with completion at Headquarters by 1985; completion world wide by 1990. (recommendation #6.3.4) (C 3d(3))

Contingency Planning Policy should be promulgated to cover the range of eventualities from brown-outs to natural disaster and nuclear conflict. (recommendation #6.6.1, ref. 4.1.6)

A central, easily accessed **repository of data regarding information released** to the public, the media, and outside the Executive Branch. It is recommended that analysis of alternative means for establishing such a system, including use of commercial bibliographic reference services, be commissioned by EXCOM. (recommendation #6.3.5, ref 3.8.e)

Personnel Resources Recommendations

Two recommendations are made to improve the supply of, and utilization of skilled information handling personnel. See also, the recommendation below that Directorates plan for centralized career management for information service personnel.

Information handling familiarization training should be incorporated in directorate career development plans. Such training should include ADP familiarization, Office Automation, and information management depending upon the nature of the service and the level of the employee. (recommendation #6.1.1)

Indoctrination on available information services, should be provided for all employees which will also explain the user's responsibilities, e.g., establishing and maintaining dissemination profiles. (recommendation #6.5.2)

Information Control Recommendations

Three recommendations are made in the area of information security. The first recognizes a threat in the technology, the latter two recognize a promise in the technology.

Control ALL storage media which are transportable, machine writeable, and non-human readable, e.g., magnetic cards, tapes and disks. Such media must be presumed to contain information of the highest sensitivity. (recommendation #6.4.1) (S 3d(5))

Positively account for sensitive information by aggressive use of new technology to implement complete audit trails on all Top Secret and compartmented information within Agency computer data bases. The Office of Security should implement systems and procedures to frequently review audit information for anomalous accesses. (recommendation #6.4.2) (S 3d(5))

Positively authenticate database accesses by encourging on-line query, as opposed to second-hand query via telephone. (recommendation #6.4.3) (S 3d(5))

Organization and Management Recommendations

Seven recommendations are made in the area of organization and management. Two recommendations provide for a Systems Architect, and two recommendations are directed at reorganization of information services components in the DDA. A revision of the ADP review is recommended as is mission budgeting for dedicated services, and directorate wide career management for information services personnel. Specifically:

Create an Information Services Architect to maintain and publish an Agency strategic plan for the development of information services. (recommendation #6.1.1, ref. 4.1.2)

Assign to the Office of the DDA the Information Services Architectural Function. (recommendation #6.1.2, ref. 5.)

Charge the Deputy Director of Administration with responsibility for accomplishing within six months:

Establishment of a joint planning mechanism to produce a unified plan for information services of OC, ODP, and OL/P&PD.

Creation of a plan and time table for **restructuring DDA information service components** in accordance with the needs of this strategic plan and with due consideration of the issues raised by this report. (recommendation #6.1.3, ref. 4.2.2, 4.2.3, 4.2.4, 4.2.6, 4.2.7, 4.4.2)

Expand the current EXCOM ADP review to incorporate all information services and charge the Architect for Information Services with management of the preparation and presentation of that review. (recommendation #6.2.1, ref. 4.1.4)

Budget by mission component those capital investments required to provide information services dedicated to them. (recommendation #6.2.2, ref. 4.1.3)

Planning for centralized career management of information services personnel should be developed and implemented by the Directorates. Early attention should be given to centralized management of ADP and registry personnel. (recommendation #6.2.3, ref. 4.1.5)

The Elements of an Information Handling Strategy

In summary, the elements of the information handling strategy proposed are:

1. Constant Buying Power

   Excepting the necessary recapitalization of NDS and Mercury and the planned SAFE & CRAFT programs, a constant spending profile coupled with cost performance improvements in technology will allow us to meet the information challenges of the decade.

2. Career Management

   An aggressive career management program applied to an Agency-wide career service broadly defined as including all subspecialities of information handling will be needed to meet needs for skilled personne.

3. Training

A forward-looking campaign of reeducation will be required to allow individuals to reappraise their jobs in more general information handling terms so that the cultural shock of technological improvement is minimized.

4. Information Security

The changing technologies of information handling allow a departure from document accountability to personal accountability for all items of information accessed. The new technology also permits dynamic application of need-to-know. Broader applicability of encryption techniques demands consolidation of now disparate organizations. The changing technologies are accompanied by new vulnerabilities requiring a change in the skills of the security officers and augur for dedicated information security specialists.

5. Architectural Planning

The historical accumulation of current systems and the otherwise undisciplined proliferation of new sytems threatens expensive incompatibilities absent a firm, forward-looking responsive architecture. In information handling, more so than in most areas, the whole exceeds the sum of the parts.

6. The Information Access/Distribution Network

With some effort, the ideal of a coherent, integrated, media-independent, data-independent network can be achieved within the decade. This will be largely a matter of vision and planning rather than otherwise additional capital spending.

7. The Space-Dollar-Person Equation

Continued modest diminution of personnel can be accomplished this decade as in the last as a result of information handling technology. Required, however, will be some exchange of more numerous, less-skilled information handlers for more highly skilled specialists. After the SAFE space allocation, dedicated space for information handling should remain relatively constant, as computers, like cars, continue downsizing.

8. The Use of Technology

More and more we will realize that our information handling needs are less and less unique. Patience and perspicacity will allow us to make far greater use of commercial products.

9. **Standards**

As with any maturing field the need for standards will increase, and the nature of the standards will become more apparent to us. We must avoid a rush to Agency-unique standards which will entail significant downstream expense. Standards for user interfaces (which mirror his intuition) will be most cost effective.

The NAPA Report

Concurrent with the formation of this Task Force, the Executive Committee was engaged in a series of decisions with respect to personnel management in CIA. These decisions were a result of a study, "The CIA Personnel Management System", completed by representatives of the National Academy of Public Administration during the Spring of 1979.

While dealing with Agency personnel management in the broadest terms, there were ultimately some more narrowly focused recommendations. One such recommendation was:

> "Establish some Agency-wide occupational systems across career services or subgroup lines where several components employ significant numbers in the same occupational family. For example...data processing personnel..."

The Executive Committee deferred a decision on an Agency Career service for ADP professionals pending results of the Information Handling Study.

Task Force recommendations with regard to career management were developed without reference to the NAPA report. Task Force recommendations have resulted from a focus on the projected critical shortages of information specialists and the belief that a personnel management system, in addition to the vacancy notice system, is required to equitably deal with needs of the service vs. desires of the individual.

The Security Task Team Report

Immediately following the events of the Kampiles case, the Office of Security constituted a Task Force to conduct an in depth review of security systems. The final report, "A Security Review of the Central Intelligence Agency", contains many recommendations for change in policies and procedures for information handling. While a number of changes and new initiatives resulted from Senior management review of the recommendations, an uncomfortably large set of actions were not approved because of cost and perceived impact on operations. (C 3d(5))

This Task Force was asked to address those remaining actions in developing a strategic plan. The Task Force approached this charge by giving heavy emphasis to elements of strategy that promise to capitalize on technological innovation in overcoming concerns for cost and efficiency and that provide more positive control and accounting than current systems.

ALL PORTIONS THIS CHAPTER UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

2. SYNOPSIS OF INFORMATION HANDLING

For purposes of this study, information handling services were categorized as:

- Recording of Information
- Acquisition of Information
- Dissemination of Information
- Distribution of Information
- Information Reference Services
- Reproduction of Information
- Security, Control & Accountability
- Computing Support Facilities
- Information Systems Development & Maintenance
- Miscellaneous Services

2.1. Recording of Information

This category includes all facilities or services which enable the generation or capture of information in a media that will support subsequent storage and exploitation of that information. It encompasses the mechanisms by which Agency components can put information into a retention media.

These retention media can generally be thought of as falling into three classes: hard-copy documents, electronic or magnetic based storage, and methods for retaining information in more graphic forms such as film or maps.

The traditional methods for creating documents has been the use of standard typewriters to create correspondence-quality documents and the use of high-quality printing presses, such as those provided by P&PD, to produce finished intelligence or documents where significantly large quantities of copies were required.

While these facilities still account for a substantial amount of the documents produced by Agency components, automated facilities are increasingly being used to support document creation:

o Standard typewriters are being supplemented by devices which provide automated support to the creation, editing, and printing of documents. These facilities are generally referred to as word-processing (WP) devices.

- o Terminals connected to the central computer facilities provide a WP service which enables a user to prepare printed documents.

- o A growing population of distributed, high-quality printers which are attached to communications and data processing systems, are being used to create quality documents using information which is normally stored, processed, or transmitted by these systems.

- o Planned facilities under development such as the SAFE system will offer additional document creation functions to NFAC analysts.

Recording information in the various forms of electronic media is also being heavily influenced by technological developments. Early facilities for entering information for electronic storage and processing were largely limited to centrally supported keypunch (key-to-card) facilities and optical character readers (OCR) which can recognize and convert to electronic storage information represented in certain type fonts.

While central keying facilities are still provided by ODP & IMS, and OC utilizes OCR devices to capture cable traffic, user-operated word processing devices and computer terminals are increasingly being used to enter information into electronic storage. Once in this media, the information is being manipulated by an expanding array of software and hardware facilities to edit, store, retrieve, rearrange, distribute and display/print the data.

A prime example of recording information in a graphic media is the extensive use of microfilm and microfiche facilities found throughout the Agency but especially in P&PD, OCR, and IMS. This use of micrographics to record information will shortly reach a new technological sophistication with the implementation of the ADSTAR and DORIC-W systems in OCR and IMS.

The creation of graphic and cartographic information is supported by the central plotting facilities of OGCR and increasingly by the remote terminals and plotters associated with the ODP central computers. This range of facilities enables a user to create graphic representations of limited complexity on local CRT screens and plotters or request sophisticated, publication-quality maps or graphs from OGCR.

Finally, a number of components provide facilities to prepare graphics which are used primarily as briefing aids. The mini-computer based GENIGRAPHICS system recently acquired by OGCR provides a facility which assists a graphics artist in the creation of color viewgraphs and 35 mm slides.

2.2. Acquisition of Information

Acquisition refers to the receipt of information which has been collected or generated by non-CIA resources and acquired for Agency use. This category of service identifies the Agency windows or portals through which externally produced information is made available for Agency exploitation.

Existing systems and procedures provide a variety of classified and unclassified data to Agency analysts that is remarkable for the depth and breadth of coverage. Although several components are involved, there is surprisingly little duplication. Agency employees are apparently satisfied with the level of support as evidenced by the singular lack of complaints concerning acquisition service in office responses to the Comptroller's information handling memorandum of November 1978 and in their subsequent responses to the IHTF survey.

The primary offices which acquire data for Agency use and their responsibilities are described immediately below.

- The Office of Central Reference is responsible for the procurement of foreign publications, the provision of books, periodicals and newspapers to Agency components, the receipt and dissemination of intelligence information reports and publications, the maintenance of specialized collections of intelligence data, and response to requests for motion picture film and video tape, An acquisition function is either implied or stated in each of those responsibilities.

- The Office of Communications is responsible for dissemination and delivery of CIA and non-CIA cables within Headquarters. This responsibility carries an implied acquisition function.

- The Foreign Broadcast Information Service is responsible for acquiring and disseminating selected foreign broadcast information.

- The Office of Current Operations is the Agency terminal point for the major commercial press wire services.

These four components provide the bulk of textual reporting to the Agency. The division of responsibility is fairly clear. The availability of increased amounts of information directly to consumers via electronic networks promises to blur some of these responsibilities. If duplication is to be avoided coordination of requirements is essential. (S 3d(3))

2.3. Dissemination of Information

Dissemination is the process of determining the component or individual that should be made aware of recorded or acquired information. Dissemination may consist of automated procedures which match the information content to a user interest profile or reading list and/or manual procedures in which a dissemination analyst reads the information to match content with user interest.

This "intellectual" dissemination process is contrasted with the distribution function discussed in the next section, the process by which information is delivered to users. We have found in our study that many users fail to make this distinction, complaining about dissemination delays, when, in fact, some of the delays are attributable to delays in the physical movement (distribution) of documents from place to place. The reader should keep this distinction in mind when reading about the dissemination/distribution process.

Two components are responsible for the bulk of document dissemination in the Agency. They are the Office of Communications (Cable Dissemination System) and the Office of Central Reference (hard-copy intelligence documents and open-source publications). On a more limited scale, OD&E, FBIS, OCO and RSG Watch Offices, DO/IMS, various registries, and the originators of documents are all involved in dissemination functions, as are those components who acquire information in liaison. In some cases, members of this latter group make the initial dissemination; in other cases, they do a second-level and sometimes a third-level dissemination when the initial dissemination needs to be expanded to assure delivery to a more specifically identified consumer. (S 3d(3))

Although reasonably well satisfied with dissemination support, users identify three types of dissemination problems. They are: delays in user receipt of electrically received intelligence products, a need for dissemination tailored to users (branch, individual) requirements, and a concern that the various Agency components involved in the dissemination process do not use the same set of reading requirements with the perceived result that information is missed. The greatest user dissatisfaction resides in NFAC components.

For many years, dissemination was a manual process performed by people. In the last few years dissemination has moved in the direction of automated processing. OCR's Machine Assisted Dissemination (MAD) led the way but was largely replaced in 1978 by OC's Cable Dissemination System. OCR's Interim SAFE which offers NFAC production analysts their own mail files will be followed in the near future by the final SAFE system which will greatly expand mail file support. With more and more data being created in electrical form, in part a result of the word processing expansion, we anticipate growing requirements for automated dissemination systems linked together by communications networks. (S A9c(4.1))

There is little technical difference between (machine-assisted) dissemination and (machine-assisted) retrieval. The user may see a duality: in one case fixed requirements played against a changing stream of incoming information; in the other, new requirements played each time against a fixed store of information. Underscoring the identity of dissemination and retrieval, a user frequently wishes to search the (recent) past receipts of electrical information and then be advised of new incoming information on the topic.

2.4. Distribution

Distribution refers to the physical movement of information (in whatever media) and to related registry, mail, courier, electrical and pneumatic tube services provided by various information support units.

Distribution functions are the natural follow-on to dissemination activities. Dissemination decides who gets what. Distribution gets it there. Responsibility for distribution is quite diffused. Distribution functions are assumed by many individual components in order to move information to where it is needed.

The Office of Communications is a major distributor of electronic based information within the Agency through its Field Stations, automated message switching facilities (MAX and DATEX), the Cable Dissemination System, and an extensive network of communication lines throughout the building. The Office of Data Processing also distributes a high volume of electronic information through its growing network of Remote Job Entry (RJE) facilities, Message Routing Service (MRS), network of mainframe computers, and extensive remote terminal and printing facilities. Because facilities of both offices are becoming increasingly linked, the division of responsibility for distribution of electronic information is blurring. (S A9c(4.1))

Unlike electronic distribution where jurisdiction and activities involve only a few components, the distribution of hard-copy, primarily paper documents, involves practically every major and minor component in the Agency. Organizational units either sponsor registries, mail rooms or some combination thereof or have fixed mailing addresses (see Agency telephone directory) at which a secretary or clerk performs similar functions. The function is labor intensive.

If distribution responsibility within Headquarters for electronic information is blurred by increased linkage between communications and computing facilities, responsibility for hard-copy distribution is even more difficult to pinpoint, because of the number of components involved. Technology promises to reduce this problem by creating and moving more information electrically. These parallel trends are readily apparent in the expansion of data creation in electronic form through word processing facilities and the planned acquisition of automated printing and reproduction systems (e.g. APARS) for distribution purposes. (S A9c(4.1))

2.5 Information Reference Services

Information reference services are those services that store documents and/or information for subsequent retrieval. Responses to the Task Force request for information directed to users and providers of information services identified literally dozens of such systems. The variety defies easy categorization. An earlier inventory by the Comptroller led to similar findings.

Major systems include the DO's Record and Information Control System (DORIC), OCR's subject/bibliographic index to intelligence documents (AEGIS/RECON), OCR's manual biographic files, NPIC's Integrated Information System (IIS), and the COMIREX CAMS files. There are others. (S A9c(4.1))

Examples of smaller, more unique systems are OGCR's World Data Banks, the IG Audit Staff's Automated Information Management System (AIMS), OTS' [redacted] system, OL's Agency Copier Management System (ACMS), and OWI's MIX to mention a few. (S A9c(4.1)) 25X1

In addition to operational systems and files there are a number of development projects under way or soon to start. OCR's Project SAFE is scheduled to go operational in late 1982 and will offer NFAC analysts access to major information files, the capability of building their own private files, and a current dissemination/distribution service for material that is in electrical form. A similar system is tentatively planned for DO activities.

CRAFT for Clandestine Records Automated Field Terminal is a system designed to provide automated storage and retrieval facilities to overseas installations. The system is planned to support rapid destruction and/or transfer of records in emergency situations and later reconstitution of files when the emergency is over. (S A9c(4.1))

With few exceptions, Agency systems are designed and built independently for specific users. Each system is undoubtedly useful but most serve only the original requestor or a limited clientele.

Unique design is to be expected in mission oriented organizations. Mission managers have a job to do, and quite understandably, they worry about and plan for their own activities, not those of other managers. Because this is so, information systems suffer from parochial design. Planners are either unaware of, don't care about, or don't have the time or resources to worry about related requirements. Is this bad? Not necessarily. If the system requirements are unique, that is if no other organization has similar or overlapping requirements, then local design is probably optimal. Many would argue, however, that information requirements are not unique to one component and that separate design leads either to overlap and duplication, or non-use of available systems because potential users are unaware of their existence. The problem is to manage system development to encourage the initiative and imagination associated with independent design efforts while simultaneously promoting adherence to standard languages, common protocols, etc.

2.6 Reproduction of Information

This category includes all facilities which enable the production of one or more copies of an information item in the same media as the original.

The most widespread media reproduction activity in the Agency today involves the use of the ubiquitous 'Xerox' type copier machines. While reproduction facilities are available to create copies of information retained in electronic and graphic media as well, the use of document or paper reproduction devices is an integral and indispensible part of the daily operations of every component in the Agency.

Copier devices in the Agency at the beginning of this year numbered 267, an increase of three percent over the previous year. Average monthly copy volumes in 1979 ran 11.6 million, also showing a three percent increase over 1978. (S 3d(5))

One technological activity that is expected to dampen this need for large volumes of paper reproduction is the growing use of electronic based word processing and office automation systems. As more information is created and retained using these facilities, the amount of document based information that would require the facsimile copying (as opposed to producing a new copy from the digital representation) should stabilize and eventually diminish.

2.7 Security Control and Accountability

Subsequent to its formation the Information Handling Task Force asked the Office of Security to describe its goals for information security. Four goals were identified:

- o to prevent compromise of information while permitting timely access for those with an approved need-to-know;
- o to detect failures in the control system;
- o to assess damage in the event of penetration, defection, or accidental compromise;
- o and, to take remedial action to correct control system deficiencies.

The question is whether the Agency information security program is meeting these goals.

In 1978 the Agency Security Task Force examined the personnel, physical, and information security programs of this Agency. The task force report published in November of that year described the personnel and physical security programs as essentially sound and the information control program as ineffectual. The Information Handling Task Force is, for obvious reasons, concerned primarily with the latter program. (S 3d(5))

Information control refers to those facilities or procedures designed to enforce the need-to-know principle and to prevent unauthorized access to, or unauthorized release of classified information. Information control implies accountability. Information accountability refers to facilities or procedures to determine the location of information and to identify the components or individuals who have been exposed to that information. Enforcement of accountability has a direct impact on the control of information.

Control functions include the encryption of information, the requirement for passwords to access computer-held information, the use of classification and dissemination control caveats on documents, the establishment of security compartments for sensitive types of information, etc. Accountability functions include all the record-keeping activities which permit the location of information or the identification of people who have seen or who have had access to the information, i.e., registry activities, logs, document and courier receipts, document manifests, etc.

Is information properly controlled and accounted for in the Agency today or does the 1978 Task Force conclusion still apply? The IHTF found a variety of systems working to protect information. Electrical message traffic entering and leaving the Agency is encrypted. Most, if not all, computer data bases are protected by controlled environments, where access is permitted only to those with the appropriate clearances, or by the use of passwords to access on-line systems. OC enforces emanations (TEMPEST) standards while OS Information Systems Security Group controls the placement of electronic devices to limit emanation problems. IMS, OC and OCR exercise control over dissemination by requiring official approval of a disseminee's need-to-know. A variety of registries throughout the Agency are involved in information control insofar as they determine who will see controlled documents.

Other steps have been taken in recent months to improve control over information. Authority to remove classified material from Agency buildings has been limited to approved couriers and to those individuals authorized on a case-by-case basis by Agency Document Control Officers. Briefcase and package checks help enforce this rule. New systems being implemented and planned provide for improved control of information. These include the Blacker cryptographic system which will provide end-to-end encryption over communications networks, ADSTAR which will authenticate requester clearances against a copy of the OS Special Clearance File [redacted] 25X1 and Project SAFE which will record the location of documents in SAFE or ADSTAR and the identification of dissemination addresses to which documents are directed. (S A9c(4.1))

Another recent undertaking is the establishment of the APEX Steering Group and appointment of a Special Assistant to the DCI for Compartmentation charged with establishing a single integrated control system for all compartmented classified information.

Accountability is the ability to determine where information is located and/or who has seen it. Most Agency components keep records which help that component trace lost documents and/or documents for which there is some reason to conduct a search. The reasons for maintaining such records vary from component to component as do the kind of records kept and the length of time for which they are kept.

OC maintains message journals for whatever length of time is needed to assure that messages are completely processed through the system. OC's Cable Dissemination System maintains a two-year file of messages on microfilm on which is recorded the message's (primary) dissemination. ODP's Automated Message Processing System (AMPS) maintains copies of messages transmitted from CDS in order to retransmit messages when so requested by the message recipients. OCR maintains a three-year record of document request forms and a five-year record of TK document request forms. The Office of Security maintains an automated TOP SECRET Control and Dissemination System (TSCADS) to account for Top Secret collateral documents. The DO/IMS maintains permanent records of all name traces, file and document chargeouts. (S A9c(4.1))

When operational, the SAFE system will provide a document accountability record for all records in the SAFE system and will record the dissemination and routing addresses to which the documents were directed by the system. ODP plans to install a badge reading machine and an optical wand reader at the Ruffing Center control point to verify and record the release of highly classified computer-printed information.

These are only a few of the operational or planned systems which will either control information or account for its disposition. (Additional information is available on this topic in Attachment B.) Most of these systems were designed to support operational requirements. It is largely accidental that security audit trails can be constructed from the data stored for other purposes.

The control of and the ability to account for information remains much the same as described by the 1978 Security Task Force. The XEROX machine largely cancels out any control or accountability advantage achieved by the existing systems. The availability of more and more information in electronic form resulting from the increased use of word processing equipment does however offer some promise of improving future control and accountability through the use of automated systems.

2.8. Computing Support Facilities

This category of information handling service includes all computers and the peripheral devices attached to those computers which support the storage and processing of information. This support includes the operation and maintenance of these facilities and the provision of any systems (non-application) software needed to insure efficient utilization of the hardware devices.

The primary sources of Agency computing services today are found in the large general purpose, centrally supported facilities provided by ODP and the large special purpose computers which provide dedicated support to NPIC, the DO, and COMIREX applications. (S 3d(3))

Of secondary but increasing importance, is the growing list of user-controlled mini- and microcomputers being utilized to satisfy data processing requirements that, for one reason or another, are not being satisfied by the large general-purpose devices.

The backbone of ADP support is provided by the ODP computer center located in the Ruffing Center in Headquarters. This complex of machines, storage devices, and remote terminal/printers provides service to about fifty Agency and Community components and satisfies a wide variety of data and word processing requirements. In addition to providing batch and interactive time-sharing facilities to the general user, this complex satisfies large data base management needs and provides the processing support for the OCR AEGIS/RECON and Interim SAFE services.

The ODP managed Special Center houses large dedicated computers which support the COMIREX management system (CAMS) and provide computing facilities for a range of compartmented DO data processing activities collectively known as ALLSTAR. (S A9c(4.1))

NPIC operates its own large computer center [redacted] 25X1
which is used to support photographic interpretation and provide data reference services for information derived from that interpretation. (S A9c(2.8))

Because of unique security, processing, or availability requirements, many components have found it beneficial to utilize smaller, locally controlled, minicomputers to satisfy some of their data processing requirements. In the absence of Agency standards for minicomputer hardware and software, a large variety of systems has evolved to satisfy a variety of applications.

The inescapable trend that one observes in viewing the computing facilities of the Agency is that of constant growth. Growth in the capacity and flexibility of the central support computers, storage capacity and availability of remote terminals; growth in the use of large special purpose systems; and especially growth in the use of component-based computers dedicated to unique user requirements.

Significant events on the horizon that will have an unmistakable impact on the character and availability of computing resources in the Agency are:

- The establishment of the SAFE computing center and the availability of the Headquarters wide-band communications BUS system to support SAFE and other data communications requirements.
- The utilization of the new standard soft-copy terminal and the added local processing facilities it will provide the user.
- The establishment of a minicomputer standard (such as the IBM 4300) to reduce or eliminate the profusion of incompatible computing devices and languages.
- The introduction of computing facilities in an overseas environment as envisioned by the CRAFT concept. (S A9c(4.1))

2.9 Information Systems Development and Maintenance

This category includes the analysis, design, implementation, and subsequent maintenance of systems used to support specific user requirements in information handling. This activity is primarily related to the development and maintenance of hardware and software but can involve non-automated systems as well.

Systems development facilities in the Agency have evolved to the point where both centralized and distributed resources are utilized. This has essentially mirrored the evolution of the facilities for computing services.

Centralized facilities are made available by ODP and OC to respond to virtually any Agency component which indicates a need for systems analysis or implementation. ODP and OC will perform the required feasibility studies or project proposals to determine if and how a user information handling problem should be addressed. In addition to systems development and documentation, ODP and OC assume responsibility for maintaining systems as long as they continue to satisfy user requirements.

Software development and maintenance services are performed by several non-ODP components in direct support of their parent organizations. The largest of these groups are found in NPIC and the DO. The NPIC group is dedicated to supporting the NPIC Data System and related systems [redacted] and DO/IMS/Systems Group performs software support functions for the DO systems running in the Special Center as well as several minicomputer applications. (S A9c(2.8)) 25X1

In addition to these two groups, there are a large number of components which provide their own systems capabilities. These component resources are relatively limited, rarely exceeding a half dozen people. Offices such as OCR, OSO, OER, and OL are among the organizations which include systems support personnel on their staffs.

While there is a fairly widespread distribution of Agency resources involved in systems development work, the efforts are not as disjointed as one might assume. Two significant activities are contributing to a closer degree of cooperation and uniformity among the various groups; the use of ODP professionals on rotational assignment, and the development of Agency-wide ADP software standards.

Because of ODP personnel ceilings, a number of components have found it advantageous to provide permanent positions or slots in their organization which are filled on a rotational basis by ADP professionals from ODP. Under this arrangement, the ODP personnel become functioning members of the component staff, working in the user area in direct response to user established priorities while adhering to ODP procedures and standards. Similar arrangements exist between OC and some of its customers, notably major program offices within DDS&T.

A recently established ADP standards committee has been constituted to develop Agency-wide standards relative to defining systems requirements and the preparation of documentation associated with the design, implementation, testing and maintenance of computing systems. All major Agency components having software development capabilities are participating in this effort.

2.10. Miscellaneous Services

This category includes two services which warrant some discussion but which do not logically reside in the nine categories described above. They are:

- o Formal training to support the various disciplines that constitute the IH services

- o Data Base Management and Support

Training

Training, like most of the other elements of Information Handling, is highly distributed throughout the organization. While OTR provides several general purpose records management oriented and information systems survey courses, the majority of the technical related offerings are provided by the specific components that require the unique skills. Even within a technical speciality such as ADP, a variety of components feel the need to conduct their own formal training. This results primarily because resource limitations of the central training facilities of OTR and ODP preclude the support of many component-unique training requirements.

OTR does review component training programs and thus there is no discernible duplication of effort among the available courses.

External vendors, tutorial conferences and educational organizations continue to provide supplemental training where Agency expertise is unavailable.

The Computer Aided Instruction (CAI) facility envisioned for the SAFE system indicates a trend that will be more evident on the development of large ADP systems. Under this facility, the user of the system will receive the majority of his usage training from the system itself. In addition to the more traditional 'help' facilities which provide the user with explanatory comments on the use and format of common commands and procedures, the CAI can conduct a formal interactive training lesson with the novice or experienced user. Using this technique, the user can request individual instruction on selected functions of the system, proceed at his own pace and experiment with the various system facilities.

Data Base Support

Associated with the establishment of large complex data bases has developed the concomitant need to ensure that the data is accurate, current and available for user exploitation. Normally, the user or the owner of the data cannot devote the resources or the expertise to provide these services. Consequently, a number of organizations which have developed ADP systems for users, also provide the related service of maintaining the data for production activities. NPIC, ODP, IMS and OCR are the primary examples of components providing this service.

In addition to data maintenance, these components also provide periodic or ad hoc data base reports to the user based on the users' specific requirements.

Users are, however, taking an increasing role in managing their own data bases. OF's establishment of its Data Base Management Branch to monitor the state of the FRS and GAS systems is a prime illustration. (S A9c(4.1))

ALL PORTIONS THIS CHAPTER UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

3. SAMPLING OF PERCEIVED ISSUES

This section lists information handling and management issues identified by Agency component managers. Frequently, several component managers identified the same issues. The task team therefore elected to present a representative sample rather than list every issue identified by every manager. Words enclosed by parenthesis were added to improve readability.

3.1. Management of IH Systems

Planning:

a. Development and maintenance of a strategic policy for Agency IH support.

> "The lack of a comprehensive Agency Information Handling Strategic Plan renders ineffective attempts to develop coordinated, complementary information handling programs." (OC)

> "...the need for coordination of ADP, communications, and other information handling mechanics should be viewed as only a part of the broader need to develop policy and organizational procedures to rationalize and control information flow." (DO)

b. Establishment and prioritization of long-range goals or objectives to support these policies.

> "Agency management issues (include the) development of a managerial structure to manage, develop, control, coordinate, and optimize information-handling activities without destroying individual office requirements and creativity...." (OMS)

> "(A management issue to be addressed is) Who should be responsible for formulating objectives, policies, plans and programs relating to the establishment of an Agency-wide information handling system?" (O/DCI)

c. Assignment of organizational responsibilities, action plans and schedules to accomplish these objectives.

> "Charter conflicts between Agency components are presently developing and promise to worsen in the future. Technological advances have eliminated many of the traditional functional boundaries associated with information handling. Computer security and communications security efforts are also becoming inseparable. Consequently, many OC/ODP and OC-CSD/OS-ISSG areas of interest and responsibility are in dispute or have the potential of developing into conflict situations." (OC)

"The acquisition of adequate ADP resources to meet the growing demand for data or access to existing computer assets under the control of other organizations...." (OD&E)

d. The allocation of the necessary resources commensurate with assigned responsibilities and schedules.

"There are areas of severe imbalance between work load and resources. Customers, occasionally, are forced to accept lengthy delays in service. This imbalance sets the stage for information handling users to initiate their own programs to acquire and implement equipment or systems to satisfy their requirements. This situation has serious managerial and security implications." (OC)

"Examine the issue of centralization/decentralization of directorate and office control of resources." (NPIC)

Goals:

e. Agency support to community requirements.

"(A significant information handling problem is) the use of Agency resources to develop and support community-wide ADP systems." (ODP)

"(One of the principal needs is) A small skilled community-oriented organization to install, maintain, and manage information handling systems and activities for all IC components directly involved with RD&E. Since there is a diversity of requirements and continual unanticipated demands within the RD&E components, there must be some flexibility built into any information handling system. To best achieve this flexibility and to retain a semblance of system or order, calls for a focal point specialist to oversee the effort." (OD&E)

f. Overseas support to field station activities.

"The extension of ADP to the field will significantly impact foreign telecommunications requirements in the future." (OC) (C 3d(3))

g. Philosophy of centralized versus distributed IH resource allocations.

"(An) Agency management issue (is the) expansion of activities to utilize standard hardware and software so as to derive the benefits of economy of scale and reduce maintenance and training requirements...." (OMS)

"(An Agency management issue which needs attention is) the degree of centralization or decentralization of effort to bring order to the Agency and community information handling problems." (OD&E)

h. Physical space for IH support devices/personnel.

"(ODP is concerned about) the allocation of adequate physical space to house ADP and Communications hardware." (ODP)

"We do not have a coherent policy on space allocation, which should take information handling factors into account in the positioning and modification of offices." (DO)

i. Jurisdictional responsibilities between ADP and communications support components.

"Technological advances, primarily in electronic components, have fostered integral system design. It is no longer possible to identify the boundary between data processing and telecommunications." (OC)

"The most serious problem identified by ODP has to do with the gradual and inexorable blurring of the distinctions which once separated ADP functions from communications functions...." (ODP)

j. Extent of required information control and accountability.

"(A) Policy regarding data integrity and accountability should also be developed." (OC)

k. Extent of recovery from catastrophic failure of IH facilities.

"We lack a sound Agency position on requirements for the survivability of CIA information systems, on vital records, and on the ability of computer and micrographic data bases to serve as records." (DO)

"Decentralization of major IH systems (telecommunications and ADP) will be necessary to improve the survivability of local IH resources." (OC)

Control and Coordination

l. Insuring that established policies, goals, and plans are coordinated, monitored, and evaluated.

"Reorganize organizational structures to minimize coordination requirements encountered when developing and maintaining information handling systems." (OF)

"Is there adequate project oversight and reporting at the directorate level (to avoid ADP projects which go on forever but never get completed)?" (OP)

m. The establishment and promulgation of IH standards to enable compatible and efficient implementation of plans.

"Acquisition of new information handling equipment and systems should be tightly controlled to ensure compliance with Agency operational, technical, and security guidelines and standards. All new equipment procurement should also be reviewed to ensure compliance with an Information Handling Strategic Plan." (OC)

"Inter-office and inter-directorate coordination and cooperation (is needed) when interfaces between the various agency automatic data processing systems are required. The issue generally arises as to which system will be modified to allow for compatible interfaces. When neither party or parties will modify their system, it means the storing of extra data for identification purposes or extra processing is required in order to make the data passed compatible." (OP)

n. The interface to, and coordination with, other government and community organizations.

"The role of NPIC in providing on-line access to the NPIC data base from various Intelligence Community organizations through COINS II and the usage of COINS II by NPIC to access intelligence information at other IC sites requires Inter-Agency coordination and planning of ADP and communication resources." (NPIC) (C 3d(3))

"The Community...is actively pursuing programs that involve shared data bases, common standards, assigned responsibilities, and services of common concern. Often ignored or glossed over are the resource implications of such proposals. The Office of Central Reference is under increasing pressure to modify processing and file coverage and currency, and to develop and maintain new automated data bases to meet Community rather than Agency requirements." (OCR)

3.2. Recording of Information

a. Proliferation, control, and compatibility of word processing devices:

> "Our use of word-processing equipment to streamline the production of finished intelligence is plagued by incompatabilities between users' equipment and uncertainties about future Agency standards." (OWI)

> "A plan should be established which permits production offices to efficiently carry out their own word processing functions and at the same time be part of an Agency-wide integrated word processing system. In the long run, this approach will be less costly and will prevent the proliferation of varying types of incompatible systems." (OPA)

b. Integration of word processing and current ADP facilities:

> "OER currently utilizes the SCRIPT facilities of ODP to prepare finished intelligence documents and will participate in the NFAC plan to introduce the NBI-3000 as the standard NFAC word-processing device. They wish to avail themselves of the benefits of both systems and consequently have expressed a need for a communications facility between a NBI and the VM systems such that VM data (including SCRIPT files) can be included in NBI-produced documents." (OER)

> "The proper organizational placement of control over word processing, the relationship of that control to organizational control over computerized printing, and the relationship of both of those functions to the traditional functions of communications and ADP, involve organization issues which must be dealt with at the Agency level." (ODP)

c. Need to expand present word-processing capabilities to include general purpose office automation facilities such as document dissemination and routing.

> "(An issue to be resolved is) should DDA analysts have access to SAFE or SAFE-like capabilities." (OL)

> "(A management decision is required on the) plans for a wider use of SAFE and the SAFE-like concept to operating elements of CIA." (OSO)

d. Need for additional document-to-electronic transformation facilities:

> "(Need for) development of a capability to transform hard-copy information into a digital form." (OSO)

> "...there has been mutual cooperation between Community

library organizations for many years in the exchange of books, documents and microfilms. There is, however, no (electronic) communication systems available in the Washington metropolitan area that can handle this large exchange of non-digital intelligence material." (OCR)

3.3. Acquisition of Information

No significant problems identified.

3.4. Dissemination of Information

a. Perceived delays in dissemination processing.

"Delays in dissemination of electrically received intelligence products have become increasingly significant since April 1978. ...The CDS does not include an automated print capability...resulting in user receipt delays. In addition, the CDS is unable to presort the document output thus requiring rereading at centralized points before analyst receipt." (OCR)

"Because of the time lag in the distribution process a parallel operation has been implemented to speed delivery of cables to OPA." (OPA)

b. Component responsibilities for dissemination need clarification.

"The Agency's present system for the dissemination of classified documents is handled by four separate CIA offices (OCR, PPG, Operations Center, and Cable Secretariat). In addition, a few documents are disseminated by the Executive Registry, SALT Support Staff, and others. None of these activities use the same set of requirements to provide their service resulting in disparate dissemination and no single record on how documents were disseminated. This decentralized approach to dissemination warrants review to determine if one centralized activity might improve Agency dissemination." (OCR)

"An information handling strategy should also address the flow, dissemination, storage, and retrieval of cable traffic. ORPA (OPA) analysts rely heavily on cable traffic coming into the Agency as a primary information source for political analysis. The Cable Dissemination System developed by the Office of Communications is a beginning. The SAFE project will further help. Any information handling strategy should ensure that cable traffic is available to analysts in a timely fashion and that the information remain available for a reasonable period of time, perhaps three or four weeks, in a computerized form for further querying." (OPA)

c. Need for additional dissemination support.

"There is a need for improvement in methods for selective and timely dissemination of substantive intelligence which is tailored to the individual user requirements instead of the present broadcast method of reporting this information." (NPIC)

"We are working with the Cable Secretariat to develop profiles to address all cable traffic to the branch level. If we can accomplish this, we plan to install a dedicated printer in the OER registry to handle all of our incoming cable traffic on a real-time basis." (OER)

3.5. Distribution of Information

a. Limited capacity of current electronic distribution facilities.

> "The probability of greater volume of digital forms of information to be handled within, to, and from [redacted] will place additional requirements on the communications capabilities at NPIC." (NPIC) (S 9c(2.2))

25X1

> "Here at Headquarters the DO needs an encrypted wide-band bus communications grid which will facilitate flexible growth in the number of convenient computer terminals to handle data, image, secure voice, facsimile, and word processing traffic. It is an ironic fact that we can today send a message back and forth several times between Headquarters and a field station in the same time that it takes to hand-deliver a message within the Headquarters building itself. An expensive communications network such as that we seek is difficult to justify for any one directorate. It must be justified as in everyone's interest." (DO) (S A9c(2.1))

b. Reliability of current electronic distribution facilities.

> "(There are) problems in maintaining reliable communications circuits for outlying buildings." (OP)

c. Current limitation on the types of information that can be distributed electronically.

> "There needs to be a closer integration of manual and computer- based systems, with perhaps greater reliance placed on use of 'electric mail'." (OL)

> "(An Agency-wide management issue which needs attention is the) planning for the transition from predominantly published report dissemination to electronic dissemination, and filing and retrieval systems." (FBIS)

d. Need for communications standards to facilitate the distribution of information.

> "We should reduce the diversity or variety of data communications protocols and character representations throughout the Agency and Intelligence Community as well." (NPIC)

3.6. Information Reference Services

a. Space to store increasing amounts of information.

"Technological advances have given us the capability to collect enormous amounts of information. There is such a proliferation of information and 'hard-copy' printout that managers are being inundated with mounds of information." (OL)

"Another management issue in information handling that in our view should be of significant Agency concern is the growth in the amount of information we are collecting and perhaps unable to use. This issue applies to the growth of our records both in hard-copy and computerized form. While we have acknowledged this growth problem in the hard-copy world, the compression capabilities of computers and microfiche have tended to make the problem less visible in these areas." (OS)

b. Standards for indexing and storing information to facilitate retrieval.

"We see the lack of standardization of information handling procedures now used in manual or semi-automated systems as a significant Agency-wide problem. Standardization is required for information security as well as for efficient application of technology to the administrative office environment." (DDA/ISS)

"There is a need for further standardization of terminology used in reporting intelligence events and objects." (NPIC)

c. More flexible and user-oriented retrieval facilities.

"Generalized Information Management System (GIMS) does not have a language which is easy for managers to use. Rapid Access Management Information System (RAMIS) has file size and multiple user constraints. OL would like to see a management-oriented data base capability with good reports and graphics." (OL)

"We maintain one of the world's largest libraries of machine-readable statistics on international trade and finance. In total, the library contains over a half-billion statistics stored on some 4,000 reels of tape. We need to be able to retrieve this information according to criteria that we can program in a general language like APL." (OER) (C 3d(3))

d. Need to establish and maintain directories or catalogs of stored information and the facilities available to retrieve this information.

"Data resource banks are so fragmented...that it is difficult to know where and what type of information is available for individual office use." (OTS)

"Our analysts are not adequately informed about existing automated information handling systems, both within this Agency and in other Intelligence Community agencies. This is partly because these systems are poorly documented or the documentation is not kept up to date." (OWI)

e. Limitations of existing centrally supported files of administrative information.

"Current Agency data base support/utilization, from OC's viewpoint, is characterized by dated information and incorrect, incomplete reports. Such a situation results in inefficiency and justification for a component to acquire its own local system in order to overcome this problem and to realize the advantages of automatic data processing." (OC)

"(A major issue which needs attention is the lack of) automated transfer of administrative information between OMS, OP, OS, etc. to expedite case processing and research studies, while protecting individual medical confidentiality and privacy." (OMS)

f. Analysis required to review increasing amounts of information.

"The vast quantity collected is overwhelming our analysts. They are forced to spend time sifting through irrelevant data, time which would be better spent analyzing relevant data. And in the crush, sometimes important information is overlooked." (OWI)

"Collection systems are presenting larger quantities of more complex data which requires more analysis with concomitant increases in Agency computer resources." (OSI)

3.7. Reproduction of Information

(The proliferation and unrestricted use of reproduction equipment is categorized in paragraph 3.8. below because it is a security issue not a reproduction problem.)

Requirement for better remote printing facilities to satisfy a variety of remote printing needs:

> "Will printer networks be established such that (components) can satisfy a variety of remote printing needs?" (OER)

> "RMS would like ... a multi-purpose printer/ graphic network so that a variety of RMS printing needs could be satisfied...." (ICS/RMS)

3.8. Information Control and Accountability

Access Control:

a. Maintain a proper balance between the requirements for compartmentation/confidentiality and user need-to-know.

> "Determination of the requirement for compartmentation and need-to-know protection in the electronic environment is a prerequisite to major decisions about the direction of future systems." (OC)

> "(A major issue is the) protection of individual privacy and medical confidentiality." (OMS)

b. Need for better security facilities to control information in electronic form.

> "Recent and perceived advances in end-to-end encryption techniques, file encryption, and verifiable software (secure operating systems) will enable processing systems to simultaneously execute multilevel classification and compartmentation jobs. The justification to operate separate processor centers based on sources and methods compartmentation is no longer valid." (OC)

> "...It is the opinion of this Office that the most important information handling issue facing the Agency and the Community today is computer security. In view of the lack of confidence and reliability in computer software and the growth of computers into large systems and networks, the threat of a major security incident is very real. Systems have been proven to be vulnerable and in view of the quantity of information we are now computerizing, the potential penetration loss and compromise could be devastating." (OS) (C 3d(5))

c. Need to record declassification and downgrading actions.

> "It is essential that all decisions having to do with the declassification of Agency material should be reflected in (Agency) records." (D/NFAC)

Accountability:

d. Need for internal registry and document control systems.

> "A growing problem is the handling of document control records. This is now done manually in PPG and other registries. Especially with the spectre of multiplying requirements for recording the handling of sensitive material until now not subject to individual control, this issue may mushroom." (PPG)

"A (need exists for a) standard approach to a document control system tailored to the needs of an organization, program, or project oriented toward research, development and engineering. This is not to imply that an Agency centralized system is the answer to our foreseen problems. Rather, we seek a community RD&E system that may or may not be compatible with other systems in the collection and production components." (OD&E)

e. Need for systems to record the release of information outside the Agency.

"Coordination of CIA release of information to the public remains the weakest element of information handling today. Our unconcerted approach to information disclosure in various forms via the Public Information Office, OGC, OLC, FOIA/PA and declassification channels has the potential for recurring embarrassment." (DO) (C 3d(5))

"Another problem that is symptomatic of our lack of strong central Agency management in this field is the Agency's present, decentralized ad hoc approach to monitoring the release of information to the public. At present, there is no centralized index where one can easily determine what material has been requested; what material has been released; and what material has been denied... It is essential, as a first step, that all decisions having to do with the declassification of Agency material be registered in a single place and that central records be maintained of these decisions." (D/NFAC) (C 3d(5))

f. Control of Reprographics

"Machine copying of documents in CIA is virtually without oversight or restriction, except for self-restraint exercised by individual employees. Under current practices, anybody can copy anything." (OS) (C 3d(5))

3.9. Computing Support Services

a. Optimal division of central and distributed facilities.

"State-of-the-art and Agency policy are both changing. We would like to consider a distributive system in which we would do most of our work from a dedicated mini, but would have access to mainframe support for storage and other tasks which can be done in batches." (DDA/ISS)

"While a large proportion of data processing applications require the power and storage capacity of a large computer system, other applications might be better served through a distributed processing approach. These applications would involve text editing, or relatively simple computations, which could be done locally, without tying up the main computer. There are many types of terminals or small computer systems which offer this stand-alone capability, as well as the capability to communicate with the main computer system, to transmit information or share data, for example." (OSO)

b. Extent of required hardware standardization.

"(There is a) need to achieve Agency standardization in dealing with a burgeoning hardware market which includes a profusion of minicomputers and microcomputers." (ODP)

"Entering the mini- and microcomputer era, which has great potential to assist us, we will need to guard against unwarranted proliferation and duplication of effort. This will require us to standardize to some extent." (DO)

c. Methodology for allocating (prioritizing) central resources to component users.

"With the move towards minicomputer, is ODP taking steps to assure they will be able to support customers in the future?" (OP)

"We in OER occasionally have high-priority demands for time-sharing services. To meet these demands, we would willingly require all OER users except one to stop using the time-sharing system. Under the current time-sharing system, the step of choosing among users would benefit OER very little. The computing resources that we would save would be distributed among all remaining users of the system, so our priority demand would get very little additional attention. In contrast, we could get the priority service we need, should we operate our own system. This same problem of local versus central control occurs in many other areas of information handling, such as batch processing and centralized word processing for producing finished intelligence." (OER)

d. Limitations in the availability, capacity, and responsiveness of the central facilities.

"(An information handling problem is) the availability and the allocation of user terminals (and) the availability of an adequate communications network to support these terminals." (ODP)

"The Office of Security views its most significant problem as being in the area of computer downtime. This factor, in many cases very subtle, has a cumulative effect that can result in major losses in resources and program effectiveness." (OS)

3.10. Systems Implementation and Maintenance

a. Optimal division of central and distributed facilities.

> "Because of their increasing workload, it is becoming more and more difficult for ODP Central Services to provide timely support." (OSR)

> "To what extent should each organization possess organic ADP support resources?" (OWI)

b. Extent of required standards for implementation methodology and documentation.

> "A problem facing this organization is the need for a greater degree of standardization in the Agency's development of ADP software." (ODP)

> "There is the need, however for a central office or group to coordinate and monitor data processing applications throughout the Agency, if only to avoid duplication of effort. They might also make an effort at standardization -- of programming languages, data base management systems, programming techniques, etc. -- among all user offices." (OSO)

c. Need for the development of standard data accessing languages.

> "The number of digital data bases (both commercial, such as the New York Times Information Bank, and Governmental, such as NSA's SOLIS) is rapidly increasing. This proliferation of data bases forces OCR personnel to maintain a working knowledge of a variety of command languages for interrogating the various data bases. Some means must be developed to enable an individual to query multiple data bases in a single standard language which can then be machine translated to fit the appropriate file." (OCR)

> " A major problem is the standardization of user retrieval languages for large systems such as COINS II." (OSR)

d. Need to develop data bases which can serve the widest population of users.

> "There needs to be a greater effort towards the integrated development of information handling systems, with direction and coordination stratified at the directorate level." (OL)

> "OF has expressed concern that the development of large administrative ADP systems within the DDA are commonly too parochial in scope and design. The observation is made that far too often data transactions must be processed (machine and manual) by several different systems because each system is designed to satisfy only the specific processing

requirement of the sponsoring office. OF feels that economies of processing would be achieved if there were a DDA systems architect who would ensure that the design of any new, relatively large, ADP system reflects the applicable requirements of all DDA components." (OF)

e. The expressed need for additional graphic oriented data manipulation facilities.

"Graphic terminals and business graphics have not been adequately explored or exploited. OL would use these aids if they were available and easy to use." (OL)

"The advent of sophisticated intelligent computer terminals, more elaborate graphics capabilities using computer input, and the introduction of a mass storage system to lessen our dependence on magnetic tape for storage of data will contribute to OSR's mission.... A graphics package capable of tabulating and displaying order-of-battle data as well as overlaying disposition of forces data on computer-generated maps is being planned. This will rely on a micro-computer to display output and make it available in color hardcopy form." (OSR) (C 3d(3))

f. Insufficient analysis prior to implementation.

"With respect to the management issues, we feel that successful planning for the acquisition of information handling systems must be preceded by an analysis of the requirements for these systems... The design of information handling systems should encompass the procedures involved in using the systems. It is not sufficient that an information handling system merely automates the current work and paper flow - a fresh look is required which will look at both the procedures and the available technology." (ORD)

"Better organization is needed to ensure proper coordination among CIA offices on information handling decisions that impact on many other components. New information handling systems too often are based on automation of existing procedures rather than a detailed analysis of the problem and its interrelationships to other components. Recent actions in such areas as records management planning, cable dissemination, and security markings on documents are but a few illustrations of this deficiency." (OCR)

g. Resources required to maintain current systems.

"The increasing requirements to maintain existing systems reduces resources available to respond to new requirements. Old, costly, systems must be reviewed and either replaced or terminated." (OL)

3.11. Miscellaneous

Personnel Services:

a. Insuring an adequate availability of IH professionals.

> "I also believe that this study should focus to some degree on the qualifications, or lack thereof, of the people currently involved in the information handling process. My own belief is that many of our current problems are caused by such lack of qualified personnel." (DDA/ISS)

> "(A problem for ODP is) the attraction and retention of qualified ADP professionals given the inducements present in today's marketplace...." (ODP)

b. Insuring that IH professionals receive the necessary training to support current systems and are kept aware of the advances in technology.

> "Training is heavily booked and does not always match our needs, either in the nature of the training or in timeliness." (DDA/ISS)

> "Skill profiles of employees required to design, install, operate, and maintain new information handling systems must reflect modern technological training... Significant increases in training are projected if the Agency is to effectively utilize its investment in newer/more sophisticated IH systems." (OC)

Data Management:

c. Data management services: Optimal level of central versus distributed support.

> "(A major problem in IH is) should the Info Control Officer staff include a data base management function?" (OP)

Research & Development:

d. Prioritization of support efforts in R&D.

> "Often times information handling projects proposed by OCR are overridden by other priorities in ORD. Long-term basic research is a necessity to meet future Agency information handling requirements." (OCR)

> "(An Agency-wide management issue is) who will identify Agency- wide research and development needs and promote intra-component cooperation in research and development on information processing?" (O/DCI)

External Implications and Constraints:

e. Government regulations relative to procurement, records management and other IH standards.

"Legal constraints are highly significant inhibitors to efficient information flow, as we all have come to appreciate. They dictate what information we store, how and where we store it, for how long, how we may develop points of access to it, who may have access to it, to whom we may send it, and so on. In the DO, for example, we cannot permit use of minicomputers solely on the basis of their security or cost effectiveness because protection against improprieties, such as unwarranted storage of information on U.S. citizens, must also be assured." (DO)

"Despite the increasing availability and utility of minicomputers as a viable alternative to large scale centralized computers, restrictive procurement directives and budgetary decisions have imposed limitations on ODP which cripple its efforts to manage the development of this alternative in a logical and systematic manner." (ODP)

f. Oversight and review by elements of the Community, OMB, and Congress.

"Obviously, we are going to be measured against any (information handling) standard adopted by OMB and therefore the initial question is 'What need we do to maintain management control of those areas of real concern to OMB'." (DDS&T)

"An issue which will have an impact on ODP's ability to continue or expand services (is) increased external oversight." (ODP)

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4. DISCUSSION

In this section, a series of analyses of discrete issues leads, in some cases, to one or several tentative recommendations. Each analysis intertwines technical and policy analysis. In many cases, forecasts of technical trends underlie the analysis. These forecasts are independently derived in attachment C.

For the most part, the analyses have been grouped, after the fact, according to the nature of the tentatively proposed solution: managerial, structural, policy standards, and security/compartmentation.

The analyses derive from the expressed issues of chapter three, and the set of goals and objectives summarized in chapter 1. The goals and objectives allow an integrated evaluation of management alternatives, in chapter 5 with final management, program, policy and security recommendations in chapter 6.

Each analysis is designed to stand on its own, independent of the others, and they are so presented. Where the issues overlap in substance, the presentations are somewhat repetitive. This is usually flagged for the reader and is the price for guarding against misunderstandings which could arise if an analysis were otherwise taken out of context.

The chapter is divided into four major sections corresponding to the four major issues in the original Terms of Reference (Att. A), i.e.:

Management

Structure

Standards

Compartmentation

Section 4.1, **Management of Information Handling Services,** provides a series of analyses which stress the need for a top-level view, a strategic plan, and an overall systems architecture. Conclusions revolve around the management structures needed to support this integration over the breadth of information services. Career management and contingency planning are also discussed.

Section 4.2, **Structure for Providing Information Services,** presents a vision of how information services will be delivered in the future and, where appropriate, suggestions as to reapportionment of responsibility and tasking. Major conclusions are the need for a pre-planned integrated network with administrative and technical provision for compartmentation. This section deals both with the technical mechanisms and their organizational implications.

Section 4.3, **Standards for Information Handling,** recognizes the clear benefits of standardization, tempered by a realization of the way in which premature standards can pre-empt economical use of changing technology.

Section 4.4, **Compartmentation in Information Handling,** Analyzes the problems of control and accountability and the impact of changing technology. Major conclusions are a suggested swing from document- to information- accountability and a realization that, in spite of new technical threats and new technical defenses, personnel security remains the cornerstone. Technical discussions of the use of encryption for compartmentation and overseas quick destruction promise improved damage limitation.

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4.1 MANAGEMENT OF INFORMATION HANDLING SERVICES

In this study, Information Handling was broadly defined. Included are: creation of information (keystroking, composition, editing...); movement of information (courier & cable); dissemination, storage, record keeping, reference & retrieval; and, ultimately, destruction ... as well as the security and compartmentation measures needed to protect information. This vast panoply of services was bounded at one edge by excluding collection and the processing intimate to it. Excluded at the other extreme is analysis. These boundaries are meant to restrict attention only to those non-value-added services. The emphasis is on the "handling" of information.

This section deals with the management structures which might be needed to deal with such a breadth of services. The need for a top-level view, top-down strategic planning and an integrated, overall systems architecture are stressed. Career management and contingency planning are also discussed.

Section 4.1.1, **PROVIDING CLEAR DIRECTION FOR IH,** proceeds from the broad concern within the Agency, expressed repeatedly to the Task Force and its predecessor fact finding activities, for the orderly development of information services. It proceeds, too, from a maturing view of the role of technology and a recognition of the increasing interdependence of systems upon one another. The premise is put forward that the uniqueness of the Agency's information handling needs is the exception, rather than the rule. From this flows the conclusions that if patience supplants premature development many of our needs can be met by commercial offerings to come. Required, however, may be a redefinition and regrouping of information handling tasks and concommitant organizational realignments. Planning is seen as the key.

Section 4.1.2, **THE ARCHITECTURAL FUNCTION,** recognizes all the human and organizational motives which conspire to yield designs "in the small". These are rejected as being too costly in the coming decade. Establishment of a clear authority within the Agency, to clearly define the scope of individual systems and to provide the blueprint for needed inter-systems integration, is recommended.

Section 4.1.3, **THE ABILITY TO ACQUIRE NEEDED RESOURCES,** distinguishes between budget planning and defense by the provider of an information handling service, and budget planning and defense by the user of a service. Recent history demonstrates the efficacy of the latter, **mission budgeting,** over the former. While relatively easy to implement where the service is dedicated to a mission component, this can be chaotic in the case of indivisibly shared, central services.

Section 4.1.4, **THE ADP REVIEW PROCESS,** discusses the putative reasons for current EXCOM review procedures of ADP. Certain deficiencies are noted in this year's execution of that review, and alternate steps are urged. The exact nature of these, however, is contingent upon larger managerial and organizational realignments which may be contemplated.

Section 4.1.5, **CAREER MANAGEMENT**, proceeds from a shortage of technically skilled, information specialists, which is predicted to worsen over the decade. Because of the constraints we face in competing for these skills, emphasis is placed upon a vital program of career management. Emphasizing upgrading and refreshing of skills, and a planned pattern of career growth, this should also serve to lessen the "future shock" of the introduction of new information handling technologies.

Section 4.1.6, **CONTINGENCY PLANNING**, addresses measures which must be taken to ensure that our information resources, gradually being entrusted to new, and perhaps more fragile technology, can survive the broad range of potential catastrophes ... which in variety and frequency may increase over the coming decade.

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4.1.1 PROVIDING CLEAR DIRECTION FOR IH

Summary

The absence of top-level guidance and coordination is contraindicated by the rapid pace of technology, its concommitant fundamental change in the nature of our jobs, potential economies of scale, and the size of the capital investment required.

A lack of direction is also at odds with the quantum steps in the effectiveness of information systems which can result from enlarging the subscriber communities and enlarging the information bases.

To reap technology's fruit in an era of tight resources and a shortage of skilled personnel will require top-down design, personnel management, and foregoing the luxury of treating all our needs as unique. Required above all is a well-charted course and a deft hand on the tiller.

Background

A careful analysis of the preceding sections is at once reassuring and discomforting. The activities and trends show a continuation of the progressive and innovative spirit of Agency employees that is commonly referred to as the "can-do" attitude. There is a broad range of developments in information handling carried out by a major percentage of Agency components, each intended to improve the efficiency and effectiveness of some part of Agency information handling.

The discomfort arises from the realization that developments and innovations are occurring largely in response to local needs and problems without benefit of higher level guidance that would ensure all developments pull together for the common good. This problem has been frequently identified by many of the Agency components and, in fact, was the primary motivation for the formation of this Task Force. The need for Agency-level guidance for the future development of information systems and services is clear.

The need for this top-level view of the future is made more urgent by the rapidity with which technology is changing the way information services are provided and the large capital investments those changes involve. People have grown accustomed to the flexibility and adaptability of manual systems. Major changes in manual systems can be implemented with comparatively little upper management involvement. Mistakes in implementation are easily detected and quickly corrected by the humans who form the system.

By contrast, employing technology to an increasing range of information services entails large equipment expenditures that necessitate more upper management involvement if only because of the budgetary impact. Application of technology also involves more demanding discipline in the execution of change. Whereas manual systems benefited from our most adaptable resource, the human, machine systems are insensitive and unforgiving employees. Misdirection and misapplication of technology can result in years of undesirable service.

The issues expressed to the Task Force demonstrate the broad concern within the Agency for the orderly development of information services. The issues also depict a maturing view of the role of technology in the delivery of services. While plans and programs still address local needs and problems, the issues demonstrate the awareness that systems are increasingly dependent upon each other and that, in fact, many of the needs are more universal than local.

Hence, while senior management is concerned with the fiscal effectiveness of information services and their development, the lower levels of the Agency are concerned with the operational effectiveness. Both parties point to the same need - the need for top-level guidance and coordination to help ensure that developments in information services are mutually supportive and directed toward common objectives.

The management problem in information services for the 80's will be to maximize the benefits of technology to Agency users in a projected environment of relatively constant buying power and increasing shortfalls of technical specialists required to develop, operate, and maintain a growing capital investment.

To do so will require more emphasis on top-down systems design, a centralized personnel management system for scarce technical specialists, increased reliance on external contractors to offset personnel shortfalls, and minimization of unique Agency systems and their attendant support costs.

Suggested Solutions

Agency-level strategic planning for information services is a viable and rational means of providing top-level guidance for the development of Agency systems. If senior management can convey desires and concepts for services and systems of the future and reinforce those top-level views within existing management systems such as MBO's, programs, and budgets, then positive effects on system development will result. The degree and rapidity with which these effects will be noticed will be in rough proportion to the management and organization changes introduced to ensure Agency response and in proportion to the degree of specificity contained in the guidance.

The specificity of the guidance that senior management is capable of providing will be constrained by the amount of executive time that can reasonably be devoted to services without detriment to management of primary missions and by the need for prudent restraint required to avoid stifling creativity and innovation. A reasonable estimate of a strategic goals program that might be managed by EXCOM is that response will be slow and erratic. The network of thirty goals suggested later in this report has resulted in only one substantive criticism, i.e., it is too extensive. But, to reduce the number of goals by any rational process leads to significant loss of specificity.

This loss of specificity leads to a void in guidance between top-level goals and lower-level planning that will largely perpetuate the concerns and issues that exist today. Components will be left to define their own strategies through the middle ground, insuring continuation of component conflict and lack of systems compatibility.

What is suggested in addition to the Agency-level goals program is creation of a systems architectural function to coordinate planning at the Agency level and to help map the strategies between top-level goals and component-level planning. This function is seen as the answer to the broadly expressed need for Agency-level coordination of IH planning. To be effective the architectural function would have to be placed in the Agency hierarchy in such a way that meaningful influence could be exercised over issues such as what systems would be developed and when; assignment of organizational responsibility for implementation and operation; the nature and number of interfaces among systems; the location and structure of data bases; standards for development, management, and delivery of services; and career management of information service specialists. Also inherent in such a central function could be a single Agency voice to the community member and external oversight bodies concerned with Agency systems and their management.

Whether such a function would be implemented as an Agency-level staff function or assigned to an existing line function is largely a matter of senior management style and the degree of impact desired. It is reasonable to speculate that the function at any level will be in continuous jeopardy without solid support of top management.

With a reasonably compact set of strategic goals endorsed by EXCOM and the support of an architectural function coordinating the Agency response to top-level goals, a strategic planning process can become a continuing management system. Whether further organizational change is required or desired is a question that can be separately addressed. An estimate of the Agency resources devoted to providing information services as defined in this study is 20% of the personnel and 40% of the CIAP. These resources are distributed across communications, ADP, reference services, registries, couriers, security, and associated management functions. Allocation of these resources is related directly to the evolutionary development of information services. The current institutions can be said to have withstood the test of time. Why then question the current organization? (S

A9c(3.2))

The answer to that question is that technology is driving us to question our historical categorizations of information and hence question our views on how to manage information. Stated otherwise, until now we have confused the concept of information with the media used to retain information. Our systems have been built around the concepts of media. Documents are handled by registries and libraries, messages are handled by communicators, data is peculiar to ADP, etc.

When technologists suggest that, in the abstract, information is independent of media and that technology can deal with information without regard to media, there is an organizational identity crisis. People begin to question why we differentiate messages from memoranda and dispatches. The technologist responds there is no need to differentiate when modern technology is at work. But that suggests redundancy and inefficiency in the current organization and raises questions of which systems should survive and which should be absorbed or abandoned. Such issues will continue to surface over the years as technology allows text, images, and voice information to be moved, processed, stored, and retrieved within common systems and procedures.

There are two management strategies for dealing with these developments. The first is to continue with existing organizations, dealing with the organizational issues as they arise and pursuing the policy of gradual evolution. The second option is to forecast the issues that are likely to occur and attempt to modify the current organization in such a way that issues are avoided or at least minimized in number and significance.

When permitted to focus on the questions of future services and organizational change as this Task Force has had the luxury of doing, there develops a clear preference for early and significant change resulting from a confident view of the future. This confidence derives from consistency of technology forecasts; parallelism between development of Agency information services and those of other departments, agencies, and industry; and the promise of top-level strategic planning that can improve the effectiveness of information services if properly supported.

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4.1.2 THE ARCHITECTURAL FUNCTION

Summary

An architectural function which transcends the design of individual information handling systems is needed. The absence of this function results in locally optimized systems which often fail to meet larger Agency needs.

At present, no component representing an Agency perspective is responsible for overall system design nor are there incentives for a systems designer to look beyond his immediate component context.

Establishment of that architectural function is recommended.

Background

CIA's information handling systems, large and small, are generally designed in response to a specific need. Usually, that need is expressed by a single component which subsequently becomes the advocate of the proposed solution. In some cases, this is satisfactory. Increasingly, however, we find that a single component's needs are not independent of those of another component. In those cases, a number of factors act in concert to prevent the solution from rising above the specific need to anticipate larger Agency needs:

- The advocate component may be unaware of larger Agency needs ... there is no overall plan;
- Territorial imperatives and the golden rule argue against exploring problems outside a component's immediate sphere of influence;
- Resources, or a perceived need for an immediate solution constrain the amount of time which can be devoted to such exploration;
- Larger needs sometimes add complexity (at least from the designer's viewpoint);
- If a consideration of larger needs elevates the system design beyond immediate jurisdiction, coordination can be slow ... and sometimes unpleasant.

There are, then, mechanical and emotional reasons why systems in the Agency tend to be designed "in the small". There are no incentives for the designer of a particular system to examine its requirements within the context of larger Agency needs. Rather, there are disincentives: the costs of a system may increase and its Initial Operating Capability (IOC) may be delayed. This is not to say that the system necessarily becomes more complex. Often as not a larger view leads to a simpler overall conception (though this may not be apparent from the component's perspective). Typically, however, a larger view leads to a system which crosses firmly established institutional boundaries. This immediately raises questions: Who should be responsible for the design of the larger system? for the implementation? for the operation? These are questions we cannot expect the designer of a particular system to answer. These are questions we can expect him to avoid. Raising these larger questions can be the responsibility of a systems architect inured to hardship and properly situated.

The lack of systems architecture and the need for a systems architect has been noted by previous students of the problem. The ASPIN report in 1970, for example recommended "...a central technical management review of major ADP projects be created under the present umbrella of Executive Director-Comptroller responsibility for Agency ADP management, that a full-time position of ADP advisor to the Executive Director-Comptroller be created to ... review the various local plans, ... (and) ... develop a statement of long term ADP objectives for the Agency ..." The report emphasized that "...the most critical need in automatic data processing control is a formal means for review of ADP activities."

Other agencies, too, have perceived the void and created a systems architect. Most relevant among these are NSA with their architectural board including data processing and communications architects, and the Department of Defense with their WWMCCS architect.

The term "systems architecture" is meant here to include:

- structure and interrelation of major hardware modules;
- interconnectivity of processes and processors;
- communications networks and protocols;
- structure and interrelation of major software modules;
- structure and interrelation of major data sets.

The term "systems architecture" is meant, here, to be unrelated to:

- specific choices of hardware and software;
- specific choices of communications protocol.

Instead, the focus of the Systems Architect is on functionality and the flow of information.

Duties and Responsibilities

The duties and responsibilities of the Systems Architect include: formulation of overall design (with help, of course); encouragement of programs to achieve the design; and the design review of all new or modified information systems whose procurement, implementation or revision will require a major expenditure of resources. Specifically, the Office of the System Architect will:

formulate overall architecture for information handling systems:

- publish functional specifications showing the composition and interconnections of major subsystems including, but not limited to:

  . Central and Distributed Computing

  . Electronic Communications, Dissemination, & Distribution

  . Word Processing and Printing

  . Micrographics

  . Graphic Display and Plotting

  . Remote Terminals

  . System and Applications Software

  . Substantive and Administrative Databases

- incorporate into the functional specifications, all available strategic guidance, expressed user needs, and changing technology.

encourage the formation of programs to implement the overall architecture:

- initiate planning and budgeting of programs required to fulfill overall architectural needs;

- commission the design of information systems to meet future needs;

- coordinate and represent resource requirements of overall architecture.

conduct a formal review of each proposed information system to:

- explore the functional needs which the system is designed to meet;

- identify larger Agency needs which may be subsumed or otherwise impacted;
- identify relevant interfaces with other current and future systems;
- comment upon the information security of the proposed design.

publish the results of the design review including:

- modifications recommended to meet larger needs;
- an estimate of additional resources required to satisfy those needs;
- an estimate of benefits to be derived;
- recommendations for needed coordination.

Recognizing the importance of timely review, the Systems Architect will ordinarily complete his review in sixty days.

The Systems Architect will represent Agency information systems' designs as required in the larger community context. The Systems Architect will also keep abreast of National Programs and the interrelations of specific collection processing as these may impact Agency information systems.

The Systems Architect will not design information systems, nor be involved in the implementation of such systems. The Systems Architect will neither certify nor validate the need for an information system (except, of course, those which he commissions directly.)

The Recommendation

CIA/IHTF recommends:

establishment of a Systems Architect Staff;

the staff to consist of a Chief Systems Architect, responsible for administration and coordination, and Specialist Systems Architects, responsible for:

interrelationships of word/data-processing and telecommunications hardware;

software macro-design, and data-base interrelationships;

user interfaces, documentation and training standards.

The role of the Systems Architect will be advisory. Current decision-making mechanisms are unaltered -- planning, budgeting, designing and implementing. The design review conducted by the Systems Architect will be public, thus available to all decision-makers. The extent to which decision-makers rely on the advice of the Systems Architects will depend upon:

the logic and persuasiveness of the advice;

the fervor of those advocates in opposition to the architect;

operational imperatives; and,

a sense of history on the decision-maker's part.

The clients whom the Systems Architect advises include:

user communities;

designers and implementers;

budget planners;

Office Directors;

The Executive Committee.

In order to serve properly the advisory role, the Systems Architect must have a master design against which new information systems are measured. Achieving a realistic, agreed-upon, forward-looking design will require:

as input, ENDORSED GOALS for information handling;

as building blocks, EXTANT INFORMATION HANDLING SYSTEMS;

the DESIGN INPUTS of all relevant components;

publication of a PRELIMINARY DESIGN;

a round of COMMENTS on the preliminary design by interested parties;

iterations resulting in a FINAL DESIGN; and,

MANAGEMENT APPROVAL of the final design.

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4.1.3 THE ABILITY TO ACQUIRE NEEDED RESOURCES

Summary

Resources required to bring new information-handling systems on-line, and to operate and maintain needed information services are frequently denied us by the budget process.

Where inappropriate, this results from a focus on the aggregate of support services rather than on the individual mission supported by a specific information handling system.

It is recommended that budgeting for new information systems be done by the "users", the mission organizations who are the beneficiaries. It is further recommended that, where possible, this principle of beneficiary budgeting be applied to operations and maintenance.

The doctrine encounters practical difficulties with general purpose services or specific systems developments where marginal enhancements allow the system to serve broader needs. We cannot afford to forego these economies of scale. However, the principal benefit of beneficiary budgeting, the user's opportunity to balance information handling costs and benefits against other program considerations, is substantial.

User budgeting, together with a sound, well understood architecture for the development of information handling systems and services will enhance our information handling posture over the next decade.

Background

The pool of resources available to the Agency is shrinking. Many factors are responsible, a worsening government balance sheet, erosion of planned expenditures by inflation, competing needs of other agencies, closer inspection of Agency programs, and occasional disaffection with the Agency at large. In information handling, the general constriction of resources is exacerbated by well-meaning but misguided attempts to "control the growth of computers" or some similar malaprop. It is unlikely that any information handling recommendation will cure the economy or assuage the appetites of other, competing agencies. However, recommendations which allow us to more fairly and clearly represent the benefits of a proposed information system or an existing information handling service do ease the Agency problem.

The Role of Information Handling

In the overall defense context, budget scrutineers enthusiastically endorse the concept of intelligence as a force multiplier. Good intelligence is worth a certain number of divisions; said differently, we can cut our military force if our intelligence is good. As the concept is applied, budget cuts have been accompanied by ratcheting up the force multiplier. The mathematical beauty of tiny changes in the force multiplier displacing significant military expenditures has been irresistible..

If there is validity to the concept, then information handling services, the new technologies and new systems, surely qualify as force multipliers. In fact, the Agency's record is quite good in this respect: a decade of relatively constant dollar expenditures have allowed a steady reduction in information handling personnel. Upcoming investment opportunities will allow us to continue the reduction and/or greatly improve the quality of information handling. When choosing between further resource reductions or improved services, consider: small improvements in intelligence are leveraged into large improvements in the nation's defense posture. We must not shrink, therefore, from aggressively seeking the resources needed to improve information handling ... for they are twice multiplied into overall defense improvements.

Creating a Defensible Budget

Because of the importance of information handling investments, the budgetary case must be made as clearly and persuasively as possible. Capital and recurring costs must be well understood. More importantly, the benefits must be clearly presented in the context of the mission. This will:

- permit weighing an information system investment or information handling service expenditure against other mission budget elements;

- allow the ultimate intelligence contribution of that system or service to be easily understood; and

- promote to the larger national level the benefits to accrue from the outlay of resources.

Once having assumed its place within the overall mission priorities, the budget item should be immune to frivolous challenge as a general support item. The only legitimate reason for critical examination in the context of general support would be to identify potential savings which result from economies of scale. An integrated architectural plan will identify such savings or preemptively demonstrate that none exist.

This analysis emphasizes the importance of budget defense within the mission context. In implementation, however, we would not want to err at the other extreme -- i.e., attempt to defend technically complex items without benefit of technical expertise.

Historical Lessons

An analysis of current budgeting practice shows an uneven record of defending resource requirements. In part, this appears to be process dependent. As an example, the Office of Communications calls for requirements, validates and consolidates these, and puts forward an integrated communications budget. This submittal necessarily prioritizes requirements within the overall communications program, recognizes only indirectly the priority of an individual mission, and does not specifically address the priority of the communications requirement within the overall mission plan. This process is magnified as the DDA places portions of the Communications budget within the overall, prioritized Directorate program. Thus, overall DDA guidance and priorities may heavily impact a mission's communications. The effect has been to subordinate new communications starts, in deference to ongoing activities ... even though the new communication start thus denied may be an essential part of an ongoing overall mission. This results in post hoc reprogramming of mission funds in the current year thereby vitiating the original planning process. (C 3d(3))

Within the same Directorate of Administration, the Office of Data Processing offers an interesting contrast. Here, too, an Agency-wide call for requirements leads to a consolidated ADP budget submittal. However, the record shows an effective defense of resources required to take on the new jobs while improving ongoing service. The differences seem to be:

- the size of the capitalization required
- the non-identifiability of the separate requirements
- the dividends of improving technology

Now, we can expect communications increasingly to reap the cost-performance dividends of computer technology as the disciplines coalesce. Moreover, communications functions, properly viewed as applications on general purpose computers, submerge the individual identities of underlying requirements. Both of these factors can be expected to improve the communications resource picture. However, where it becomes desirable to preserve the identity of an individual requirement, or where the capital size mandates, closer ties to the mission may serve us best. (C 3d(3))

The SAFE Project illustrates the principle of users budgeting for the development of an information handling system. The project is administered and technically managed by the Office of Data Processing. However, budget requests have been carried in NFAC (formerly DDI) submittals since the inception of the SAFE effort. Each year, NFAC has weighed the benefits expected from SAFE against other intelligence production needs. On balance, NFAC decided that SAFE's relative priorities placed it on the margin between then current activity levels, and high-priority enhancements. Subsequently, a vigorous budgetary defense tied to intelligence production needs was successfully mounted. Excluding the dust raised by questions about a SAFE-ADISS relationship, the only serious challenge to SAFE's fiscal health came early in the planning when an ambitious [redacted] plan was scaled back to a dangerously lean [redacted] plan. (S A9c(3.2)) 25X1 25X1 25X1

The Offices of Communication and Data Processing have experience with the "user" budgeting for proximal personnel, OC with its field communicators who man S&T networks, and ODP with its "outlander" program. Other services, Finance, Security, Logistics, similarly have operated for some time with "users" providing the slots for seconded personnel.

Some Drawbacks

Having the "user" budget for information handling services -- both capital items and personnel slots -- has certain drawbacks:

- the user may balk at funding a part of the overall architecture whose short term local benefit is not obvious; and,

- the user may reduce needed information security expenditures and security personnel.

Outlays for these "overhead" items -- security, standards, documentation, interface to other systems -- may be traded-off against direct-benefit information services or other program expenditures only within prescribed limits. Doubtless, some tension will arise between the user and the architect or the information security officer. No different from the situation today, this highlights the need for overall management of information services.

The Recommendation

On balance, it is recommended that where possible, budgeting for new information handling systems be done within the beneficiary's mission budget. User budgeting for operations and maintenance of information services is similarly recommended, insofar as possible. Where the budgeting questions touch larger issues such as security, system standards, the needs of other users, and intersystems architecture, coordination will be required. The nature of this coordination is the subject of other recommendations in this series.

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4.1.4. THE ADP REVIEW PROCESS

SUMMARY

Current EXCOM procedures for reviewing ADP projects stem from two faulty assumptions: insufficiency of, and contention for central ADP resource; and, an increasing share of the Agency budget devoted to ADP.

A third impetus was Congressional and OMB pressure for tighter management controls.

Ineluctably, a disproportionate amount of senior executive attention is focused on ADP which accounts for a [redacted] of the Agency's 25X1 budget. Moreover, the format and effectiveness of current review procedure is questioned. (S A9c(3.2))

What EXCOM requires is a report on progress toward established information handling goals and a coherent budget briefing in the context of those goals, highlighting the overall architecture at which we aim. Life cycle costs and measures of effectiveness of major ADP programs also need to be discussed. Certain issues, with which EXCOM must deal, would result.

For programs which are major consumers of ADP resource, the mission managers should be directed to discuss, in context, the support of mission objectives via ADP, and measures of effectiveness of that support.

Background

In his 28 March, 1977 memorandum, the Comptroller set the stage for current EXCOM review procedures. Two primary issues, raised on 16 December 1976 by the DDCI, were central to the formula:

> How can we monitor month-to-month use of central ADP resources to permit Agency-level resource allocation decisions when contentions arise?
>
> How can we plan for the future to ensure that the large ADP budget increases we are experiencing are in the overall interests of the agency?

In retrospect the assumed antecedents hardly materialized: major contentions for central ADP resources did not arise, and we did not continue to experience large ADP budget increases.

At the time, the Comptroller stated that

> "...ADP expenditures are not only continuing to increase steadily, but are consuming an ever-increasing portion of the Agency's total Budget..."

With the advantage of hindsight the portion of the Agency budget allocated to ADP is relatively constant at:

[redacted] 25X1

This represents an inflationary, not a real-dollar growth. Moreover, if we look at information handling services at large, we see no real dollar growth over a ten year period, and a modest decline in personnel which has resulted from the capital investment. This longer and larger perspective pre-empts the supposition that EXCOM's two years of reviews curbed an otherwise runaway ADP budget. (S A9c(3.2))

As for presumed growth in demand for central ADP services, we must distinguish demand for computing resource from demand for programming resource.

Computing Demand

Excepting new initiatives such as SAFE, the growth in demand for computation is an orderly, linear increase. Steady improvements in price-performance characteristics of new hardware meet the rising needs with a modest CPU and disk replacement strategy. Such a replacement strategy would be indicated on grounds of maintainability absent a forecast rise in demand. When SAFE comes on-line, the apparent step-increase is more the result of procurement strategy than disorderly demand outstripping technology's offering. Denominating in dollars the demand for computation evidenced by SAFE, and allocating [redacted] expenditure to software development, leaves [redacted] worth of computation demand amortized across 10 years, 1974-84. (S A9c(3.2)) 25X1 25X1

Software Demand

With regard to demand for centrally supplied software development, the picture may be substantially different. ODP has adopted the strategy of assigning the bulk of its in-house applications software development capability to a very small set of projects. Two or three projects occupy more than half of the applications staff. This results in a 1-2 year backlog of documented projects, excluding those where the customer is unwilling to wait in queue, and excluding those whose initial investigation has been prohibited by personnel scarcity. While quite serious, and worthy of EXCOM attention, this applications programming shortfall was not thoroughly vetted within the current review procedures. More to the point, since the backlog is measured in years, a month-by-month review would hardly be needed. (C 3d(3))

Dealing with Significant Issues

A perceived failure of the current EXCOM review of ADP is its failure to resolve, and sometimes even to recognize significant issues when they arose in the course of the briefings.

One such issue was the question of whether ADP support to National Programs should be provided for in the CIAP or the NRP. This was raised explicitly by the IG on several occasions. It had been dealt with by EXCOM on a per-project basis, previously. (S A9c(3.2))

Another issue, raised explicitly by the Comptroller in the context of an accelerated CRAFT initiative, was the possible shortage of skilled manpower. Because of the context in which the question was put, the issue was narrowly addressed. However, the shortage of skilled personnel is forecast to get worse, not better, as we must compete with increasing industrial demand for a scarce supply of good people. Among the questions which this raises are: how can we recruit, train, and retain manpower in this area? can we compensate them competitively? and, if we cannot compete for the scarce supply, what ADP initiatives will be foreclosed? (C 3d(3))

A third issue, raised but hardly attended to, was the possible need for ... or, at least the effectiveness of vastly increased computational power. The DDS&T pointed out that certain engineering design exercises, already big batch number-crunchers, are in fact, shortcut approximations of more complete engineering calculations and that there would be benefit in more complete exploration of larger solution spaces. Moreover, there would be some benefit in affording the engineers a higher degree of interaction than is now possible with overnight, batch turnaround. (C 3d(3))

Another issue, one which was implicitly revealed on several occasions was the lack of appreciation of total life-cycle costing. This surfaced in discussions of Language Translation where the ADP acquisition costs paled beside the human operator requirements, and in the case of CRAFT aspirations which were presented independent of substantial communications costs. Yet another example was the apparent surprise to some that when PERSIGN comes online, a substantial programming effort will still be required for the foreseeable future.

An obvious incongruity in the EXCOM review of ADP is the omission of any reference to Project SAFE. Disregarding the fact that SAFE already has as many reviewing groups as programmers, it seems that its absence misrepresents the context in which other ADP activities should be viewed.

Recommendations

One remedy for the foregoing is embodied in organizational realignment options discussed elsewhere. If there were to be a clear line authority for all information services, EXCOM could play a more seemly upper management role, the setting of goals and the monitoring of progress thereto. The manager of information services could provide a context for budgetary review of a coherent program by revealing the information handling architecture which he is developing. (Absent an overall manager of information services, the sytems architect, discussed elsewhere, could provide the needed context.)

For some programs, ADP resources will comprise a substantial fraction of the total cost. It is recommended, in such cases, that the mission manager, in the course of normal management review of his program, should be instructed to address the questions of: why ADP resources of that magnitude are required, what alternatives might have been considered, and what measures of effectiveness he intends to apply to ADP contributions to his overall effort.

Finally, it is recommended that the individual charged with conducting the review, (manager, architect, whoever) be directed to flag a significant issue when it arises and prepare a coordinated discourse of that issue, including a suggested resolution thereof.

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4.1.5 CAREER MANAGEMENT

Summary

The Agency is faced with meeting the challenge to provide qualified professional information handling specialists who have the training and experience to respond to burgeoning information services. With increased emphasis on developing technology, responding to FOIA/PA and litigation requirements, and intensified interest in managing information as a resource, we must be prepared to meet these demands with a cadre of information handling specialists who have been identified, trained, and developed within a career-oriented environment.

A well-defined career program would enable Agency management to use more effectively the scarce personnel resources which exist currently in many categories of information handling services. In addition, the Agency would be in a better position to attract and recruit qualified professional applicants from external sources if able to present a comprehensive career development program.

It is recommended that each Directorate establish a career service for Information Handling specialists which will meet current and long-range needs of the organization as well as foster the professional development of the employee.

An Information Handling specialist is defined as one whose primary job responsibility is concerned with the management of data or information. Computer programmers, communications specialists, systems analysts, document indexers, registry clerks, couriers, and micrographic technicians are examples of categories of personnel which may be identified as information handling specialists.

Mission

A career service is not the panacea for all personnel management woes. It will not solve all recruitment problems nor will it necessarily produce better ADP systems. A career service for Information Handling (IH) specialists will, however, assign responsibility within each Directorate for career management, i.e., establish and maintain Agency standards for recruiting, developing, ranking, promoting, and assigning employees of a common discipline.

SCOPE

[redacted] 25X1

Although a DDA centralized career service would be considerably larger than others, we believe it is manageable and we do not anticipate any significant problems beyond those posed by the career service of [redacted] managed by the Office of Communication (prior to OC's reduction to its current ceiling). (S A9c(3.2)) 25X1

The estimates presented in the accompanying table are based on our analysis of the "Agency's General Schedule Occupational Groups and Series" where those positions involved primarily in the management of data or information were selected and a total count effected in each Directorate. Specifically of interest were those IH activities concerned with recording and editing of information, e.g., word processing; acquisition of information, e.g., library acquisition of periodicals; dissemination, e.g., cable analysis; distribution, e.g., mail and courier functions; communications, e.g., telecommunications services; information reference, e.g., those functions supporting the storage and retrieval of both manual and automated data bases; printing, reproduction, and transformation, e.g., printing and publication services; information security, e.g., communications and computer security functions; information systems, e.g., computer programs and computer technical services. Excluded from the list are positions involved with collection, processing proximal to collection, and value added services such as analysis.

In some cases the list may be too broad in scope since the functions may vary significantly from one Directorate to another. The duties of an electrical engineer in the DDA for example may be cited as an IH activity while an electrical engineer in DDS&T should be excluded from the list. We have attempted to identify these unique positions and adjust the list accordingly. However, there are IH services which do not appear on the list since the functions are performed by personnel whose position title does not accurately reflect the assignment of IH duties. In such exceptional cases, the managers of these activities must assume the responsibility of identifying the positions within their offices as IH-related. Obviously there will be additional categories of personnel whose functions are somewhat equally divided between providing IH services and some additional speciality, such as production analyst. These cases will require a review by the mission component and the career service to decide which function takes precedence thereby determining which career service will administer the employee's career. In the final analysis, only Directorate management is in a position to review and reconcile the list of IH positions to ensure its completeness and accuracy.

CONCEPTS

Within a directorate career service, IH functions could be grouped into areas which are further identified by the career service or "functional" category. The assignment of functional categories facilitates the competitive evaluation process so that the performance of all members within a category can be evaluated against established standards. These standards, coordinated Agency-wide for use in all directorates and applied to all members of the IH occupational family, greatly enhance the comparative evaluation system.

In addition, the assignment of functional categories serves to correlate career paths. A functional category could logically include all personnel involved in records management, e.g., records management officers, records officers, archivists, etc. Another category could group ADP professionals, e.g., computer programmers, computer systems analysts, computer specialists, computer engineers, etc. A third category might include computer technicians, computer operators, technical writers, production control specialists, and computer support personnel. Although career progression would normally occur within the employee's career development area, lateral movement into other areas could be viewed as career enhancing for the employee and at the same time beneficial to the organizational component. Additional specialized training would be required, however, prior to assignment of a non-technical specialist into a technical position. Given the projected critical shortage of information specialists, especially computer personnel, we must use the personnel resources available within the IH occupational family as a feeder group into those areas plagued by personnel shortages.

Benefits to the Organization

1. Assignments

    A centralized career service is more aware of Directorate and Agency-wide requirements and opportunities than individual components and is in a better position to respond quickly to demands for reallocation of personnel. Having the ability to draw from a large pool of resources, the Directorate would be able to respond to requests which require more experienced personnel than a single component controls. Indeed, centralized career management provides a Directorate with the unique opportunity to recruit from identified members of an occupational family across Directorate lines in order to fill positions with the most qualified personnel available. This is especially important where overseas assignment is perceived as beneficial to the employee's career development. The major benefits are twofold: the field stations's IH services improve when positions are staffed with the highest calibre of IH

Page Denied

specialist; and, the employee profits from the opportunity to broaden his professional experience and further develop his skills in a mission oriented environment. The role of the IH specialist in an overseas station will, however, change significantly in the future with the installation of CRAFT. The OC-communicator will assume the new responsibility of the technical maintenance of the CRAFT system. This change will bring the communicator in closer affinity with ADP professionals. It is especially important in the development of costly systems, such as CRAFT, to select personnel with the technical expertise most often found resident in the component who is the major provider of that technical service. (C 3d(3))

If an employee is to have optimal opportunity for career advancement, he should be a member of an "occupational family" which is represented by a career service with responsibility for all members of that family. Unless career development is focused on the occupational family rather than the organization, we cannot achieve maximum benefit from our career services. We believe that although career management should encourage assignment of personnel across directorate boundaries, compartmentation need not be threatened. Good compartmentation dictates the restriction of sensitive data to as few individuals as reasonable and also the implementation of security procedures by the mission component who has operational control. We conclude that the individual operating in a secure environment, regardless of which career service he represents, can be made sensitive to the security considerations of the mission component. As evidenced in the past by the long and successful relationship between the DO and OC-communicators in overseas field stations and, more recently, the enhanced level of support furnished by ODP in its operation of the DO Special Computer Center, it is clear that compartmentation can be effectively administered within an occupational family regardless of which directorate controls the career service.

2. Training

The Agency continues to commit substantial capital investments in information handling systems yet lacks a coordinated plan for furnishing requirements and direction to the Office of Training to ensure a timely, effective training program which bridges the transition to new technologies. A centralized career service would be the most logical organizational entity to develop a coherent training plan based on the skills required to support current systems and project future training needs. The benefits accrued would be reflected in the refinement of the training courses offered which would more closely relate to the skills needed to perform IH services and, in general, result in better scheduling which fit the needs of both employees and managers. Indeed, in the aggregate, the benefits that accrue would have a positive effect on all users of IH services.

3. Establishment of Evaluation Standards

An additional benefit accrued from a centralized approach to career management would be the establishment of uniform evaluation standards for Information Handling specialists and staffing of competitive promotion panels with Information Handling personnel who have an appreciation for the nature and value of the job performed.

Benefits to the Employee

1. Professionalism

Although the employee has to assume responsibility for managing his own career, the Agency is well served by providing him the training and career opportunities to allow him to develop his skills so that he may advance into more responsible positions. Amalgamating Information Handling specialists into a career service at the Directorate level will offer him some affinity with others of the same discipline and as part of a larger forum, help him to achieve recognition as a professional. As a member of a recognized and viable group with its own esprit de corps, one could reasonably expect to achieve better morale and a sense of professionalism within the group, as well as an overall improved image of the Information Handling specialist. The "professional" status allows him the opportunity to join external vocational groups whose seminars and educational information on the latest trends and technology would contribute to his career development.

2. Career Development Plan

A well-defined career program for information specialists is not complete without establishing a comprehensive career development plan (CDP). Although some career planning is administered by the Office of Personnel with its Senior Officer Development Program (SODP) and its Annual Personnel Plan (ADP), in addition to some localized component planning, there is generally a lack of centralized career planning focused on information handling specialists.

With the exception of DO/Information Management Staff (IMS), component career planning traditionally focuses on a very select group, e.g., ODP, OC personnel. The DO has, however, a broad-based career development plan which encompasses all information handling specialists within the Directorate. Within the DO, information handling services and the career management of the information handling specialists are centralized in IMS. The [redacted] H specialists 25X1 are members of the DC career service and are home-based in IMS. The Staff is responsible for establishing recruitment requirements for new IMS employees as well as the assignment (or reassignment) of all IH specialists within the Directorate. The career management of all IMS employees is a shared responsibility between IMS management and employees played out through the career development plan. This recommendation, based on the DO model but projected at an Agency level, includes all information handling specialists as members of a recognized discipline. As such, it represents a significant effort in career management. (S A9c(3.2))

A career development plan provides the architecture for an intelligent, orderly preparation for career progression. It is a tool intended for use by both managers and employees in their attempt to balance individual career interests and organizational goals. The objective of a career plan for IH specialists is to develop a group of skilled, versatile, and motivated professionals whose development contributes significantly to the improvement of IH services. To be effective, a career development plan must be interfaced with other management systems, e.g., vacancy notices, performance evaluations, OTR's testing facilities, career counseling, etc. A career development plan cannot survive in a vacuum; it must be supported by a strong personnel management structure.

The CDP, identified by a schematic, is a formal document which outlines performance requirements, training, and advancement opportunities in the field of information management. Development of the plan requires a considerable manpower investment to identify and perform a task analysis of all categories of IH functions, develop a career path structure for each functional category, and provide descriptions of career development requirements and advancement possibilities. Specifically, the plan should: identify the information handling positions within the Agency; describe the knowledge and performance skills desired of one entering an IH position; list the formal training courses to be completed while on-the-job; describe the knowledge and performance skills to be attained while in a position; and, describe the qualifications desired for the next logical level of advancement. Once orchestrated, the plan is personalized through career counseling sessions with the employee. During these sessions, a commitment is made by both employee and supervisor. Specifically, the supervisor is charged with providing work assignments which make optimal use of the employee's skills and experience. The employee, on the other hand, must accept the commitment to attain the skills needed to perform his current job through training, rotational assignment, etc. In addition, the plan is used to assist him make thoughtful decisions on his career progression and future assignments based on his skills, interests, and potential. An employee having access to this comprehensive body of information should be in a position to set achievable career goals and, in general, assume responsibility for his own career. Ideally, the plan represents a dynamic process which will continue to evolve as an employee progresses through various stages of his career.

Drawbacks of a Centralized Career Service

Although a career service offers the employee greater mobility in job assignments, there is obviously some erosion of the operational component's management control. In addition, mobility must be traded off with some loss of continuity and increased on-the-job training. However, the long term goal of developing the employee should outweigh the short term objective of retaining personnel in a narrow office environment.

Recommendation

It is recommended that each Directorate establish a career service for Information Handling specialists. The career service, managed at Directorate level, should be responsible for administering the career development program for all Information Handling specialists. In addition to providing career development opportunities and planning, the career service should be charged with establishing and maintaining standards for recruiting, ranking, training, and promoting information specialists. A Career Development Plan should be designed for all IH specialists.

4.1.6 CONTINGENCY PLANNING

SUMMARY

Two trends, increasing application of technology to information service and decreasing confidence in the sanctity of the operating environment, are elevating concerns for contingency planning.

Such concerns are justified and imply a need for resources over and above those required for "fair weather" operation.

Future planning should address contingency operations from outset and budgeting/programmatic estimates should reflect associated costs.

Coherent contingency planning requires agreement on the range of operating conditions systems are expected to survive. An Agency policy statement is recommended as a first step.

DISCUSSION

Continuity and survivability have always been key elements of communication planning. OC maintains detailed procedural planning and necessary resources to insure that mechanical failures and local disasters do not cause unacceptable interruptions to communications. That office rightfully takes pride from its repeated performance as an "only remaining channel" in crisis situations. The concern for contingency planning in OC systems is a direct result of the unstable nature of the overseas operating environment.

This reflection of instability overseas is also very visible in DO planning for CRAFT. In fact CRAFT may be viewed as a contingency resource since one of its major reasons for being is contingency planning. (C 3d(3))

By contrast, domestic planning has traditionally been "fair weather". The U.S. environment has been politically and environmentally stable. Probability of significant interruptions to service have been associated mainly with the systems and not the environment. Information processed by systems has always existed in some form outside the system so that we could "jury-rig" a process, bypassing the technical equipment to maintain the most urgent services.

The future is conspiring against this relaxed view of contingencies. The trend toward increased machine dependence will continue with or without our planning. More and more information will reside in machines, less in physical print. We will continue to institutionalize human thought processes and commit them to machines. Employees will learn new skills commensurate with new processes and, by default, lose competence and proficiency associated with current processes. In short we will continue to move toward total machine dependence because "fair weather" operations will be greatly improved by doing so.

Turning to the environment, there are at least two troublesome developments that point to declining stability for our systems. We have been quickly brought to face the possibility of terrorism and sabotage domestically. The need to plan for such domestic eventualities is now as much in our consciousness as the same need in the foreign field.

The second concern is not yet upon us, but projected to develop over the next 5-10 years. The energy situation and its economic consequences are retarding growth of the power utilities. Since the demand will inevitably continue growing even with conservation, there will be cross-over points in many of the country's power grids when demand exceeds supply. Planned energy rationing and/or unplanned "brownouts" may occur with increasing frequency. While this prediction is based on current trends, there is nothing in view to suggest a substantial change for the better.

If we have allowed ourselves to increase machine dependence without making a parallel commitment to the stability of the environment required for reliable operation, the Agency mission may be in serious jeopardy.

CONCLUSION

Increasing use of machine systems for information handling is not to be denied. The problem is to develop information services capable of maintaining essential mission operations under adverse conditions domestically as well as abroad.

RECOMMENDATION

1. Promulgate an Agency policy statement on contingency planning for information services (suggested draft attached.)

2. Direct that future plans, programs, and budgets for new machine systems overtly acknowledge the resource commitment to contingency planning.

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DRAFT

POLICY FOR CONTINGENCY PLANNING

1. Information is a key resource in Agency operations. Inability to move, access, and/or manipulate this resource effectively negates our ability to perform the Agency mission. For this reason, it is essential that information services and the systems that support those services maintain contingency capabilities to assure the availability of information under a range of adverse conditions.

2. There are two major elements to be considered in contingency plans: (A) the time criticality of the service to the users it supports, and (B) the geographic dependence of the users' missions.

   A. Information services and systems will maintain contingency plans that will assure continued response within maximum allowable times established by the missions supported.

   B. Information services and systems will provide a contingency capability to support geographic dispersion of Agency missions in instances of local disaster.

3. Contingency plans will consider loss of facilities due to mechanical failure, sabotage, and natural disaster. The plans may be based on the assumption that only one type of casualty will occur at one time.

4. Contingency planning for information services during general and nuclear war is necessary only when specifically directed by the DCI.

4.2 STRUCTURE FOR PROVIDING INFORMATION SERVICES

The rapidly changing technology foreshadows major changes in the way we do our jobs. These changes may suggest a reapportionment of tasking and responsibility. Section 4.2.1, **TECHNOLOGY'S EFFECT ON EXISTING ORGANIZATION**, proceeds from an understanding of how earlier technological limitations, and capital spending, as well as desired flows of information have configured the organization which we have today. It is suggested that the organization needs to be continually revisited in light of changing technological constraints.

Section 4.2.2, **ADP AND COMMUNICATIONS**, reviews historical distinctions between data processing and communications, and the manifestation of these differences in OC and ODP. The Agency orientation toward teleprocessing, and the inevitable resource constraints with which we must reckon, are seen to indicate an eventual merger between the providers of the respective information handling services.

Section 4.2.3, **INFORMATION DISTRIBUTION - THE ROLE OF PRINTING**, reviews changes in the way information is made available on paper to consumers. The strong conclusion is that the nature of the printing in this industry should be all around the periphery of a generalized information distribution network. To prepare for this, an organization merger of the now disparate components producing paper output of information is felt desirable. As pointed out in the section, this has provocative space implications, and beneficial security implications for controlled "copying".

Section 4.2.4, **INFORMATION SYSTEM SECURITY**, points out the growing technical threat which will accompany entrusting more and more of our sensitive information resources to the new technologies. It is desirable, therefore, for the relevant technical security, information security, and communications security responsibilities to merge under a single line management, which recognizes the necessary professional career specialization required. The analysis does not downplay the traditional personnel and security functions. Quite the reverse, the fidelity and diligence of personnel permitted access becomes all the more crucial.

Section 4.2.5, **USER SATISFACTION**, attempts to deal both with the reality of how legitimate user-needs for information services are met, and with the perception, as well. The starting point is a perceived deficiency in training and knowledge about the range of information services available, and the circumstances of their most effective use. This is compounded by the fact that to use a variety of services now requires dealing with a variety of components, even at the most preliminary level. Providing a single point of contact, a "customer service organization", is seen as desirable. An added benefit of the early establishment of same is the insulation it may provide the user from subsequent organizational and/or technological changes.

Section 4.2.6, **INFORMATION DISTRIBUTION NETWORK,** reiterates the fundamental universality of information and recognizes the benefits of enlarging the subscriber community, and the on-line available information base. This is tempered by the need for compartmentation, leading to technical recommendations, amplified subsequently in section 4.2.7, as to how logical separation can be achieved to support the "need to know".

Section 4.2.7, **THE UNIVERSAL TERMINAL NETWORK,** recites the array of terminal networks already interconnected or potentially interconnected, and differentiates between electrical interconnection and logical (administratively approved) interconnection. Potential security risks posed thereby are discussed, concluding that planned interconnection, and an understood architecture, combined with certain technical measures can provide relief. Electrical isolation, but logical interconnection (via an exchange of magtapes) is not seen as the preferred solution.

Section 4.2.8, **CENTRALIZED DISSEMINATION AND REFERENCE,** distinguishes dissemination (who gets what?) from distribution (physical delivery), and points out the similarity of dissemination and reference (servicing a request for available or to-be-available information on a topic). The plethora of dissemination services which has materialized over time is deplored and an urge to re-integration is urged, with attention to compartmentation.

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4.2.1 TECHNOLOGY'S EFFECT ON EXISTING ORGANIZATION

Summary

Changes in technology typically have an effect on existing organizations. In the case of information handling technologies, changes can heavily impact organizations:

- organizations are often configured around an apportionment of tasks whose scope has been delimited by an earlier technology;

- organizations are often built around a level of capital investment or a prescribed number of personnel; and,

- organizations are often configured around the flow of information which may have been limited by an earlier technology.

As technologies change, particularly information handling technologies, a former apportionment of tasks may no longer be appropriate. New and improved forms of communications, and radically different task durations often suggest a new breakdown or, more likely, a consolidation of task segments. Moreover, the nature of information handling technologies is that of capital investment and a small cadre of skilled individuals displacing a much larger number of less skilled workers. Thus, organizational structure built around formalisms of grade and span of control may no longer be appropriate.

Many of the organizational changes which will suggest themselves as technology changes can be anticipated. A careful analysis of why an extant organization's boundaries are as they are is required. When coupled with healthy skepticism and an appreciation of where technology might lead, new organizational options can be explored. Historically, this has been threatening because change is threatening ... in part, because it has been unanticipated and its motivations are poorly understood by the affected.

It is recommended that, as workers are given formal training in the information handling nature of their present jobs, a continuing analysis be conducted as to when organizational change will be beneficial, given what changes in technology.

To retain (or regain) the vitality of the Agency, we must recognize that organizations are arbitrary social constructions to accomplish an overall job under specific conditions. As the conditions change, so must the organization. Understanding the forces underlying the change is the only why to receive the benefits with a minimum of costly disruption.

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4.2.2 ADP AND COMMUNICATIONS

Summary

It has been recognized for some time that the technologies of telecommunications and data processing were gradually developing an interrelationship that will eventually see their convergence into one unified technology - teleprocessing.

The management of both OC and ODP have expressed a similar concern that they are finding it difficult to identify the boundary between the two disciplines. ODP, for example, has indicated that "the most serious (IH) problem identified ... has to do with the gradual and inexorable blurring of the distinctions which once separated ADP functions from communications functions..."

The Agency evolution towards a teleprocessing orientation is clearly evidenced in the growth in the use of remote terminals and printing/graphic devices over the years. This, together with the anticipated expansion of ADP support to the overseas environment, necessitates a significant dependence on the telecommunications services of OC. Conversely, computers have become an indispensable part of the communications networks supported by OC.

The Task Force has identified a number of advantages which support consolidation. The functions of planning, operations, career management and information security would all be enhanced by an organizational realignment. In addition, user satisfaction and our ability to interface with external organizations on teleprocessing matters would be strengthened.

On the negative side, we would anticipate a number of problem areas that would be associated with any merger; the size of a new organization may be formidable, the integration of an essentially domestic oriented ODP with OC's worldwide responsibilities would create integration barriers, and the combined budget would make a tempting target for arbitrary budget reductions.

On balance, however, we feel that technology is dictating an eventual merger. In an era of increasing resource constraints, we can not afford to support what promises to be a unified technology with multiple, sometimes competitive, organizations. While the two components have shown considerable cooperation and mutual support in integrating their support activities, the justification for unique organizations seems to be eroding.

Background

The worldwide communications services provided by OC and the central ADP support provided by ODP developed in relative isolation from each other until the advent, some ten years ago, of the remote ADP terminal and printer devices. In that these remote devices are linked to the host computer by communications transmission devices, the coordinated functional disciplines of both communications and ADP are required to support a growing demand for access to electronically based information and the related systems which transmit, process, and store this information. During the past decade, we have experienced a rather dramatic growth in these distributed processing facilities, primarily in the Headquarters area. Evidence would suggest that this growth has yet to reach its peak. It is also reasonable to expect that in the next ten years we will see a similar rate of growth in the use of terminals in overseas locations as well as domestic sites outside the Headquarters area. This burgeoning requirement for telecommunications support will necessitate a high degree of planning, coordination, and nonredundant activity by OC and ODP if the users of their combined services are to be effectively supported.

This growing technological dependence on communications facilities by ODP is mirrored somewhat by an increasing utilization of computers by OC to satisfy their mission. The MAX, DATEX and CDS systems, for example, are all based on software controlled computers.

This growing convergence of ADP and communications technologies is of great concern to the management of both OC and ODP. OC has indicated that "technological advances, primarily in electronic components, have fostered integral system design. It is no longer possible to identify the boundary between data processing and telecommunications." ODP has stated that "the most serious problem ... has to do with the gradual and inexorable blurring of the distinctions which once separated ADP functions from communications functions."

It has been suggested that an organizational realignment which placed all or selected portions of OC and ODP under a single line manager would preclude any existing or potential areas of conflict or duplication. The following discussion addresses some of the merits and liabilities of any such restructuring.

Discussion

The advantages that might be realized by any OC/ODP merger are examined from six functional attributes: planning, operations, user satisfaction, career management, external oversight and coordination, and security. Some negative aspects of any organization realignment are also explored.

1. Planning

Probably the greatest potential for improvement that would be realized by an organizational merger would be in the area of long-range planning. While periodic planning sessions are currently held between the two organizations, they are primarily ad hoc in nature and deal with relatively short-range issues. While there is general agreement on the functional capabilities and responsibilities of such forthcoming systems as MERCURY, the Headquarters BUS, and the COMTEN terminal control devices, additional longer-range problems such as the nature of the eventual CDS follow-on system and its relationship to the forthcoming ODP Message Processing System (MPS) need to be addressed. While the creation of an Agency architect would do much to alleviate this strategic planning shortfall, establishing a joint planning function under a single line manager would provide the best insurance against any redundant or inefficiently competitive IH services.

2. Operational Control

a. Software Development and Maintenance

The discipline of computer software analysis and development is an area where functional alignment within a single organization could result in increased efficiencies. The creation of software, whether for a large general purpose mainframe or a more dedicated message switching unit, requires generally the same skills and can be enhanced by the utilization of the same developmental and documentation standards. ODP's experience in the development and use of programming languages, test procedures, documentation and other tools, is as applicable in the development of such OC systems as CDS and the AFT terminal as in a personnel or information retrieval system.

b. Hardware Procurement and Maintenance

Over the years both organizations have acquired a wide variety of devices designed to support the distribution and processing of information which has been recorded in an electronic media. ODP has concentrated on large general purpose computers which are used to support a variety of Agency data processing applications. The OC emphasis, appropriately, was to utilize processors which were easily interfaced to communications channels. Advances in technology are quickly rendering the distinction moot. Economies of scale, back-up facilities, common maintenance and operational support are all areas where uniformity of processing and storage devices would result in increased flexibilities and efficiencies. Current plans for OC to provide overseas maintenance support for CRAFT and the ODP standard terminal is indicative of the evolving similarities in hardware commonality and mutual support. (C 3d(3))

3. User Satisfaction

a. Coordinated Requirements

Currently, the Agency user of ADP or communications services is generally required to express separate requirements to ODP and OC respectively. Annual requirements surveys from ODP and OC are independently levied on the components they support. Under a single organization, user needs for teleprocessing support would be handled as an integrated requirements/planning activity. Routine requests for terminals, for example, could be more efficiently handled if a single organization had priority scheduling and installation responsibility.

b. Single Point of Contact and Response

A joint OC/ODP organization would present a single point of user contact for any perceived data dissemination, distribution or processing problem. The user should not be concerned, for example, if a system failure is the result of a terminal, communications line, encryption device, or computer failure. In addition to problem identification, solutions and estimated recovery times would be more accurate if a teleprocessing 'trouble desk' was responding to user complaints. A joint organization would also be in a better position to respond to users requests for system performance improvements. The recent decision to supplement the CDS distribution process by installing ODP driven HETRA printers in OCO for NFAC and CDS-driven APARS units for the DO appear to be two different solutions to the same basic problem. Whereas each of these solutions viewed independently may be valid, a more coordinated design for cable dissemination/distribution is required.

4. Career Management

There would appear to be a significant degree of similarity between several technical activities of each office. Because of the advantages of central career management described elsewhere, a merger of the following specialities would be beneficial:

a. Computer software development and maintenance

b. Engineering, especially that which is associated with environmental requirements

c. System operators

5. External Coordination and Interfaces

The past several years have seen a marked increase in Agency support to Community ADP systems. The CAMS, [redacted] and 4C systems are examples of operational, and planned systems that support Community requirements on Agency housed equipment. Communications support is, of course, an integral part of each of these systems. Since it is reasonable to assume that the Agency's involvement in Community systems will continue to expand (including a wider participation in COINS), an OC/ODP organization would be in a better position to plan for and respond to additional requirements for Community support. (C 3d(3)) 25X1

In addition, responses to inquiries relative to Agency teleprocessing plans or capabilities from the Community staff, OMB, or NFIB would be more efficiently handled by a single organization which represents both ADP and communications services.

6. Security

While there is a limited interaction today between OC and ODP on information security devices and techniques, the steady distribution of computer terminals and minicomputers is stimulating an increased awareness of the need for emanations protection and the use of encryption facilities. It is felt that the communications security expertise developed by OC could be applied most effectively to ADP applications by a single service component.

Data processing dependence on security facilities will become increasingly evident as ADP devices move out of the protected Headquarters environment and play a more integrated role in overseas operations.

7. Negative Aspects of Organizational Change

Countering the positive aspects of consolidation described above are the likely problems and disruptive ramifications of any such consolidation. The most significant of these disadvantages are:

a. Size

OC is currently the largest office in the Agency with a T/O of [redacted] Merging an ODP work force of [redacted] additional people and encompassing both communications and ADP functions creates an organization which will tax the managerial capabilities of a single line manager. (S A9c(3.2)) 25X1

b. Budget Defense

There is a danger that the combined budget of the two service organizations would be more susceptible to arbitrary budget reductions by any of the various echelons of budget review. It is felt that the service, rather than mission, orientation of such a large budget would make it more vulnerable.

c. Overseas Orientation

The one obvious dichotomy in the functional orientation of the two organizations today is the significant overseas support provided by OC. ODP, except for some small applications for OF and the planned use of the standard terminal, has had an exclusively domestic orientation. While not crucial, this historical and cultural perspective would inhibit integration.

Recommendation

While it is true that the current relationship between OC and ODP is marked by forthright communication and mutual support, it is the view of this Task Force that consolidation is inevitable. During the next ten years the technologies of communications and ADP will continue to merge until there is but one technology - teleprocessing. In an era of increasing resource restrictions, we can ill afford to support a single technology with multiple, sometimes competing, organizations. The current arrangement will become increasingly inadequate as digital communications becomes the technological standard. We recommend merger.

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4.2.3 INFORMATION DISTRIBUTION - THE ROLE OF PRINTING

Summary

Since Gutenberg, economies of scale have dictated highly centralized printing and a physical distribution system which delivers packages of paper to which the information is largely incidental. New technologies are changing the equation, however. To take maximal advantage of improvements attendant on these technologies, we must consider printing in the more global context of information distribution.

It is important, then, for the Agency to juxtapose printing with other information handling disciplines. This will allow us to:

- view requirements in a broader context and design the needed integrated system;
- recover capital resources otherwise spent on needless duplication;
- preserve our human resource through comfortable transition to new technology; and,
- provide overall improved quality, timeliness, and security of service.

It is recommended that the management of printing, photography and duplication within the Agency be consolidated within the overall management of information services. It is further recommended that a transition be made from the present disconnected system(s) for printing to a coherent information distribution network with printing nodes liberally distributed in locations convenient to the user. These user pickup points shall perform an information control and accountability function as required.

It is further recommended that the P&P building be dedicated to information services equipment, freeing HQs space.

Background

As computing and communications have matured, their interface to the users, printed output, has swelled in volume and improved in quality. These increases in quality and quantity have been both the cause of, and the result of increased computer storage, processing and retrieval of text. As the amount of textual material on-line exceeds a critical mass, the manipulation and re-manipulation of text, and its retrieval based on full-text search, lead to superior products with a more economical use of human resources.

Wet Ink Printing

Historically in the printing industry, the high initial cost of typesetting and the relative economies of large scale press runs tended to centralize the process, the capital investments, and the personnel training. Within the traditional printing industry itself, many factors have conspired to change this:

- rising labor costs, especially skilled (unionized) labor;
- increasing cost of physical distribution ... rising energy and postal manpower costs;
- competition from other more timely information distribution media ... radio and TV;
- competitive advantages of customized, short run printing.

Technology has responded with a steady schedule of improvement: cold type, linotype, photo-typesetting, photo-offset and imaging plate-makers, and most recently laser plate-making. Most interesting in this discussion is the emergent emphasis on an optical image and the new, raster-scan methods for producing that image. This allows direct conversion of computer compatible information into plates needed in conventional printing. It allows an almost-direct interface between computing and printing. However, the necessity of making plates and mounting them is not interactive (in the computer sense) and therefore undesirable.

Xerography and Related Technologies

Xerographic and related "printing" techniques allow an optical image to be converted to an electrostatic "charge" image on paper which differentially attracts dry "ink dust" (toner.) Heat then fuses the ink into the paper and results in a permanent "printed" page. The optical image can be produced by mirrors and lenses from a "facsimile" original as in ordinary office copiers. Alternatively, the optical image can be produced by CRT or laser, controlled by the computer. This allows the "copier" to produce copies without an original ... every copy is an original. (This has important security implications to be considered below.)

Computing naturally gravitated to such optical methods for outputting information on paper as they had for film output (COM). The result is a more interactive method for producing high quality, human readable output. Moreover, because the production process is not labor intensive (and therefore not driven to concentrated capital investment to offset labor costs) and not intrinsically centralized (because the copier market has fostered small, low volume units) this paper output process lends itself to distributed printing -- i.e., electrical distribution of the information and local printing of the paper, as opposed to centralized printing and physical distribution of the paper. This distributed printing feature nicely complements remote terminal access and/or distributed computing.

Today and Tomorrow

Today, we see an ever-narrowing gap between printing traditionally derived, and printing whose genesis is computing and copying. High volume, ultra-high quality, and full-color are, for now, the exclusive province of "iron press" printing, and may remain so for years to come. Customization, interaction and electrical distribution are otherwise. Color copying and large-bed copiers could narrow the gap further at a rate dependent on the whim of the marketplace.

To take advantage of the technology trends, it is essential that joint planning occur between the data processors, the communicators, and the printers. The goals of this joint planning should be:

- elimination of unnecessary duplication (of information as well as facilities);
- elimination of intervening manual operations between original text input and final paper output;
- continuation of current high standards of appearance;
- increased security and accountability of output;
- interconnection of relevant sources of input text and convenient access points for pickup.

The Recommendations

Pursuant to the above goals, it is recommended that:

a. **Organizationally,** the currently disparate printing, duplication and photography functions be consolidated within the overall information service element.

b. **Programmatically,** the newly consolidated output services group plan, design, implement and operate a highly interconnected, universally accessed network of conveniently distributed output points, each of which would provide security, compartmentation, and accountability features.

It is further recommended that:

c. **Spatially**, as printing facilities disperse to user-convenient nodes, and as ADP/Communications inventories roll over, central ADP and Communications relocate from HQs building to the "P&P" building; when feasible, a second story be added ... fully shielded to meet now and future TEMPEST requirements; special perimeter defenses be emplaced.

The Organization

Implementing the organizational recommendation will remove from the Office of Logistics the current P&PD and combine with these personnel those ODP and OC personnel responsible for printing and COM output (exemplified by HETRA and APARS operation).

The newly combined, multi-media output services function will be responsible for planning and oversight of (human-readable) output services, operation of shared-use facilities, and cognizance over all dedicated facilities. The output services function will also maintain cognizance over facsimile copiers.

Insofar as output services are a subset of customer services, it is recommended that the organizational hierarchy of the consolidated information service element reflect this. This will put output services organizationally and technically close to input services and to the reference and dissemination services which it supports.

The Network

It is recommended that design and development begin on an integrated information output network which will be:

- built upon the fully integrated, multi-level secure, cryptographically isolated information distribution network;

- provided with a large number of convenient pickup points in all Agency buildings, posts, bases, and stations;

- able to provide quick turn-around, high-quality, individually sorted and addressed copies of text ; and,. on paper, film, or other media; and,

- collocated with, and operated as an integral part of registry/mail rooms.

It is anticipated that as the network develops over the next decade, and as the bulk of our information goes on-line:

- distribution of documents will largely shift to electronic distribution and local reproduction;

- all copies of documents will be new, serialized originals so that today's uncontrolled facsimile copying will disappear; and

- the perceived easy retrieval of copies of documents will allow individuals to purge their major paper holdings; so that

- a "read and destroy" caveat will have much broader operational applicability ... so that compartmentation access controls can become dynamic.

Irrespective of internal network procedures, the system will provide end-to-end acknowledgement (receipting) and end-to-end privacy (super-encipherment) where required.

The Space

We now have an opportunity to right the irony which inconveniently distances printing output from users while remotely accessible computers reside in the HQ's building:

- the printing technology is swinging toward smaller-scale, higher quality "printing" devices which output electronically communicated information;

- new security policy, in league with new technology, suggests individual accountability and unique serialization for printed documents.

Taken together with user convenience, which will facilitate decreased personal paper holdings, these factors suggest a migration of printing from its centralized location to peripheral locations. At the same time, we face:

- increasing demands for ADP equipment space ... which already occupies a distressing fraction of the HQs building;

- stiff competition from components who recognize the intangible benefits of close encounter; and,

- growing security awareness which suggests sequestered computers with EM shielding, and secure perimeters.

In aggregate, these factors argue for an exchange whereby the bulk of printing services be dispersed to convenient "registries" and ADP and communications equipment relocate to the current P&P building. Naturally, this should not, indeed could not be a precipitous exchange. The specialized need for iron-press printing -- high quality color, and very high volume -- may remain for some time to come. However, as part of a long-term plan, it makes good sense to start the distribution of printing, as recommended above, and as new

ADP and signals equipments are procured to receive them in the P&P building. If modest new construction in the HQs compound becomes practicable, a second story on the building is attractive, electrically shielded during original construction and built economically, not having to accommodate people. In fact, such a modest construction option competes favorably in cost with retrofitting TEMPEST shielding, or special TEMPEST engineering of otherwise commercially available equipments. And, while this study did not address any explicit community information services, perhaps we should reserve the third floor for these.

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4.2.4 INFORMATION SYSTEM SECURITY

Summary

The ability to provide adequate protection to Agency information is a vital part of the management of information services.

In spite of the importance attached to this function, there is an enduring tendency to minimize the resources devoted to the security function in order to maximize the productivity of the missions.

When the information security problem exceeds the capability of traditional low cost physical and personnel security techniques and requires high-cost technical solutions, the tendency to sacrifice security for efficiency becomes markedly more pronounced.

With increasing investment in technical systems for provision of information services will come heavier pressures to ensure that maximal benefits are delivered from limited resources made available for information security.

Placing the several functions devoted to information security under single management would facilitate optimum allocation of security resources, minimize the negative effects of disparate national policy organizations, and expedite technological transfers across several disciplines.

Background

As technology rapidly changes our concepts of information and information handling, so does it change our perceptions of security threats and effective countermeasures. No longer can we be content to assume that the presence of physical barriers such as safes, vaults and guard posts will provide sufficient information security.

While traditional physical and personnel security measures are no less important, technology has added new disciplines such as computer and emanations security. These new disciplines require different skills and larger resource committments to keep pace with technological development. Modern information security personnel should have a depth of technical understanding that rivals that of systems designers, engineers and programmers and need a wide range of technical equipment to carry out their function.

Information security functions in the Agency today are divided because of historical developments of national policy.

The Office of Security is responsible for all information security except communications security. The Office of Communications is responsible for communications security primarily because of national policy decisions that have maintained national policy bodies composed of representatives from communications elements. Secondarily, the discipline of communications security has been highly technical and the OC personnel system has been uniquely qualified to provide the specialists required. (C 3d(3))

Computer security has developed within the Office of Security in parallel with the growth of Agency ADP. The Office of Security represents the Agency to the Community through the DCI Security Committee.

In contrast to the OC personnel system, the OS personnel system is not well suited to provide technical specialists for systems security. The security generalist assigned system security duties is well qualified to deal with policy issues but disadvantaged in dealing with questions of technical implementation that arise in profusion from systems designers.

As might be expected, the merging of computing and communications technologies also raises issues regarding computer and communications security. ADP systems are being networked through communications in ways that raise jurisdictional issues between the disciplines. Computers are increasingly applied to communications functions in applications that resemble traditional ADP. One clear example combining both problems is the CRAFT program. While intended to provide ADP support to field stations, it is planned to connect to the communications system and perform communications functions. (C 3d(3))

What is suggested is an amalgamation of those technical security functions devoted to protection of information systems. An integrated information systems security organization would ensure consistent protection across all systems, mitigate the negative effects of conflict at the national policy level, and, most importantly, allow freer flow of technical security techniques between ADP and communications technologies.

Drawback

In most amalgamations there is one party who is relatively advantaged and one relatively disadvantaged. Amalgamation alleviates this disparity by reallocation of resources. In this case, the Office of Security has been severely understaffed and underfunded with regard to computer security. The Office of Communications, by comparison, has a large resource investment in communications security. Integrating the two functions has the potential to provide improved computer security programs at the expense of security of communications.

Recommendation

It is recommended that those technical security functions involved in protection of information systems be merged into a unified Information System Security organization. Staffing of the organization should be accomplished by drawing from those career services capable of providing technical specialists qualified to deal with questions of policy implementation. This organization should be placed close to those components responsible for system design, operation and maintenance to facilitate policy implementation. In the interest of a unified security policy, systems security policies should be promulgated by the Director of Security.

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4.2.5 USER SATISFACTION

Summary

User perceptions of IH services today are of a growing variety of computer terminal and word processing systems each different from the other, each operating under different rules and using different languages. Users perceive a multitude of organizationally disparate systems, difficult to use, characterized by dated and incomplete information. The perception all too frequently mirrors reality.

Given these problems and regardless of the degree of centrality of any organizational solution, a customer service function is needed to assure users quick and easy access to all information services.

Background Discussion

User satisfaction is defined as the degree to which individual employees find information services meet their requirements.

New employees are made aware of information services available to them through orientation training, on-the-job training in their new components, contact with counterparts in other components, through various functional directories (Agency telephone directory, DO telephone directory, OCR Bulletins describing available information services), through progressive experience on the job and sometimes by sheer accident. Few formal training courses are available.

There is no formal training course describing official information services available in the Agency or the procedures for using those services. There is no training course available covering informal information resources and channels. Individuals are largely left to their own devices in trying to tap the information resources in this Agency related to their needs.

Once aware of the service, employees in need of information normally go directly to the component(s) offering the service. For ADP support the procedure is to request the service through officially established channels.

Responses to various information studies and user satisfaction polls are replete with complaints about the quality of the information service, or the currency of the information. Users frequently cite the difficulty of obtaining good service and inevitably question the relevance and or completeness of responses. Are the complaints justified? Certainly there are cases of documents lost or delayed in the dissemination or distribution process, reference service that has been slow, printing support unresponsive, ADP support delayed.

The opposite view holds that users often levy unreasonable demands on the information system. Here too, there are cases of users demanding faster dissemination service and then failing to pick up the disseminated material when the faster service was provided. There are cases of urgent user requests with close-of-business deadlines, with the response made by the deadline only to find that the requestor had gone home without waiting for his answer. Although individual complaints are real, one gets the feeling that deficiencies are frequently more annoyance than serious. Where the deficiency is recognized as serious, corrective action is usually taken by the responsible organization.

We believe that a more significant problem is the user's difficulty in coping with the richness and variety of information services available. The user must not only become acquainted with the official and unofficial services but is faced with the task of learning how to use increasingly complex resources. This entails much more than surface appearances would suggest.

To illustrate the extent of the problem with more specific examples one has only to look at the multiple points of contact a user must exploit for needed information. Dissemination requirements are negotiated with OCR for hard-copy documents or Cable Secretariat for cables or with other disseminating components for more specialized material. The user obtains open-source publications from OCR's Acquisition Branch, maps from OGCR's Map Library, communications support from OC, computer support from his own shop or from ODP, data base management support from ODP, etc. Many more specialized support services are also available such as OCR's RSM system, the various automated systems in OCR's TAP room, the OGCR Genigraphics system, ODP's RAMIS system, etc. (C 3d(3))

Finally there are the information resources owned by the non-IH Service components; data bases and information systems that are created by operating components to satisfy their own requirements but which because of the non-unique nature of information are of potential use to many others, e.g., Office of Finance and Office of Personnel Policy Planning and Management require many of the same data elements in their work.

We have no measure of the extent of these information resources, though several surveys have attempted to catalog them. Neither do we have a good measure on the actual and potential population of users of these resources nor on the depth of their knowledge about the information base. Managers of any future information service should collect information, possibly by questionnaire, to resolve these unknowns and to determine minimum training requirements for both new and old employees.

The Task Force (CIA/IHTF) cataloged responses to the 1978 Comptroller questionnaire concerned with information services and subsequent responses to its own questions concerning the type of service provided by current information handling components. Because the responses were prepared at Office level the extent of individual concern is unknown. Without extensive polling, it is impossible to determine whether many of the problems identified are real or simply perceptions resulting from bad but isolated experiences. The sum of the complaints, however, suggests that a large number of users find it increasingly difficult to master their own work while simultaneously developing proficiency on available information systems, each one of which satisfies only part of the users requirement for information.

Major Agency information handling components have long recognized this problem and the utility of customer service units. The Office of Communications, Current Activities Branch, for example, assists users with any problems they have with the communications network, helps customers formulate requirements statements, and directs customers to appropriate contact points within OC.

Similarly, ODP has established a trouble desk to help customers with problems such as terminal outages. A control point provides a human front-end interface to the computer systems in ODP's Operations Center. A customer support staff prepares and publishes ODP Tech Notes and responds to user questions about the kinds of service offered by ODP.

OCR does not label similar functions as customer service activities but the concept of one-stop customer service is clearly built into the system. The most widely advertised customer service directory in the Agency is provided by the Office as a one-page outline of OCR services found just inside the front cover of the Agency telephone directory. The CIA Library offers a reference service that provides either the answer to a question or a referral to where the information might be found. The library also offers on-line information service through several commercial and classified information systems and provides the trained staff to operate the terminals thus relieving requestors of the need to learn several additional systems. The OCR Country Reference Analyst provides one-stop service against a variety of files and data bases. Finally, OCR has published four bulletins which describe in considerable detail the various information resources available in the office.

The DO/IMS has no component assigned specifically as a customer service contact point but the availability of the IMS functional directory in the DO telephone book, the functional organization of IMS itself, the DO training program and the long existence of IMS as a service unit obviate the need for any special customer interface.

The only other formal mechanism for identifying information services is the functional directory found in the back of the Agency telephone directory. The functional directory, however, is neither complete nor current.

The existing Agency organizational structure and people who have worked in that structure for some time constitute an institutional memory which functions as an informal directory of available information resources. Informal institutions, however, are deprived of any long-term continuity by transfers, retirements, etc.

To summarize, the users of information services have a variety of customer service contacts available to them none of which can provide definitive information on all available information services. The user understandably has reservations when searching for information as to whether significant information has been missed.

Is it possible to create a customer reference service that will assure users access to all available information services? Why hasn't such a service been installed? Should such a service be established? Where should it be located? How should it be staffed? Will users use it? Can it be kept current?

The need for a customer service function is unquestioned. OCR, ODP, OC and IMS all provide a level of customer service that is dictated by experience. ODP at one time created a user support division to assist do-it-yourself programmers in their work but the organization atrophied as users learned how to exploit terminal systems on their own. Catalogs or inventories of files and systems have been created in the past but were little used whether from lack of awareness of their existence or because they were not current. A referral service was an integral part of the CHIVE task force proposal but the concept was dropped when that project was terminated. Enthusiasm for such a service seems to rise and fall with some regularity.

A single point of contact for access to all customer information services is on the surface an attractive idea. If a customer wants a new terminal, a document, a subject search, a new software program, a change in dissemination profile, a word processing system, etc. the customer service would oblige. The service point could provide information directly to the customer, act as an intermediary between the user and the many available information systems and services, or function as a central referral service. Which of these functional configurations or combinations thereof is created depends on a number of factors. Certainly creation of a new Directorate of Information Services will result in different customer service requirements than will a decision to create an Office of Information Services in the DDA or in NFAC. Questions which require intermediary intervention to access large manual files preclude separation of the service person from the file and therefore limit assignment of the person to any kind of central service component. It will also be difficult to place individuals in a customer service component who have other duties in addition to their customer service responsibilities, e.g., a biographic analyst. On the other hand the increasing availability of documents and data in electronic form which can be recovered quickly makes possible the creation of very sophisticated technologically advanced customer service systems. Referral services too appear more attractive in this environment. Many IH activities take place throughout the Agency of which most people are unaware. Compartmentation, organizational change, and just plain parochialism conspire to restrict awareness of such information resources. A referral service would help overcome these barriers.

How much it would be used is unknown. Such a service would be useful to new employees. Experience suggests that need would diminish as users acquired a working knowledge of information resources. This argument is countered by a continued need for such a service by individuals whose knowledge of resources fades with less frequent use. Where should a customer service component(s) be placed organizationally in the Agency? The answer depends on what organizational option is selected for Agency management of information services. Placement of customer service components is discussed in each of the organizational options descriptions provided in the Executive Committee Decision Analysis package.

Recommendation

A customer service should be established. Its placement and configuration should correspond to the service described in the organizational option selected by the Executive Committee.

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4.2.6 INFORMATION DISTRIBUTION NETWORK

Summary

We have ignored the universality of information as organizational structure and technological limitation fostered development of a variety of information distribution networks. Compartmentation reinforced the diaspora by requiring "special channels".

It is recommended that we transition from the welter of (electronic and other) networks to a universal information distribution network which will achieve compartmentation and command privacy by cryptographic separation. Although this integrated network will continue to have "manual" (i.e., pouch and courier) links, the electronic distribution should bear an ever-increasing fraction of the load, including facsimile transmission. Electronic authentication and release procedures will support command and control, and originator control. Formal APEX controls will be supported on a per-document, per-subscriber basis. Irrespective of internal network procedures, the system will provide end-to-end acknowledgement and privacy where required.

Background

Both theory and practice remind us that information, in whatever form it originates, can be commonly represented. Once reduced to some canonical representation, the encoded information can be realized in a variety of media for communication and storage.

Suppose we have a series of discrete bits of information, say, sequences of yes/no decisions. With some convention about which bits go where, this binary information can be communicated as electrical impulses, flashes of light, puffs of smoke, sequences of tones, etc. The information can be stored as marks on paper, film and the like, magnetic regions on a magnetizeable surface, hills and valleys in a deformable plastic, etc.

Suppose we have discrete letters, numbers or punctuation marks. A simple coding scheme allows the representation of each character as a short, agreed-upon sequence of bits. Now the characters may be communicated/stored in all the ways to which we have previously alluded.

In the case of Shakespeare's Sonnets, messages from the COS, or editorials from Pravda, they are simply well-formed strings of characters. Thus, composed in turn of a series of bits, the sonnets, messages and editorials can be handled as previously described.

In the case of reconnaisance photos or renaissance paintings, a facsimile representation can be derived much like the "paint-by-the-numbers" schemes. Scanning the numbers in a well-defined way, say left to right, top to bottom, we can generate our familiar string of characters and, so, handle these as before.

In the case of operatic arias, telemetry signals, or political broadcasts, a similar facsimile representation can be established by periodically sampling the waveform and measuring it. This string of numerical measurements, our familiar string of characters, after all, can now be handled as before.

In facsimile schemes it is important to know how fine-grained is the real information in the original. The fineness of the sampling and the precision of the measurement are not at all constrained by the numerical representation. Therefore, no sensible information ever need be lost in the process; the danger is the reverse: we can be overwhelmed by uninformative detail. Any constraints in the process are those of the physical production processes.

Using a numerical representation scheme allows preservation of any desired degree of precision using a sufficiently long series of relatively imprecise physical quantities. This ultimate superiority of the numerical representation over the precision attainable with analogue physical quantities underlies the preference for digital encryption as opposed to any other forms of "scrambling". Thus, security, in addition to elegance, results from utilizing the underlying informational commonality of various forms of data.

Information Security and the Pouch

A number of personnel and physical security measures are taken to preserve the integrity of the pouch, or, failing that, to detect its compromise. In addition, a number of purely "informational" measures are employed, one inadvertently, and several, perhaps unofficially:

- **levels of indirection:** personal and impersonal identities are protected by use of pseudonyms, including transient "IDENs", and cryptonyms;

- **split transmissions:** the paper realization of a sensitive message is ever more finely halved until no single piece of paper is adjudged sensitive; then, with each containing instructions for reassembly by the intended recipient, the pieces are shuffled out into separate pouches;

- **signal in noise:** the more the pouch is abused, by carrying non-official materials, the greater the cost and difficulty an intruder has in sorting wheat from chaff in a brief interlude (... presumably, this concept is not officially endorsed); (C 3d(3))

Closely allied with the signal-in-noise concept are two informational security measures, the practice of which is unconfirmed:

- **disguise:** wherein all other applicable, sensible information security measures are deliberately not employed in hopes that the supremely sensitive message will be overlooked; and,

- **"defensive" disinformation:** whereby the subsequent revelation of falsity calls into question the veracity of other transmissions in the same channel, thereby "protecting" those not independently confirmable.

In spite of such information measures, and in spite of physical security measures taken for pouch protection, cable transmission is regarded as more secure because of an additional information security measure, encryption of the information. However, encryption is not a property restricted to electrical transmission. Rather, it is a derives from the digital encoding incidental to cable transmission. As we have seen above a digital representation can be derived for any sort of information. Hence, encryption can be applied to pouched materials as well as to cables. Instead of sending a paper copy of the plaintext, we could send encrypted keystrokes captured when the material was originally typed (in the case of a dispatch, say) or digitized facsimile of materials otherwise acquired.

Recommendations

It is recommended that the extant bits and pieces of our information distribution systems be sewn together into an integrated, world-wide, multi-media, encrypted network.

Further, it is recommended that administrative mechanisms for compartmentation and command privacy be integral to the initial design, and fully supported by strong technical measures including dynamic electronic key distribution (EKDC) for cryptographic separation as required.

Finally, it is recommended that the network, insofar as possible, be geography independent and distance insensitive -- at least from the end user's point of view -- so that the headquarters area transmission system and the worldwide network are indistinguishable, excepting administrative impositions.

The blueprint for this, presumably the work of the System Architect, and coordinated with affected components, will include:

- the physical interconnection (backbone communications) network;

- the logical networks superimposed upon the backbone;
- the administrative and technical measures (e.g., cryptographic separation) which will keep logical networks distinct;
- the administrative and technical procedures for passing information (through a "gateway") from one logical network to another, including convenient "pouch" interfaces, i.e., interfaces to off-line exchange media (magtapes, cartridges, floppy disks, etc.)
- the clear apportionment of responsibility for implementation thereof.

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4.2.7 THE UNIVERSAL TERMINAL NETWORK

Summary

Functional specialization, compartmentation, and organizational structure, in the absence of an overall architecture, lead to a proliferation of disjoint terminal networks. However, specialization, structure, and compartmentation are neither absolute nor eternal. People's information needs are dynamic and the terminal network, as it becomes our primary access to information, must accommodate.

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We must rediscover the universality of information, recognize administrative and substantive data as indistinguishable except by application, and distinguish between the access controls for information and the interconnectivity of the underlying network.

It is recommended that a blueprint be developed for the universal terminal network and that current and planned equipments be reconfigured in accordance with it.

It is further recommended that the convergence between word- and data-processing be accelerated: that the majority of our administrative memoranda be reduced to the data base transactions they really are ... a clear opportunity to <u>do more with less</u>.

The benefits in reduced numbers of terminals (in the aggregate and on any one desk), the attendant standardization of user interfaces and resulting simplifications in training, and the enhanced utility and flexibility of the network will be substantial rewards. The universality of the physical network should not preclude the superimposition, where necessary, of administratively discrete logical networks upon it.

Background

Like Topsy, information processing in CIA just grew. Now, disjoint applications run on a single mainframe computer, several mainframes are networked together, several dedicated minis are to join the network, while others stand alone running one or several related or unrelated applications.

A variety of terminal networks serve these applications:

- ODP's network of Delta Data terminals which access, via COMTENs, the general purpose mainframes in the Ruffing Center;

- A network of Delta Data terminals accessing the CAMS application in the Special Center -- this network is logically and administratively distinct from, but electrically interconnected with the above network via COMTENs;

- A network of Delta Data terminals accessing DO applications in the Special Center -- logically and administratively distinct from, but electrically interconnected to the aforementioned networks via COMTEN interconnection;

- A network of STAR terminals tied directly to mainframes in the Special Center ... and therefore electrically but not logically interconnected to all preceding networks;

- A group of four-phase input devices now on-line to Special Center mainframes ... and therefore electrically but not logically connected to all above networks;

- A forthcoming network of SAFE terminals tied to segregated SAFE mainframes ... which will be electrically interconnected with, and provide a logical gateway to general purpose Ruffing Center mainframes ... and therefore electrically but not logically connected to all preceding networks;

- A network of CDS terminals tied to segregated CDS mainframes ... which are electrically and logically interconnected with GC03 mainframes ... thence to preceding networks;

- A network of Ann Arbor terminals serving two crisis management computers in the Office of Current Operations ... which are connected to GC03 mainframes via COMTEN and to CDS (receive only);

- A network of ETECS terminals connected to a P&PD mini-computer network will be connected to VM GC03 mainframes ... and therefore generally connected to above networks;

- A network of System 6 terminals are connected to OCO/PPG's System 6, connected in turn to VM GC03 mainframes via COMTEN network ... and therefore generally connected to above networks;

- A network of Delta Data terminals dedicated to the NPIC Data System ... logically and electrically connected through DATEX. (S 3d(3))

To understand the interconnections of these terminal networks, it is useful to introduce some computer science argot: "virtual", "logical", and "transparent". The terms virtual and logical, nearly synonomous in this context, imply that the functional description of a device can be divorced from its physical implementation. In this same context, transparent means that the user of a (logical/virtual) device should be unaware of the incongruity.

In the case of a communications network, then, we can have an underlying electrical interconnectivity upon which we can superimpose a number of different logical networks. The logical networks may be distinguished from one another by:

- use of different communications protocols; or
- administrative access controls; or
- the ignorance of subcultures of the overall community of subscribers.

In turn, this suggests that if one wishes to compartment the various logical networks, keeping subscribers to one logical network from accessing another we can:

i. implement the logical networks so that they map one-to-one onto separate physical networks;

ii. utilize different communications protocols ... which the individual user must be unable to modify;

iii. utilize a more general protocol which enforces administratively set access controls;

iv. hide the existence of a larger network from subscribers.

The last strategy, depending upon secrecy, is a risky one at best. It is overcome by curiosity, accident, and the sheer number of subscribers. Worse, having kept the very existence of a larger network secret, the discoverer will not appreciate the gravity of trespass.

The first strategy, physical separation, is technically foolproof, but operationally awkward if some subscribers are privy to more than one compartment and therefore must access more than one logical network. Specialized interconnections merely return us to the original problem, albeit sometimes disguised. The alternative is an array of specialized terminals for that user, and expensive, error-prone manual transport of information from one network to the other. (note that the more we automate the manual interconnection -- say, by a tape-carry -- the more we lose the original benefit, namely, the mind of the knowledgeable human serving as the gateway between two otherwise disconnected networks.)

The second strategy, depending upon different protocols, also disadvantages those subscribers common to more than one network. Its success, moreover, depends upon a user being unable to modify the protocols. The present state of the computer security art cautions that this is hard to prevent if the protocols are implemented in a general purpose, time-sharing environment. Thus, such protocols must be the province of specialized, dedicated communications processors. Simply moving protocols into hardware, while appealing on the surface, probably will collide with industry trends. Developing a protocol control chip costs about $250,000, making impractical the single protocol chip. The forecast is that commercially available chips will, therefore, handle many protocols; protocol selection will be based upon CPU control signals. If the CPU from which the control signals are derived is time-shared, general-purpose, then hostile-user code can abrogate the intended separation, again arguing for a specialized, dedicated communications processor.

The third strategy accomodates overlapping communities of interest, but like the second, today depends upon the access controls mechanisms being sequestered in a specialized, dedicated communications processor. A variant on this theme is the use of cryptographic separation, with dynamic key distribution on a per transaction basis; the Key Distribution Center (KDC) is responsible for enforcing access controls. Less operationally responsive, super-encipherment with static keying also can enforce logical separation; peripheral nodes must be intelligent enough to add communications headers after encipherment ... we might refer to this as a Private Line Interface (PLI).

The Universality of the Terminal

The functionality of terminals is steadily increasing. They have more local processing power, allowing more efficient communications or stand-alone processing. Higher resolution, multiple character sets and graphics, including color, are all examples of the increased functionality. The base price of terminals of interest to the Agency continues to be dominated by the cost of CRT, keyboard, tempest-proof enclosure and power supply. Given this rather high fixed cost, functions which can be software-derived --local processing power, graphics and multiple fonts -- add little to the cost. Marginal costs for higher resolution and color will be noticeable, however.

Because of the increased processing power which could be available, at small marginal cost, in all our terminals, there is no reason why terminals need to be dedicated to applications, excepting needs for high resolution color. Of course, certain configurations -- keyboards, for example -- might be optional for some applications. However, judicious procurement will allow a high degree of interchangeability. Thus, most of our terminals could be universally applicable to most of our applications. This is true even were the Agency to retreat from its ideal of a single standard terminal (Delta Data 7000).

The Universality of Data

The encoding of information for machine manipulation does not distinguish between substantive and administrative data, nor between word processing or data processing functions. At root, then, there is no reason to have separate networks for administrative data and for substantive intelligence data; in fact, there are good reasons to merge these. Similarly, we should strive to eliminate any distinction between word processing and data processing terminals. Insofar as these distinctions occur today in commercial offerings, they result from historically different starting points in the development of the two functions. Irrespective of starting point, word processing and data processing terminals (and the processes themselves) are converging. As word processing matures, the file management, communications, and sophisticated text processing algorithms of data processing (Key Word in Context, etc.) will be inextricably incorporated. Similarly, as data processing matures, loosely formatted strings of text become an increasingly important data-type.

Perhaps the most compelling evidence of the similarity, and the richest prospect for economies as a function of more automated information handling, arises from an inspection of adminstrative memoranda and forms. To communicate administrative information, request information, seek concurrence, or accomplish coordination, we compose a memorandum. As a particular species of communication is required over and over, human creativity overlays the few bits of data with poetic variation. The addressee must strip away the semantic disguise to recover the few data bits. Sometimes the process is noisy and the recovery flawed. Additional noise is introduced as the data included by the initiator may not be exactly congruent with the needs of the recipient. Ultimately, a form may be created which structures the communique. Thus, many of our adminstrative memoranda are basically simple database transaction, which, if the truth be recognized, could proceed directly from keyboard to data base much more efficiently. That is, much of today's word processing is really data processing gone agley. If ever there was the opportunity to "do more with less", it is here.

In the terminal proper, word processing will benefit from the incorporation of graphics (maps, charts, etc.), while data processing will benefit from the full page displays (50-60 lines of text) which exemplify the best word processing devices. The local processing power now being included in terminals accommodates word or data processing algorithms insofar as they may be distinct, as well as general communications protocols.

Access Control and Authentication

To achieve compartmentation, ensure command privacy, and bolster security it is essential to control the access of individuals to information. A quantity of information can be given only to an individual with a predetermined need-to-know. The three parts to this process are:

- **authentication of the individual**-- Who is he? Is he who he claims to be? In what capacity is he acting?

- **identification of the information**-- What information is being requested? (Or, what process is being initiated?)

- **validation of the permission**-- May that person access that information or initiate that process?

In essence, then, compartmentation is an incontrovertible decision based on an unimpeachable function which maps individuals to a quanta of information. The process can break down in two generic ways:

- **the mechanism can be bypassed**-- The information can be obtained outside the purview of the access control process

- **the mechanism can be suborned**-- An individual can masquerade as another, disguise the information requested, or tamper with the mapping function of individuals to information.

Drawing upon the computer science distinction between procedure and data, bypassing the mechanism is procedural while suborning the mechanism is a function of data. In considering ways in which the mechanism can be suborned it is useful to consider individually the data required for authentication, identification, and validation.

Basically, all schemes for authenticating the individual come down to known information which can be supplied uniquely by that individual. This information can be a password, the bitting of a conventional key, a derived function of the fingerprint or speech pattern, information recorded on a badge, etc. The password can be elaborated to include an extended inquiry where the individual is randomly required to supply personal history details, the aggregation of which is probably known only to him and the system.

The authenticating data can be acquired by a malefactor from three sources: from the individual himself, from the system's records, or the malefactor can alter to a known state the system's records.

An individual can reveal his password, or (temporarily) lose control of his key or his badge. The malefactor needs a means of copying that information for later production ... easy for a password, and not hard for key or badge information. Copying information carried in fingerprint or voiceprint is technically no harder for the malefactor than for the system, and does not really require the cooperation of the individual. However, the capital investment required for fingerprint information currently exceeds badge and voiceprint, while no capital investment is required in the case of the password, and little in the case of a conventional key. The mix of such authentication devices must be based upon a threat analysis which reveals the casual or determined nature of the potential malefactors and the protective custody which can/will be exercised by the individual.

Recommendations

It is recommended that a blueprint be developed for the universal terminal network and that current and planned equipments be reconfigured in accordance with it. The blueprint, presumably the work of the System Architect, and coordinated with affected components, will include:

- the physical interconnection (backbone communications) network;

- the logical networks superimposed upon the backbone;

- the administrative and technical measures (i.e. cryptographic separation) which will keep logical networks distinct;

- the administrative and technical procedures for passing information (through a "gateway") from one logical network to another, including necessary authentications;

- the clear apportionment of responsibility for implementation thereof.

This will require a vigorous research program to further the principles of dynamic electronic key distribution to support cryptographic separation of logical networks.

It is further recommended that all new terminal acquisitions, and word processing devices (for as long as the two remain distinct) be procured so as to serve multiple function, and equipped with compatible communications options. It is <u>not recommended</u> that the terminals be provided with local storage; instead, it is recommended that the network provided storage ... distributed as required in vaulted "registries".

Finally, it is recommended that the convergence between word- and data-processing be accelerated: that the majority of our administrative memoranda be reduced to the database transactions they really are. At this point, conventional typewriters should begin to phase out (unless we institute a robust, conveniently distributed OCR interface to the general information distribution network.) A particular target for replacement should be those with local magnetic media storage.

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4.2.8 CENTRALIZED DISSEMINATION AND REFERENCE

Summary

To its detriment, the Agency has permitted development of a disharmony of information services. Acting as if the media were the message, different dissemination systems and different storage and retrieval systems service different incoming information streams. Thus the Agency denies its roots as coordinator of information and impedes fulfillment of its all-source analysis role.

Providers of the disjoint dissemination and retrieval services needlessly duplicate the design, development and operation of systems to satisfy user needs. Worse, would-be users must supplicate many suppliers, never sure of the completeness of their inquiry.

Task Force analysis of dissemination sharpens two distinctions and blurs one:

- distinguish dissemination (cognitive, who gets what?) from distribution (physical delivery)
- distinguish centralized data base of dissemination requirements, from the centralization of disseminators and/or the centralization of release policy
- recognize the similarity of dissemination (requesting to-be-available information on a topic) and reference (requesting available information on a topic).

It is recommended that the Agency recentralize dissemination and reference services as these are increasingly done "on-line", and that an integrated database of dissemination requirements be kept, accessible to all would-be disseminators. Where security/compartmentation dictates, levels of indirection may be used.

DISSEMINATION SYSTEMS

Two components are responsible for the bulk of document dissemination in the Agency. They are the Office of Communications (cables) and the Office of Central Reference (hard-copy intelligence documents and open-source publications). On a more limited scale, OD&E, FBIS, OCO and RES Watch Offices, DO/IMS, various registries, and the originators of documents are all involved in dissemination functions. (C 3d(3))

Although reasonably well satisfied with dissemination support, users identify three types of dissemination problems; delays in user receipt of electrically received intelligence products, a need for dissemination tailored to users (branch, individual) requirements, and a concern that the various Agency components involved in the dissemination process do not use the same set of reading requirements with the inevitable result that information is missed.

REFERENCE SYSTEMS

As in the dissemination function, many components are involved in storing and retrieving information. OCR manages the AEGIS/RECON Subject file, Biographic files, files, Rapid Search Machine files and Interim SAFE. OC maintains reference and archival files on Agency cables. DO/IMS manages, among others, the Special Trace and Retrieval system, the Documentation Reference System, the COMET Cable file and the Walnut Microfilm file. The Exploitation Products file, the Objects Data file and the Installation Data file are major NPIC data bases. Hundreds of files are maintained by other Agency components as data bases in ODP systems oron dedicated mini and microcomputers located in Agency components. (C 3d(3))

Users of reference systems see a need for more flexible and user-oriented retrieval facilities and a need for directories or catalogs of stored information and information handling systems.

User Difficulties with Multiple Systems

Agency personnel in need of information can request that information from one or more of the several reference systems. All of the dissemination and reference systems, however, operate independently. The user must first learn what dissemination and reference systems exist and what source materials each disseminates or stores. The user then must go through the bureaucratic drill of levying information requirements against each of the separate dissemination systems and requests against each of the separate reference systems to be sure that he has obtained all available information on his subject.

This partitioning of dissemination and reference systems, while understandable given the evolutionary development of information handling over the life of the Agency, pressures for compartmentation, isolated locations, etc., makes the job of the user considerably more time consuming. Partitioning inevitably raises doubts in the user's mind as to whether all available information sources have been fully exploited.

Simplification Needed

We assume the average user is able to cope with the multiple systems available to him once they have been identified. But, each additional system demands more of his time. There are other pressures, too, for simplicity and standardization of dissemination and reference systems. The sheer cost of developing and operating overlapping systems ... including multiple indexing and data entry, on occasion ... pushes us toward standardization and integration in a time of fiscal austerity.

There is an obvious need to simplify the user interface with dissemination and reference systems, to reduce training costs, provide more information on what is available, and to combine systems where possible. Simplification is not easy to achieve, however. Functionally related systems, dissemination, for example, exist in several organizationally autonomous components of the Agency. Combination of systems would require not only that technical barriers be overcome but organizational barriers as well. Two alternatives, a requirements registry and a catalog of reference services provide some relief and avoid the organization issue.

Requirements Registry

Rather than submit redundant requirements to each of the many organizations having dissemination responsibility, the user would submit his requirements (e.g., subject, area, source, category ...) to a reading requirements registry. The requirement would be entered into an automated requirements database to which controlled, shared access would be available to all would-be disseminators ... who would be required to use it. Such a database would save the user time, assure higher quality, and help the disseminators, as well ... assuming the latter had remote terminal access. Giving the disseminator a search capability against this data base would simplify the matching of requirements with incoming material. The requirements could be automatically run against stored collections of material.

The on-line system would provide tools for the maintenance and updating of the database so that flows of information could be easily terminated when no longer required. Also provided would be clearance and compartmentation data about the requestor.

Reference Service Catalog

The interface between users of intelligence information and the various reference services must be simplified. A catalog of available reference and dissemination services has been suggested on a number of occasions. Inventories of reference systems have, on occasion, been completed, sometimes for other purposes. These have not, however, been widely enough circulated nor have they been maintained, thus quickly falling into disrepair and, understandably, disuse. Nor has thoroughness always been the goal, again diminishing the usefulness of past inventories. Maintaining such a catalog should be recognized for the time-consuming job it is. Automation of such a catalog would help keep it current, and remotely accessible.

Combining Dissemination and Reference Service

Because both dissemination and reference functions are, today, labor intensive, combining the two to save manpower is attractive. Conceptually, the two services are alike. Both attempt to match user requirements for information with available information. The dissemination process attempts to match user requirements with newly-arrived information. The reference process attempts to match user requirements with stored (previously received) information.

Historical Developments

One of the earliest attempts to combine dissemination and reference activities took place in June 1949. At that time the Agency's Office of Collection and Dissemination conducted an experiment to determine the feasibility of having one person do both coding for retrieval and reading for dissemination of documents. At that time the reference function was already supported by an IBM punched card system. A two week test proved little except that all agreed that keeping current with changing reading requirements was the hard part.

A later (mid-50's) test explored the feasibility of automatic dissemination based on a match between punched card subject/area code representations of documents and reading requirements indexed with the same codes. Accuracy of dissemination was good but dissemination was slowed because of delays in coding the documents (which equation, presumably changed with electrical receipt and computer advances ... culminating in MAD).

Looking forward to increased electronic receipts and holdings, including internally produced, word-processed documents, and incorporating modern computing technology makes possible what was formerly only desirable.

The Continuing Present

OC's Cable Dissemination System, CDS, is now the primary dissemination vehicle for electrical messages (cables). CDS incorporates, vitally, the MAD automated dissemination concepts (and execution). To support electrical distribution to current analysts, the distribution portion of the MAD software has been reborn in ODP's Message Routing Service. Electronic delivery of selected messages to NFAC analysts is provided by Project SAFE (which, in its selectivity is a dissemination/reference system.) NPIC's installation of the High Speed Text Search (HSTS) machine will provide key word in context dissemination/retrieval. The DO-OC plan for remote APARS will incorporate second-level dissemination at the periphery of the distribution network (in the registries) whose terminal mini-computers and human ingenuity will create irresistible pressures for automated dissemination. (C 3d(3))

Finally, much reference activity has been automated. OCR's Rapid Search Machine (RSM), Interim SAFE, RECON, DO's COMET, NPIC's Integrated Information System (IIS) are examples of successful automated information reference systems. All are independent systems created to meet individually perceived needs which are, nonetheless, common. (C 3d(3))

Recommendations

It is recommended that:

- dissemination and reference be considered together for planning and technical design;
- a consolidated requirements registry be instituted to maintain an on-line database which will be remotely accessed by all would-be disseminators;
- a more rational blueprint for the (system of) dissemination and reference systems be promulgated;
- a catalog of information dissemination and reference services be compiled and maintained on-line.

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4.3 STANDARDS FOR INFORMATION HANDLING

At the inception of this study, there was the belief that were standards adopted, many of our perceived difficulties would be eased. Certainly, this is true of good standards, but the simplicity of the statement may serve to mask the need for an infrastructure of planning and architectural design. Inasmuch as these needs have been dealt with previously, this section concentrates on the perceived benefits of good standards, while cautioning against premature standards which can pre-empt economical use of changing technology. Section 4.3.1 develops this general theme, observing that promulgating a standard may be merely an acknowledgement that standardization has occurred.

Section 4.3.2, **NETWORKING STANDARDS**, discusses the disarray of national/international network standards, concludes that for the near future we will have to manage a variety of protocols, and suggests that the set can be kept smallest by a solely responsible component.

Section 4.3.3, **DATA BASE STANDARDS**, (to be supplied) recognizes the highly leveraged growth in usefulness as data bases are inter-related, and therefore the desirability of standards. Also recognized, however, are the (motivated?) incompatibilities in the market place. As previously, the conclusion is that focusing administrative responsibility in the organization will limit the number of protocols we must concurrently support.

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4.3.1 INFORMATION HANDLING STANDARDS

Summary

Well chosen, well designed standards contribute to efficiency, cost effectiveness, uniformity and, often, security. Unfortunately, the reverse is also true.

The question of technical standards for information services is not what but when.

Discussion

Throughout this report there is the underlying thesis that little is unique to the Agency in the use and provision of information services. When addressing the subject of standards this thesis is of great significance. If we are to achieve maximum effectiveness from limited resources then we will fare better with no standards than Agency standards that are unique from those widely accepted in the rest of government and industry.

Unique standards will commit the Agency to sole support of design, production, and maintenance and, hence, unnecessarily sap resources. Conversely, adopting standards that meet essential needs and that are widely accepted by other organizations will lower costs.

While these thoughts state the obvious, they belie the difficulty of implementing a good standards program in a rapidly developing area of activity such as information services. Our ability to invent new devices, applications and services far outraces our management ability to reach consensus across a wide enough population to describe associated procedures and specifications as standard. The time interval between invention and standardization frequently exceeds a decade. When standards are agreed upon they may appear at any one of several hierarchical levels; community, government, national, or international. It is not uncommon to see the same function addressed by disparate standards from different hierarchical levels.

The problem of standardization for the Agency then is more that of timing than substance. Recognizing that standardization in a given instance could improve effectiveness is not sufficient. Knowing when standardization becomes economically attractive is key.

One pragmatic observation of the standards process is that formal acceptance of a standard is frequently an anticlimactic acknowledgement that standardization has been implemented.

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4.3.2 NETWORKING STANDARDS

Summary

Networking of computer systems requires agreement on conventions for the format and content of messages to be exchanged.

Standardization of these conventions, or protocols, will greatly enhance our ability to maximize return on investment in information services.

While a number of protocols have achieved popular acceptance, emergence of one overwhelming favorite remains in the indefinite future.

For the near term, the Agency will be best served by managing a minimum set of protocols rather than striving for a single standard.

Discussion

While the desirability of a standard protocol for intercommunication among machines has long been recognized, development of that standard has been painfully slow. There now exists an international standard protocol developed by the CCITT and referred to as X.25.

Unfortunately, the U.S. market was not content to await a standard. To gain the benefits of distributed processing, U.S. industry proceeded in the absence of standards. The result is a variety of protocols that are, for the most part, vendor unique. The common complaint heard that one vendor's computer cannot talk to a second vendor's product is usually a result of incompatible protocols.

Major vendors find a marketing advantage in unique protocols since customers have yet one more compelling reason to stay with a vendor's product line, i.e., communication compatibility. Hence, the prospect of quick agreement on a U.S. standard is bleak. Resolution will likely occur as a result of the competitive market forces and not organizational fiat. One will see a lengthy period of evolution marked by the appearance of specialty firms who will exploit incompatibility by marketing conversion or translation systems that will negate the need for the computers at either end of a link to be modified. In parallel will develop an option set of protocols from the computer manufacturers that will resolve incompatibilities between vendor protocols at added cost. Over a period of several years there may develop a discernible movement towards one standard as evidenced by the pattern of protocol options offered.

How the Agency deals with this fluid situation can have a significant impact on how rapidly development of systems occurs. Resources expended to deal with incompatibilities are obviously lost to development of new services. On the other side, economies gained from forced standardization can quickly evaporate if history proves our anticipatory efforts in error.

For the near term there appears no alternative to accepting multiple protocols within the Agency system. What is indicated is a strategy that will minimize the number of protocols we are forced to live with. The X.25 protocol mentioned earlier will become standard in international communications. Therefore OC's decision to implement MERCURY with X.25 protocol is reasonable and establishes one standard for overseas operations. Whether X.25 will ultimately become a domestic standard remains questionable. In the interim the Agency will be well served by assigning responsibility for networking standards to one organization with a charge to minimize the cost of networking by evolution to standards emerging in industry.

Recommendation

Responsibility for network standards should be assigned to one organization which will attempt to minimize the costs of networking by limiting the number of protocols within the Agency and evolving Agency standards in consonance with industry trends.

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4.3.3 DATA BASE STANDARDS

Summary

Databases are the stock-in-trade of the intelligence process. Nonetheless, the computer, with its changing software, has lured us from the database standards of our manual files. Each new datamanagement system brings with it unique database "standards".

Theory tells us that new datamanagement systems should be able to separate the user's model of the database from the storage strategy used by the system. Until recently, however, datamanagement systems did not fulfill this promise. More importantly, the introduction of a new datamanagement system is, historically, the occasion for a reformatting of the database, a new conceptualization by the users, and a recoding of the elements of the database. As a consequence, database conversions are extremely costly ... out of proportion to the benefit, often. Moreover, interchange between databases is difficult and costly. The result is separately maintained copies of a database, each in its own format, and generally out of synchrony with the others. Occasionally noticeable analytic differences are derived therefrom; the result is somewhat diminished credibility ... of the analyst to the policy maker and of the datbase to the analysts.

As we come to recognize how many component functions are, at their root, database administration ... with management or analytic reports derived therefrom ... and as new datamanagement systems are introduced which accord with new DBMS theory, we have the opportunity to make substantial improvements. A process for setting, maintaining (and changing when necessary) the standards for databases in the Agency will become crucial. As we recognize the benefits of integrated yet distributed databases, whose parts are separately administered as required by security or logical task breakdown, the need will become yet more crucial.

Unfortunately, the commercial world is not

moving as fast toward standardization in the database area as in, say, the telecommunications area ... although they share our exact needs for standardization of databases. It will, then, be tempting to move out smartly and set standards of our own. The attendant risk of diverging irreconcilably from the commercial, (cost effective) trend is obvious. The Systems Architect will need to keep a weather eye on commercial movements.

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4.4 COMPARTMENTATION IN INFORMATION HANDLING

Previous sections have discussed benefits of inter-relation of databases, and inter-connectivity of networks of subscribers. These discussions have been coupled with technical discussions as to how separation, for compartmentation and/or command-privacy might be accomplished. This section analyzes the problems of control and accountability in light of the changing technology and the changing operational concepts, suggested in previous sections, which will result. Underlying this section is a projected policy swing from document accountability to personal information accountability.

Section 4.4.1, **INFORMATION SECURITY AND COMPARTMENTATION**, lays the policy and cost benefit tradeoffs for instituting new information security measures. A distinction is drawn, insofar as possible, between security and compartmentation. While admitting the increasing technical threat which may be posed by the new technologies, this section reminds us that personnel security must lay the firm keel, and physical security the sound hull on which a technical security superstructure may be erected.

Section 4.4.2, **COMPUTER SECURITY**, alerts us to certain generic technical threats, promotes the value of audit trails, and concludes that in computer security, as in other areas of information handling, our needs may not be so unique as once thought, and might, thus, be met by commercial offerings. Uniform personnel and physical security standards for the Community, and development of and stress on damage limiting techniques for databases, may allow us to maximize networking and its associated benefits.

Section 4.4.3, **ENCRYPTION, STORAGE, COMPARTMENTATION AND DESTRUCTION**, analyzes the context in which overseas ADP can promote quick destruction, highlights conditions which might make quick destruction illusory, and concludes that encrypted storage may provide an extra margin of safety, both in normal operation by supporting compartmentation, and in emergency operation by supporting quick destruction and reconstitution.

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4.4.1 INFORMATION SECURITY AND COMPARTMENTATION

Summary

The information security program should strive to:

- Prevent unauthorized disclosure
- Prevent accidental or purposeful damage to information
- Quickly detect failures of protective systems
- Provide quick, accurate and complete damage assessments
- Provide rapid recovery from system failures

The foundation of information security is a personnel security program that verifies the trustworthiness of employees and a physical security program to assure information is available only to trustworthy personnel.

Compartmentation is an administrative formalization of the need-to-know principle intended to restrict access to a minimum essential core of personnel within the total population of trusted employees.

The fundamental vulnerability of information security is the fact that information is not physical property, i.e., paper, magnetic media, microfilm, etc. Information is knowledge which can be transferred without benefit of physical media.

Therefore, any investment in systems designed to protect the physical representation of information must be balanced against the state of our defenses against loss of information through the abstract channel represented by the mind.

An effective information security program will address personal accountability for knowledge and its disposition. To the extent that technical and administrative systems can aid the individual in responsibly and accurately fulfilling his obligation, they should be valued.

Systems whose purpose is damage assessment and/or recovery should be transparent to the employee. Procedures that reduce the efficiency of employee job performance in order to allow

after-the-fact analysis of loss are to be avoided. Technology can provide substantial cost benefits in this instance.

Background

While those at the center of security policy may have always appreciated the subtle difficulties of protecting information, the line components responsible for policy enforcement frequently have not. This can and has resulted in establishment of systems and procedures that are expensive, cumbersome and obviously vulnerable.

A system to protect documentary information that requires an employee to take positive action to place himself on the record as having accessed information is so patently vulnerable that the most conscientious employees will view the procedure with disdain.

An improvement to that system which requires a second person to be accountable for recording accesses to information substantively increases respect for system effectiveness but without substantially improving absolute security. Knowledge still transfers without benefit of accountability other than personal accountability.

It is the employee's willingness to uphold and defend the trust placed in him by management that provides the only effective information security. As employees perceive management imposing inefficiencies on job performance in the name of improved security, the effectiveness of protective systems will decrease.

Since, in the final analysis, it is each employee's commitment to personal accountability that provides effective information security, gains from management and control systems to increase security of the physical media containing information should be weighed against gains from equivalent investments in employee indoctrination and repolygraph programs that reinforce individual commitment to personal accountability.

It is more appropriate to view investments in formalized systems of information control as aids to investigative procedures and damage assessments. These systems exist to allow us to detect and correct failures, accidents and malevolence. As such, they are ill-conceived if effective operation is based on overt acknowledgement by an individual who does not recognize or who does not want to have recognized the results of his actions. Effective systems require independent, competent and trustworthy monitors.

The Headquarters Security Task Force embodied this thought in their recommendation that sensitive material be contained in registry reading rooms along with copy machines under independent and, hopefully, competent supervision of information specialists. Our collective reluctance to accept such a recommendation can be interpreted as an intuitive understanding that we were being asked to pay a high price to prepare for a low probability event. We were asked to invest in protection of physical media without measurable gain in protection of knowledge. We were asked to impose inefficiencies on job performance for a control system that the employee recognized as vulnerable. (C 3d(5))

Technology-based systems hold promise for improving the cost effectiveness of information control. While technology will do little more to protect knowledge, it will provide ways to detect and correct accidents and failures in administrative control of physical media at reasonable cost and with minimal impact on employee efficiency. There will also be new ways to protect employees from mistakes. While technology will not prevent malevolence, it promises to reduce the probability of occurrence and contain the effects as well as present manual systems.

Conclusion

The major line of defense in information security is personnel security and individual commitment to the principle of personal accountability.

Management artifices such as compartmentation and document controls are, in the final analysis, only of value in detecting and correcting failures after the fact, assuming failure is defined as passage of knowledge to personnel whose trust is open to question.

While technology will not appreciably improve our ability to protect information, it will greatly enhance the effectiveness and efficiency with which physical media can be controlled.

There is no reason to believe that technology will guarantee protection from the malevolent person but every reason to believe that technology can limit damage to the same extent as current systems.

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4.4.2 COMPUTER SECURITY

Summary

Computer security can be defined as all physical, personnel and technical security measures taken to protect a computer system and its information. The more common definition is those measures taken to protect the instructions and data within the computer hardware. This paper assumes the common definition.

From a historical perspective, the development of computer security can be viewed as paralleling development of physical and personnel security. The end objective in each case is achievement of acceptable cost vs. risk trade-offs that allow Agency operations to proceed at acceptable costs but with finite probability of compromise.

An impressive inventory of protective techniques already exist for safeguarding computer software and data. The major remaining obstacle to wider networking is damage-limiting technology for sensitive data.

Within a homogeneous physical and personnel security environment as exists in the Agency today, multi-compartmented networks are achievable within acceptable costs vs. risk boundaries.

Development of damage-limiting techniques combined with careful construction of policy can present acceptable cost vs. risk options for multi-level secure networking and wider Community networking within the planning period.

Background

The security disciplines came to an early realization that impenetrable defenses could not be designed. The security problem inevitably reduced to cost vs. risk. When further improvements to one protective technique became too costly and difficult, the concept called rings of security allowed lower cost protective systems to be chained together to further reduce risk at acceptable cost. In this fashion we have arrived at a highly developed set of physical security standards that, given a particular operating environment, allow us to quickly determine what combination of guards, vaults, safes and alarms will reduce vulnerability of sensitive documentary information to an acceptable level.

The creation of large electronic data bases and computer networking has literally short-circuited decades of physical security development. The ability to move information electronically has created the need to devise new rings of protective systems.

There are now access controls that are as adequate as badging systems for authenticating individuals requesting access to computer systems. Extensions of the access control mechanisms allow the computer to ascertain those categories of data the individual has a need-to-know.

Data Base Management systems provide users capability to prescribe in detail requirements for privacy of their data.

Audit routines are capable of recording with unprecedented accuracy and detail the nature of information accesses. The huge volumes of audit data recorded can be thoroughly searched by security routines to point out anomalous patterns of individual behavior.

While instructions controlling system operation are expected to remain vulnerable, efforts to date have developed an inventory of techniques for trapping and alarming unauthorized transgressors that can make attempted subversion of systems an intellectual challenge of high order.

The largest area of concern remaining is damage limitation. Given the new rings of security as described above, there is still the real probability that penetration can and will occur by accident or intent. Therefore, the task before technologists is to devise ways to minimize losses. There are analogues available in the document world that suggest answers to this problem.

One approach is to geographically distribute information so that any one failure results in loss of an acceptably small part of the data base. This is translatable to relatively small computer systems and data bases distributed throughout the Agency, each logically disconnected from the other.

Another approach would be to emulate safes and vaults, i.e., distribute a large data base within one geographic location into a large number of security containers, each of which requires a significant effort to open. This principle is translatable to electronic data bases by application of encryption. By encrypting suitably small subsets of the data base under different keys (combinations) one will have emulated a large number of safes each with the potential to withstand attempts at forced and surreptitious entry of much longer duration than the physical analog.

As in most areas of information service there is little unique to the Agency on the subject of computer security. Industry, banking, and virtually every sector of society is increasingly concerned with computer security. The prevalence of computer crime and its impact on the economy are great incentives to development of protective techniques.

Conclusions

Adequate protection exists to permit multi-compartment networking within the Agency today. This protection is a combination of homogeneous physical and personnel security systems combined with currently available computer security technology.

Networking can proceed within the Community with further standardization of security procedures and/or development of damage limiting techniques for computer systems.

Multi-level operation within acceptable cost vs. risk considerations will depend on development of damage limiting technology.

By taking advantage of protective systems developed within the commercial sector, we will be able to achieve acceptable cost vs. risk tradeoffs with modest investment.

Recommendations

1. The Agency should take the initiative to establish uniform physical and personnel security standards for the Community.

2. Emphasis should be placed on developing damage limiting techniques for data bases so that the efficiencies of networking can be maximized within the Agency and the Community.

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4.4.3 ENCRYPTION, STORAGE, COMPARTMENTATION AND DESTRUCTION

Summary

Recent events have re-emphasized the need for quick destruction of sensitive material. The use of computers has been suggested in order to replace paper files with computer files thought to be more easily destroyed.

This paper examines the premise of easily destroyed computer files, and illustrates some practical limitations. Two scenarios are examined: the use of an on-site minicomputer; and, interactive use of a remote computer. More importantly, the hypothesis underlying the need for quick destruction are examined from a decision theoretic viewpoint. This provides an interesting viewpoint and argues for cryptographic protection of computer files as the most effective way of providing quick "destruction".

Unarguably, there exists a need for the safe and rapid destruction of sensitive material under emergency conditions. Recent events have prompted a re-examination of the use of computer technology to provide that emergency destruction capability. The hypothesis is that reliance on computer management of information will: effectively eliminate paper files; and, the computer files that replace these will either: be located remotely in safe haven; or, be easily destroyed. These assumptions are examined in detail, last first.

Easy destruction of computer files springs readily to the mind of anyone who has had to rely on computer storage of data. A confluence of factors make the accidental "destruction" of our data a too-frequent occurrence. Whether these accidents are caused by hardware "glitches", software "bugs", or operator error, the incidence of unusable data is quite real. It is worthwhile to look in more detail at such events, and at the normal procedures which protect against such accidental destruction, thus minimizing the impact on everyday work. When the computer informs us, arcanely: "Abend / parity error / file not found" or the like, it is saying only that the data is not normally recoverable (i.e., it may not be recoverable in its entirety, and extraordinary techniques might be needed for its retrieval.) Such examples of quick "destruction" provide little comfort in the face of a determined, and modestly sophisticated foe with reasonable time to recover the data.

More importantly, however, the frequency of such accidental unavailability of data leads to operating procedures which keep "backup" copies of the files on "backup" disks, with "backup" tapes ... and, typically, with hard-copy, paper "backup". We should not lose sight of the fact that the computer is the largest generator of paper in any organization.

Suppose, however, we have conquered the accidental unavailability problems, (an important design constraint for such an application) thus obviating the need for extensive paper backup. Now we can concentrate on purposeful destruction of computer stored data. Three major types of destruction are considered: electrically altering the appearance of the data; electrically/magnetically destroying the data; and physical destruction of the storage media.

> **electrical alteration** refers to the practice of overwriting the data with new, meaningless data which obscures the original. This technique can be used with (nearly) all types of computer storage (solid state memory, core, disk, tape) and requires the storage to be on-line (another important design constraint).
>
> **electrical destruction** depends on the fact that some computer storage retains data only when powered ("volatile" solid state memory) so that powering down the memory destroys the data.
>
> **magnetic destruction** refers to the degaussing of magnetic storage media (disk and tape) and works best with demountable storage media.
>
> **physical destruction** is the mechanical/chemical disintegration of the media upon which the data are stored, and works best with smaller, less dense storage media, the less rigid (floppy disk as opposed to hard Winchester technology) the better. The storage media must be demounted.

Procedurally, each form of destruction would proceed in turn for ultimate assurance against determined recovery: electrically alter, demount and degauss, and then disintegrate.

The reconstitution would, of course, depend upon the stage to which destruction had been carried. The media might have to be replaced, perhaps from stock. Replacement of information, however, puts a severe demand upon the telecommunications, precisely at the time when other demands are being placed upon it, for command and control, and reporting, and precisely at the time when it is likely to be severely degraded, due to environment or host government actions. Ponder the notion of writing a disk memory over a 100wpm teletype circuit shared with other traffic, and with message overhead and error control which effectively halves the bandwidth. At an effective 25bps, a modern 300mb disk would require over 3 years to re-create.

The preceding analysis has been largely directed to on-site computer use. Operational considerations attendant on use of remote ADP, traditionally dictate reserve paper files as well as redundant, high-bandwidth (expensive) telecommunications.

Otherwise, inevitable communications outages seriously degrade day to day operations. Remember, too, that good telecommunications are least likely to be available precisely during the periods in which it is necessary to have a quick destruction window, and there will be an irresistible temptation to keep backup paper files. Thus, the quick destruction goal must be achieved in harmony with adequate normal operation, and acceptable, if degraded emergency operation. This must mean quick reconstitution, or guaranteed all-weather remote access to safe haven computing, which again implies expensive telecommunications.

As we have seen, destruction and reconstitution must be considered together. Let us formalize this slightly. There ultimately will be a decision between two alternatives: DESTROY, or RETAIN. Applicable to that decision are two states of the world: Destruction Really Required, or Destruction Not Really Required. In the face of imperfect knowledge, and imperfect decision makers, four outcomes are possible:

a. We destroyed when it was required;

b. We retained and destruction was not really required;

c. We retained when destruction was required;

d. We destroyed when destruction was not really required.

Costs/benefits can be assigned to each outcome. The first two outcomes, a and b, were good; the last two outcomes, c and d, were unfortunate. This is shown below.

a decision is made to:

	DESTROY	RETAIN
when, in fact,		
Destruction REQUIRED probability = P	(a) GOOD OUTCOME Loss prevention	(c) BAD OUTCOME Possible loss of assets & other grave damage
Destruction NOT REQUIRED probability = (1-P)	(d) BAD OUTCOME Cost a function of time/expense to reconstitute	(b) GOOD OUTCOME Normal operations unimpaired

Current events focus our attention on the cost of outcome c. However, it is just as important to focus on the cost of outcome d because our decision as to whether to destroy or retain is influenced by the entire outcome cost/benefit matrix as well as our apriori assessment of the probability that destruction will really be required.

> Uncertainty in assessing the probability that destruction will, in fact, be required, coupled with the cost of outcome d (the cost of reconstitution) tempts us to postpone as long as possible the actual decision. And, the desire to postpone "as long as possible" the decision to destroy, forces us into demanding, say, a reduction in holdings to a one-hour destruct cycle.

Thus, reducing the reconstitution time is a very important, sometimes overlooked design constraint ... not only because it impairs subsequent operations, but because it impacts our decision as to when to destroy.

Encrypted storage of information allows us to add a new type of "destruction" to our list above:

> **Key destruction** - destroying the crypto keys which had been used to encrypt a data file renders that data unintelligible; the key volume, being much smaller than the volume of total information allows quicker destruction by any of the previously discussed techniques. More importantly the small volume of key material can be quickly reconstituted, thereby quickly reconstituting the information.

Encrypted storage of information, no matter the media on which it is stored (disk, tape, cassette, etc.), also affords much better protection overall, inasmuch as it is the smaller amount of key which must be most strongly protected.

In assessing the utility of encrypted storage, several constraints must be examined. First, there is the question of how secure the encrypted material is? How resistant is it to concerted attack? If not resistant to attack, we would certainly not wish to hand to a determined adversary a disk-full of data. For the field station, however, it is useful to remember how the bulk of the data was received, or sent ... by encrypted telecommunications. Any realistic threat assessment must assume that the determined adversaries already have disks full of our encrypted data. We are, then, no more constrained by the encryption algorithm's robustness (or lack thereof) for static storage than we were for communication of that same information.

A second constraint is the increased key management which would be required. Today, the domain of keys managed (generated, indexed and stored for retrieval, and destroyed) is limited. Use of cryptography for static storage would, perhaps: double the amount of key which would need to be generated (and, perhaps halve the design life of an algorithm); double the amount of key which would need to be destroyed, in steady state; and increase more markedly the amount and velocity of index, storage, and retrieval.

Another constraint which would need to be examined is the possible difference between keys for static storage, and transient communication use. (Although the image of our adversary's National Storage Agency full of statically stored, encrypted data should provide the Occam's razor for this perceived dilemma.)

A third constraint is the granularity with which keys are assigned to data. Some alternative assignment strategies include:

- key per physical storage space ... key per disk
- key per logical storage device
- key per physical/logical record
- key per entity/attribute in a database

We move from the former to the latter strategies as our goal changes from simply overall protection and quick destruction/reconstitution to compartmentation and command privacy at an elemental level.

Another design factor is the use of a master key to encrypt the individual keys required by our choice of granularity, which enforces the command privacy and appears to reduce still further the amount of material which needs immediate destruction. Whether this weakens the overall security afforded is equivalent to our faith in deterministic key generation by (presumably) known algorithm from a starting seed. (A blade for Occam's razor.) The desirability of repeatedly changing the master key is a function of the depth of the algorithm.

Another constraint to be investigated is the problem of updating data files and retrieving a portion of a file if a key of coarse granularity has been decided upon. Choice of design strategy here is the same as the dilemma of having a sequential-access device of finite speed serve as a random access memory, and the same blocking issues suffice. We need be no more constrained in using an encrypted disk than a clear text disk, inasmuch as the disk is, at best, block-sequential. (Another blade for Occam.) Another proven strategy for dealing with the update problem is that used with write-once media (from paper tape to optical disks to journals) or extremely large, sequential files -- i.e., update by "posting" transactions, and (infrequent) batch reorganizations.

A first cut design, then, argues for a policy-high, red computer with all dynamic, solid-state memory; all other memory devices are I/O devices with crypto on the red side of error control protocols (e.g., CRC calculation.)

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5. ALTERNATIVE MANAGEMENT STRUCTURES

In addressing alternative management systems for information services, the consideration is to what degree management of information services should be centralized or decentralized.

However, the problem cannot be dealt with in such global form. One must decide what is to be centralized or decentralized. The management alternatives that follow are derived by viewing the problem from three levels of management control. This analysis technique is employed by IBM in their methodology for business systems planning which is in turn based on a method of organizational analysis developed at Harvard.

The methodology speaks to three levels of control:

> **Level 1: Strategic Planning** - the process of deciding on objectives of the organization, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of resources.
>
> **Level 2: Management Control** - the process by which managers assure that resources are obtained and used efficiently in the accomplishment of the organization's objectives.
>
> **Level 3: Operational Control** - the process of assuring that specific tasks are carried out effectively and efficiently.

As applied to Agency Information Handling, the questions become:

- How should we organize to set goals for information services, decide investment strategies, and set policy on system acquisition, use and disposition?
- Who should prepare and defend, budgets, control positions, and manage the careers of information service specialists?
- Who should be in day-to-day command of operational systems and their staffs?

If one considers the possibility of placing each of these controls at different organizational levels, i.e., Agency, directorate, or office level then many options are made available for evaluation. Adding to the possible list of line options is the concept of addressing strategic planning through staff organizations.

The option tree shown in Figure 5-1 depicts the range of alternatives selected by the Task Force for study. This tree identifies six families (enclosed in boxes) of options that are described in some detail in Attachment C.

5.1 Executive Committee Guidance

The DCI's Executive Committee has reviewed all options presented in Attachment C of this report. In selecting the preferred option, the major factors considered were:

A. User Satisfaction - the degree to which information services produce satisfaction both internally and externally.

B. Planning and Budgeting - the degree to which an organization allows us to assess the current state of affairs, forecast the future, defend and allocate resources rationally.

C. Disruption - the degree to which an organizational change will interfere with the provision and use of current information services.

D. Information Control - the degree to which an organization allows us to insure that information is provided only to those with an officially approved need-to-know.

E. Personnel Resources - the organization's ability to recruit, train, and maintain a skilled cadre of information specialists.

The findings of EXCOM were:

A. There is a need for a central planning function in CIA to provide a more coherent development of future information systems.

B. While there may be justification for structural change along the lines recommended by this report, creating a total new directorate is judged undesirable due to the decrease in user satisfaction that results from the inertia and insensitivity of an overly large organization.

C. An increase in Agency level career management was judged to be unwarranted at this time. Furthermore, at least one senior manager views authority over career services as a key element in maintenance of effective compartmentation.

D. There may be virtue in greater use of mission budgeting for some forms of information services. However, rapid shifts in budgeting strategy can have negative effects in terms of external relationships. For the near term, it is judged better to maintain the central service budgets but with a more relaxed view toward mission budgeting as a means to capture necessary resources when central services are unable to adequately defend the total Agency need.

In sum, it was the consensus of the Executive Committee that the only change in Agency level management justified at this time is the creation of a System Architectural function to plan for future information systems from the broader Agency viewpoint.

Organizational Options for IH Management

INCREASE IN AGENCY LEVEL (CENTRAL) MANAGEMENT

CURRENT ORGANIZATION

DECREASE IN AGENCY LEVEL (CENTRAL) MANAGEMENT

AGENCY LEVEL PLANNING WITH:

EXISTING IH COMPONENTS

PE DENOTES: Agency Planning and Existing IH Components

- **PE1**
  - Agency Planning Network
- **PE2**
  - Agency Planning Network
  - Agency Career Management
  - Mission Budgeting and Tasking

CONSOLIDATION OF IH COMPONENTS

PC DENOTES: Agency Planning and Component Consolidation

- **PC1**
  - DDA Only
- **PC2**
  - DDA, NFAC
- **PC3**
  - DDA, NFAC, S&T

A NEW DIRECTORATE

ND DENOTES: A New Directorate

- **ND1**
  - Mission Budgeting and Tasking
- **ND2**
  - Agency Budgeting
  - Mission Tasking
- **ND3**
  - Agency Budgeting and Tasking

DIRECTORATE SELF-SUFFICIENCY WITH:

AGENCY LEVEL PLANNING

DA DENOTES: Directorate Independence with Agency Level Planning

- **DA1**
  - Strong Agency Planning
  - Directorate Budgeting and Tasking
- **DA2**
  - Strong Agency Planning
  - Mission Budgeting and Tasking
- **DA3**
  - Weaker Agency Planning
  - Directorate Budgeting and Tasking
- **DA4**
  - Weaker Agency Planning
  - Mission Budgeting and Tasking

DIRECTORATE LEVEL PLANNING

DD DENOTES: Directorate Independence with Directorate Level Planning

- **DD1**
  - Directorate Budgeting and Tasking
- **DD2**
  - Directorate Budgeting
  - Mission Tasking
- **DD3**
  - Mission Budgeting and Tasking

COMPONENT AUTONOMY

CA DENOTES: Component Autonomy

- **CA1**

Further organization and management change that may be indicated by the results of this report and the establishment of the Architect is the responsibility of each Deputy Director.

The remainder of this chapter addresses itself to regulatory establishment of a Systems Architect.

5.2 Architect of Information Services:

Mission:

Performs Agency level planning for Information services with particular emphasis on application of technology.

Functions:

1. Publishes Strategic goals and objectives for purpose of program guidance.
2. Monitors progress toward goals and objectives and reports state of Information Handling to EXCOM (incorporates ADP review).
3. Consolidates requirements for IH to maximize commonality and minimize unique development.
4. Conducts design reviews during conceptual design phase.
5. Maintains technology forecast and reports trends to management.
6. Acts as Agency focal point to Community on matters of IH.
7. Commissions system designs to fulfill architecture.
8. Initiates studies and analyses for the purpose of identifying ways to improve effectiveness and efficiency of IH.
9. Maintains a current data base on the status of information systems and their interrelationships.

5.3 The Appeal Mechanism:

The reasons for appeal are:

1. Failure of the Agency plan to satisfy Directorate requirements.

2. Failure of a Directorate to adequately program for fulfillment of the approved plan.

3. An irreconcilable policy difference between or among the Architect and the Directorates that impedes planning and implementation.

The process of appeal may be initiated by the Architect or a Deputy Director. The appeal will be addressed to the DDCI and will contain a well defined statement of the issue, a succinct statement of the rationale supporting the originator's position, and a recommended alternative course of action. A copy of the appeal will be provided to contending parties who will prepare respective position papers for the DDCI.

The DDCI may refer the issue to EXCOM for further advice and may refer the issue to the DCI for resolution.

5.4 The Architectural Staff

The Architectural Staff should consist of a Chief Architect, four technical specialists, and clerical support.

The Chief Architect should be of senior grade, have substantial experience and interest in management of technical activities, a proven record of high calibre representation and ability to maintain good interpersonal relationships with subordinates, peers and superiors. Broad technical background encompassing communications and ADP is highly desirable. The position is expected to demand aggressive advocacy of controversial concepts. The incumbent should have a knowledge of Agency organization and management processes.

The technical specialists should consist of:

1. A systems engineer widely knowledgeable of telecommunications, ADP, and word processing technologies. This person should have reasonable experience in project management of large systems, exhibit good interpersonal relationships, be articulate, capable of producing well written correspondence.

2. A software specialist widely knowledgeable of operating systems, applications, and have experience with project management of software development. Personal characteristics should be similar to those above.

3. A database specialist broadly knowledgeable of principles of information storage and retrieval regardless of media, familiar with Federal regulations concerning storage and disposal of official records, and having personal experience with design and maintenance of electronic data bases. Personal characteristics as above.

4. A human factors specialist with a wide-range of experience in dealing with man-machine interfaces, knowledgeable of system documentations systems and procedures, and capable of providing guidance on user training courses and their construction. Personal characteristics as above.

5. A senior clerical with broad knowledge of Agency administrative procedures, qualified operator of word processing and computer terminals, capable of performing as a para-professional to Staff Officers in addition to performing normal secretarial functions.

5.5 Positioning the Architect

There are two organizational locations considered for the Agency Architect. One location is the Office of the DCI and the other is within an existing Directorate.

Within the Office of the DCI the Architect could be directly supervised or seconded to an existing staff organization such as the Comptroller or EXCOM Staff. From the Architect's perspective there will be a desire to have the DCI as organizationally close and accessible as possible in order to enhance power and authority over the planning function. However, placing the Architect immediately under the DCI is judged unsatisfactory because it inevitably diverts DCI time and attention to highly technical subject matters in greater depth, out of proportion to other areas of DCI responsibility.

This leads to examination of other possibilities within O/DCI that would provide a supervisory buffer between the DCI and the Architect. One possibility is the EXCOM Staff. But, while the architectural function may bear some similarity to the Agency strategic planning function recently installed in that Staff, the architectural function has a vital need to be institutionalized in a way that guarantees more permanence than historically exhibited by staff organizations at the DCI level. The Office of the Comptroller represents an O/DCI organization with permanence. However, there is wide concern that seconding the architectural function to the Comptroller will result in overriding emphasis on perceived resource constraints as a planning criteria.

In sum, it appears that the advantages of positioning the Architect in O/DCI accrue only to the Architect in terms of enhanced prestige and implied authority. The disadvantages are excessive demands on DCI time and attention for lower level technical issues or questionable survivability of the function beyond the tenure of current Agency leadership or over-riding emphasis on resource constraints in the planning process.

The second option, delegating the architectural function to a Directorate appears to avoid the major disadvantages associated with placement in O/DCI. However, this advantage is at least partially offset by the lesser prestige and potential diminution of authority and influence inevitably resulting from competitive forces among the Directorates.

If delegation to a Directorate is considered, then the logical candidate is the DDA. This Directorate has the bulk of the resources and expertise peculiar to the IH function. It also holds a unique responsibility among Directorates to ensure equality of service Agency-wide.

From the DDA perspective there is advantage to having a staff function that can provide impartial advice and assistance to Directorate management on the large number of technical issues arising among DDA components in provision of information services.

Placement in the DDA will be seen as a disadvantage by users since they will reasonably expect planning efforts to reflect the dominant concerns of DDA support elements at varying degrees of sacrifice of user satisfaction. To ensure a proper balance of user and provider concerns, there should be heavy emphasis on meaningful user participation in planning and well defined appeal mechanisms.

One means of redressing the perceived provider/user imbalance is a larger committment to mission budgeting which gives users increased resource control and hence, more influence in the planning process. In fact, mission-budgeting implemented in its most extreme form could over-compensate the system to the detriment of both central services and architectural function.

In lieu of significant shifts in budgeting responsibility, the best candidate solution for providing provider/user balance is formalization of a user group that can deal with requirement consolidation, requirement priorities, and critical review of architectural plans. Representatives to the group would be Directorate spokesmen. The Architect would assume the role of arbitrator amongst users and providers. Appeals above the Architect would be first to the Deputy Director level, and beyond that, the DCI/EXCOM level.

The alternative of legislating inter-directorate representation on the architectural staff itself is considered too constraining on the personnel selection process to warrant serious consideration. This is not to say that all expertise should be drawn from within the DDA, but that the selection process should place prime emphasis on job qualification without regard to current career allegiance.

ALL PORTIONS THIS CHAPTER UNCLASSIFIED

6. RECOMMENDATIONS

6.1 Organizational Changes

6.1.1. Create an Information Services Architect to maintain and publish an Agency strategic plan for the development of information services. (ref. 4.1.2)

Approve: Disapprove:

6.1.2. Assign the Information Services Architect to the Deputy Director for Administration. (ref. 5.)

Approve: Disapprove:

6.1.3. Charge the Deputy Director of Administration with responsibility for accomplishing within six months:

A. Establishment of a joint planning mechanism to produce a unified plan for information services of OC, ODP, and OL/P&PD.

B. Creation of a plan and time table for restructuring DDA line components in accordance with the needs of this strategic plan and with due consideration of the issues raised by this report. (ref. 4.2.2, 4.2.3, 4.2.4, 4.2.6, 4.2.7, 4.4.2)

Approve: Disapprove:

6.2 Management Change

6.2.1. Expand the scope of the current EXCOM ADP review to incorporate all information services and charge the Architect for Information Services with management of the preparation and presentation of that review. (ref. 4.1.4)

Approve: Disapprove:

6.2.2 Mission components should program, budget and defend capital investments required to provide dedicated information services. (ref. 4.1.3)

Approve: Disapprove:

6.2.3 Directorates should develop and implement plans to centralize career management of personnel devoted to provision of information services. Early attention should be given to centralized management of ADP and registry personnel. (ref. 4.1.5)

Approve: Disapprove:

6.3 Programmatic Objectives

6.3.1 Assign responsibility to the DDA for design and implementation of a unified information distribution network whose nodes are conveniently located throughout Agency facilities and which contain facilities for storage, transmission, printing and sorting of electrical information. Management of those nodes will emphasize security, compartmentation and accountability for information. Estimated costs are $15M for a ten year program. (ref. 4.2.6) (C 3d(3))

Approve: Disapprove:

6.3.2 Assign responsibility to the DDA for evolutionary development of a universal terminal network that will provide wide electrical interconnectivity with compartmentation and command privacy enforced through cryptographic separation. Estimated costs are $40M for a ten year program. (ref. 4.2.7) (C 3d(3))

Approve: Disapprove:

6.3.3 Charge the Architect for Information Services with developing a concept and commissioning the design of a centralized data base of dissemination requirements that allows controlled, shared access to all Agency disseminators. Estimated costs are $500K with expected completion in 1985. (ref. 4.2.8) (C 3d(3))

Approve: Disapprove:

6.3.4 Place Agency priority on modernization of the communications plant to expand capacity, quality and interconnectivity required to support increased electrical flow. Estimated costs $20M with completion at Headquarters by 1985; completion world wide by 1990. (C 3d(3))

Approve: Disapprove:

6.3.5 In the interests of security, legality, and public image, there needs to be a central, easily accessed repository of data regarding information released to the public, the media, and outside the Executive Branch. A central system should be useable by and responsive to users concerned with FOIA and Privacy requests, Public Affairs Office, OLC, OGC, Office of Comptroller, DCI and DDCI Staffs. The purposes of this repository would be consistency of judgements with regard to releasability, maintenance of operational integrity, and more efficient administration. It is recommended that analysis of alternative means for establishing such a system, including use of commercial bibliographic reference services, be commissioned by EXCOM. (ref. 3.8.e.)

Approve: Disapprove:

6.4 Security Procedures

6.4.1 Establish systems of control and accountability for all transportable, machine writeable, non-human readable storage media, e.g., magnetic cards, tapes and disks. Such media must be presumed to contain information of the highest sensitivity. (S 3d(5))

Approve: Disapprove:

6.4.2 With increasing application of technology comes enhanced ability to positively account for sensitive information. This opportunity should be exploited to implement complete audit trails on all Top Secret and compartmented information within Agency computer data bases. The Office of Security should implement systems and procedures to frequently review audit information for anomalous accesses. (S 3d(5))

6.4.3 As classified databases more and more exist on-line, encouragement should be given to on-line queries from a terminal. Second-hand queries made via telephone should be discouraged. Accesses via terminal are easily recorded and audited. Most important, the terminal provides a more positive authentication of the requestor than the telephone. (S 3d(5))

Approve: Disapprove:

6.5 Personnel Activities

6.5.1 The gradual extension of information handling technology into the office environment creates a need for more informed users. It is recommended that all career services incorporate some form of familiarization training in career development plans. Such training might include ADP familiarization, Office Automation, and information management depending upon the nature of the service and the level of the employee.

Approve: Disapprove:

6.5.2 The Task Force has observed instances of user ignorance or apathy with respect to current information services. It is recommended that an indoctrination program be designed for all employees. This indoctrination, which can be integrated into other Agency-wide programs, should provide information on available services with emphasis on the user responsibility to the service, e.g., establishing and maintaining dissemination profiles.

Approve: Disapprove:

6.6 Policy and Administrative Action

6.6.1 There needs to be a definitive policy statement for contingency planning. This policy should cover a range of eventualities from brown-outs to natural disaster and nuclear conflict. (ref. 4.1.6)

Approve: Disapprove:

6.6.2 Future programs and budgets should address contingency planning by separately identifying added costs.

Approve: Disapprove:

6.6.3 It is recommended that this report be given wide distribution within the Agency as a means of publicizing the goals program and the rationale underlying the accompanying management decisions.

Approve: Disapprove:

ALL PORTIONS THIS CHAPTER UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

ATTACHMENT A

(This attachment is unclassified in its entirety)

INFORMATION HANDLING STUDY PLAN

The following paragraphs outline a plan for conduct of a study of information handling within CIA. The primary objective of this study is development of a strategic plan for the provision and use of information services.

In formulating a methodology for the study, one factor was of primary influence:

> **Participation by those components affected by the plan is critical to its ultimate acceptance and implementation.**

The schedule has been developed within the 12-month constraint stipulated. Seven tasks are defined below and a milestone chart is attached.

While priority will be given to production of the strategic plan, it is anticipated that near-term issues will be found that should be resolved by senior Agency management within the study time frame. Therefore, the Task Force will submit separate issue papers to EXCOM with recommendations for resolution whenever warranted.

There is no apparent need for sustained contractual support. Limited amounts of consultative service may be desirable. FY-80 funding of $10K appears ample for consultation and limited team travel.

Task one of the study will be interaction with each component which provides information services. The end result will be a coherent and consistent representation of each component's services and plans, prepared by the study group and verified by the respective component.

Task two will be an analysis of the provider component plans for the purpose of identifying required coordination. Task two will highlight the assumptions of information service use on which near-term investments are predicated.

Task three will be the process of developing with each component a representation of its plans for the use of information services.

Although there is some risk that the amount of Task Force time that might be consumed by tasks one and three may be greater than estimated, current estimates are judged to be reasonable. However, alternate strategies are available to stay within schedule and will be proposed if experience dictates the need.

Task four will be the analysis and aggregation of the projections for the use of information services and the identification of issues related to the use of these services.

Task five of the study will involve the correlation of the planning for the provision and use of information services. The collection and analysis steps in tasks one through four will enable the Task Force to develop a cross-impact matrix which will show the plans of both providers and users of information services. This matrix should be available on/about the ninth month of the study.

Task six will be an analysis of the matrix developed in task five to yield:

- residual, unresolved areas of overlap and duplication
- major gaps between the demand for information services and their supply
- the impact of postponing or accelerating resource investments.

With this information in hand, the Task Force will develop various applicable planning strategies for EXCOM consideration. EXCOM's choice(s) among these alternate strategies will determine the direction of the Task Force's remaining task - the preparation of the final report.

Task seven - Based on the guidance received from EXCOM, the strategic plan will be finalized and submitted for their review and approval. Any remaining unresolved issues will be documented along with recommendations for resolution.

ATTACHMENT A

TERMS OF REFERENCE - INFORMATION HANDLING STUDY

The following paragraphs constitute the proposed terms of reference for the Information Handling Study approved by the DDCI on 7 May 1979.

The definition of Information Handling contained in EXCOM-19-79 is accepted as the most appropriate for the purposes of this study:

> **Information handling in CIA is the systematic creation, movement, use, storage, retrieval, and disposal of intelligence and management information with the support of automated or other clearly identifiable processes and with due regard for control of sensitive and compartmented data.**

The Information Handling problem has been restated to clarify the reason for the study.

> **Problem: There is concern that traditional institutions dealing with provision of information services are becoming less effective as new technologies evolve, demand for service grows, and Agency resources shrink. There needs to be a reconciliation of demand vs. supply, a strategy for future investment, and assurance that appropriate institutions exist to execute the strategy.**

The major goal of the Information Handling Study is to develop a comprehensive information handling strategy for the Agency and, if appropriate, define a management structure for more formal continuing coordination of the Agency's information handling activities. The strategy will evolve from a clear definition of needs and plans to meet these within resource constraints. The proposed elements of the strategy are: management, organization, operation, security, technology, and personnel.

The study will focus on the provision and use of information services within the Agency. Information services will be defined as those disciplines and technologies whose purpose is to facilitate information handling. The study will address the interface of the Agency information systems with collection and processing systems.

The primary product of the study will be a strategic plan covering the next ten-year period, addressing provision and use of information services. The strategic plan will establish goals and priorities, speak to the resources required to address those goals, and set policy governing acquisition, use and disposition of resources. The structure of the plan will be such that subsequent planning for implementation can be delegated to lower levels. The plan will allow for orderly piecewise execution in consonance with resource allocations and operational imperatives.

If warranted, the plan will be accompanied by recommendations for changes in management systems and organizational structure.

Issues which the study will include, but not be limited to are:

a. **Management**

To what degree can central management of information handling contribute to the provision of information services? While there is popular enthusiasm for further centralization of management functions associated with information handling, there needs to be a careful assessment of what functions need to be centralized to improve provision and use of information services.

b. **Standards**

To what degree can standardization contribute to the efficiency and effectiveness with which information services are provided? Standards could cover equipment, programming, engineering, documentation, or management systems.

c. **Structure**

To what degree should technology influence Agency organization? The apportionment of missions to some components is based, in part, on historic technological definitions which may now be obsolete. As technology evolves, a reallocation of the division of labor might be useful and even necessary to clarify roles. However, the value of organizational realignment must be weighed against the employee morale, personnel management, and budgetary impact of change.

d. **Compartmentation**

To what degree can systems and data bases be shared without jeopardy to security and compartmentation? Increased efficiency will often result from aggregation of user needs and resource sharing. Strategies need to be identified that will maximize efficiencies within constraints imposed by security and compartmentation.

ATTACHMENT B

(This attachment is classified SECRET except the Introduction which is unclassified and so marked)

INFORMATION HANDLING SERVICES

Introduction (U)

This Attachment describes in some additional detail, the current status and trends of the various categories of information handling services briefly presented in the Synopsis Section of the report. (U)

The information contained in this attachment is not intended to be exhaustive. Sufficient coverage has been provided however to familiarize the reader with the variety of systems encompassed by the term 'information handling' and to illustrate the magnitude of information handling activities in the Agency today. (U)

The first six categories will be addressed primarily by the media in which the information has been recorded. We have defined three media classes that will be referenced:

1. Electronic/Magnetic

   Electronic encompasses the media in which information can be stored, processed or transmitted by telecommunications or computing hardware devices. The primary repositories for this class of media are magnetic drum, disk, card and tape storage devices associated with communications, text or data processing systems. (U)

2. Document

   Documents are any printed or typed paper media containing textual data which is human readable. This class includes hard-copy representations of information that may have been stored or transmitted in electronic form. (U)

3. Graphic

   Graphics include all film based media such as microforms and photographs plus maps, graphs, and other non-textual representations. (U)

Each category or media based subcategory will address:

1. The primary facilities and/or providers of the service. (U)

2. Recent (last year or two) significant trends or activities in this area. The purpose here is to provide some sense of how dynamic this service area is and the direction in which the Agency seems to be moving. (U)

3. Anticipated (next year or two) system implementations or events that can be expected to impact this category. The purpose of this information is to alert the reader to the near-term implication of systems or procedures that are contemplated or being implemented but not yet operational or deployed. (U)

B.1. Recording of Information

This category includes all facilities which enable the generation or capture of information in a media that will support subsequent storage and exploitation of that information. It encompasses the mechanisms by which Agency components can put information into a retention media.

a. Recording of Information in an Electronic Media

(1) Significant Facilities

(a) Data Entry Keying

Both ODP and IMS provide central facilities which are used to key information into a magnetic media for eventual transfer to computer storage.

(b) Terminal Input

The large population of remote terminals connected to the central computer facilities of ODP and NPIC provide a capability for users to directly record information into computer-based files.

(c) Optical Character Reading (OCR)

The primary OCR capability for converting typed information to electronic media is provided by OC's ACT-O facility. This device enables the entry of typed cables into the CDS system for subsequent distribution.

(d) Map Digitizing

OGCR utilizes several minicomputer based systems which convert printed maps to electronic form. These digitized files (essentially World Data Banks I and II) are used for dynamic map recreation on both graphic terminals and plotters.

(2) Recent Activities

(a) The Agency is experiencing a significant growth in the availability of remote terminal devices. This has largely been in response to users' requirements for data entry facilities.

(b) This growth in terminal devices has been augmented by the development of terminal related software which provides services such as menu selection and data validation support to data entry functions.

(c) The Electronic Time and Attendance Reporting System (ETARS) illustrates an initial step in providing a facility to electronically capture information from overseas locations.

(d) Software has recently been implemented which enables a user to compose a cable on the ODP time-sharing system and subsequently print the cable in a format and type font which is compatible for input to the OCR facility of CDS.

(3) Anticipated Events

(a) The SAFE system, when fully implemented, will offer the NFAC users an additional capability for recording information. This will be provided via the COMPOSE function.

(b) The advent of CRAFT and CLASS A systems will extend the overseas entry facilities initiated by ETARS.

(c) OCR will be investigating (Project OSCAR) the availability and applicability of utilizing advanced multi-font optical character readers to convert documents to electronic media for subsequent exploitation by SAFE.

(d) The implementation of ODP's Message Processing System (MPS) will enable a user to compose a cable in the time-sharing system and transfer it electrically to CDS for subsequent distribution.

b. Recording Information in a Document Media

Facilities for recording information in a document media will be further subdivided into three printing types:

Word processing facilities (WP)

Traditional printing press facilities

Computer controlled printing facilities.

(1) Word Processing

While many word processing devices are capable of storing their information in electronic form, and thus could be considered a mechanism for recording electronic information, the primary purpose is to directly or indirectly produce a document, thus for descriptive purposes, WP is considered a facility for recording information in a document media.

(a) Primary Facilities

- o Standard Typewriters - The primary method for creating documents continues to be the large population of standard electric and manual typewriters which have no electronic recording or communications capabilities.

- o Independent Word Processors - These facilities consist of the non-communicating typewriters or display terminals with electronic recording and display capability. These stand-alone units are typified by the ubiquitous IBM magnetic card devices.

- o Communicating Word Processors - These word processing devices are local units which have a communications capability with other local devices or the central computing systems. This type of WP device is represented by the communicating magnetic card devices, NBI 3000 and IBM System 6 systems.

- o Central WP Services - Word processing facilities are available to ODP terminal users via the SCRIPT time-sharing service and the related XEROX 9700, IBM 6670 and Design 100 high- quality printing devices.

(b) Recent Activities

- o In recognition of the fact that the functional similarities between WP and ADP are becoming more interrelated, the responsibility to monitor and approve the acquisition of word processing equipment was transferred from DDA/ISS to DDA/ODP in July 1979.

- o NFAC has selected the NBI 3000 as its standard WP device. This is viewed as an interim standard pending the development and deployment of the Agency standard terminal and its associated WP facilities.

- o The DO plans to experiment with several different WP devices in an attempt to identify a standard device for overseas use.

(c) Anticipated Events

- The SAFE and CRAFT systems will provide their users with WP types of services.

- The new standard soft-copy terminal will provide the user with local as well as centrally supported WP services.

- ODP plans to develop an office automation facility which will be a logical extension to the current WP facilities available in the SCRIPT system. This service will provide the time-sharing user with additional 'electronic mail' type functions.

- Communications links are planned which will enable data to be transmitted through the ODP central time sharing facility, the System 6 in PPG, NBI 3000 terminals in NFAC and the ETEC system in P&PD. While the ETEC system does provide WP services, for purposes of this discussion, it is included as part of the printing press facility described below.

(2) Printing Presses

(a) Significant Facilities

Traditional printing facilities are found in P&PD, NPIC and JPRS. P&PD, in addition, utilizes the minicomputer-based ETEC system to enable users and P&PD personnel to prepare text for photo-typeset printing.

(b) Recent Activities

The acceptance of the ETEC facility to prepare text for publication-quality printing has necessitated a steady growth in the amount of equipment required. A third CPU and related peripherals have recently been added to keep up with user requirements.

(c) Anticipated Activities

- A communication link which will enable the transfer of textual data between ETECS and the ODP central systems will be implemented shortly. This will enable ODP users to transfer ODP resident files to ETECS for print preparation and receive the edited files from ETECS for subsequent storage or additional processing.

- The growing availability of computer-driven high-quality printing devices such as the XEROX 9700 and the IBM 6670 will offer the user an increasing access to a variety of printing systems other than the traditional printing facilities of the type offered by P&PD.

(3) Computer Controlled Printing Devices

This facility refers to the ability to use the printing devices associated with communications and data processing devices to produce a document.

(a) Significant Facilities

- Printers which are controlled by the central computing facilities of ODP and NPIC enable a variety of computer-based files to be printed.
- Printers associated with OC's communications facilities are used to create hard-copy cables.
- Wire service printers located in OCO.

(b) Recent Activities

- To speed the delivery of cable traffic to NFAC current intelligence analysts, ODP printers were recently installed in OCO. Cables are now electronically transferred from the OC CDS system to the ODP central system which then sorts the cables prior to printing in OCO.
- Use of the XEROX 9700 in ODP now enables the production of high-quality printed reports which formerly required P&PD facilities.

(c) Anticipated Events

- When implemented, the SAFE system will provide a network of printers which will enable the NFAC user to create reports at local, regional, or central facilities.
- The ADSTAR and DORIC-W microfilm storage and retrieval systems will provide regionally located devices to provide printed copies of the stored images.

- Automated Printing and Reproduction Systems (APARS) devices are planned to improve the efficiency of printing and delivering cables that have been processed by the CDS system. Units are to be installed in the OC Secretariat and four DO registries.

c. Recording Information in a Graphic Media

(1) Primary Facilities

(a) Microforms

A number of Agency components utilize micrographics equipment to record information. The most extensive facilities are currently found in P&PD, IMS and OCR.

(b) Map Creation

OGCR provides map creation facilities primarily through the use of their own high-speed plotting devices and a computerized store of cartographic information.

(c) Computer Graphic Terminals and Plotting Devices

ODP central facilities enable the user to display graphic cartographic information on display terminals, and if desired, produce a hard-copy representation of the display. In addition, high-speed plotting devices are available to produce higher quality or more complicated graphic representations.

(d) Visual Aids

Several organizations currently support the creation of viewgraphs, slides, briefing boards and other graphic representations of information. P&PD and OGCR provide the most extensive facilities.

(2) Recent Activities

(a) OGCR recently installed the GENIGRAPHICS system which enables the creation of color 35 mm slides and viewgraphs.

(b) OGCR has also recently introduced a CRT-head equipped plotter which has drastically reduced the time needed to generate highly detailed thematic maps.

(c) PPG has established a center to evaluate the advantages of using video recording techniques to support the presentation of intelligence topics.

(d) The last two years have shown a significant growth in the use of graphic terminals available to the ODP computer center users and the introduction of the first color graphics devices.

(3) Anticipated Events

(a) The forthcoming implementation of OGCR's Meteorological, Agronomical, Geographical Analysis System (MAGAS) will enable a user to dynamically manipulate a variety of cartographic variables to produce CRT or plotter generated maps.

(b) The ADSTAR & DORIC-W systems will provide additional facilities to capture information in a graphic (film) media.

B.2. Acquisition of Information

Acquisition refers to the receipt of information which has been collected or generated by non-CIA resources and acquired for Agency use. This category of service identifies the Agency windows through which externally produced information is made available for Agency exploitation.

a. Electronic Acquisition

(1) Primary Facilities:

- OCR subscribes to a number of on-line information systems which provide Agency personnel access to both classified community and unclassified commercial data bases and files. On-line facilities are located in OCR's TAP room and in the main library.

- OCR acquires magnetic tapes from commercial sources for NFAC consumers, e.g., OER.

- OC acquires both message and data transmissions from other US government components via the MAX and DATEX facilities.

- FBIS acquires/captures foreign broadcasts and transmits the results in electronic form to Agency users.

- OCO subscribes to all the major wire services and provides that information to Agency consumers.

- NPIC subscribes to [redacted] 25X1
  and to [redacted] 25X1
  The OCR/NPIC duplication on these services is necessary because of the wide separation of the two facilities.

  NPIC obtains magnetic tapes from DIA on DIA target headers. The tape is used to produce hard-copy listings of DIA targets not contained in NPIC's IDF file.

- Several NFAC components are linked to the COINS system and to the NPIC Data System. The NDS provides direct access to imagery exploitation files as well as to the daily cables generated by NPIC.

(2) Recent Activities:

The Office of Economic Research has a recently negotiated contract with [redacted] a private corporation, to provide an on-line terminal link [redacted] owned economic data files. [redacted] collects economic information which it stores in its own computers from a variety of Government and commercial organizations. 25X1 25X1 25X1

(3) Anticipated Events:

There is a trend to acquisition of more messages and data in electronic form driven by the growth of word processing and the expansion of computer-controlled communications networks. Current and planned developments in the Agency attest to the momentum of this trend. Project MERCURY, the upgrading of OC's worldwide communications facilities is one response. Project SAFE, the development of electronic support tools for the intelligence analyst is another.

b. Document Acquisition

(1) Primary Facilities:

The Office of Central Reference has primary responsibility for acquiring unclassified foreign and domestic publications for the Agency. Because the office is responsible for the dissemination of hard-copy (paper) classified documents it has an implied responsibility to negotiate for new sources of classified information as well.

(2) Recent Activities:

OCR's open-source acquisition function is presently being automated. The objective is to move from a highly labor intensive paper based system to one that permits manipulation of a wide variety of stored information on publication orders, subscriptions, receipts, billings, bibliographic data and customer information. The system covers both foreign and domestic acquisitions. The system uses software developed at the University of Minnesota under contract to HEW.

(3) Anticipated Events:

As the system becomes established in the Agency, OCR plans to expand the network to other community agencies to collect their requirements for publications. This would create a community acquisitions network. Some agencies are already generating publications requirements on their own computers but there is currently no available facility for interconnecting to OCR.

Page Denied

B.3. Dissemination of Information

Dissemination is the process of determining the component or individual that should be made aware of recorded or acquired information. Dissemination may consist of automated procedures which match the information content to a user interest profile or reading list and/or manual procedures in which a dissemination analyst reads the information to match content with user interest.

a. Electronic Dissemination

(1) Primary Facilities

- OC's Cable Dissemination System (CDS) is one of two major providers of electronic dissemination service. CDS software performs a comparison of the bibliographic and text portions of incoming cables with computer stored profiles of user requirements. Because of the limited text analysis capability, cable analysts review much of the message traffic on CRT screens and make additional dissemination decisions. The comparison of messages with requirements yields the computer generated name and address of the requester. Actual delivery to the requester is a distribution function which is described in the next section.

  Responses to the comptroller's request to identify information handling problems and issues and to the subsequent requests by this task force to elaborate on such problems and issues identified much concern with delays in the dissemination process, concern that dissemination decisions did not account for requirements at a lower organizational level, and concern that various components involved in the dissemination process did not all use the same set of requirements on which to base dissemination decisions.

- OCR's Interim SAFE system is the second major provider of electronic dissemination service. The SAFE system stores the complete text of State cables (excluding EXDIS) and codeword materials (excluding GAMMA) for five days in electronic mail files which are selected by user defined profiles. The files are updated 12 times in 24 hours. Eight of the twelve updates occur between 0700 and 1500 hours daily. In addition, companion text files store State cables including (EXDIS), codeword (including GAMMA and some Agency traffic), [redacted] military cables, DoD IR's and FBIS worldwide field traffic. The text files

25X1

are updated once daily between 0300 and 0800 hours and stored for four weeks.

- o A third electrical dissemination process is accomplished by the use of the OCR MAD software running in the ODP Ruffing Center. Electrically received OAK messages are received in the Headquarters Building sixth floor DATACOM Center, transmitted electrically to ODP where MAD Class 1 software matches the message with user profiles and prints sorted copies for subsequent distribution by OCR's Dissemination Branch.

- o FBIS disseminates priority information from the field on a 24-hour FBIS wire service.

- o The Office of Current Operations provides dissemination support to its various task forces using a Crisis Management Automated Support System (CMASS) minicomputer. Electrical messages are received from OC's Cable Dissemination System, and from the FBIS, Reuters, and Associated Press wire services and made available to NFAC analysts assigned to crisis task teams.

(2) Recent Activities

No significant information.

(3) Anticipated Events

- o With increased use of telepouch and the installation of remote APARS in DO registries, the DO will assume increased responsibilities for cable dissemination.

- o OCR's Interim SAFE project currently provides dissemination support to a limited number of NFAC consumers. The interim system will be replaced by a permanent system now under development which will greatly expand the dissemination service to several hundred users.

- o ODP will develop office automation facilities to enable dissemination of documents created through ODP word processing facilities.

b. Document Dissemination

(1) Primary Facilities

- o Each Agency component is essentially responsible for the dissemination of its own documents and publications. Most finished intelligence is disseminated by the originating component.

- o OCR has the charter for developing and implementing dissemination policies and procedures in coordination with other Agency components. In actual practice, OCR disseminates the large majority of CIA and non-CIA hard-copy documents.

- o DO/IMS disseminates pouched documents and FBI documents to DO area divisions.

- o The Office of Development and Engineering disseminates special designee cables (BTKH) to all CIA components with requirements for Special Compartmented Intelligence (SCI).

- o The Office of Technical Services operates the DIRTECH Signal Center which is part of the Agency Staff Network. OTS disseminates about 50,000 incoming and outgoing cables annually mostly within the OTS organization.

- o OCO and RSG Watch Officers disseminate a variety of documents to Agency customers as part of their responsibility for alerting key Agency personnel to current developments.

- o PPG registry and dissemination functions handle the product of eight NFAC offices and the NIO account.

- o Various registries perform dissemination functions by redisseminating cables and documents to additional addressees at lower levels in the organization for which the registry is the primary delivery point.

(2) Recent Activities

No significant information.

(3) Anticipated Events

OCR has undertaken a study to determine the feasibility of converting hard-copy documents to electrical form via optical character reader. If the results are positive, Project OSCAR could result in reducing the number of hard-copy documents to be disseminated.

c. Graphic Dissemination

(1) Major Providers

NPIC Registry controls and disseminates all reports and graphics produced by tenants and host tenants in the center.

(2) Recent Activities

No significant information.

(3) Anticipated Events

No significant information.

B.4. Distribution of Information

Distribution refers to the physical movement of information in whatever media it is recorded.

a. Electronic Distribution

(1) Primary Facilities

- The Office of Communications is the major distributor of information recorded in electronic form followed by ODP. OC's Data Exchange (DATEX) and the Message Automated Switch (MAX) are the receipt and transfer points in Headquarters building for most electronic data entering the Agency. DATEX processes both data and message traffic and supports such varied customers as the COMIREX Automated Management System (CAMS), Remote Job Entry (RJE) to ODP's computers, and OCR's Interim SAFE. MAX processes narrative traffic (cables) which is passed to the Cable Dissemination System (CDS) and/or to Interim SAFE and to OCO. Both DATEX and MAX also process outgoing traffic.

- Although CDS is primarily a dissemination system, it also functions as a distribution system by passing high precedence cable traffic to OCO based on current intelligence requirements. The CDS also distributes message traffic directly to OCO's Crisis Management System (CMASS) computer based on geographic area interest profiles. The RSG and Imagery Watch Offices also receive electrical message traffic from CDS as well as directly from NSA and NPIC.

- Press reporting bypasses the DATEX and MAX facilities. FBIS wire service and the press wire services are distributed electrically to printers located in OCO. In addition to FBIS, Reuters traffic is distributed electrically to the CMASS computer.

- ODP's Automated Message Processor System (AMPS) links OC's CDS system and users who wish to receive message traffic electrically. AMPS distributes messages electrically (according to CDS applied dissemination codes) to NFAC's Message Routing Service (MRS), DO's document storage and retrieval system (COMET), the OF Electronic Time and Attendance Reporting System (ETARS), OCR's Interim SAFE, and others.

(2) Recent Activities

A Message Routing System (MRS) was recently installed to cut down on the time delay between dissemination of a message by CDS and the subsequent receipt of the message by the NFAC customer. Messages are sent electrically by CDS to ODP's Automated Message Processing System (AMPS). AMPS feeds the MRS which sorts messages according to CDS dissemination instructions. The MRS then sends the sorted messages electrically to OCO where they are printed and placed in bins for NFAC customer pickup.

(3) Anticipated Events

- o The Office of Communications is replacing current message switching systems (MAX'es) with state-of-the-art switching technology. This project (MERCURY) will increase Agency switching capacity and provide a broader range of data services to the foreign field.

- o The Office of Communications has contracted with XEROX Corporation for an Automated Print and Reproduction System (APARS). The APARS unit operates under control of a built-in computer. The computer receives messages and distribution instructions from the CDS system, prints the appropriate number of copies, and sorts the copies into addressee bins for manual distribution. The DO has contracted for additional APARS units which will be used for the same purpose within the DO registries.

- o The Office of Communications plans direct communications links to the SAFE and COMET systems. Interim SAFE is currently provided with OC cables via the ODP AMPS system. In the case of COMET, message traffic is recorded on magnetic tape and the tape physically transported to the DO system. There is no electrical link between ODP's Ruffing Center and the DO Special Center which could effect an electrical transfer between the AMPS and COMET systems.

- o ODP plans a Message Processing System (MPS) to replace AMPS. The new system will permit messages to be routed electrically to various Agency components and will also support message traffic from an originating office via ODP to the OC systems of CDS, DATEX, and MAX.

- o A large capacity electrical communications BUS facility is being installed under SAFE auspices.

The BUS will have sufficient capacity to satisfy OC, ODP, and SAFE communication requirements within the Headquarters Building. Terminal and computer facilities now linked via the grid system will be transferred to the new BUS. The released capacity in the existing GRID will be used for an expanded secure phone system.

b. Non-Electronic Distribution of Information

(1) Primary Facilities

- The definition of distribution encompasses mail room and registry functions and courier and pneumatic tube services. Under this definition the following organizations/systems are the major providers of distribution service.

  -- OL/P&PD - Packages and mails printed products according to dissemination instructions of the originator.

  -- OCR/ADD - Packages and mails hard-copy intelligence documents according to dissemination decisions made by division dissemination analysts.

  -- All other Agency registries and mail rooms including DO/IMS and NFAC/OCO/PPG registries and the OL-operated main mail room.

  -- DO/IMS operation of an Agency-wide pouch service in support of overseas operations.

  -- OL, OS, OD&E and other Agency courier systems.

(2) Recent Activities

An Agency-wide study of the registry function has been completed by ISS. The study identifies functions which are common to all registries with the objective of promoting standardization prior to automation.

B.5. Information Reference Services

These services involve the storage and subsequent retrieval of information in whatever media it is recorded. A reference service is also defined to include any indexing or abstracting performed to facilitate retrieval and any information sanitization needed to release information to Agency or non-Agency recipients.

Information reference services are catalogued here according to whether they are electronic-, paper-, or microfilm-based. When different elements of a single system fall in different categories, each element is described under the most appropriate heading. e.g., in AEGIS, the index to the file is described as electronic-based, and different parts of the main file under document-based and microfilm-based systems.

a. Electronic-Based Information Reference Service

(1) Major Providers and Facilities

- o The Office of Central Reference manages several storage and retrieval systems where part if not all of the information in each system is stored in electronic form. These systems are:

  AEGIS/RECON Subject File - References (index records) to hard-copy and microfilm document files are stored on magnetic media. Queries can be batched or on- line. Output from the batch search is normally a machine printed listing of related hits. On-line searches are made via Cathode Ray Tube terminals. Output is available on the CRT screen, can be printed at a local printer, or can be printed off-line on a high-speed central printer.

  Rapid Search Machine Files - Full-text documents are stored in a special format on magnetic tape. Queries recorded on punched cards are matched against the document text. Hits are recorded at an output printer where part or all of the document can be printed.

  Interim SAFE - This system stores the full text of documents in mail and text files and document bibliographic records in a third file. Searches are made using a CRT. Output is available on the CRT or can be printed on an attached printer. Users have the capability to create their own private files. The mail file contains the complete text of State and codeword cables for a five-day period. The text files store the full text of State and codeword cables, [redacted] 25X1
  Military cables, DOD/IR's and FBIS field traffic for

a four-week period. The bibliographic file is a copy of the AEGIS subject file.

- The Office of Communications Cable Secretariat maintained, until recently, a 20-year cable archival file of (except Restricted Handling) Agency messages sent and received. No indexing or abstracting is done. Retrieval service presumes the requestor has sufficient data on messages sought to allow retrieval in a straightforward clerical fashion. Retrieval by key word and/or subject alone is not possible.

- The DO/IMS manages a variety of automated and manual files in support of the DO Area Divisions. The acronym, DORIC, for Directorate of Operations Records and Information Control System, is the umbrella acronym which encompasses all the various records subsystems in the DO information system. Three of the subsystems provide automated search capabilities. The STAR (Special Trace and Retrieval) System supports personality name traces. Output is a reference to a document/cable or a 201 file. The DRS (Document Reference System) stores charge-out information, access instructions, and location information on files and/or documents. The full text of the document might be located in the COMET cable file, various hard-copy and microfiche 201 files, or the WALNUT microfilm files.

- NPIC maintains three major electronic-based files. They are:

  Exploitation Products File (EDF) - an automated index to exploitation reports and memoranda.

  Objects Data File (ODF) - a computerized file that enumerates, categorizes, and describes foreign objects, equipment, weapons, and weapon systems of intelligence interest.

  Installations Data File (IDF) - a data file containing information on 65,000 installations. The file is searched using a CRT terminal. Output is a printed listing showing all information on a specific installation or preformatted subset of the data such as a chronological description of the facility.

- There also exist throughout the Agency, a multitude of functional data files maintained by components on both the large general-purpose devices operated by ODP and the dedicated mini-and microcomputers in Agency components.

(2) Recent Activities

- o The Rapid Access Management Information System (RAMIS) provides non-ADP professionals with a simple, easy-to-use data base management package. The significance of this development is that data processing is brought closer to the user by giving him the capability to build and manage his own private reference system without professional ADP assistance. The expanded use of this service in recent months testifies to its popularity.

- o Another recent development is the DO decision to build a full-text file of DO cables - the COMET System. COMET provides the capability to search cables and supports DO archival responsibilities.

- o Joint ORD/OCO development of mini-computer support to a crisis task force allows personal receipt, storage and retrieval of cables via CDS and press & FBIS wire services, and previously produced SITREPS.

(3) Anticipated Events

- o Development contracts have been let with TRW Inc. to create and implement an expanded and permanent SAFE system for NFAC with initial operation by December of 1982.

- o OCR's RECON Subject Index to Intelligence Documents has been offered to the Intelligence Community. The proposal is being studied by Presearch, Inc., a private systems group under contract with the Information Handling Committee (IHC).

- o A joint ORD/NPIC study of high-speed text search is underway. Some hardware has been installed at NPIC. The system will provide high-speed search of free- form textual data stored on disk for internal NPIC users. The initial capability will be operational in the spring of 1980 and will allow queries against the Exploitation Products File (EDF), the Cable Reports File (CRF), and header records from the Installations Data File (IDF). Plans are for external community users access to HSTS by way of COINS.

- o We expect increased pressure for mini-computers to service reference needs perceived by the user to be unique.

b. Document-Based Information Reference Services

(1) Major Providers

- The Agency Archives and Records Center operated by ISS/RMD provides storage facilities for Agency archival records and for records on which frequency of use does not warrant primary storage in Headquarters.

- OCR manages extensive document-based files. These include:

  Biographic, organization, and category files stored in legal-sized folders and 5 X 8 card form. Each of the five geographic area divisions stores and manages its own files.

  Document holdings which are part of OCR's document subject file but for whatever reason were not microfilmed.

- IMS manages a variety of hard-copy files to support DO requirements.

  A hard-copy cable chrono (incoming and outgoing) covering a 3 - 6 month period.

  A one-year abstract file of administrative dispatches.

  DO operational activity files and subject files. Personality (201) files are stored in hard-copy or microfiche.

(2) Recent Activities

- Project RAMS is concerned with automation of the records storage and retrieval functions at the Agency Records Center. The project will include a reference service with an on-line data link between Records Center and headquarters components.

- A ten-year data base shows hard-copy document volume dropping relative to cable traffic which is increasing.

(3) Anticipated Events

- OCR has proposed a contract systems study of manual processes to determine if automation of biographic files is feasible.

c. Graphic-Based Information Reference Services

(1) Major Providers

- OCR stores about 12,000,000 all-source intelligence documents in its major document file. The bulk of this collection is in aperture card or microfiche format. The file covers the period 1947 to date. Access is by document number or by search of the AEGIS/RECON subject file.

- The OCR Library stores motion picture film and video tape. Access to these holdings is through search of a machine-stored index called MOPIRE. The Film Branch also stores large numbers of foreign personality photographic negatives. The file is arranged by photograph number (P.No.). Prints of these negatives are filed in OCR area divisions by country and by personality name.

- THE OGCR Map Library Division maintains three basic collections. The first is a comprehensive collection of approximately 600,000 foreign-produced maps of topographic, economic, political and sociological coverage; other materials on foreign areas include city plans, atlases, guidebooks, and selected geographic publications. The second collection is composed of foreign area topographic, aeronautical and hydrographic charts produced by the US Department of Defense. The third contains CIA-produced maps which are, with limited exception, small scale, thematic, and wholly problem oriented. Access to the file is supported by the DATMAP system which contains comprehensive bibliographic information on the maps held.

- NPIC manages an extensive collection of overhead imagery. The Office also maintains a comprehensive collection of ground (non-personality) photography and a collection of maps and charts required by NPIC.

- IMS stores a large collection of documents in the WALNUT system. The film stored in the WALNUT equipment is reproduced on aperture cards for requestors. Specific documents in the WALNUT file are identified for retrieval by the Document Reference System (DRS) mentioned above. IMS is a major producer and user of computer output microfilm. IMS is also a joint sponsor with OCR of an automated document storage and retrieval system (ADSTAR). See anticipated events below.

The IMS version of ADSTAR is named DORIC/W.

- o Smaller microform collections exist in other Agency components. Every office in the DDA has ongoing microfilm applications. All DDA microfilming is done by P&PD with the exception of two small applications, one in the Office of Finance and one in the Office of Security. Two offices in DDS&T - NPIC and OD&E - operate microfilm facilities.

(2) Recent Activities

OGCR has automated its map library with the DATMAP system. The DATMAP file contains comprehensive bibliographic information on 600,000 foreign-produced maps.

(3) Anticipated Events

At present, an automated document storage and retrieval system (ADSTAR) is being installed in OCR and IMS. The ADSTAR project is a joint effort of NFAC/OCR and DO/IMS under the management of DDA/ODP. The system will store documents on 16 mm cartridge microfilm housed in automatic retrieval modules. "Soft-copy" display, paper output, and microfiche output will be available at local and remote locations through the use of sophisticated, solid-state, image scanners.

B.6. Reproduction of Information

This category includes all facilities which enable the production of one or more copies of an information item in the same media as the original.

a. Reproduction of Information in an Electronic Media

(1) Primary Facilities

Virtually all hardware devices in the Agency which are capable of storing information in an electronic media are also capable of creating copies of that media. Normally, the media involves some form of magnetic tape but increasingly magnetic disks are being used as the storage media.

b. Document Based Reproduction

(1) Primary Facilities

The vast majority of information reproduction activity centers around the use of the ubiquitous 'Xerox' type copier machines. While there are a number of large devices which provide central reproduction facilities, the availability of small, inexpensive devices has permitted the justification and acquisition of these devices by virtually every component in the organization.

(2) Recent Activities

Copier devices in the Agency at the beginning of this year numbered 267 machines; an increase of 3% over the previous year. Average monthly copy volumes in 1979 ran about 11.6 million; again about a 3% increase over 1978.

(3) Anticipated Events

While it is unlikely that the total number of copier devices will be reduced in the near future, the continued expansion of word processing and office automation services will have a restrictive influence on the continued need for and growth of document reproduction services.

c. Graphic Reproduction

(1) Primary Facilities

A number of Agency components involved in the creation and use of microforms also maintain the necessary equipments to create film copies. The most significant facilities are found in P&PD, IMS, and OCR.

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B.7 SECURITY

The Agency Security Task Force examined the personnel, physical and information security programs of this Agency. The task force described the personnel and physical security programs as essentially sound. The information control program was described as ineffectual. This Task Force (Information Handling) is concerned primarily with information control. Physical security will be discussed only as a particular activity is specifically related to the protection of information, e.g., vaulted area alarm systems.

Information control refers to those facilities or procedures designed to enforce the need-to-know principle and to prevent unauthorized access to or unauthorized release of classified information. Information control also implies accountability. Information accountability refers to those facilities or procedures which enable the determination of the location of information and the identification of the components or individuals who have been exposed to that information. We recognize, of course, that enforcement of accountability has a direct impact on the control of information.

Control functions include the encryption of information, the requirement for passwords to access computer-held information, the use of classification and dissemination control caveats on documents, the establishment of security compartments for sensitive types of information, etc. Accountability functions include all the record-keeping activities which permit the location of a document or the identification of people who have seen or who have had access to the document, i.e., registry activities, logs, documents and courier receipts, document manifests, etc.

Information Control and Accountability

a. Control/Decontrol of Electronic Based Information

(1) Major Providers

- The Office of Communications encrypts and decrypts message traffic leaving and entering the Agency. OC also provides secure voice facilities.
- ODP provides computer security services by administering user identification/password access procedures for each of its systems which can be accessed remotely.
- OC is responsible for enforcing National emanations (TEMPEST) standards for all Agency equipment which processes classified information. This function is implemented through laboratory testing, engineering advice to user components, and periodic testing of installed systems.
- OS Information Systems Security Group approves

the physical location of electronic devices to limit emanations from the building.

- OC Cable Dissemination Branch exercises security control over the dissemination of electronic information through use of computer-stored reading requirement profiles. The profiles approved in writing by requirements authorities in Agency offices, e.g., Office of D/NFAC represent a predetermined need-to-know decision.

- Agency components which maintain central holdings of documents in electronic form exercise a security control function by determining whether a customer has the appropriate clearances to receive requested information. DO/IMS, for example, maintains compartmentation of centrally stored DO documents/files by restricting access to personnel with a demonstrated "need to know", and authenticating user identification via the DO Badge Office Authorization Table (BOAT). OCR, on the other hand, authenticates user identification for access to RSM files either through badge check or bigot lists.

(2) Recent Activities

No Significant Information.

(3) Anticipated Events

- [redacted] 25X1

- OCR's ADSTAR system will authenticate requester clearances by matching user supplied identification data against a copy of [redacted] 25X1
[redacted] which will be stored in the ADSTAR computer. Requesters will be denied information for which they lack the appropriate clearances. 25X1

b. Control/Decontrol of Non-Electronic Based Information

(1) Providers of Security Control Function

Control of non-electronic information is diffused throughout the Agency. Responsibility rests with:

- o Originators of documents in many cases make the original dissemination (need-to-know) decision.

- o Organizations with major dissemination responsibility such as OCR's Acquisition and Dissemination Division exercise security control over the dissemination of hard-copy documents through use of standard reading lists. These approved reading lists, like OC's computer-stored reading profiles, represent a predetermined need-to-know decision.

- o Registries, in so far as they determine who will see controlled documents, exercise a security control function.

- o Users of information are the largest security-control group and perhaps the weakest link in the security control function. Users can and do reproduce classified documents, extract information from one document for use in another document or for use in various files, and send documents to counterparts in other offices. Users also attend meetings where they exchange ideas/information as they do in meetings with their counterparts. The Security Task Force characterized weaknesses in the security control system attributable to individuals in these words:

  "inadequate knowledge and understanding of information security by many employees; and a lack of ardor on the part of many employees, both individuals and supervisors, to accept and discharge responsibilities for information control and protection beyond the barest minimum."

- o The DDA/ISS Classification Review Division is responsible for the mandatory review of classified material for downgrading and declassification purposes. The ISS Information and Privacy Division manages FOIA, Privacy Act, and Executive Order requests for the DDA. Downgrading, declassification, and release are all security control functions.

(2) Recent Activities That Affect Security Control of Information

- o The implementation of briefcase and package checks.

- Restrictions on authority to remove classified material from Agency buildings to approved couriers and to individuals authorized on a case-by-case basis by Agency Document Control Officers.

- Installation of the OS Automated Alarm Monitoring System (AAMS) which monitors protected areas of the Headquarters Building and alerts OS personnel when possible intrusions are detected.

(3) Anticipated Events (that will affect security control of information)

The recent establishment of the APEX Steering Group and the establishment of a Special Assistant to the DCI for Compartmentation to chair the APEX Steering Group will have a major impact on the administration of information security in the Agency. We cannot, at this time, predict the nature of, nor the extent of change which these events will generate, but we anticipate the need for close liaison between this group and any planning/architectural function developing from the IH Study recommendations.

B.8. Computing Support Facilities

This category includes all computers and the peripheral devices attached to those computers which support the storage and processing of information. This support includes the operation and maintenance of these facilities and the provision of any systems (non-application) software needed to ensure efficient utilization of the hardware devices.

a. Primary Providers

1. Central services providing common or general purpose support:

ODP maintains a large complex of processors and storage devices in the Headquarters Ruffing Center to support some fifty Agency and Community components. Services offered fall into five support categories:

- Interactive Time Sharing - which supports user controlled remote terminals to perform such activities as on-line file creation and update, program creation and execution, and interaction with the batch processor.

- Batch Processing - which handles processing jobs or requirements which generally require the use of large data bases and/or computing capabilities and do not require interactive communications with the user or job submitter.

- Data Base Management - which utilizes the GIMS system to support large complex information handling requirements.

- Office of Central Reference Support - which provides on-line computing and storage facilities to the OCR AEGIS/RECON and Interim SAFE systems.

- Message Processing - which accepts cables in electronic form from OC's CDS system and distributes these cables to a variety of users for subsequent storage and processing.

2. Large systems dedicated to specific functions:

- ODP provides dedicated computing facilities in its Special Center to support the DO's information storage and retrieval systems collectively known as ALLSTAR.

- ODP also provides a dedicated facility in the Special Center to support the COMIREX Automated Management System (CAMS).

- NPIC maintains its own large-scale computer center which supports imagery exploitation by NPIC and other community photo interpreters, measurement of photo discernable objects and information storage and retrieval services which are made available to Agency, Community, and COINS users.

- When the Telemetry Analysis and Display System (TADS) becomes operational, it will utilize a large dedicated computer that will be housed and operated by ODP.

3. Small systems dedicated to specific functions. This category of computing service is represented by a growing inventory of mini- and microcomputers that are generally located in, operated by, and directly support a user component. A sampling of these systems follows:

DDA/OL - In addition to the three minicomputers that are used to support the ETECS facility, P&PD has recently installed a minicomputer to help manage its inventory and production activities.

DDA/OP - Minicomputers are used to support the Credit Union and insurance/hospitalization functions.

DDA/OS - Minicomputers have been installed which control and record access to the Headquarters Building and to the vaulted areas within the building.

DDA/OMS - A minicomputer is used to interface special medical testing facilities to the ODP computers and to provide a mechanism which ensures the confidentiality of OMS medical records.

DDA/OC - A dedicated minicomputer is used to control the distribution of cryptographic materials.

DDA/OTR - OTR uses its own minicomputer to support training courses which deal with the functional ways in which a computer can facilitate intelligence analysis and production.

NFAC/OCR - A dedicated minicomputer supports the OCR central library activities.

NFAC/OCO - Minicomputers are used to support the collection and processing of information for analytical task teams assembled to report on specific international crises.

NFAC/OGCR - OGCR uses minicomputers to control their digitizing, map creation and visual aids production facilities. In addition, they have recently installed a system which supports interactive geographic and cartographic analysis of a variety of locationally related sets of information.

DO - The DO utilizes minicomputers to maintain a registry for Agency issued pseudonym, cryptonym and alias data and to support a community accessible data base on terrorist activities.

DDS&T/NPIC - In addition to the large computer systems mentioned above, NPIC also uses minicomputers to perform mensuration and image enhancement activities.

DDS&T/OSO - OSO operates and maintains minicomputers in the field as well as a computer center located in Headquarters. Functions include the collection, sorting, storage, transmission and processing of signal data.

DDS&T/OTS - Minicomputers are used to provide the facilities to support several laboratory test and evaluation functions in OTS.

b. Recent Activities

Activity in the area of computing support over the last few years has been characterized by a steady growth in:

- o The capacity of the computers providing general purpose support functions and the amount of on-line storage they provide for user files.
- o The number of installed minicomputers and the diversity of applications to which they are being applied.
- o The number of remote general purpose terminals and printers available to users and the wider use of graphic display and plotting devices.

c. Anticipated Events

(1) The installation of the Headquarters BUS will provide a communications environment that will facilitate the exploitation of Agency computing services by the widest possible population of users.

(2) There will be a sizeable increment in the computing facilities of the Agency when the separate SAFE computer center is operational.

(3) ODP is involved in an effort to identify a minicomputer that could be used to satisfy a large majority of Agency minicomputer needs. Because of its software compatibility with the large IBM mainframes, it is anticipated that the IBM 4300 minicomputer can serve as a mini 'standard' for a variety of data processing applications.

(4) As the new standard soft-copy terminal is deployed, it will greatly enhance the users ability to perform local word and data processing activities.

(5) The CRAFT concept will introduce comparatively sophisticated computing facilities to the overseas environment. CRAFT will also have impact on the use of Headquarters computing services to support overseas requirements.

B.9. Information Systems Development and Maintenance

This category includes the analysis, design, implementation, and subsequent maintenance of systems used to support specific user requirements in information handling. This activity is primarily related to the development and maintenance of computer and communications systems but can involve non-automated systems as well.

a. Primary Providers

(1) Organizations which include resources involved in the development and maintenance of information handling systems fall into three categories characterized by size and function.

- o Large, centralized, general purpose support. ODP provides a staff of approximately 100 individuals whose mission is to respond to Agency and Community requests for the development of new systems or the modification/enhancement of existing production applications. OC provides approximately 300 engineers, programmers and technicians to design, install and maintain Communications Systems for the Agency and the Community.

- o Medium-sized, dedicated support. Both NPIC and the DO maintain ADP personnel to create and service systems unique to their respective organizations. Each of these components contains approximately fifty individuals.

- o Small, dedicated support. A number of Agency components have found a need to provide their own software expertise which is dedicated to supporting their own unique mission requirements. The resources found in these groups are relatively small, seldom exceeding a half dozen people. ADP resources of this category are found in the following representative components: OCR, OSO, OER, and OL.

(2) It should also be noted that most of the larger software support groups utilize contractors to provide unique or temporary skills which are not available from Agency staff personnel.

b. Recent Activities

(1) Because of limited personnel resources, ODP has not always been able to respond to user requests within the time constraints requested. This has lead increasingly to an arrangement whereby the using component

provides a permanent position or slot in their organization which is occupied by an ADP professional from ODP. This assignment is temporary in nature and after two or three years ODP rotates another individual into the component position. Under these arrangements, the ADP professional works with user personnel in direct response to user established priorities but follows ODP professional standards and procedures.

(2) A recently established ADP standards committee has been constituted to develop Agency-wide standards relative to defining systems requirements and the preparation of documentation associated with the design, implementation, testing, and maintenance of computer systems. All of the major Agency components having software development capabilities are participating in this effort.

c. Anticipated Events

(1) The growth in the use of ODP professionals in rotational assignments is expected to continue. The current population of about thirty rotatees should expand at the rate of about five per year.

(2) Further efforts to adopt standard Agency procedures and techniques for software development can be expected to continue.

B.10 Miscellaneous Services

This category includes two services which warrant some discussion but which do not logically reside in the nine categories described above. They are:

Formal training in IH services

Data management services

a. Training

(1) Primary Facilities

- o OTR conducts IH related courses in such subjects as records management, micrographics, FOIA/PA and surveys of Agency and Community information systems.
- o OC provides an extensive training facility to support their communications and equipment maintenance responsibilities.
- o IMS/Training Staff serves as the DO focal point for records system training. This includes determining the requirements for, developing, and conducting DO records training for CIA personnel, other U.S. Government agencies, and foreign liaison personnel.
- o ODP offers computer related courses that are available to any Agency component that has a need to improve their ADP skills.
- o Many components support small, specialized training courses that are run on an ad hoc basis and are usually restricted to component personnel. Illustrative examples are:

  OF's course on information science techniques for financial management

  OER's courses on the use of specialized languages (e.g., APL & TROLL) for economic analysts.

(2) Recent Activities

An interesting development in ADP training support is the use by OTR of a dedicated minicomputer which enables student access during normal classroom hours as well as a remote capability to permit students to perform out of class 'homework' activities.

(3) Anticipated Events

The SAFE system, when implemented, will provide an extensive Computer Assisted Instruction (CAI) facility that will support the training of the new SAFE user or refresh the knowledge of the experienced user. The CAI facility will allow the user to either experiment with the system or enter into a structured lesson. Certain users will also be allowed to create or modify lessons.

b. Data Management Services

This category includes data base backup, recovery and other integrity services which ensure that the information stored and retrieved is accurate and available. These services are performed on behalf of the owner of the data who does not have the resources or expertise to ensure the required integrity.

(1) Primary Facilities

- o ODP's Production Division provides data management and job production services to a number of computer applications running in the Ruffing Center. These applications range from periodic batch submissions to monitoring on-line data base management systems and cable distribution services.

- o Other organizations which are responsible for large collections of data provide similar services. NPIC personnel ensure the integrity of the NDS files, IMS/SG ensures that the DORIC data bases are accurate and available and OCR provides the resources to ensure that the AEGIS/RECON and Interim SAFE files are available for user exploitation.

(2) Recent Activities

- o The owners of the data are assuming more responsibility for validating data base integrity. OF's establishment of a data base management function which monitors the state of the FRS and GAS data bases in a good example.

- o Multiple users of the same data base are beginning to share responsibility for their joint store of information. OSR and OIA have assumed joint responsibility for maintaining the OASIS order-of-battle data base.

(3) Anticipated Events

When SAFE becomes operational, it will continue the data management support philosophy initiated in Interim-SAFE by establishing a SAFE User Representative Element (SURE) which will provide data base management functions for all SAFE files.

C. ALTERNATIVE MANAGEMENT STRUCTURES

In addressing alternative management systems for information services, the consideration is to what degree management of information services should be centralized or decentralized.

However, the problem cannot be dealt with in such global form. One must decide what is to be centralized or decentralized. The management alternatives that follow are derived by viewing the problem from three levels of management control. This analysis technique is employed by IBM in their methodology for business systems planning which is in turn based on a method of organizational analysis developed at Harvard.

The methodology speaks to three levels of control:

Level 1: Strategic Planning - the process of deciding on objectives of the organization, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of resources.

Level 2: Management Control - the process by which managers assure that resources are obtained and used efficiently in the accomplishment of the organization's objectives.

Level 3: Operational Control - the process of assuring that specific tasks are carried out effectively and efficiently.

As applied to Agency Information Handling, the questions become:

- o How should we organize to set goals for information services, decide investment strategies, and set policy on system acquisition, use and disposition?
- o Who should prepare and defend, budgets, control positions, and manage the careers of information service specialists?
- o Who should be in day-to-day command of operational systems and their staffs?

If one considers the possibility of placing each of these controls at different organizational levels, i.e., Agency, directorate, or office level then many options are made available for evaluation. Adding to the possible list of line options is the concept of addressing strategic planning through staff organizations.

The option tree shown in Figure C-1 depicts the range of alternatives selected by the Task Force for study. This tree identifies six families (enclosed in boxes) of options that are described in some detail below. Each family has been assigned a two character mnemonic (PA, DA, etc.) and a single digit numeric suffix to distinguish the options within each family. The boxes identifying the family options in Figure C-1 also briefly indicate the salient differences which separate the members within each family.

Table C-1 contains brief definitions of some terms used throughout this section of the report. Definitions are included for:

- o A Directorate of Information Services (DIS)
- o An Office of Information Services (OIS)
- o Career Management
- o Mission Budgeting
- o Mission Tasking
- o Strong and Weak Architects

Organizational Options for IH Management

INCREASE IN AGENCY LEVEL (CENTRAL) MANAGEMENT

CURRENT ORGANIZATION

DECREASE IN AGENCY LEVEL (CENTRAL) MANAGEMENT

AGENCY LEVEL PLANNING WITH:

EXISTING IH COMPONENTS

PE DENOTES:
Agency Planning and Existing IH Components

PE1	• Agency Planning Network
PE2	• Agency Planning Network • Agency Career Management • Mission Budgeting and Tasking

CONSOLIDATION OF IH COMPONENTS

PC DENOTES:
Agency Planning and Component Consolidation

PC1	• DDA Only
PC2	• DDA, NFAC
PC3	• DDA, NFAC, S&T

A NEW DIRECTORATE

ND DENOTES:
A New Directorate

ND1	• Mission Budgeting and Tasking
ND2	• Agency Budgeting • Mission Tasking
ND3	• Agency Budgeting and Tasking

DIRECTORATE SELF-SUFFICIENCY WITH:

AGENCY LEVEL PLANNING

DA DENOTES:
Directorate Independence with Agency Level Planning

DA1	• Strong Agency Planning • Directorate Budgeting and Tasking
DA2	• Strong Agency Planning • Mission Budgeting and Tasking
DA3	• Weaker Agency Planning • Directorate Budgeting and Tasking
DA4	• Weaker Agency Planning • Mission Budgeting and Tasking

DIRECTORATE LEVEL PLANNING

DD DENOTES:
Directorate Independence with Directorate Level Planning

DD1	• Directorate Budgeting and Tasking
DD2	• Directorate Budgeting • Mission Tasking
DD3	• Mission Budgeting and Tasking

COMPONENT AUTONOMY

CA DENOTES:
Component Autonomy

CA1	

TABLE C-1

DIRECTORATE OF INFORMATION SERVICES (DIS)

A new, i.e., fifth, Directorate which consolidates all of the Agency's IH functions and resources under one manager. The Director of this organization, or his appointee, functions as the Agency Architect for IH planning activities.

OFFICE OF INFORMATION SERVICES (OIS)

An organization which consolidates all of a Directorate's IH functions under one manager. IMS currently provides an "OIS" function for the DO. The OIS' envisioned as part of the DA and DD family of options also allows the Directorate OIS' to acquire information resources currently managed by another Directorate, e.g., ADP hardware, communication facilities, etc. The OIS concept does not necessitate the creation of a single 'office' as the organizational term is commonly used. An OIS could be composed of several existing components which have been placed under central directorate control. For example, an OIS in the DDA could be implemented as a single new office or existing IH oriented components could be placed under the control of a directorate level manager of IH services.

CAREER MANAGEMENT

A term used to describe those personnel practices which are designed to foster an employee's professional development. These include counseling, training, and planning for future job assignments. Career management does not imply position or operational/tasking control.

MISSION BUDGETING

Mission budgeting stipulates that if a user (Directorate or Office) can be identified as the sole or principal beneficiary of an IH system or service, that component should be responsible for the budgetary justification of that service.

MISSION TASKING

Mission tasking stipulates that if a user (Directorate or Office) can be identified as the sole or principal beneficiary of an IH system or service, that component should be responsible for operational control or tasking of the resources used to support that service. Mission tasking enables the user to establish the requirements and priorities for the utilization of the supporting services.

STRONG ARCHITECT

An Architect who derives his authority directly from the DCI or from the DDIS. His authority is in direct proportion to the extent that he is granted authority by them to initiate and promulgate Agency-wide

IH plans in their name. This option can be viewed as a top-down, i.e., Agency level to Directorate level, approach to Strategic IH Planning.

WEAK ARCHITECT

An Architect who derives his authority directly from the DCI. His role under this option is to coordinate Directorate initiated IH plans into an Agency Strategic Plan. This option can be viewed as a bottom-up approach to Strategic IH Planning, i.e., Directorate level to Agency level.

ALL PORTIONS THIS SECTION UNCLASSIFIED

C.1 DESCRIPTION OF OPTIONS

OPTION CO

(CURRENT ORGANIZATION)

SUMMARY

The status quo is an intriguing blend of Agency, directorate and office level centralization. If it has only one virtue, that virtue would be flexibility, i.e., there is a management system for every occasion. Information services are provided by a variety of organizations which have evolved over thirty years to meet the unique demands of Agency institutions. IH functions are generally managed by an Office, or in the case of DO, by a Staff. Services provided are Directorate wide, as in the case of IMS service to the DO, or Agency wide, as in ODP or OC. Agency-wide planning for integrated information services is non-existent. Some Agency-wide IH planning is done by components having functional responsibility for a particular IH service, e.g., OC for communications. (C 3d(3))

ORGANIZATIONAL IMPLICATIONS

Responsibility for information handling activities in the current organization rest, for the most part, in eight major components. There are exceptions which do absorb IH resource dollars and manpower but they are small by comparison and usually unique. The eight major components and their areas of responsibility are:

Office of Communications	Design, installation, operation and maintenance of foreign and domestic electrical communications and dissemination.
Office of Data Processing	Operation of computer hardware,provision of systems analysis and programming support to Agency components, storage and maintenance of data bases, word processing management.
Information Management Staff	Management of all IH activities for the DO.
Office of Central Reference	Agency-wide reference support,dissemination of hard copy intelligence documents, Community biographic support on non-military personalities, acquisition of foreign

	publications.
Printing and Photographic Division	The bulk of Agency printing of publications and microfilming operations
Information Services Staff	Administers Agency FOIA and Privacy Act programs and Agency Records Management activities.
FBIS	Disseminates foreign press, radio and TV information. Publishes JPRS Translations.
NPIC	Computer support to overhead reconnaissance activities. Dissemination of PI reports. (S 3d(3))

PLANNING RESPONSIBILITIES

There is no Agency Information Handling Plan. Until recently only DO had a Directorate-wide IH plan. NFAC, ODP and OC have independently initiated five-year IH planning exercises in their own areas of responsibility. Although ODP and OC compile Agency-wide requirements for computer and communications support annually, coordination on planning is informal and ad hoc. Some planning on major expenditures is forced by the budget process, e.g., SAFE. There is an annual ADP Project Review by EXCOM. (C 3d(3))

CAREER MANAGEMENT

Career Management for "IH Careerists" is essentially a component responsibility with a few exceptions. DO/IMS manages all DO IH careerists. ODP has career management responsibility for some ODP programmers on rotational assignments in non-ODP slots. OC has career management responsibility for OC personnel assigned to DDS&T Program slots. (C 3d(3))

BUDGET MANAGEMENT

DDA components attempt to budget at the Agency level. OC, ODP, and OL budget at the Agency level for commo, ADP, and printing services insofar as that is consistent with the management systems of other directorates. (C 3d(3))

The DO relies on OC and OL budgeting for communications and printing support but shares budgeting responsibility for ADP with ODP. DO/IMS typically will budget for new ADP systems and applications while ODP budgets ongoing support for the DO computer center. (C 3d(3))

NFAC relies heavily on Agency-level budgeting by the DDA to meets its needs. However, NFAC offices are beginning to budget for unique needs such as special purpose minicomputers and software support. (C 3d(3))

DDS&T inputs requirements to DDA Agency-level budgets but also does significant program and mission budgeting for unique communications and ADP. (C 3d(3))

OPERATIONAL CONTROL (TASKING)

In the DDA, OC, ODP, and OL control the large, shared facilities such as the ODP center, OC base stations, and OL printing plant. Otherwise, user control is the rule. (C 3d(3))

Within the DO, DO/IMS performs operational control at the directorate level. (C 3d(3))

NFAC is largely dependent on shared facilities but in the area of reference services, OCR has control. PPG is establishing control over recording and editing as it is applied to NFAC publications. (C 3d(3))

Within DDS&T the control lies principally with the offices and programs. While there is significant reliance on the central services of OC and ODP, there is heavy emphasis on mission services and their control. (C 3d(3))

IMPACT ON USERS

Several IH service organizations provide customer service functions to simplify user access to information support. Examples are OC's Foreign Network Division Current Activities Branch, ODP's Customer Services Staff and Production Division, OCR's Country Reference Analyst, IMS records referent at the desk program, etc. (C 3d(3))

IMPLEMENTATION PHASING

Not applicable.

UNMARKED PARAGRAPHS OF THIS SECTION ARE UNCLASSIFIED

PE FAMILY OF OPTIONS

(AGENCY LEVEL PLANNING IN CONJUNCTION WITH EXISTING IH COMPONENTS)

SUMMARY

Options PE1 and PE2 leave existing IH service components unchanged. Both options provide information handling planning staffs at the DCI level, and IH coordinators in each of the four Directorates. Career management of personnel, budgeting and operational control of resources remain unchanged in option PE1. Career management is centralized in one component where possible in option PE2. Responsibility for budgeting and operational control of resources in option PE2 is passed to the mission manager whenever the mission manager is the primary beneficiary of the service. For example, overseas COMMO operations which directly support the DO would be budgeted by the DO, not OC. (C 3d(3))

ORGANIZATIONAL IMPLICATIONS

Existing service components are unchanged. A DCI staff is established to provide Agency level strategic IH planning. Directorate IH staffs provide directorate coordination with the DCI staff.

PLANNING RESPONSIBILITIES

The Architect at the DCI level is responsible for initiating information handling planning for the Agency. After coordination with the Directorates, the Architect prepares and presents the IH Strategic Plan to the EXCOM for its concurrence. The Architect will take the lead in strategic planning for information services and will reconcile Agency policy statements and Agency goals on intelligence collection and production with knowledge of information service activities and technology advances to formulate information service goals for the Agency. A shorter term plan developed in conjunction with Directorate and Office level IH coordinators is created at the Architect's initiative and integrates information service planning with budget planning. The Architect is responsible also for presenting an annual Agency IH review to the EXCOM. The presentation would replace the present annual ADP review conducted by the EXCOM. The Architect monitors Agency ADP activities as required to ensure that they are in harmony with the Strategic Plan. The Architect is the Agency IH representative to the Intelligence Community.

CAREER MANAGEMENT

Career management remains unchanged in option PE1. Career management is centralized in one component wherever possible in option PE2, e.g., ODP for ADP careerists, OC for Communication careerists.

BUDGET MANAGEMENT

Budget management varies. In option PE1, budgeting remains unchanged, e.g., IMS budgets directorate wide for DO IH services, ODP and OC budget Agency wide for ADP and Communications services, OCR budgets for the Agency on acquisition of foreign publications. In option PE2 budget management is shifted wherever possible so that the mission manager budgets for those IH services dedicated to his mission.

OPERATIONAL CONTROL (TASKING)

Operational control is under the manager who provides the IH service. Generally speaking, resource tasking is controlled by the component which has budgeting responsibility for the resources.

IMPACT ON USER

Because there are no organizational changes contemplated in the components providing information services, little impact on the user is anticipated.

IMPLEMENTATION PHASING

The initial phase in either of these options is to create the DCI staff. This would be followed closely by the identification or establishment of the directorate coordination staffs. Identification of career management, budgeting and operational control changes under option PE2 would follow the creation of this planning network.

ALL PORTIONS THIS SECTION UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

PC FAMILY OF OPTIONS

(AGENCY LEVEL PLANNING IN CONJUNCTION WITH CONSOLIDATED IH COMPONENTS

SUMMARY

The attributes of the PC family are as follows: A DCI level Architectural Staff is created. A mechanism is established at the Directorate level (if none exists) to coordinate with the Architect. The information handling services are consolidated within the existing Directorate(s) into an Office of Information Services (OIS). Three incremental consolidation options are suggested: DDA/OIS (PC1), NFAC/OIS (PC2), DD/S&T/OIS (PC3). The IH specialists career service is Agency-wide. Budgeting and operational control remain as closely aligned to the mission component as possible. Current central services such as communications, data processing,and central reference remain in their current Directorates.

ORGANIZATIONAL IMPLICATIONS

A DCI level Architectural Staff is created. An Office of Information Services (OIS) is created within the Directorate(s). The OIS includes a realignment of the information handling functions within a centralized component (there would be no organizational change to the DO which has already centralized its information handling services in IMS).

OPTION PC1 establishes an OIS in the DDA only. The IH functions performed presently by the Office of Communications, the Office of Data Processing, the Printing and Photography Division, the Information Services Staff, the Office of Logistics courier and registry operations, and the Office of Security's Information Systems Security Group would be incorporated in the new OIS. Personnel of these components would be reassigned to several functional Divisions within OIS, namely: Systems Engineering, Applications, Operations and Maintenance, Customer Service, and Information Security. If the OIS structure is considered too large to be manageable, an alternate option would create an Associate Deputy Director for Information Services and an Associate Deputy Director for Administrative Services within the DDA. (C 3d(3))

OPTION PC2 establishes an OIS in NFAC in addition to the DDA/OIS (as described). The NFAC/OIS would include, but not be limited to, those functions related to records management, 'FOIA, systems, registry, map/film library, acquisition and dissemination, etc.

OPTION PC3 completes the Directorate centralization of IH services by establishing an OIS in DD/S&T. The OIS would consolidate registry, courier, ADP, and records management functions in S&T.

PLANNING RESPONSIBILITIES

CAREER MANAGEMENT

Agency-wide career management is centralized in the DDA/OIS for ADP, Communications, Registry, Courier, Printing, Photography, Records Management careerists, etc. Career management for librarians, indexers, disseminators, etc., is centralized in NFAC.

BUDGET MANAGEMENT

Where the IH service can be identified as uniquely supporting a mission, the mission manager will budget for the service, e.g., NFAC will budget for SAFE. However, general purpose services will continue to be budgeted by the central support component, e.g., OC, ODP.

OPERATIONAL CONTROL (TASKING)

Where the IH services can be identified as uniquely supporting a mission, the mission manager directs the day-to-day use of resources supporting the mission. For example, registry personnel whose career is managed by an OIS would still be subject to tasking by the Component to which they are providing registry support.

IMPACT ON USERS

An OIS/Customer Services component will serve as a single point of entry for the user so that the selection of IH services is optimized and not up to chance or ignorance. This component will function as an integrated customer service organization and will act as a buffer between the user and IH systems. Although systems may change, the user interface will remain quite constant. Therefore, early introduction of this component is desirable to shield the user from disruptions that normally accompany organizational change.

IMPLEMENTATION PHASING

We envision a phased implementation which spread over a three year period would include the following chronology: Creation of the DCI IH Staff which would be responsible for the transition planning and the Architectural function, and related IH coordinating mechanisms; Creation of a Customer Service Component in each Directorate; creation of the DDA/OIS; DDA/OIS assumes career management responsibility for most IH specialists; create NFAC/OIS; NFAC assumes career management of indexers, disseminators, etc.; create DDS&T/OIS.

ALL PORTIONS THIS SECTION UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

ND FAMILY OF OPTIONS

(NEW DIRECTORATE)

SUMMARY

In options ND1, ND2, and ND3, a new Directorate of Information Services (DIS) is created and assumes management responsibility for all Agency information handling activities. An Architectural Staff established within the new DIS does Agency-wide planning for all information handling activities. Each of the four existing Directorates identifies or creates a formal IH staff to plan for and to coordinate Directorate IH plans with the DIS Architect. Career management of all IH careerists is assumed by the new Directorate. In option ND1, budget management is shared between the DIS, which budgets for all central IH services, and the mission component which budgets for dedicated services. Operational control follows the same pattern with the DIS manager exercising operational control over most resources and the mission manager exercising operational control over resources dedicated to his mission. In option ND2, the DIS assumes total responsibility for budgeting while continuing to share operational control over IH resources with mission managers. Option ND3 is totally centralized with the DIS assuming full control of planning, career management, budgeting, and operational control of resources.

ORGANIZATIONAL IMPLICATIONS

A new Directorate of Information Services (DIS) is created in options ND1, ND2, and ND3. The DDIS assumes full management responsibility for all information handling activities in the Agency. IH components in the four existing Directorates are disestablished and their functions and personnel reorganized into the new Directorate. An Agency level Architectural Staff is created in the new DIS. IH staffs are identified or created in each of the four existing Directorates to coordinate IH plans and requirements with the new DIS Architect.

PLANNING RESPONSIBILITIES

Because the new DIS is responsible for all Agency information management, the DIS Architect becomes the de facto Agency Architect. He is, therefore, responsible for preparing and maintaining the Agency IH Strategic Plan, review of the new IH project proposals initiated by Agency components for conformity to the Strategic Plan, is the principal advisor to the DDIS and, through him, the EXCOM on IH matters, and is the Agency IH representative to the Intelligence Community. The Architect also functions as a coordinator on technical matters within the DIS.

CAREER MANAGEMENT

The DIS is responsible for Agency-wide career management of IH careerists under all three options.

BUDGET MANAGEMENT

Under ND2 and ND3, the Director, DIS, budgets for all Agency IH services. Under ND1 budget authority is shared with mission managers. The mission manager budgets for those IH activities which are dedicated to his mission.

OPERATIONAL CONTROL (TASKING)

Option ND3 is the most centralized. The DIS is vested with operational control over all IH resources. Under options ND1 and ND2, DIS shares operational control with mission managers. The latter assume control of dedicated IH resources.

IMPACT ON USERS

Because all three options involve extensive organizational change a customer service organization is included in the new DIS. This organization minimizes disruption by acting as an intermediary between the user and newly reorganized and relocated systems.

IMPLEMENTATION PHASING

The creation of a new Directorate and the disestablishment and transfer of IH functions in existing Directorates to the new Directorate could be accomplished in any one of a number of ways. The following phasing is a logical approach.

1. Establishment of a new Directorate of Information Services. Functions to be transferred to that organization are word processing, dissemination, distribution storage and retrieval, communications, printing, automatic data processing and information security.

2. Appointment of a Deputy Director to head the new organization with appropriate budget and staffing authority to create an implementing staff.

3. Development of an implementation plan coordinated with existing Directorate Staffs.

4. Implementation of the reorganization in accordance with the plan developed by the planning staff beginning with creation of a customer service component.

5. Disestablishment of the implementation staff.

ALL PORTIONS THIS SECTION UNCLASSIFIED

DA FAMILY OF OPTIONS

(DIRECTORATE INDEPENDENCE WITH AGENCY LEVEL PLANNING)

SUMMARY

This family of options emphasizes IH self sufficiency for each of the four Directorates. This independence is tempered however by the presence of a DCI level staff architect which initiates and/or coordinates IH planning with the Directorates. Each Directorate would consolidate all of its own IH services into a single component; an Office of Information Services (OIS). DO/IMS already represents this consolidated component for the DO. Each OIS (or DO/IMS) could also develop and maintain its own IH support services which it currently receives from a central service oriented component. (C 3d(3))

ORGANIZATIONAL IMPLICATIONS

A DCI staff is established to provide Agency level strategic IH planning. DO/IMS remains unchanged. Each of the other Directorates would consolidate its IH services into a single component (OIS) which would assume all IH planning and service responsibilities for the Directorate. Each OIS (including DO/IMS) has the option of assuming central support functions currently being performed by another Directorate. For example, the NFAC/OIS could budget for and operate it's own ADP center if it chose to assume this responsibility from ODP. (C 3d(3))

PLANNING RESPONSIBILITIES

While this family of options calls for the creation of a DCI level staff to provide an Agency Architect for IH planning, the role of the Architect in options DA1 and DA2 is stronger than in DA3 and DA4. Under DA3 and DA4 the architect would act as a coordinator of Directorate submitted IH plans, advising the EXCOM as to their applicability and compatibility.

In all of the options, the OIS' created in each of the Directorates (or DO/IMS) would provide planning coordination with the DCI staff Architect.

CAREER MANAGEMENT

DO/IMS retains, and the three OIS components assume, career management responsibility for all IH specialists in their own Directorate. There is no Agency-wide career management.

BUDGET MANAGEMENT

Under options DA1 and DA3, the OIS'(or DO/IMS) budget for all IH support provided to the respective Directorate. Options DA2 and DA4 specify that mission budgeting is to be encouraged.

OPERATIONAL CONTROL (TASKING)

Options DA1 and DA3 require the OIS' (or DO/IMS) to provide tasking for all IH resources in their respective Directorates. DA2 and DA4 require that the mission components assume tasking responsibilities where appropriate.

IMPACT ON USERS

The impact on DO users should be minimal in that IMS already serves as the focal point for IH services in that Directorate. The creation of a Directorate OIS would be preceded by the establishment of a customer services component that would assist the directorate user in any shift from central to directorate oriented services. If no existing central services are subsumed by the OIS (or IMS), the impact on the users should be relatively insignificant. If central responsibilities (e.g., ADP) are established by an OIS, the impact could be substantial if non-standard (different from central) devices, languages, procedures or standards are implemented by the OIS.

IMPLEMENTATION PHASING

Implementation of any of the options in this family would probably adhere to the following phases:

1 - Creation of the DCI level staff architect
2 - Assumption of central functions (if any) by DO/IMS
3 - Creation of an OIS in NFAC
4 - Creation of an OIS in S&T
5 - Creation of an OIS in DDA which would retain any central service functions not transferred to DO/IMS or a new directorate OIS.

ALL PORTIONS THIS SECTION UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

DD FAMILY OF OPTIONS

(DIRECTORATE INDEPENDENCE WITH DIRECTORATE LEVEL PLANNING)

SUMMARY

This family of options emphasizes IH self sufficiency for each of the four Directorates. Each Directorate is responsible for its own IH planning. There is no Agency level IH planning capability. Each Directorate would consolidate all of its own IH services into a single component; an Office of Information Services (OIS). DO/IMS already represents this consolidated component for the DO. Each OIS (or DO/IMS) could also develop and maintain its own IH support services which it currently receives from a central service oriented component. (C 3d(3))

ORGANIZATIONAL IMPLICATIONS

DO/IMS remains unchanged. Each of the other three Directorates would consolidate their IH services into a single component (OIS) which would assume all IH planning and service responsibilities for the Directorate. Each OIS (including DO/IMS) has the option of assuming central support functions currently being performed by another Directorate. For example, the NFAC/OIS could budget for and operate its' own ADP center if it chose to assume this responsibility from ODP.

PLANNING RESPONSIBILITIES

In all of the options of this family, the OIS' created in each of the Directorates (or DO/IMS) would plan independently for their own Directorate oriented information services. There is no Agency-wide planning function. There is no Agency Architect.

CAREER MANAGEMENT

DO/IMS and the three OIS components assume career management responsibility for all IH specialists in their own Directorate. There is no Agency-wide career management.

BUDGET MANAGEMENT

Under options DD1 and DD2, the OIS (or DO/IMS) budget for all IH support provided to the respective Directorates. Option DD3 specifies that mission budgeting is to be encouraged.

OPERATIONAL CONTROL (TASKING)

Option DD1 requires the OIS (or DO/IMS) to provide tasking for all IH resources in their respective Directorates. DD2 and DD3 require that the mission components assume tasking responsibilities.

IMPACT ON USERS

The impact on DO users should be minimal in that IMS already serves as the focal point for IH services in that Directorate. The creation of a Directorate OIS would be preceded by the establishment of a customer services component that would assist the directorate user in any shift from central to directorate oriented services. If no existing central services are subsumed by the OIS (or IMS), the impact on the users should be relatively insignificant. If central responsibilities (e.g., ADP) are established by an OIS, the impact could be substantial if non-standard (different from central) devices, languages, procedures or standards are implemented by the OIS.

IMPLEMENTATION PHASING

Implementation of any of the options in this family would probably adhere to the following phases:

1 - Assumption of central functions (if any) by DO/IMS
2 - Creation of an OIS in NFAC
3 - Creation of an OIS in S&T
4 - Creation of an OIS in DDA which would retain any central service functions not transferred to DO/IMS or a new directorate OIS.

ALL PORTIONS THIS SECTION UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

CA FAMILY OF OPTIONS

(COMPONENT AUTONOMY)

SUMMARY

All existing information services components are disestablished and their functions assumed by existing office level and DO division level components. Each component thus becomes responsible for its own ADP support, its own communications, acquisition of foreign publications in its own field of interest, provides its own couriers, etc. Complete decentralization of IH functions is the intent.

ORGANIZATIONAL IMPLICATIONS

Existing central information handling organizations, e.g., OC, ODP, OCR, IMS, are disestablished. Individual Agency components, e.g., Office of Finance, Office of Economic Research, each assume responsibility for providing their own IH support. (C 3d(3))

PLANNING RESPONSIBILITIES

Individual Agency components plan for their own information support. There is no directorate or agency level planning activity.

CAREER MANAGEMENT

Individual Agency components retain career management responsibility for people already assigned to the component and would assume additional responsibility for those central IH personnel reassigned to their component.

BUDGET MANAGEMENT

Each component budgets for its own IH services.

OPERATIONAL CONTROL (TASKING)

Each component has operational control over its own resources.

IMPACT ON USERS

The disestablishment of the central services would have a severe impact on the current population of centrally supported users. The possibility that their parent component could replicate the eliminated central service such that the change would be transparent or the quality maintained is very unlikely. Of all the options considered, this would have the most significant ramification on the way users acquire IH services.

IMPLEMENTATION PHASING

Time period is indeterminate. Phasing would require:

1. Creation of a central planning and implementation group.
2. Creation of planning groups in each Office or DO Division level component.
3. Preparation of a phasing plan
4. Transfer of IH personnel to components, acquisition of minicomputer and other hardware by individual components, release of central leased hardware to vendors, release of central, purchased hardware to government surplus, all in compliance with the phasing plan.
5. Disestablishment of planning group after reorganization is complete.

ALL PORTIONS THIS SECTION UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

C.2 STRUCTURING THE DECISION

In addition to an awareness of what options are available to the decision maker, there needs to be agreement on what criteria will be used to select the desired option. A complex question such as Agency management and organization of information services presents a seemingly endless list of factors that might be significant in evaluating options. Hence, establishing the criteria for decision making is in itself a complex problem.

Therefore, the Task Force perceived its task not only to include development of a range of organizational alternatives but also a tentative criteria for the decision.

A tentative list of decision factors was developed by the Task Force. This tentative list was then modified by suggestions from selected major Office Directors. Five major factors were further subdivided into component parts for ease of discussion and analysis. The decision factors are listed below. The definitions of these factors are contained in the accompanying table.

A. Management
- (1) Planning and Allocation
- (2) Acquisition of Resources
- (3) Organizational Clarity
- (4) Life Cycle Costs
- (5) Span of Control
- (6) Utilization of Technology
- (C) External Oversight

B. User Satisfaction
- (1) Access and Quality of Services
  - (a) Quality of Service
  - (b) Response Time of Service
  - (c) Ease of Access to Service
- (2) Responsiveness and Flexibility
  - (a) Large Requirements
  - (b) Small Requirements

C. Personnel Resources

D. Information Control
- (1) Compartmentation
- (2) Physical Security
- (3) Technical Security

E. Disruption
- (1) Disruption to Providers
- (2) Disruption to Users

TABLE C-2

DEFINITIONS FOR DECISION FACTORS

Planning and Allocation of information handling resources - The degree to which the organization improves our ability to assess the current state of affairs, forecast the future, and allocate scarce resources rationally.

Acquisition of Resources - The degree to which the organization is able to compete with mission oriented components to capture dollars for the IH function.

Organizational Clarity - The degree to which the organization reflects the mission, responsibility, and authority of information service components, in a simple, understandable hierarchy with a modest span of control and low-level delegation of authority.

Life Cycle Costs - The degree to which the organization allows us to fully appreciate the total life cycle costs--development, implementation, operations and maintenance, salvage value and replacement costs--of current and proposed ways of delivering needed information services.

Span of Control - The degree to which the organization limits the number of individuals who report directly to the manager and who require significant planning and control efforts on his part.

Utilization of Technology - The degree to which the organization is capable of adopting new technology to improve the delivery of information services.

External Oversight - The degree to which the organization is able to satisfy the demands from Congress, the White House, OMB, etc., for information relative to the information handling function.

Quality of Service - The degree to which the organization assures that data bases are accurate, current and relevant to user needs.

Response Time - The degree to which information systems are able to provide substantive information to users on a timely basis.

Ease of Access - The degree to which the organization is able to assure simple, direct access to information resources without being inhibited by bureaucratic procedures or technological barriers.

Responsiveness and Flexibility - The degree to which the organization (provider of information services) is able to respond in a timely fashion to new or modified user requirements for information support, i.e., new information systems. (Includes large and small requests)

Personnel Resources - The degree to which the organization allows us to recruit, train, and maintain a skilled cadre of information specialists sufficient to meet the growing demands.

Compartmentation - The degree to which the organization is able to limit information to those with an officially approved need to know while operating within minimum policy standards for release of information.

Physical Security - The degree to which the organization is able to deny entry by unauthorized persons to a protected facility.

Technical Security - The degree to which the organization is able to guard against technical threats (primarily electronic) directed against the Agency's information handling resources.

Disruption - The degree to which the organizational change will lead to short-term disruptions of on going activities, the losses therefrom, and any lasting effects.

Provider Disruption - The degree to which the organizational change will interfere with information handling component' ability to provide at least the same level of services as currently are available.

User Disruption - The degree to which the organizational change will interfere with a user's ability to obtain information service.

Having agreed upon options and criteria upon which to base a decision, the remainder of the task consists of a judgement as to the relative goodness of each option for each decision factor and a judgement of the relative importance of each decision factor with respect to all other factors.

While these judgements can be delegated, the end result will be of questionable value to the senior manager. Judgements reflect a combination of education, background, experience and organizational perspective. The acceptable decision to the senior manager is the one that best agrees with his sense of what is correct. The sum total of all of these judgements is the decision-making process.

ALL PORTIONS THIS SECTION UNCLASSIFIED

C.3 AIDING THE DECISION PROCESS

In the complex decision problem presented in this report, the difficulty of making each judgment is not great. The difficulty is in mentally tracking the significance of the sum total of all judgments integral to the larger decision. It is this function of bookkeeping that is facilitated by machine assistance. Software exists that presents a display of the decision problem in the form of a matrix. Management options are arranged along one dimension, decision factors along the opposing dimension. Each square within the matrix ultimately contains a ranking of the relative goodness of an option for one particular factor.

Provisions are included to assign and account for the relative importance of factors by the assignment of weights. Thus, if acquisition of resources is felt to be twice as important as planning and allocation, numerical weighting will be assigned accordingly. When the matrix is complete these weights will be applied to the contents of the matrix to arrive at an ordered list of options reflecting the decision-maker's preferences based on the sum total of his judgments.

Once all entries in the matrix are complete, the machine system provides a quick and efficient means of demonstrating to the decision-maker what the most influential judgments are in reaching a final decision and allows confidence in the outcome to be built by varying entries in cases where uncertainty of judgments remain.

While the decision-making environment of discussion, debate, and consensus remains undisturbed, the background availability of machine assistance helps focus discussion and expedite conclusions.

ALL PORTIONS THIS SECTION UNCLASSIFIED

ATTACHMENT D

CIA/IHTF GLOSSARY

AAMS: OS Automated Alarm Monitoring System. A minicomputer-based system which monitors protected areas of the Headquarters Building and alerts OS personnel when possible intrusions are detected. (C A9c(3.7))

access: The ability and the means to approach, communicate with (input to or receive output from), or otherwise make use of any material or component in an ADP system or network. Access also has a security context, i.e., access to a security compartment through a clearance issuance.

access control: (Software) Validation and enforcement of a user's privilege.

accountability: The systems and procedures established to assure that responsibility for maintenance and protection of information can be traced to an organization and/or individual.

accreditation: A formal declaration by the responsible NFIB member or his designee, as appropriate, that the ADP system or network provides an acceptable level of protection for processing and/or storing intelligence information. An accreditation should state the operating mode and other parameters peculiar to the ADP system or network being accredited.

ACF: APEX Control Facility. A facility for the receipt, control, storage, and use of APEX materials.

ACM: Agency Copier Management System. Provides information on copiers, counters, and costs.

ACO: APEX Control Officer.

ACT-O: OC's Automated Communications Terminal -

Originating. The CDS system relays traffic for addresses external to the Agency to ACT-O which reformats traffic for target nets and passes traffic to MAX for transmission.

ADISS: DIA's Advanced Defense Intelligence Support System. This was the original designation for the system which is now more commonly known as DIA-SAFE.

ADP: Automatic Data Processing.

ADPE: Automatic Data Processing Equipment.

ADP System: The central computer facility and any remote processors, terminals, or other input/output/storage devices connected to it by communications links.

ADSTAR (C): OCR's Automatic Document Storage and Retrieval System. ADSTAR will be NFAC's system for the storage and retrieval of hard-copy documents being retained in microform. A similar system being implemented by the DO is referred to as DORIC-W . (C A9c(4.1))

AEGIS: OCR's Already Existing Generalized Information System. A file management system which supports a number of OCR-maintained data files.

AEGSUBJ: The Subject Index file within the AEGIS system. This file records bibliographic and content indexing information used to search for OCR retained documents.

AEGOL: OCR's AEGIS On-line. The facility to conduct on-line queries of an AEGIS data file.

AEMMS: Agency Equipment Monitoring and Maintenance System. Documents preventive maintenance, cost status, etc.

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AFT: OC's Automated Field Terminal. A communications device which provides automatic originating and terminating message processing with a minimum of operator intervention. (S A9c(2.1))

AGMET: OGCR's Agricultural Meterological System. A system to predict the production of a variety of crops in denied countries.

AIRES: DIA's Advanced Imagery Requirements and Exploitation System.

AKDC: Automatic Key Distribution Center.

ALDOCS Maintains records on all alias operational documentation and disguise materials which have been issued. (C 3d(3))

ALGOL: An algorithmic and procedure-oriented computer language used principally in the programming of scientific problems.

allocated circuit: A communications circuit provided for Agency use from the communications resources of another Government element, e.g., DoD.

ALLSTAR (C): The DO's name search and document retrieval system, developed and maintained by IMS, which includes the Document Reference Subsystem (DRS), the Special Trace and Retrieval (STAR) subsystem, the Collection of Operational Messages Electrically Transmitted (COMET) subsystem, and the Subject and Operational File Activity (SOFA) subsystem. (C A9c(4.1))

ALLSTAR/CARD (C): System for the processing, storage, and retrieval of retired document/file location and status information, being developed by IMS. (C A9c(4.1))

ALLSTAR/COMET II (C): System for on-line analysis of electrically transmitted messages, being developed by IMS.

(C A9c(4.1))

ALLSTAR/SMART (C): Decentralized name searching system, being developed by IMS. (C A9c(4.1))

AMPS: ODP's Automated Message Processing System. AMPS receives messages from CDS, stores the messages for each customer designated by CDS and then activates customer software to process the message. AMPS will be replaced by the MPS system in 1980. (C 3d(3))

APARS: Automated Printing and Reproduction System. OC system that will automate the printing and sorting of messages. System components will be installed in OC Cable Secretariat and four DO registries. Similar to State Department's ARCS system. (S A9c(2.1))

APEX: The APEX Special Access Control System will be the single Intelligence Community program for the security, control, and safeguarding of intelligence programs and materials which cannot be adequately protected at standard levels of classification.

ARC: Provides information on DO documents returned to Records Center, an IMS developed system.

ARCINS: Archives and Records Center Inventory System. A batch-mode ADP system operated by DDA/ISS to control documents in these repositories.

ARCS: Automated Reproduction and Collation System. A State Department system designed to reproduce and collate messages for State distribution. Agency version is known as APARS. (q.v.)

ASO: APEX Security Officer.

ATMH: DoD's Automated Text Message Handler.

AUDIO: Provides information on audio operations, an IMS developed system. (C 3d(3))

authentication: A positive identification, with a degree of certainty sufficient for permitting certain rights or privileges to the person or thing positively identified.

AUTODIN: Automatic Digital Network. A DoD message and data communications network.

automatic data processing system security: The organized collection of hardware and software united by regulated interaction and designed to accomplish a specific data processing objective. All of the technological safeguards and managerial procedures established and applied to computer hardware, software, and data in order to ensure the protection of organizational assets and individual privacy; it includes: all hardware/software functions, characteristics, and features; operational procedures, accounting procedures,and access controls at the central computer facility; remote computer and terminal facilities, management constraints, physical structures and devices; and the personnel and communication controls needed to provide an acceptable level of protection for classified material to be contained in the computer system.

AVR: Agency Vehicle Records System. Provides procurement and operation information of Agency vehicles.

BADGILE: OS system that provides reports in various sequences of all badges assigned on a temporary basis. (C A9c(3.7))

baud: A unit of signaling speed equal to the number of code elements per second.

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BLANKET Provides listings of Agency-devised facilities that are controlled by CCS, an IMS developed system. (C 3d(3))

BOAT: Badge Office Authorization Table. An IMS developed system that identifies requesters authorized access to DO files. (C A9c(3.7))

BUS: A generic term used to describe intrabuilding wideband communications systems utilizing either coaxial or fiber optics. The salient feature of a bus system is its capacity to accommodate extremely high bit rates and many users.

CAAR: Central APEX Access Registry. Contains name of individual and lists all approvals for access to APEX compartments. (C A9c(3.7))

CAI: Computer Assisted Instruction.

CAMAPER: IMS developed system which furnishes location data for microform document storage and retrieval system.

camp-on: With call-back -- A feature of an electronic telephone switch which allows it to remember when a call is placed to a busy telephone called camp-on. The call-back feature allows the caller to hang-up and the switch automatically rings his phone when the called station becomes "unbusy".

CAMS: (1) COMIREX Automated Management System run by ODP to assist the Intelligence Community in the management of the National imagery collection, processing, dissemination, and exploitation requirements. (C 3d(3))

(2) OGCR's Cartographic Automatic Mapping System. Software system which enables graphics terminal and plotter creation of maps in various scales and projections.

CARS: Common-use Automated Registry System.

CARTOMAP: This is a cartographic mapping project processed by ODP on behalf of OGCR the primary output of which is computer-generated maps and plot tapes. Synonymous to CAMS (2).

CASTLE (C): CRAFT large-station domestic testbed, being developed by IMS. (C A9c(4.1))

CDS: Cable Disemination System. An OC facility which disseminates Agency cable traffic.

CEMLOC: Central Emergency and Locator Record System. This OS system provides locator information on Agency personnel. (C A9c(3.7))

CENBAD: OS system that controls the issuance of badges and credentials. (C A9c(3.7))

CENCO (C): This project, run by ODP on behalf of the Central Cover Staff, provides assignment and related data on all Agency personnel under cover. (C A9c(4.1))

central computer facility: One or more computers with their peripherals, storage units, central processing units, and communications equipment in a single controlled area.

CI: Counterintelligence

circuit: A means of two-way communicatiion between two points.

circuit switching: Procedure which enables the connection of any one of several input communications lines to any one of several output or trunk communications lines.

CLASS A Provides overseas-based accounting systems for Class A field stations using standard Agency soft-copy terminals. (C 3d(3))

CLASS B	Provides Headquarters-based accounting systems for Class B field stations via VM systems. (C 3d(3))
CMASS:	OCO's Crisis Management Analytical Support System. A developmental information management system which is being used to support NFAC analysts during crisis situations. (S A9c(7.2))
coaxial cable:	A transmission line or cable in which one conductor completely surrounds the other, the two being coaxial and separated by insulating material.
CODIB:	Committee on Documentation of the US Intelligence Board.
COINS:	Community On-Line Intelligence System.
collateral:	All National security information classified under the provision of an Executive Order for which special Intelligence Community systems of compartmentation (i.e., sensitive compartmented information) are not formally established.
collection/ acquisition:	The Agency acquires a wide variety of classified and unclassified information through its various components, i.e., open-source publications; cables from DoD, State Department and NSA; reports from other government agencies; reports from DO collection operations; foreign broadcast information via FBIS; etc. (C 3d(3))
COLTS:	OCR's On-Line Text Search. A facility to conduct free text searches of electrically held documents and cables.
COM:	Computer Output Microfilm.
COMA:	Contractor Mailing Addresses.
COMET:	Collection of Operational Messages Electronically

Transmitted. DO system which collects and stores electrically transmitted documents from Cable Dissemination System (CDS). (S A9c(2.1))

COMIREX: Committee on Imagery Requirements and Exploitation.

communications security (COMSEC): The protection resulting from any measures taken to deny unauthorized persons information of value which might be derived from telecommunications, or to ensure the authenticity of such telecommunications.

CONIF: A contract information system run by ODP in support of the Offices of Logistics and Finance to provide management information on Agency contracts.

COMTEN: The communications control units which interface the ODP mainframes to remote terminal/printer devices.

control: The process of governing the distribution and use of information, documents, or other material.

courier: (1) An overt official professional messenger traveling outside the continental US under military or diplomatic sanction as the custodian of official pouches or other material in transit.

(2) A Headquarters employee responsible for the secure transportation and delivery of material between Headquarters and external agencies in the headquarters area, or between Headquarters and points in the continental US other than in the headquarters area.

CPU: Central Processing Unit. The component of a computer that includes the circuits to control the interpretation and execution of computer instructions.

CRAFT: Projected Clandestine Records Automated (Applications) Field Terminal. DO concept to provide field stations with automated information system support which affords reduced paper holdings, enhances security, provides timely information and support services, and enhances human productivity. (C 3d(3))

CRAMS: Computer Run on Agency Metropolitan Area Space.

CRT: Cathode Ray Tube Terminal.

CSPO: ODP's Consolidated SAFE Project Office.

[redacted] 25X1

CTS: Collection Tasking Staff.

current intelligence: Intelligence of all types and forms of immediate interest to the users of intelligence; it may be disseminated without the delays incident to complete evaluation, interpretation, analysis, or integration.

DAC: OER's Development and Analysis Center. Provides Information Handling support to OER components.

DACOM: A USAF encrypted facsimile network between major US and overseas military commands. NFAC/OCO is a subscriber. (C 3d(3))

DAILYMAD: The OCR software facility within Interim-SAFE which disseminates electrically received cables.

[redacted] 25X1

DARE: Declassification and Review System of DDA/ISS.

data base: A collection of interrelated data stored together with minimum redundancy to serve multiple applications.

data base management system: The collection of software required for using a data base.

DATEX: Data Exchange. An OC data communications switch. Largest users are CAMS, ODP, and OCR's Interim SAFE. (S A9c(2.1))

DBMS: Data Base Management System.

DCID: Director of Central Intelligence Directive.

DEC: Digital Equipment Corporation.

DECAL: A small AEGIS file used as an index to some of the documents released by the Agency.

dedicated circuit: A communications circuit made available for a customer's full-time use.

dedicated computer: A computer whose processing facilities are reserved for a single, or a unique class of applications.

25X1

demuxed: The act of having separated two or more signals that were previously combined by a compatible multiplexer and transmitted over a signal channel.

DIA: Defense Intelligence Agency.

DIRS: Document Information Retrieval System used to control and track documents controlled by the DDS&T Registry.

dispatch: An official written communication which is transmitted by pouch between Headquarters and field or between field stations.

dissemination: The intellectual process of matching the content of a document to stated user interest requirements.

distributed data base: A data base which is geographically dispersed to several separate computer facilities.

distributed processing: The technique of various arrangements of computers within an organization in which the organization's computer complex has many separate computer facilities all working in a cooperative manner, rather than the single computer at a single location.

distribution: The physical movement of information in whatever media it is recorded.

DLSC: Defense Logistics Supply Center System. Updates ICS's Federal Stock Number and Part Number File.

document: Used broadly in this paper to describe any form of message, cable, report, or communication.

DoD: Department of Defense.

DORIC: Directorate of Operations Records and Information Control System. The umbrella acronym which encompasses all of the various central records subsystems in the DO system. (C 3d(3))

DORIC/W: DORIC/WALNUT replacement. DO version of the ADSTAR microform storage and retrieval system. (C 3d(3))

DRS: Document Reference System. An IMS-developed system which provides for computer terminal update of the location, restrictions, and charge-out information of DO documents and files. (C 3d(3))

DTS: Diplomatic Telecommunications Service.

25X1

EDP: Electronic Data Processing.

electrical: An Agency-unique term used colloquially to refer to information received in the Agency via communications channels. Synonymous with message.

electronic mail: A loosely defined term referring to electronic means of approximating postal service for delivery of information.

ELINT: Electronic Intelligence.

emanations security (EMSEC): The protection resulting from all measures designed to deny unauthorized persons information of value which might be derived from intercept and analysis of compromising emanations from other than cryptographic equipment and telecommunications systems.

escort: Duly designated personnel who have appropriate clearances and access approvals for the material contained in the ADP system and are sufficiently knowledgeable to understand the security implications and to control the activities and access of the individual being escorted.

ETARS: Electronic Time and Attendance Reporting System. An OF project designed to transmit field-generated T&A reports to Headquarters, to store the reports in computer files for subsequent payroll processing, and to transmit OF-generated T&A traffic to the field. (C 3d(3))

ETECS: OL/P&PD's Electronic Text Editing and Composition System.

[redacted] 25X1

EXCOM: Executive Committee.

Executive Agent Program: A program wherein a single department, agency, or organization collects or processes foreign intelligence for the Intelligence Community at the direction of the DCI or higher national authority. Executive Agent Program can also be used to identify a single Agency providing a service of common concern, e.g., OCR acquisition of foreign publications, etc.

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facsimile: A technique for transmitting images electronically. This can also mean to make an exact copy.

FAMPS: Field Automated Message Processing System. An ODP facility which enables electronic cables to be transmitted from ODP to CDS. FAMPS will be replaced by MPS in 1980. (C 3d(3))

FARMS: Provides an index to all forms and reports used by the Agency.

FARS: Federal Automated Requisition System. FARS enables OL to access the Federal Standard Requisitioning and Issue Procedures (FEDSTRIP) for requisitions from GSA and Military Standards Requisitioning and Issue Procedures (MILSTRIP) for military requisitions. (C A9c(2.10))

file: A collection of related records, in manual or ADP machine form, considered as a unit.

FIS: Foreign Instrumentation Signals. Electromagnetic emissions associated with the testing and operational deployment of foreign weapons and space systems. Includes telemetry, beaconry, electronic interrogators, tracking signals, command links and satellite data links.

FOIA: Freedom of Information Act.

front-end processor: A computer associated with a host computer that performs preprocessing functions. It may perform line control, message handling, code conversion, error control, data control, data management, terminal handling etc.

FRS: Financial Resource System. This project is run by ODP on behalf of OF to provide budgetary controls and resource allocations and utilization figures for use throughout the Agency.

GAS: This project, the General Accounting System, is processed by ODP primarily on behalf of OF to maintain official records reflecting status, use, and accountability for all funds, property, and other assets for which the CIA is accountable.

GIMS: Generalized Information Management System. GIMS is a DBMS (q.v.) provided by ODP for those customers who have large, complex, information handling requirements.

goal: The desired future position which the Agency wants to attain.

HATS: Headquarters Area Transmission System.

HF: High Frequency.

HSTS: (1) High Speed Text Search. A software/hardware approach to optimize the speed of searching massive text files.

(2) Headquarters Secure Telephone System.

HUMINT: Human Intelligence.

IC: Intelligence Community.

ICS: OL's Inventory Control System.

IFARS: Interim Federal Automated Requisitioning System. Provides information on supplies requisitioned from other government agencies and is the backup system for FARS. (C A9c(2.10))

IIS: Integrated Information System. An NPIC computer system with programs for storing, updating, and retrieving information from the Installation Data File (IDF), the Exploitation Products Data File (EPDF), and the Objects Data File (ODF). (C 3d(3))

IMINT: Imagery Intelligence.

IMS: Information Management Staff of the DO.

information: Unevaluated material of every description, at all levels of reliability, and from any source which may contain intelligence information.

information handling: (1) Management of data or information which may occur in connection with any step in the intelligence cycle; such management may involve activities to transform, manipulate, index, code, categorize, store, select, retrieve, associate or display intelligence materials; it may involve the use of printing, photographic, computer or communications equipment, systems or networks; it may include software programs to operate computers and process data and/or information; and may include information contained in reports, files, data bases, reference services and libraries. For the purposes of this report we have excluded collection, processing proximal to collection, and value added services such as analysis.

(2) The systematic creation, movement, use, storage, retrieval, and disposal of intelligence and management information with the support of automated or other clearly identifiable processes and with due regard for control of sensitive and compartmented data.

information security: Safeguarding knowledge against unauthorized disclosure; or, the result of any system of administrative policies and procedures for identifying, controlling, and protecting from unauthorized disclosure or release to the public, information, the protection of which, is authorized by Executive Order or statute.

Interim-SAFE: OCR's Interim-SAFE processes electrical traffic received from DATEX, MAX, and CDS. It distributes this traffic to various NFAC users based on message content and dissemination codes that have been assigned by CDS. (S A9c(2.1))

interactive: When used in conjunction with a computing system, refers to the ability of a terminal user to communicate with the system such that a conversational dialog is sustained.

interactive computing: Use of a computer such that the user is in control and may enter data or make other demands on the system which responds by the immediate processing of user requests and returning appropriate replies to these requests.

IOC: Initial Operating Capability.

IPANA: Information Process for Analysis. An ORD exploratory development of advanced information processing techniques for the support of intelligence analysis.

[redacted] 25X1

IPS-LOG — A GIMS program used by ISS to keep track of Information and Privacy Division requests.

IRO: — Information Resources Office/RMS.

ISGTRAIN: — Provides IMS information on employee training, an IMS developed system.

ITD: — Provides index to international travel documents, an IMS developed system. (C 3d(3))

ITS-W: — Imagery Transmission System - Washington. Photo transmission network of ten units located throughout the Intelligence Community. A unit is located in the Imagery Watch Office of RSG. (S A9c(2.1))

JES3: — Job Entry Subsystem Three. IBM product which facilitates the entry and scheduling of jobs in the batch processing environment controlled by the MVS Operating System.

25X1

LASERFAX: — Facsimile transmission terminal which utilizes a laser recording device. See ITS-W.

LASERFAX Network: — An imagery transmission system - Washington.

LDX: Long Distance Xerography. See WASHFAX.

leased-line circuit: A communications circuit, normally dedicated, obtained from a public communications utility on a rental basis.

logic line disconnect: A feature of an electronic telephone switch in which the disconnection of the telephones from the switch is controlled by the central or microprocessor computing element within the switch.

MAD: Machine Assisted Dissemination. A facility which distributes electrically received information based on user requirements profiles. Originally developed and used by OCR, later most of its functions were incorporated in OC's CDS.

MAGAS: OGCR's Meteorological Agronomical, Geographical Analysis System. A minicomputer-based system to support interactive geographical manipulations.

mainframe: Term used to refer to computers with large processing, memory and storage capacities.

MAX: Message Automated Switch. Office of Communications message switch.

MERCURY: Office of Communications program to replace message switches with packet switches.

message: A unit of information treated as a transaction within a communications network. Synonymous with electrical.

milestone: A discrete event within an activity that is observable and useful for measuring progress.

MIDAS: The new version of RAPID. Media Intelligence Dissemination Automated System.

MIPS: (1) Medical Information Processing System. A composite of all projects processed by ODP on behalf of OMS.

(2) Millions of (computer) instructions per second. An indication of the speed of a CPU.

MIS: Management Information System for P&PD.

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MPS: Message Processing System. A software system that will enable the transfer of information between ODP's Ruffing Center and OC's CDS and DATEX systems. This system will replace the AMPS and FAMPS facilities in 1980. (C 3d(3))

MPX, MUX: Abbreviations for multiplex. A communications device that permits a small set of users to interleave or simultaneously transmit two or more messages on a single commmunications channel.

MTST: Magnetic Tape Selectric Typewriter.

multiplexer: A device which combines two or more signals for simultaneous transmission over a common transmission medium.

MVS: Multiple Virtual Storage. An IBM Operating System (O/S, q.v.) which controls all of the CPU's being used in the batch processing complex. Used in both the Ruffing and Special Centers.

MVT: Multiple Jobs with Variable Tasking. An IBM operating system.

NBIDI: National Base of Imagery Derived Information. This NPIC system includes the Installation Data File (IDF), the Exploitation Products Data File (EPDF), and the Objects Data File (ODF). (C 3d(3))

NDS: NPIC Data System. An on-line, interactive data system to support exploitation of overhead reconnaissance derived in the Agency. (S 3d(3))

near-real-time: The brief interval between the collection of information regarding an event and reception of the data at some other location, caused by the time required for processing, communications, and display.

netted: A communications term applied when more than two locations can converse using the same physical circuit or when more than two locations share the same cryptographic keysetting.

NFAC/MRS: NFAC Message Routing System. MRS is an OCR-developed software package that sorts cable traffic that AMPS has received from CDS. The sorted messages are then printed in OCO for distribution to NFAC current intelligence analysts.

NFIB: National Foreign Intelligence Board.

NIO: National Intelligence Officers.

NIPS: National Military Command System, Information Processing System. A data base management system used for batch and on-line applications primarily in the Special Center. Provides informatiion storage and retrieval capability.

NITC: National Intelligence Tasking Center.

NOC: Non Official Cover. (C 3d(3))

NOCC: NOC Communications. (C 3d(3))

NOCPERS: Non-Official Cover Personnel System, being developed by IMS. (C 3d(3))

NOIWON: National Operations and Intelligence Watch Officers Net.

non-pro communicator:	A term applied to Agency employees who perform communicator duties as a secondary job function.
non-pro courier:	A term applied to Agency employees who perform courier duties as a secondary job function.
NSA:	National Security Agency.
NSCID:	National Security Council Intelligence Directive.
OAK (C):	Photographic interpretation reports published by NPIC. (C 3d(3))
OASIS:	(1) OSR Automated Strategic Information System. This system developed by ODP enables analysts to efficiently and accurately identify, evaluate, and monitor the strength, deployment and organization of military units. (C 3d(3)) (2) An on-line system operating in NPIC's Dissemination Control Branch to support the recording, dissemination, distribution, and control of classified materials. (C 3d(3))
objective:	Identifiable and specific activities which are to be achieved in the pursuit of Agency goals. Progress is measured in terms of timely accomplishment of objectives.
OCR:	(1) Optical Character Reader. (2) Office of Central Reference
OCRDIR:	OCR Directories. This project supports the automated production of biographic reference aids such as directories of foreign officials for the Office of Central Reference
OLDE:	On-Line Data Entry. Office of Central Reference software used primarily to enter information into the AEGSUBJ file.
operational	

compartment: A compartment designed to protect policy, planning, research and development, contracting, budgeting, and mission-related information pertaining to systems of foreign intelligence collection.

optical fibers: Transparent glass fibers which have the ability to transmit great amounts of information with extremely low losses by a process of total reflection of a light source.

O/S: Operating System. An integrated collection of service routines for supervising the sequencing and processing of programs by a computer.

packet switching: The method of segmenting and reconstructing messages so that each segment can be transmitted via a different route, if necessary, to minimize communication delays in complex, remote terminal computer systems.

Packet switching is a telecommunications technique that dynamically allocates bandwidth to a number of low-to-medium duty cycle users by blocking information into numbered "packets" and transmitting these packets over the communications channel in a pipeline mode. This technique makes extremely efficient use of bandwidth, but requires substantial computing power at the switching nodes. Error-protection of data by error detecting codes and packet retransmission is an inherent feature of this technique.

25X1

PAYROLL: This is an aggregate of some 13 related payroll projects processed on behalf of OF to provide for the payroll of all Agency employees, retirees, and agents. (C 3d(3))

PCS: Defector system.

PCTG: Programmable Channel Termination Groups. Minicomputers that serve as input/output controller subsystems for the DATEX and MAX systems.

[redacted] 25X1

PERCON: This OP system maintains information on contract employees.

PERFIT: Performance Appraisal Call-Up and Control System. This OP system tracks the submission and rating of Agency fitness reports.

PERSIGN: The Personnel assignment project for OP is a composite of five related projects, all dealing with information on each Agency employee, and is used to provide managers with statistical reports or explicit data on their employee's current status and assignment.

PHOTO: Provides an index to file of photographs, an IMS developed system. (C 3d(3))

[redacted] 25X1

P&L: Prescribed and Limited. DO procedure used to establish a channel to limit distribution of sensitive operational information and intelligence information reports. P&L correspondence is identified by the operational activity cryptonym prefixed by the [redacted] (C 3d(3)) 25X1

precedence: The priority system used to determine the order in which messages will be processed in OC systems. They are FLASH, IMMEDIATE, PRIORITY, and ROUTINE.

privileged instruction: Computer instructions which because of their capability to affect system integrity, are not normally available for application program development.

processing and/or storing: All inclusive term used to include in addition to processing and storing such functions as manipulating, deleting, modifying, editing, outputting, etc.

protocol: A set of conventions between communicating processors on the format and content of messages to be exchanged.

RAMIS: Rapid Access Management Information System. A DBMS (q.v.) supported by ODP which enables a user to create and manipulate a wide variety of data files.

RAMS: Records Center and Archives Management System. A proposed on-line system to allow components to recall material using local terminals and to automate the Records Center suspense system.

RAPID: A system to automate the word processing, editing, and publication of FBIS documents. (Arch. see MIDAS)

RCO: ROYAL Control Officer.

reading requirements: A statement which defines user or component interests in receiving disseminated information.

REAL-ESTATE Agency Real Property Summary Reporting System.

REARCS: Remote ARCS (q.v.)

RECON: Remote Console. An OCR on-line file management system used to support its document reference facilities.

registry: A functional component which receives and distributes mail and normally records this transmission activity in a limited retention register.

[redacted] 25X1

repertory dial: A feature of an electronic telephone switch which allows the switch to originate a call by the user dialing only an abbreviated code for lengthy numbers.

RIS: Records Information System.

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RJE: Remote Job Entry. The facility to submit jobs through an input unit that has access to a computer through a communications link.

ROYAL: An APEX control used to indicate a small body of extremely sensitive intelligence which is disseminated on a named-individual basis only.

Ruffing Center: ODP's central computer support facility located in GC-03.

RYBAT (C): A sensitivity indicator for correspondence between Headquarters and field or between field components. Used in addition to the security classification when, in the judgment of the originator, a cable or dispatch concerns administrative or operational matters of such sensitivity that initial cognizance should be limited to a station chief, division chief, staff chief, or higher authority. At Headquarters, cables bearing this sensitivity indicator will be disseminated to the head of the action unit and information unit(s) authorized by the appropriate deputy director to receive such cables. The head of the action unit is responsible for ensuring that other officials are kept informed on a need-to-know basis. (C A9c(4.1))

SACS: OS Security Access Control System Minicomputer. Associated with the badge machines. (C A9c(3.7))

SAF: OC's Special Activities Facility. This facility decrypts non-routine TCF (q.v.) activities such as double encrypted messages, VIP circuits, an NSA circuit,a set of 10 telephone circuits, and encryption/decryption for a line to the White House. (S A9c(2.1))

SAFE: Support for the Analysts' File Environment. The system being developed for NFAC which will support the rapid dissemination of incoming or locally composed intelligence messages and documents and the creation, storage, retrieval, and exchange of documentary intelligence.

SANCA (C): OS system that manages an index for name traces. (C 3d(3))

SARS: Security Access Records System provides automated file search of SACS records for badged personnel and those individuals with Visitor-No-Escort badges. (C A9c(3.7))

SCAM: OSR's Strategic Cost Analysis Model. This project performs analysis of Soviet and Chinese data to produce estimated defense expenditures.

SCIPS: Staff for Community Information Processing Study. A committee established by the Committee on Documentation (CODIB) of the United States Intellience Board (USIB). CODIB existed from 1958 - 1968 and was reestablished as the Information Handling Committee at that time.

SCI: Sensitive Compartmented Information. All information and material bearing special controls for restricted handling within compartmented foreign intelligence systems.

SCRIPT: An ODP provided on-line word processing system.

Supports data entry, storage, text editing, formatting, and print-outs of information. DO uses a separate copy of this software package in the Special Center.

SECOND — Security Contractor Data System Support. Provides data on industrial security program, contractor personnel, and company data. (C A9c(3.7))

Senior Intelligence Officer of the Intelligence Community: — Those officials who represent their departments or agencies on the National Foreign Intelligence Board (NFIB).

SI: — Special Intelligence.

SIGINT: — Signal Intelligence.

simulate: — To imitate one system with another, primarily by computer software, such that the imitating system achieves the same results as the imitated system.

SMOSA: — System for Management of Small Arms.

SOCOMM: — Special Operations Communications Network. An NRO system operated by the Air Force. (S 3d(3))

SOFA: — Subject Operational File Activity. DO on-line system, developed by IMS, to locate files on subjects and operations. (C 3d(3))

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Special Center: Computer Center located in GC47 which is used to support DO and CAMS activities. (C 3d(3))

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stand-alone: Independent; without electrical connection to other processing devices.

STAR: DO's Special Trace and Retrieval System, developed by IMS. (C 3d(3))

STEPS: DDS&T's Science and Technology Evaluation and Planning System.

store and forward: A communications switching technique in which blocks of data or messages are received and stored before onward transmission. Used to maximize the efficiency of circuit utilization.

SUPPLYMAN: OL's Inventory Control System.

[redacted] 25X1

switched circuit: A communications path that is shared by a number of parties by changing the electrical connection from one terminal to another.

T-1 rate: A rate of data transmission designated by the Bell System at 1.544 million bits per second.

TACK: A dynamic graphics system which plots geo-referrent data on maps drawn from the World Data Base. This ORD-developed system knows about orbital mechanics, look angles, and footprints.

TADS: Telemetry Analysis Display System. An OWI project which is designed to support interactive analysis of technical sources to determine the characteristics of foreign aerospace vehicles. (C 3d(3))

TAGS: Traffic Analysis by Geographic and Subject. State Department key line dissemination system.

TAP: Terminal Access Point. A facility provided by OCR which allows on-line access to a number of external data bases.

TCF: OC's Technical Control Facility. Location where incoming signals are decrypted before being passed to subsequent OC systems for processing.

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telecommunications: Any transmission, emission, or reception of signs, signals, writing, images, and sounds or information of any nature by wire, radio, visual, or other electromagnetic systems.

telenote: An unauthorized message format occasionally used for informal communications between two Agency locations.

telepouch: A unique message format (deferred cable) used for information that has no time criticality and that requires proprietary protection.

teleprocessing: The overall function of an information transmission system which combines telecommunicatons, automatic data processing, and man/machine interface equipment and their interaction as an integrated whole.

TEMPEST: An unclassified term referring to technical investigations for compromising emanations from electrically operated, information processing equipment; they are conducted in support of emanations and emission security.

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TSCADS: Top Secret Control and Distribution System. A system run in the Ruffing Center for OS to support TS document accountability. (C A9c(3.7))

TSO: Time-Sharing Option. An IBM product which provides the applications programmer with the capability to perform on-line software development.

VM: Virtual Machine. An IBM Operating System run in the ODP Ruffing Center which supports a wide variety of interactive ADP services to Agency users.

WASHFAX: A Defense Communications Agency encrypted communications system managed by the National Communications System. Transmits facsimile material at all classification levels and all compartments. A WASHFAX terminal is located in OCO. (S A9c(2.1))

WBCS: Wideband Bus Communication System. A SAFE communications subsystem to transmit information to remote locations within the Headquarters Building. System will be encrypted. NSA assigned task of developing cryptographic subsystem. (S A9c(2.1))

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WWMCCS: The WWMCCS is the World Wide Military Command and Control System that provides the means for operational direction and technical administrative support involved in the function of command and control of US Military Forces.

4C: Projected Community-wide, computer-assisted compartmentation control system.

ATTACHMENT E

BIBLIOGRAPHY OF COMPONENT INPUTS IN RESPONSE TO CIA/IHTF SURVEYS

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IC Staff

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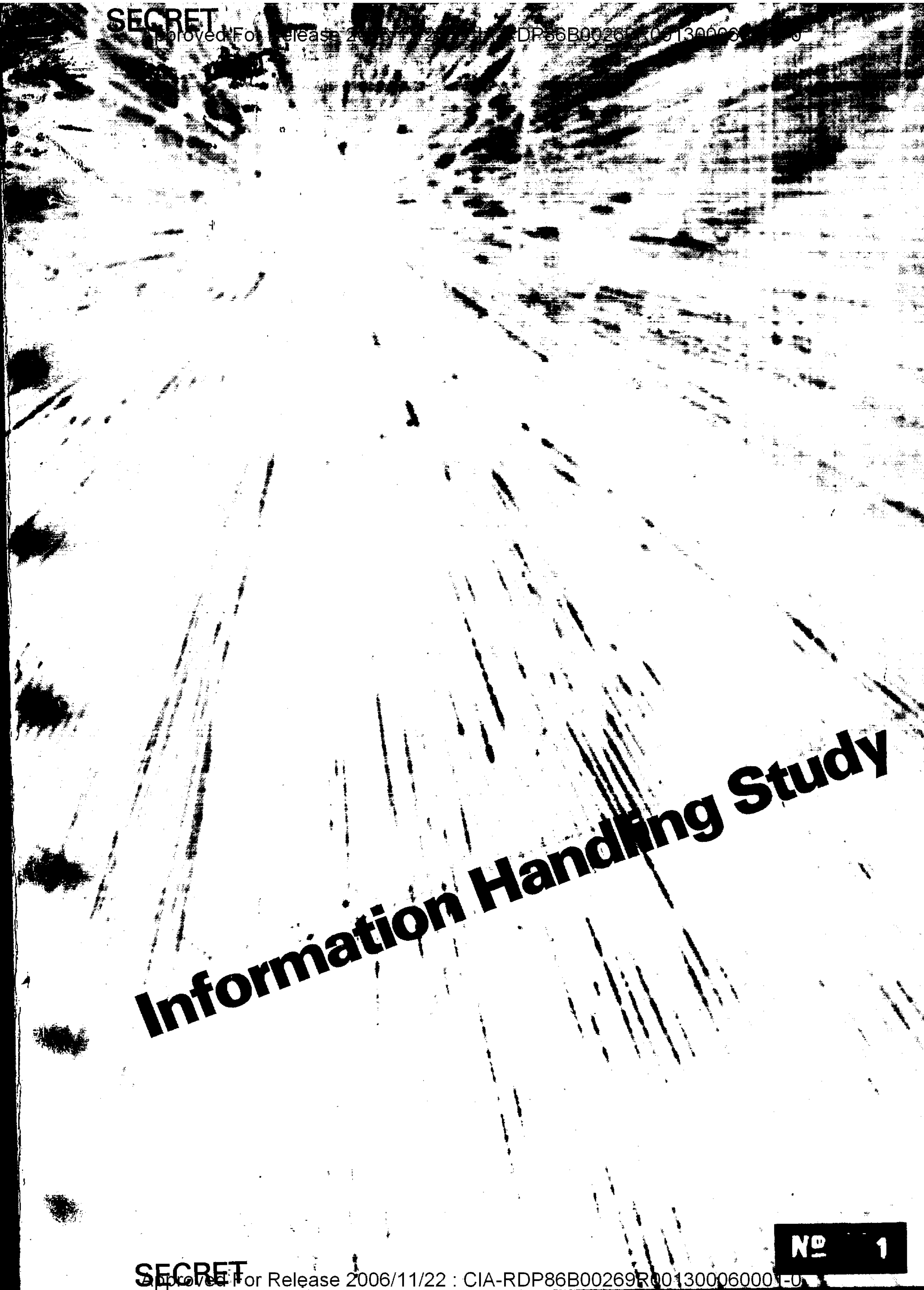

Information Handling Study

№ 1

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INFORMATION HANDLING STUDY

28 August 1980

SECRET

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INFORMATION HANDLING STUDY—1980

This document constitutes the final report of the Information Handling Task Force submitted to the Executive Committee, CIA.

Team members:

[redacted]

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Caveats:

1. This report follows the convention that he is to be interpreted as he or she.
2. Classification marking & handling—unmarked portions of this report are unclassified; some portions, while unclassified, are designated for administrative use only.

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1. EXECUTIVE SUMMARY

This report sets out the procedure and conclusions of CIA's Information Handling Task Force. In a year, the five member team investigated the ways in which information services, broadly defined, are now provided, and gauged the impact of a rapidly changing technology. Their goal was to produce the Agency's first strategic plan for information handling.

The "Problem"

One cannot but be dazzled by the pace of computer technology. If automobile technology were improving at the same rate, a Rolls Royce would cost $2.50 and get 200,000 miles to the gallon. Correspondingly, the demand for computer and related services is ever growing. However, Agency buying power is constricting and we are enjoined to "do more with less". Two problems thus pertain:

— Computers promise to "do more with less" . . . at the cost of capital spending. Senior managers find they must make major resource decisions, often unprogrammed, with insufficient background in a rapidly changing technical area. Seemingly related projects are considered (and apparently designed) in isolation. The absence of a "Master Plan" precludes optimization.

— Traditional institutions providing information services may become less effective as new technologies evolve, demand grows and resources shrink. There needs to be a reconciliation of demand vs. supply, a strategy for investment, and appropriate institutions to execute the strategy.

In addition: there was widespread belief at the inception of the study that there was an "information explosion", ill defined; there was scattered enthusiasm for appointing an information processing "Czar"; and finally, some sentiment prevailed that the Offices of Communications and Data Processing could profitably be merged as the technological distinctions blurred.

Launching the Study

The Executive Committee of the Agency—the Director of Central Intelligence, his deputies, comptroller and EEO director—commissioned the study in the winter of 1979. Recommended severally by the Comptroller, and the Deputy Director for Administration and his Directors of Data Processing and Communications, the study had two predecessors, the SCIPS and CHIVE studies. The more proximal antecedent was a survey and catalog of information handling issues compiled by the Director of Data Processing, a recap of which can be found in Chapter 3.

The Study Team

Although it was decided that the study team should be collegial rather than representative, it turned out to be both. While non-partisan (the inevitable result of a year of close habitation) team members came from each of the directorates: one each from NFAC, S&T, and DO, and two from the DDA. Skills embodied in the team ranged from computer science and human factors, across traditional computing and communication, to records management.

The Charge to the Task Force

The Task Force was asked to draft a Strategic Plan for the use and provision of Information Handling Services, and to recommend management and institutional changes needed to carry out the plan. The definition of a "Strategic Plan" agreed upon:

— Sets out clearly the goals and objectives toward which we must strive;

— Starts from a clear appraisal of where we now stand;

— Charts, in general terms, the (alternative) routes by which we get from here to there;

— Publicizes major observables by which we measure our progress and projects a timetable of these milestones;

— Fixes the responsibility for fulfillment of the various objectives and subobjectives; and,

— Estimates the magnitude of resources required.

In the terms of reference on which the study was based (Attachment A) the Task Force was also invited to "...define a management structure for more formal continuing coordination of the Agency's information handling activities." In toto, then, the proposed elements of the strategy were to include: "management, organization, operation, security, technology, and personnel."

The terms of reference directed the attention of the Task Force to the following issues:

Management " . . . To what degree can central management of information handling contribute to the provision of information services? While there is popular enthusiasm for further centralization of management functions associated with information handling, there needs to be a careful assessment of what functions need to be centralized to improve provision and use of information services.

Standards " . . . To what degree can standardization contribute to the efficiency and effectiveness with which information services are provided? Standards could cover equipment, programming, engineering, documentation, or management systems.

Structure " . . . To what degree should technology influence Agency organization? The apportionment of missions to some components is based, in part, on historic technological definitions which may now be obsolete. As technology evolves, a reallocation of the division of labor might be useful and even necessary to clarify roles. However, the value of organizational realignment must be weighed against the employee morale, personnel management, and budgetary impact of change.

Compartmentation " . . . To what degree can systems and data bases be shared without jeopardy to security and compartmentation? Increased efficiency will often result from aggregation of user needs and resource sharing. Strategies need to be identified that will maximize efficiencies within constraints imposed by security and compartmentation.

Scope of "Information Services"

The study focused on the provision and use of information services within the Agency. Information services were defined as those disciplines and technologies whose purpose is to facilitate information handling. The study addresses the interface of the Agency information systems with collection and processing systems, not the collection systems, themselves.

The definition of Information Handling contained in EXCOM-19-79 was accepted as the most appropriate for the purposes of this study:

> *"Information handling in CIA is the systematic creation, movement, use, storage, retrieval, and disposal of intelligence and management information with the support of automated or other clearly identifiable processes and with due regard for control of sensitive and compartmented data."*

For purposes of this study, information handling services were categorized as:

— **Recording of Information,** including all facilities or services which enable the generation or capture of information in a media that will support subsequent storage and exploitation of that information.

— **Acquisition of Information**, referring to the receipt of information which has been collected or generated by non-CIA resources and acquired for Agency use.

— **Dissemination of Information,** the process of determining the component or individual that should be made aware of recorded or acquired information. This "intellectual" dissemination process is contrasted with the distribution function.

— **Distribution of Information,** referring to the physical movement of information (in whatever media) and to related registry, mail, courier, electrical and pneumatic tube services provided by various information support units.

— **Information Reference Services,** including those services that store documents and/or information for subsequent retrieval.

— **Reproduction of Information,** including all facilities which enable the production of one or more copies of an information item in the same media as the original.

— **Security, Control & Accountability,** referring to those facilities or procedures designed to enforce the need-to-know principle and to prevent unauthorized access to, or unauthorized release of classified information. Information control implies accountability. Information accountability refers to facilities or procedures to determine the location of information and to identify the components or individuals who have been exposed to that information.

— **Computing Support Facilities,** including all computers and the peripheral devices attached to those computers which support the storage and processing of information. This support includes the operation and maintenance of these facilities and the provision of any systems (non-application) software needed to insure efficient utilization of the hardware devices.

— **Information Systems Development & Maintenance,** including the analysis, design, implementation, and subsequent maintenance of systems used to support specific user requirements in information handling. This activity is primarily related to the development and maintenance of hardware and software but can involve non-automated systems as well.

— **Miscellaneous Services,** including two services which warrant some discussion but which do not logically reside in the nine categories described above. They are: Formal training to support the various disciplines that constitute the IH services; and, Data Base Management and Support.

Study Procedures

Offices in the Agency were asked to provide structured responses to a set of questions regarding current information services. These responses were categorized by components whose mission is to provide services (providers) and those components whose missions make them users of services (users).

Using this data base, the Task Force then analyzed the information to identify and define issues among providers, among users, and between provider and user communities. The purpose of these preliminary steps was to define the "benchmark" in information services from which future plans necessarily depart.

Thirdly, the Task Force compiled a current technology forecast by literature searches and discussions with Government and industry representatives. The purpose of the forecast was to allow estimation of those innovations in information services likely to become attractive to the Agency in coming years.

With a data base containing the present state of services and the predicted future developments, attention was turned to formulation of goals. Goals and objectives were identified by applying the technology forecast in a fashion that would allow information services to develop in ways that met requirements while contributing optimally to Agency goals.

The goals and objectives were presented to the Executive Committee for review and comment. Based on the generally favorable response, approval was requested and received to use these goals for further analysis and development of a strategic plan.

The issues concerning management and organization were approached in a non-traditional manner. A decision analysis model was created by identifying a broad range of organizational options, identifying the most important factors to be considered in choosing among options and then inviting senior management to utilize the model by a process technically termed Multi-attribute utility analysis.

Provided with the preliminary report of the Task Force and the insight developed through the Decision Analysis model, the Executive Committee developed a consensus on the future direction of organization and management of information services. This consensus was used by the Task Force in developing the final report.

The State of the "System"

Current information services in the Agency continue to be provided largely by manual processes. Technology has historically been applied to increase the efficiency

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and effectiveness of these manual processes, not to achieve true automation. That these trends continue is evidenced by continued growth of stand-alone word processing, copiers, and registry automation.

Computer applications continue to grow both because of growing familiarity with computer applications and the rapidly decreasing costs of system capacity. Increasing communications capacities are making it possible to extend the convenience of automation to employee workstations by installation of remote terminals and high quality printing devices. This growing intimacy of end users with the technology produces added pressures for more and better technology. The pressures result in increasing strains on the human resources of the providers since requirements grow more rapidly than the available work force. The management problem that results is the user perception that providers are less and less responsive to their needs.

To gain relief from the short falls in central services, users are leaning more toward "do-it-yourself" programming, establishing component positions for dedicated programmers, and arguing more intensely for local resources such as minicomputers. These initiatives provide local relief to components that are successful, but raise Agency level questions regarding their impact on higher level priority and resource allocation decisions. These initiatives also raise questions from providers of central services who tend to view part of their management role as fostering development of coherent Agency-wide systems.

Providers of technologically based services are facing issues and frictions amongst themselves. As digital logic rapidly diffuses through communications and printing, traditional definitions of ADP, communications and printing fail to adequately categorize new devices and concepts of service. This leads to frequent disagreement over delineation of responsibilities. The astute user occasionally gains advantage from this confusion by shopping in what appears to him a competitive marketplace.

Despite the increased confusion and discontent, the Agency's priority needs continue to be satisfied. A comparison of Agency systems and their management with those of other Government and industry organizations allows one to conclude that the same information handling issues and problems are the contemporary focus of many organizations.

Scheduled Advances in Technology

Forecasting computer technology is chancey but not hopeless. A high degree of accuracy is not needed for our strategic planning purposes. Sadly, because of the long development cycles of our major systems, our plans will seldom intersect technology at its leading edge. Moreover, predicting the "where to?" of the technologies can be separated from the "when?" of those technologies. Finally, it is even useful to document those expectations which will prove wrong, as plans, spoken or unspoken, will be based on those expectations, right or wrong.

Even in the absence of major scientific breakthroughs, an increasing rate of change will occur in computer technology because of better communication among engineers, the availability of methods for exploiting scientific knowledge, the increasing priority given to R&D. The driving force will be profitable exploitation by the private commercial sector, particularly burgeoning sales of sophisticated consumer goods. At a price, the government will reap the fruits of cheaper computing elements. The price will be an industry less and less responsive to unique government needs as manifest by formal programs like MULTI-LEVEL SECURITY, TEMPEST, COMSEC, MILSPEC, etc. The price will also be disadvantageous competition with industry for trained personnel.

The rapidly declining cost of computer components will cause explosive growth in new computer applications and in the quantities of units produced. There will be great demand for, and shortages of, computer system designers, programmers, and technicians. There will also be a critical shortfall in management personnel to oversee system development.

The capability which may be incorporated in a single chip doubles roughly every two years and this growth will continue throughout the planning period. The resulting reductions in price, weight, and power consumption of semiconductor memories and logic elements will open the possibility of many new applications and for great improvements in present applications.

Sensor and communications systems will increasingly be designed to output digital information and the rates of data flow can be expected to increase greatly. Computers will be utilized to transform this data glut into useful information. Increased data processing at the sensor location will reduce the complexity of the problem at the central processor.

As has been pointed out [redacted] micro's and mini's promise computing 25X1
power to the end user, but do not compete with terminals connected to traditional data processing systems. Who wants to use a terminal to do a job which could be done on a pocket calculator? Properly used, however, the computer does not compete with the pocket calculator. The computer collects and stores information. Where and how the information should be stored are important questions. Questions as important as where the data should be processed.

Most pertinent of the major new applications areas in the commercial sector is office automation. It is hard to think of an advance in office automation, broadly conceived, which is not directly applicable to information handling in the CIA.

As computers become cheaper and smaller, the tendency to use separate computers to perform specific functions in large systems will increase. Some may operate individual sensors or input/output devices, some may share the computational tasks, and some may perform test and diagnostic functions.

Because of budgetary and political constraints, system acquisition cycles and operational lifetimes will continue to be long (10-15 years) in comparison with the period of significant technological change (2-5 years). Because of the disparity in these periods, changes of requirements, modifications for using the improved technology, and additions to capability will be commonplace. Considerable stress will be placed on the requirements, analysis, and design phases.

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Goals for the Next Decade

In the face of fast-paced technological development, a wise investment policy must be based upon a relatively stable set of long range goals and objectives. Early in the study, a tentative set of interlocking goals were developed for EXCOM approval. And, while never officially adopted, the goals were approved provisionally as the basis for developing the strategic plan. Throughout the course of the study, the goals have had to be modified only slightly, to improve their readability and make more easily understandable their interrelation.

The set of goals and objectives is presented graphically in the accompanying figure. A distinction is made between "goals" and "objectives". Objectives are viewed as action items whereas goals are understood to be ideals toward which we strive. There is no guarantee that goals are achievable, but there is the sense that the future will be better if we work collectively toward common ends, even if those ends are not completely achieved. A further structure imposed on the set of goals and objectives is their division into primary and secondary objectives and intermediate and strategic goals. Thus, a continuum of sorts is developed from the short-term, achievable, to the long-term ideals.

The Task Force developed three primary objectives:

PO-1 Develop effective top-level ***coordination among managers of components which provide information services*** . . . vital if we are to proceed in step on the secondary objectives.

PO-2 Develop effective top-level ***coordination among managers of components that use information services*** . . . to make hard decisions on resources.

PO-3 Establish the means to ***accelerate the integration of communications and*** centralized information services, particularly ***ADP services***.

Assuming successful completion of the Primary Objectives and the resultant establishment of an Agency IH planning and coordination mechanism, the secondary objectives become the work plan of this "Systems Architect".

SO-1 ***Develop overall investment and resource guidance for Agency information handling*** . . . needed for two reasons: pursuit of some of the goals involve large up-front costs; and many of the information handling goals are in conflict because of their resource implications.

SO-2 ***Establish a career service*** which will be responsible ***for*** recruiting, developing, ranking, promoting and assigning ***Information Handling specialists***. Design a Career Development Plan to overcome the forecast shortfall of skilled information handling specialists.

SO-3 ***Establish system management standards*** . . . vital to the attainment of goals IG-5 and IG-6.

SO-4 ***Achieve a consistent and natural Agency-wide standard for access to information services*** . . . tailored to the needs of the person, not the peculiarities of the system. Consistency is needed to reduce training costs.

SO-5 ***Store information more efficiently*** . . . multiply-accessed, single-copy file storage can improve accuracy, consistency, and economy.

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SO-6 ***Aggregate information for managers and analysts***. Better means must be found to meet their information needs with the available data by processing stored data into higher-level forms on an ad hoc basis.

SO-7 ***Provide multilevel security access to data bases*** . . . essential to achieving better access control for those systems that are not single-level and compartmented.

SO-8 ***Develop cryptographic devices for user terminals and storage devices*** . . . not only for end-to-end secure electrical transmission but also for additional information storage security (goal IG-10).

SO-9 Provide a single, ***universal network of user terminals***. The information user should have one and only one terminal at his/her desk.

SO-10 Provide the means to ***capture keystrokes***. To eliminate tedious and error-prone retyping.

SO-11 ***Communicate most information electrically between people***, wherever they may be. This includes Headquarters-field communication, sending products to consumers, etc. This goal is central to the achievement of several others: achieving a sense of community (IG-7), integrating information tools into office work patterns (IG-12), and improving data base accessibility (IG-8). The movement of information by means of paper is slow, inefficient, and presents unique security risks. Still, paper has singular virtues as a medium for the reader, so electrical distribution implies the availability of conveniently positioned printing and facsimile devices.

The set of Intermediate goals will enable an evaluation of progress on the above objectives. They would be used to measure the effect or benefit of the completed objectives. The Architect would be required to develop measurement criteria for each of the intermediate goals and report progress to EXCOM.

IG-1 ***Ensure***, in the face of competing demands, that information services are directed to the ***most important*** intelligence and administrative ***needs***.

IG-2 ***Eliminate*** information handling ***activities of marginal value*** vis-a-vis their cost.

IG-3 ***Shorten the coordination, approval, and release cycle*** of both intelligence and administrative actions.

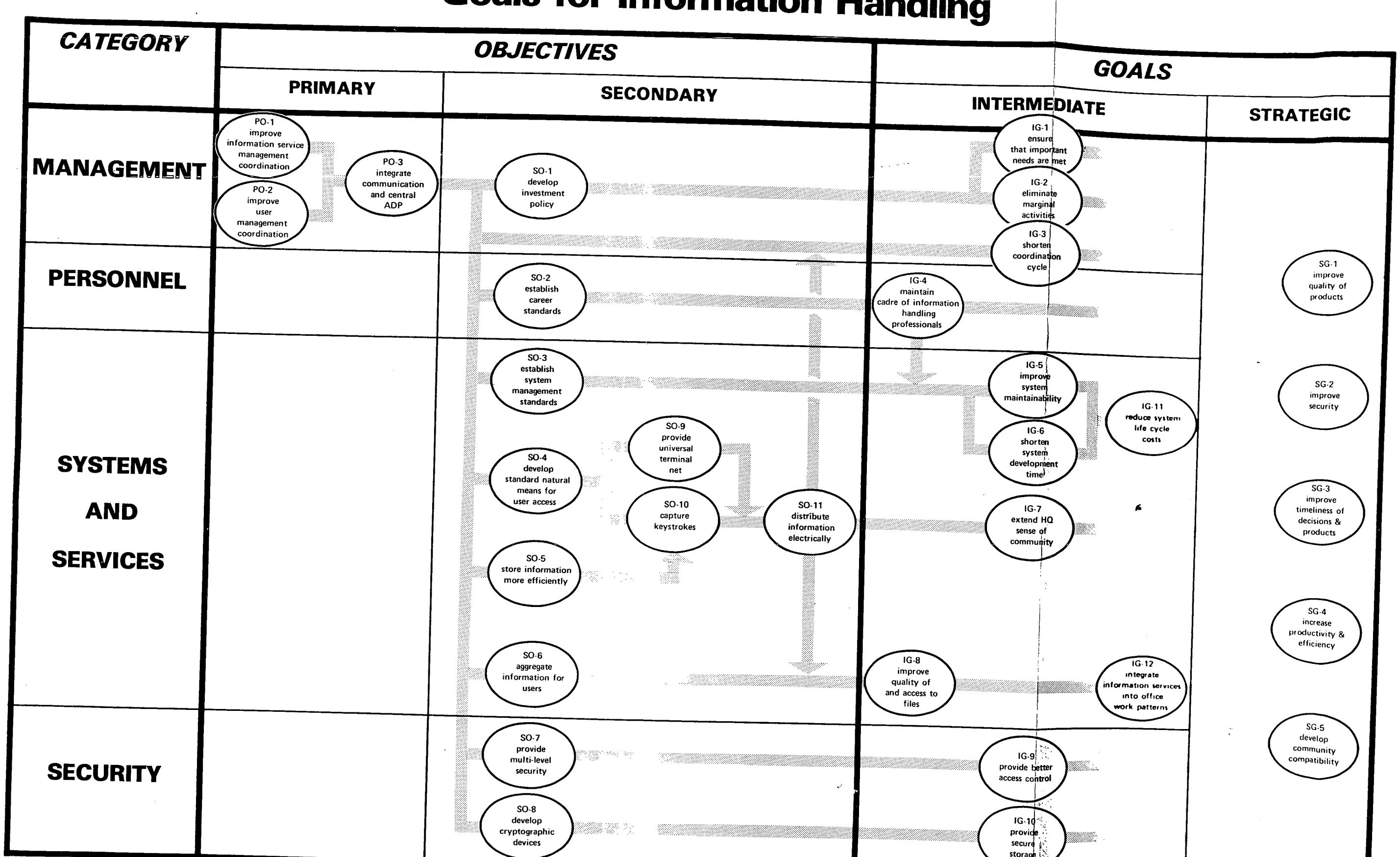
IG-4 ***Maintain a cadre of information handling professionals*** with the requisite skills to meet the needs over the next decade . . . finding and keeping people who can reduce the life-cycle information systems costs through goals IG-5 and IG-6.

IG-5 ***Improve maintainability*** of information handling systems, both existing and planned . . . to stabilize the cost of keeping production systems working effectively.

IG-6 ***Shorten information system development time***. With a rapidly changing technology we cannot tolerate a 7-12 year development cycle with the attendant risks of having systems unwanted or outmoded at IOC.

IG-7 ***Improve and extend the sense of Headquarters community*** to all Agency components in all locations, overseas and domestic.

Goals for Information Handling



IG-8 ***Improve the accessibility of data bases*** and their quality with regard to consistency and completeness.

IG-9 ***Provide better control over access to classified information***, including provision of individual accountability.

IG-10 ***Provide more secure storage*** for sensitive material.

IG-11 ***Reduce the life-cycle costs*** of existing and planned information systems.

IG-12 ***Make information handling tools a natural, well-integrated part of the office work pattern***.

Finally, the Task Force has identified five strategic goals which should be used to channel and justify Information Handling activities over the next decade. While nebulous, they are worth emphasizing lest we forget the real purpose of advances in information handling: Information Handling Technologies are a means to the real ends.

SG-1 Improve the ***quality*** of the Agency's products.

SG-2 Improve the ***security*** of our activities.

SG-3 Improve the ***timeliness*** of decisions and the responsiveness of our products.

SG-4 Increase the ***productivity and efficiency*** of our people and components.

SG-5 Agency systems should be developed with consideration for ***community compatibility*** . . . future systems should be capable of efficient and cost-effective interconnection.

Information Systems Development Recommendations

It is recommended that five information system developments be undertaken in the coming decade. In some cases these are not wholly new activities but, instead, reconceptualizations of programs already forecast. The system development activities recommended are:

A unified information distribution network whose nodes are conveniently located throughout Agency facilities and which contain facilities for storage, transmission, printing and sorting of electrical information. Management of those nodes will emphasize security, compartmentation and accountability for information. (recommendation #6.3.1, ref. 4.2.6) (C 3d(3))

A universal terminal network that will provide wide electrical interconnectivity with compartmentation and command privacy enforced through cryptographic separation. (recommendation #6.3.2, ref. 4.2.7) (C 3d(3))

A centralized data base of dissemination requirements that allows controlled, shared access to all Agency disseminators. (recommendation #6.3.3, ref. 4.2.8) (C 3d(3))

Modernization of the communications plant to expand capacity, quality and interconnectivity required to support increased electrical flow. (recommendation #6.3.4) (C 3d(3))

Contingency Planning Policy should be promulgated to cover the range of eventualities from brown-outs to natural disaster and nuclear conflict. (recommendation #6.6.1, ref. 4.1.6)

A central, easily accessed ***repository of data regarding information released*** to the public, the media, and outside the Executive Branch. It is recommended that analysis of alternative means for establishing such a system, including use of commercial bibliographic reference services, be commissioned by EXCOM. (recommendation #6.3.5, ref 3.8.e)

Personnel Resources Recommendations

Two recommendations are made to improve the supply of, and utilization of skilled information handling personnel. See also, the recommendation below that Directorates plan for centralized career management for information service personnel.

Information handling familiarization training should be incorporated in directorate career development plans. Such training should include ADP familiarization, Office Automation, and information management depending upon the nature of the service and the level of the employee. (recommendation #6.1.1)

Indoctrination on available information services, should be provided for all employees which will also explain the user's responsibilities, e.g., establishing and maintaining dissemination profiles. (recommendation #6.5.2)

Information Control Recommendations

Three recommendations are made in the area of information security. The first recognizes a threat in the technology, the latter two recognize a promise in the technology.

Control ALL storage media which are transportable, machine writeable, and non-human readable, e.g., magnetic cards, tapes and disks. Such media must be presumed to contain information of the highest sensitivity. (recommendation #6.4.1) (S 3d(5))

Positively account for sensitive information by aggressive use of new technology to implement complete audit trails on all Top Secret and compartmented information within Agency computer data bases. The Office of Security should implement systems and procedures to frequently review audit information for anomalous accesses. (recommendation #6.4.2) (S 3d(5))

Positively authenticate database accesses by encourging on-line query, as opposed to second-hand query via telephone. (recommendation #6.4.3) (S 3d(5))

Organization and Management Recommendations

Seven recommendations are made in the area of organization and management. Two recommendations provide for a Systems Architect, and two recommendations are directed at reorganization of information services components in the DDA. A revision of the ADP review is recommended as is mission budgeting for dedicated services, and directorate wide career management for information services personnel. Specifically:

Create an Information Services Architect to maintain and publish an Agency strategic plan for the development of information services. (recommendation #6.1.1, ref. 4.1.2)

Assign to the Office of the DDA the Information Services Architectural Function. (recommendation #6.1.2, ref. 5.)

Charge the Deputy Director of Administration with responsibility for accomplishing within six months:

> ***Establishment of a joint planning mechanism*** to produce a unified plan for information services of OC, ODP, and OL/P&PD.
>
> Creation of a plan and time table for restructuring ***DDA information service components*** in accordance with the needs of this strategic plan and with due consideration of the issues raised by this report. (recommendation #6.1.3, ref. 4.2.2, 4.2.3, 4.2.4, 4.2.6, 4.2.7, 4.4.2)

Expand the current EXCOM ADP review to incorporate all information services and charge the Architect for Information Services with management of the preparation and presentation of that review. (recommendation #6.2.1, ref. 4.1.4)

Budget by mission component those capital investments required to provide information services dedicated to them. (recommendation #6.2.2, ref. 4.1.3)

Planning for centralized career management of information services personnel should be developed and implemented by the Directorates. Early attention should be given to centralized management of ADP and registry personnel. (recommendation #6.2.3, ref. 4.1.5)

The Elements of an Information Handling Strategy

In summary, the elements of the information handling strategy proposed are:

1. Constant Buying Power

Excepting the necessary recapitalization of NDS and Mercury and the planned SAFE & CRAFT programs, a constant spending profile coupled with cost performance improvements in technology will allow us to meet the information challenges of the decade.

2. Career Management

An aggressive career management program applied to an Agency-wide career service broadly defined as including all subspecialities of information handling will be needed to meet needs for skilled personnel.

3. Training

A forward-looking campaign of reeducation will be required to allow individuals to reappraise their jobs in more general information handling terms so that the cultural shock of technological improvement is minimized.

4. Information Security

The changing technologies of information handling allow a departure from document accountability to personal accountability for all items of information accessed. The new technology also permits dynamic application of need-to-know. Broader applicability of encryption techniques demands consolidation of now disparate organizations. The changing technologies are accompanied by new vulnerabilities requiring a change in the skills of the security officers and augur for dedicated information security specialists.

5. Architectural Planning

The historical accumulation of current systems and the otherwise undisciplined proliferation of new sytems threatens expensive incompatibilities absent a firm, forward-looking responsive architecture. In information handling, more so than in most areas, the whole exceeds the sum of the parts.

6. The Information Access/Distribution Network

With some effort, the ideal of a coherent, integrated, media-independent, data-independent network can be achieved within the decade. This will be largely a matter of vision and planning rather than otherwise additional capital spending.

7. The Space-Dollar-Person Equation

Continued modest diminution of personnel can be accomplished this decade as in the last as a result of information handling technology. Required, however, will be some exchange of more numerous, less-skilled information handlers for more highly skilled specialists. After the SAFE space allocation, dedicated space for information handling should remain relatively constant, as computers, like cars, continue downsizing.

8. The Use of Technology

More and more we will realize that our information handling needs are less and less unique. Patience and perspicacity will allow us to make far greater use of commercial products.

9. Standards

As with any maturing field the need for standards will increase, and the nature of the standards will become more apparent to us. We must avoid a rush to Agency-unique standards which will entail significant downstream expense. Standards for user interfaces (which mirror his intuition) will be most cost effective.

The NAPA Report

Concurrent with the formation of this Task Force, the Executive Committee was engaged in a series of decisions with respect to personnel management in CIA. These decisions were a result of a study, "The CIA Personnel Management System", completed by representatives of the National Academy of Public Administration during the Spring of 1979.

While dealing with Agency personnel management in the broadest terms, there were ultimately some more narrowly focused recommendations. One such recommendation was:

> *"Establish some Agency-wide occupational systems across career services or subgroup lines where several components employ significant numbers in the same occupational family. For example . . . data processing personnel . . ."*

The Executive Committee deferred a decision on an Agency Career service for ADP professionals pending results of the Information Handling Study.

Task Force recommendations with regard to career management were developed without reference to the NAPA report. Task Force recommendations have resulted from a focus on the projected critical shortages of information specialists and the belief that a personnel management system, in addition to the vacancy notice system, is required to equitably deal with needs of the service vs. desires of the individual.

The Security Task Team Report

Immediately following the events of the Kampiles case, the Office of Security constituted a Task Force to conduct an in depth review of security systems. The final report, "A Security Review of the Central Intelligence Agency", contains many recommendations for change in policies and procedures for information handling. While a number of changes and new initiatives resulted from Senior management review of the recommendations, an uncomfortably large set of actions were not approved because of cost and perceived impact on operations. (C 3d(5))

This Task Force was asked to address those remaining actions in developing a strategic plan. The Task Force approached this charge by giving heavy emphasis to elements of strategy that promise to capitalize on technological innovation in overcoming concerns for cost and efficiency and that provide more positive control and accounting than current systems.

ALL PORTIONS THIS CHAPTER UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

2. SYNOPSIS OF INFORMATION HANDLING

For purposes of this study, information handling services were categorized as:

— Recording of Information

— Acquisition of Information

— Dissemination of Information

— Distribution of Information

— Information Reference Services

— Reproduction of Information

— Security, Control & Accountability

— Computing Support Facilities

— Information Systems Development & Maintenance

— Miscellaneous Services

2.1. Recording of Information

This category includes all facilities or services which enable the generation or capture of information in a medium that will support subsequent storage and exploitation of that information. It encompasses the mechanisms by which Agency components can put information into a retention medium.

These retention media can generally be thought of as falling into three classes: hard-copy documents, electronic or magnetic based storage, and methods for retaining information in more graphic forms such as film or maps.

The traditional methods for creating documents has been the use of standard typewriters to create correspondence-quality documents and the use of high-quality printing presses, such as those provided by P&PD, to produce finished intelligence or documents where significantly large quantities of copies were required.

While these facilities still account for a substantial amount of the documents produced by Agency components, automated facilities are increasingly being used to support document creation:

— Standard typewriters are being supplemented by devices which provide automated support to the creation, editing, and printing of documents. These facilities are generally referred to as word-processing (WP) devices.

— Terminals connected to the central computer facilities provide a WP service which enables a user to prepare printed documents.

— A growing population of distributed, high-quality printers which are attached to communications and data processing systems, are being used to create quality documents using information which is normally stored, processed, or transmitted by these systems.

— Planned facilities under development such as the SAFE system will offer additional document creation functions to NFAC analysts.

Recording information in the various forms of electronic media is also being heavily influenced by technological developments. Early facilities for entering information for electronic storage and processing were largely limited to centrally supported keypunch (key-to-card) facilities and optical character readers (OCR) which can recognize and convert to electronic storage information represented in certain type fonts.

While central keying facilities are still provided by ODP & IMS, and OC utilizes OCR devices to capture cable traffic, user-operated word processing devices and computer terminals are increasingly being used to enter information into electronic storage. Once in this media, the information is manipulated by an expanding array of software and hardware facilities to edit, store, retrieve, rearrange, distribute and display/print the data.

A prime example of recording information in a graphic medium is the extensive use of microfilm and microfiche facilities found throughout the Agency but especially in P&PD, OCR, and IMS. This use of micrographics to record information will shortly reach a new technological sophistication with the implementation of the ADSTAR and DORIC-W systems in OCR and IMS.

The creation of graphic and cartographic information is supported by the central plotting facilities of OGCR and increasingly by the remote terminals and plotters associated with the ODP central computers. This range of facilities enables a user to create graphic representations of limited complexity on local CRT screens and plotters or request sophisticated, publication-quality maps or graphs from OGCR.

Finally, a number of components provide facilities to prepare graphics which are used primarily as briefing aids. The mini-computer based GENIGRAPHICS system recently acquired by OGCR provides a facility which assists a graphics artist in the creation of color viewgraphs and 35 mm slides.

2.2. Acquisition of Information

Acquisition refers to the receipt of information which has been collected or generated by non-CIA resources and acquired for Agency use. This category of service identifies the Agency windows or portals through which externally produced information is made available for Agency exploitation.

Existing systems and procedures provide a variety of classified and unclassified data to an Agency analyst which are remarkable for the depth and breadth of coverage. Although several components are involved, there is surprisingly little duplication. Agency employees are apparently satisfied with the level of support as evidenced by the singular lack of complaints concerning acquisition service in office responses to the Comptroller's information handling memorandum of November 1978 and in their subsequent responses to the IHTF survey.

The primary offices which acquire data for Agency use and their responsibilities are described immediately below.

— The Office of Central Reference is responsible for the procurement of foreign publications, the provision of books, periodicals and newspapers to Agency components, the receipt and dissemination of intelligence information reports and publications, the maintenance of specialized collections of intelligence data, and response to requests for motion picture film and video tape. An acquisition function is either implied or stated in each of those responsibilities.

— The Office of Communications is responsible for dissemination and delivery of CIA and non-CIA cables within Headquarters. This responsibility carries an implied acquisition function.

— The Foreign Broadcast Information Service is responsible for acquiring and disseminating selected foreign broadcast information.

— The Office of Current Operations is the Agency terminal point for the major commercial press wire services.

These four components provide the bulk of textual reporting to the Agency. The division of responsibility is fairly clear. The availability of increased amounts of information directly to consumers via electronic networks promises to blur some of these responsibilities. If duplication is to be avoided coordination of requirements is essential. (S 3d(3))

2.3. Dissemination of Information

Dissemination is the process of determining the component or individual that should be made aware of recorded or acquired information. Dissemination may consist of automated procedures which match the information content to a user interest profile or reading list and/or manual procedures in which a dissemination analyst reads the information to match content with user interest.

This "intellectual" dissemination process is contrasted with the distribution function discussed in the next section, the process by which information is delivered to users. We have found in our study that many users fail to make this distinction, complaining about dissemination delays, when, in fact, some of the delays are attributable to delays in the physical movement (distribution) of documents from place to place. The reader should keep this distinction in mind when reading about the dissemination/distribution process.

Two components are responsible for the bulk of document dissemination in the Agency. They are the Office of Communications (Cable Dissemination System) and the Office of Central Reference (hard-copy intelligence documents and open-source publications). On a more limited scale, OD&E, FBIS, OCO and RSG Watch Offices, DO/IMS, various registries, and the originators of documents are all involved in dissemination functions, as are those components who acquire information in liaison. In some cases, members of this latter group make the initial dissemination; in other cases, they do a second-level and sometimes a third-level dissemination when the initial dissemination needs to be expanded to assure delivery to a more specifically identified consumer. (S 3d(3))

Although reasonably well satisfied with dissemination support, users identify three types of dissemination problems. They are: delays in user receipt of electrically received intelligence products, a need for dissemination tailored to users (branch, individual) requirements, and a concern that the various Agency components involved in the dissemination process do not use the same set of reading requirements with the perceived result that information is missed. The greatest user dissatisfaction resides in NFAC components.

For many years, dissemination was a manual process performed by people. In the last few years dissemination has moved in the direction of automated processing. OCR's Machine Assisted Dissemination (MAD) led the way but was largely replaced in

1978 by OC's Cable Dissemination System. OCR's Interim SAFE which offers NFAC production analysts their own mail files will be followed in the near future by the final SAFE system which will greatly expand mail file support. With more and more data being created in electrical form, in part a result of the word processing expansion, we anticipate growing requirements for automated dissemination systems linked together by communications networks. (S A9c(4.1))

There is little technical difference between (machine-assisted) dissemination and (machine-assisted) retrieval. The user may see a duality: in one case fixed requirements played against a changing stream of incoming information; in the other, new requirements played each time against a fixed store of information. Underscoring the identity of dissemination and retrieval, a user frequently wishes to search the (recent) past receipts of electrical information and then be advised of new incoming information on the topic.

2.4. Distribution

Distribution refers to the physical movement of information (in whatever media) and to related registry, mail, courier, electrical and pneumatic tube services provided by various information support units.

Distribution functions are the natural follow-on to dissemination activities. Dissemination decides who gets what. Distribution gets it there. Responsibility for distribution is quite diffused. Distribution functions are assumed by many individual components in order to move information to where it is needed.

The Office of Communications is a major distributor of electronic based information within the Agency through its Field Stations, automated message switching facilities (MAX and DATEX), the Cable Dissemination System, and an extensive network of communication lines throughout the building. The Office of Data Processing also distributes a high volume of electronic information through its growing network of Remote Job Entry (RJE) facilities, Message Routing Service (MRS), network of mainframe computers, and extensive remote terminal and printing facilities. Because facilities of both offices are becoming increasingly linked, the division of responsibility for distribution of electronic information is blurring. (S A9c(4.1))

Unlike electronic distribution where jurisdiction and activities involve only a few components, the distribution of hard-copy, primarily paper documents, involves practically every major and minor component in the Agency. Organizational units either sponsor registries, mail rooms or some combination thereof or have fixed mailing addresses (see Agency telephone directory) at which a secretary or clerk performs similar functions. The function is labor intensive.

If distribution responsibility within Headquarters for electronic information is blurred by increased linkage between communications and computing facilities, responsibility for hard-copy distribution is even more difficult to pinpoint, because of the number of components involved. Technology promises to reduce this problem by creating and moving more information electrically. These parallel trends are readily apparent in the expansion of data creation in electronic form through word processing facilities and the planned acquisition of automated printing and reproduction systems (e.g. APARS) for distribution purposes. (S A9c(4.1))

2.5. Information Reference Services

Information reference services are those services that store documents and/or information for subsequent retrieval. Responses to the Task Force request for information directed to users and providers of information services identified literally dozens of such systems. The variety defies easy categorization. An earlier inventory by the Comptroller led to similar findings.

Major systems include the DO's Record and Information Control System (DORIC), OCR's subject/bibliographic index to intelligence documents (AEGIS/RECON), OCR's manual biographic files, NPIC's Integrated Information System (IIS), and the COMIREX CAMS files. There are others. (S A9c(4.1))

Examples of smaller, more unique systems are OGCR's World Data Banks, the IG Audit Staff's Automated Information Management System (AIMS), OTS' [redacted] 25X1 system, OL's Agency Copier Management System (ACMS), and OWI's MIX to mention a few. (S A9c(4.1))

In addition to operational systems and files there are a number of development projects under way or soon to start. OCR's Project SAFE is scheduled to go operational in late 1982 and will offer NFAC analysts access to major information files, the capability of building their own private files, and a current dissemination/distribution service for material that is in electrical form. A similar system is tentatively planned for DO activities.

CRAFT for Clandestine Records Automated Field Terminal is a system designed to provide automated storage and retrieval facilities to overseas installations. The system is planned to support rapid destruction and/or transfer of records in emergency situations and later reconstitution of files when the emergency is over. (S A9c(4.1))

With few exceptions, Agency systems are designed and built independently for specific users. Each system is undoubtedly useful but most serve only the original requestor or a limited clientele.

Unique design is to be expected in mission oriented organizations. Mission managers have a job to do, and quite understandably, they worry about and plan for their own activities, not those of other managers. Because this is so, information systems suffer from parochial design. Planners are either unaware of, don't care about, or don't have the time or resources to worry about related requirements. Is this bad? Not necessarily. If the system requirements are unique, that is, if no other organization has similar or overlapping requirements, then local design is probably optimal. Many would argue, however, that information requirements are not unique to one component and that separate design leads either to overlap and duplication, or non-use of available systems because potential users are unaware of their existence. The problem is to manage system development to encourage the initiative and imagination associated with independent design efforts while simultaneously promoting adherence to standard languages, common protocols, etc.

2.6. Reproduction of Information

This category includes all facilities which enable the production of one or more copies of an information item in the same media as the original.

The most widespread media reproduction activity in the Agency today involves the use of the ubiquitous 'Xerox' type copier machines. While reproduction facilities are available to create copies of information retained in electronic and graphic media as well, the use of document or paper reproduction devices is an integral and indispensible part of the daily operations of every component in the Agency.

Copier devices in the Agency at the beginning of this year numbered 267, an increase of three percent over the previous year. Average monthly copy volumes in 1979 ran 11.6 million, also showing a three percent increase over 1978. (S 3d(5))

One technological activity that is expected to dampen this need for large volumes of paper reproduction is the growing use of electronic based word processing and office automation systems. As more information is created and retained using these facilities, the amount of document based information that would require the facsimile copying (as opposed to producing a new copy from the digital representation) should stabilize and eventually diminish.

2.7. Security Control and Accountability

Subsequent to its formation the Information Handling Task Force asked the Office of Security to describe its goals for information security. Four goals were identified:

— to prevent compromise of information while permitting timely access for those with an approved need-to-know;

— to detect failures in the control system;

— to assess damage in the event of penetration, defection, or accidental compromise;

— and, to take remedial action to correct control system deficiencies.

The question is whether the Agency information security program is meeting these goals.

In 1978 the Agency Security Task Force examined the personnel, physical, and information security programs of this Agency. The task force report published in November of that year described the personnel and physical security programs as essentially sound and the information control program as ineffectual. The Information Handling Task Force is, for obvious reasons, concerned primarily with the latter program. (S 3d(5))

Information control refers to those facilities or procedures designed to enforce the need-to-know principle and to prevent unauthorized access to, or unauthorized release of classified information. Information control implies accountability. Information accountability refers to facilities or procedures to determine the location of information and to identify the components or individuals who have been exposed to that information. Enforcement of accountability has a direct impact on the control of information.

Control functions include the encryption of information, the requirement for passwords to access computer-held information, the use of classification and dissemination control caveats on documents, the establishment of security compartments for sensitive types of information, etc. Accountability functions include all the record-keeping activities which permit the location of information or the identification of people who have seen or who have had access to the information, i.e., registry activities, logs, document and courier receipts, document manifests, etc.

Is information properly controlled and accounted for in the Agency today or does the 1978 Task Force conclusion still apply? The IHTF found a variety of systems working to protect information. Electrical message traffic entering and leaving the Agency is encrypted. Most, if not all, computer data bases are protected by controlled environments, where access is permitted only to those with the appropriate clearances, or by the use of passwords to access on-line systems. OC enforces emanations (TEMPEST) standards while OS Information Systems Security Group controls the placement of electronic devices to limit emanation problems. IMS, OC and OCR exercise control over dissemination by requiring official approval of a disseminee's need-to-know. A variety of registries throughout the Agency are involved in information control insofar as they determine who will see controlled documents.

Other steps have been taken in recent months to improve control over information. Authority to remove classified material from Agency buildings has been limited to approved couriers and to those individuals authorized on a case-by-case basis by Agency Document Control Officers. Briefcase and package checks help enforce this rule. New systems being implemented and planned provide for improved control of information. These include the Blacker cryptographic system which will provide end-to-end encryption over communications networks, ADSTAR which will authenticate requester clearances against a copy of the OS Special Clearance File [redacted] and 25X1
Project SAFE which will record the location of documents in SAFE or ADSTAR and the identification of dissemination addresses to which documents are directed. (S A9c(4.1))

Another recent undertaking is the establishment of the APEX Steering Group and appointment of a Special Assistant to the DCI for Compartmentation charged with establishing a single integrated control system for all compartmented classified information.

Accountability is the ability to determine where information is located and/or who has seen it. Most Agency components keep records which help that component trace lost documents and/or documents for which there is some reason to conduct a search. The reasons for maintaining such records vary from component to component as do the kind of records kept and the length of time for which they are kept.

OC maintains message journals for whatever length of time is needed to assure that messages are completely processed through the system. OC's Cable Dissemination System maintains a two-year file of messages on microfilm on which is recorded the message's (primary) dissemination. ODP's Automated Message Processing System (AMPS) maintains copies of messages transmitted from CDS in order to retransmit messages when so requested by the message recipients. OCR maintains a three-year record of document request forms and a five-year record of TK document request forms. The Office of Security maintains an automated TOP SECRET Control and Dissemination System (TSCADS) to account for Top Secret collateral documents. The DO/IMS maintains permanent records of all name traces, file and document chargeouts. (S A9c(4.1))

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When operational, the SAFE system will provide a document accountability record for all records in the SAFE system and will record the dissemination and routing addresses to which the documents were directed by the system. ODP plans to install a badge reading machine and an optical wand reader at the Ruffing Center control point to verify and record the release of highly classified computer-printed information.

These are only a few of the operational or planned systems which will either control information or account for its disposition. (Additional information is available on this topic in Attachment B.) Most of these systems were designed to support operational requirements. It is largely accidental that security audit trails can be constructed from the data stored for other purposes.

The control of and the ability to account for information remains much the same as described by the 1978 Security Task Force. The XEROX machine largely cancels out any control or accountability advantage achieved by the existing systems. The availability of more and more information in electronic form resulting from the increased use of word processing equipment does however offer some promise of improving future control and accountability through the use of automated systems.

2.8. Computing Support Facilities

This category of information handling service includes all computers and the peripheral devices attached to those computers which support the storage and processing of information. This support includes the operation and maintenance of these facilities and the provision of any systems (non-application) software needed to insure efficient utilization of the hardware devices.

The primary sources of Agency computing services today are found in the large general purpose, centrally supported facilities provided by ODP and the large special purpose computers which provide dedicated support to NPIC, the DO, and COMIREX applications. (S 3d(3))

Of secondary but increasing importance, is the growing list of user-controlled mini- and microcomputers being utilized to satisfy data processing requirements that, for one reason or another, are not being satisfied by the large general-purpose devices.

The backbone of ADP support is provided by the ODP computer center located in the Ruffing Center in Headquarters. This complex of machines, storage devices, and remote terminal/printers provides service to about fifty Agency and Community components and satisfies a wide variety of data and word processing requirements. In addition to providing batch and interactive time-sharing facilities to the general user, this complex satisfies large data base management needs and provides the processing support for the OCR AEGIS/RECON and Interim SAFE services.

The ODP managed Special Center houses large dedicated computers which support the COMIREX management system (CAMS) and provide computing facilities for a range of compartmented DO data processing activities collectively known as ALLSTAR. (S A9c(4.1))

NPIC operates its own large computer cente [redacted] which is used to support photographic interpretation and provide data reference services for information derived from that interpretation. (S A9c(2.8))

25X1

Because of unique security, processing, or availability requirements, many components have found it beneficial to utilize smaller, locally controlled, minicomputers to satisfy some of their data processing requirements. In the absence of Agency standards for minicomputer hardware and software, a large variety of systems has evolved to satisfy a variety of applications.

The inescapable trend that one observes in viewing the computing facilities of the Agency is that of constant growth. Growth in the capacity and flexibility of the central support computers, storage capacity and availability of remote terminals; growth in the use of large special purpose systems; and especially growth in the use of component-based computers dedicated to unique user requirements.

Significant events on the horizon that will have an unmistakable impact on the character and availability of computing resources in the Agency are:

- The establishment of the SAFE computing center and the availability of the Headquarters wide-band communications BUS system to support SAFE and other data communications requirements.
- The utilization of the new standard soft-copy terminal and the added local processing facilities it will provide the user.
- The establishment of a minicomputer standard (such as the IBM 4300) to reduce or eliminate the profusion of incompatible computing devices and languages.
- The introduction of computing facilities in an overseas environment as envisioned by the CRAFT concept. (S A9c(4.1))

2.9. Information Systems Development and Maintenance

This category includes the analysis, design, implementation, and subsequent maintenance of systems used to support specific user requirements in information handling. This activity is primarily related to the development and maintenance of hardware and software but can involve non-automated systems as well.

Systems development facilities in the Agency have evolved to the point where both centralized and distributed resources are utilized. This has essentially mirrored the evolution of the facilities for computing services.

Centralized facilities are made available by ODP and OC to respond to virtually any Agency component which indicates a need for systems analysis or implementation. ODP and OC will perform the required feasibility studies or project proposals to determine if and how a user information handling problem should be addressed. In addition to systems development and documentation, ODP and OC assume responsibility for maintaining systems as long as they continue to satisfy user requirements.

Software development and maintenance services are performed by several non-ODP components in direct support of their parent organizations. The largest of these groups are found in NPIC and the DO. The NPIC group is dedicated to supporting the NPIC Data System and related systems [redacted] and DO/IMS/Systems Group performs software support functions for the DO systems running in the Special Center as well as several minicomputer applications. (S A9c(2.8)) 25X1

In addition to these two groups, there are a large number of components which provide their own systems capabilities. These component resources are relatively limited, rarely exceeding a half dozen people. Offices such as OCR, OSO, OER, and OL are among the organizations which include systems support personnel on their staffs.

While there is a fairly widespread distribution of Agency resources involved in systems development work, the efforts are not as disjointed as one might assume. Two significant activities are contributing to a closer degree of cooperation and uniformity among the various groups; the use of ODP professionals on rotational assignment, and the development of Agency-wide ADP software standards.

Because of ODP personnel ceilings, a number of components have found it advantageous to provide permanent positions or slots in their organization which are filled on a rotational basis by ADP professionals from ODP. Under this arrangement, the ODP personnel become functioning members of the component staff, working in the user area in direct response to user established priorities while adhering to ODP procedures and standards. Similar arrangements exist between OC and some of its customers, notably major program offices within DDS&T.

A recently established ADP standards committee has been constituted to develop Agency-wide standards relative to defining systems requirements and the preparation of documentation associated with the design, implementation, testing and maintenance of computing systems. All major Agency components having software development capabilities are participating in this effort.

2.10. Miscellaneous Services

This category includes two services which warrant some discussion but which do not logically reside in the nine categories described above. They are:

— Formal training to support the various disciplines that constitute the IH services

— Data Base Management and Support

Training

Training, like most of the other elements of Information Handling, is highly distributed throughout the organization. While OTR provides several general purpose records management oriented and information systems survey courses, the majority of the technical related offerings are provided by the specific components that require the unique skills. Even within a technical speciality such as ADP, a variety of components feel the need to conduct their own formal training. This results primarily because resource limitations of the central training facilities of OTR and ODP preclude the support of many component-unique training requirements.

OTR does review component training programs and thus there is no discernible duplication of effort among the available courses.

External vendors, tutorial conferences and educational organizations continue to provide supplemental training where Agency expertise is unavailable.

The Computer Aided Instruction (CAI) facility envisioned for the SAFE system indicates a trend that will be more evident on the development of large ADP systems.

Under this facility, the user of the system will receive the majority of his usage training from the system itself. In addition to the more traditional 'help' facilities which provide the user with explanatory comments on the use and format of common commands and procedures, the CAI can conduct a formal interactive training lesson with the novice or experienced user. Using this technique, the user can request individual instruction on selected functions of the system, proceed at his own pace and experiment with the various system facilities.

Data Base Support

Associated with the establishment of large complex data bases has developed the concomitant need to ensure that the data is accurate, current and available for user exploitation. Normally, the user or the owner of the data cannot devote the resources or the expertise to provide these services. Consequently, a number of organizations which have developed ADP systems for users, also provide the related service of maintaining the data for production activities. NPIC, ODP, IMS and OCR are the primary examples of components providing this service.

In addition to data maintenance, these components also provide periodic or ad hoc data base reports to the user based on the users' specific requirements.

Users are, however, taking an increasing role in managing their own data bases. OF's establishment of its Data Base Management Branch to monitor the state of the FRS and GAS systems is a prime illustration. (S A9c(4.1))

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3. SAMPLING OF PERCEIVED ISSUES

This section lists information handling and management issues identified by Agency component managers. Frequently, several component managers identified the same issues. The task team therefore elected to present a representative sample rather than list every issue identified by every manager. Words enclosed by parentheses were added to improve readability.

3.1. Management of IH Systems

Planning:

a. Development and maintenance of a strategic policy for Agency IH support.

"The lack of a comprehensive Agency Information Handling Strategic Plan renders ineffective attempts to develop coordinated, complementary information handling programs." (OC)

". . . the need for coordination of ADP, communications, and other information handling mechanics should be viewed as only a part of the broader need to develop policy and organizational procedures to rationalize and control information flow." (DO)

b. Establishment and prioritization of long-range goals or objectives to support these policies.

"Agency management issues (include the) development of a managerial structure to manage, develop, control, coordinate, and optimize information-handling activities without destroying individual office requirements and creativity. . . ." (OMS)

"(A management issue to be addressed is) Who should be responsible for formulating objectives, policies, plans and programs relating to the establishment of an Agency-wide information handling system?" (O/DCI)

c. Assignment of organizational responsibilities, action plans and schedules to accomplish these objectives.

"Charter conflicts between Agency components are presently developing and promise to worsen in the future. Technological advances have eliminated many of the traditional functional boundaries associated with information handling. Computer security and communications security efforts are also becoming inseparable. Consequently, many OC/ODP and OC-CSD/OS-ISSG areas of interest and responsibility are in dispute or have the potential of developing into conflict situations." (OC)

"The acquisition of adequate ADP resources to meet the growing demand for data or access to existing computer assets under the control of other organizations. . . ." (OD&E)

d. The allocation of the necessary resources commensurate with assigned responsibilities and schedules.

"There are areas of severe imbalance between work load and resources. Customers, occasionally, are forced to accept lengthy delays in service. This imbalance sets the stage for information handling users to initiate their own programs to acquire and implement equipment or systems to satisfy their requirements. This situation has serious managerial and security implications." (OC)

"Examine the issue of centralization/decentralization of directorate and office control of resources." (NPIC)

Goals:

e. Agency support to community requirements.

"(A significant information handling problem is) the use of Agency resources to develop and support community-wide ADP systems." (ODP)

"(One of the principal needs is) A small skilled community-oriented organization to install, maintain, and manage information handling systems and activities for all IC components directly involved with RD&E. Since there is a diversity of requirements and continual unanticipated demands within the RD&E components, there must be some flexibility built into any information handling system. To best achieve this flexibility and to retain a semblance of system or order, calls for a focal point specialist to oversee the effort." (OD&E)

f. Overseas support to field station activities.

"The extension of ADP to the field will significantly impact foreign telecommunications requirements in the future." (OC) (C 3d(3))

g. Philosophy of centralized versus distributed IH resource allocations.

"(An) Agency management issue (is the) expansion of activities to utilize standard hardware and software so as to derive the benefits of economy of scale and reduce maintenance and training requirements. . . ." (OMS)

"(An Agency management issue which needs attention is) the degree of centralization or decentralization of effort to bring order to the Agency and community information handling problems." (OD&E)

h. Physical space for IH support devices/personnel.

"(ODP is concerned about) the allocation of adequate physical space to house ADP and Communications hardware." (ODP)

"We do not have a coherent policy on space allocation, which should take information handling factors into account in the positioning and modification of offices." (DO)

i. Jurisdictional responsibilities between ADP and communications support components.

"Technological advances, primarily in electronic components, have fostered integral system design. It is no longer possible to identify the boundary between data processing and telecommunications." (OC)

"The most serious problem identified by ODP has to do with the gradual and inexorable blurring of the distinctions which once separated ADP functions from communications functions. . . ." (ODP)

j. Extent of required information control and accountability.

"(A) Policy regarding data integrity and accountability should also be developed." (OC)

k. Extent of recovery from catastrophic failure of IH facilities.

"We lack a sound Agency position on requirements for the survivability of CIA information systems, on vital records, and on the ability of computer and micrographic data bases to serve as records." (DO)

"Decentralization of major IH systems (telecommunications and ADP) will be necessary to improve the survivability of local IH resources." (OC)

Control and Coordination

l. Insuring that established policies, goals, and plans are coordinated, monitored, and evaluated.

"Reorganize organizational structures to minimize coordination requirements encountered when developing and maintaining information handling systems." (OF)

"Is there adequate project oversight and reporting at the directorate level (to avoid ADP projects which go on forever but never get completed)?" (OP)

m. The establishment and promulgation of IH standards to enable compatible and efficient implementation of plans.

"Acquisition of new information handling equipment and systems should be tightly controlled to ensure compliance with Agency operational, technical, and security guidelines and standards. All new equipment procurement should also be reviewed to ensure compliance with an Information Handling Strategic Plan." (OC)

"Inter-office and inter-directorate coordination and cooperation (is needed) when interfaces between the various agency automatic data processing systems are required. The issue generally arises as to which system will be modified to allow for compatible interfaces. When neither party or parties will modify their system, it means the storing of extra data for identification purposes or extra processing is required in order to make the data passed compatible." (OP)

n. The interface to, and coordination with, other government and community organizations.

"The role of NPIC in providing on-line access to the NPIC data base from various Intelligence Community organizations through COINS II and the usage of COINS II by NPIC to access intelligence information at other IC sites requires Inter-Agency coordination and planning of ADP and communication resources." (NPIC) (C 3d(3))

"The Community . . . is actively pursuing programs that involve shared data bases, common standards, assigned responsibilities, and services of common concern. Often ignored or glossed over are the resource implications of such proposals. The Office of Central Reference is under increasing pressure to modify processing and file coverage and currency, and to develop and maintain new automated data bases to meet Community rather than Agency requirements." (OCR)

3.2. Recording of Information

a. Proliferation, control, and compatibility of word processing devices:

"Our use of word-processing equipment to streamline the production of finished intelligence is plagued by incompatabilities between users' equipment and uncertainties about future Agency standards." (OWI)

"A plan should be established which permits production offices to efficiently carry out their own word processing functions and at the same time be part of an Agency-wide integrated word processing system. In the long run, this approach will be less costly and will prevent the proliferation of varying types of incompatible systems." (OPA)

b. Integration of word processing and current ADP facilities:

"OER currently utilizes the SCRIPT facilities of ODP to prepare finished intelligence documents and will participate in the NFAC plan to introduce the NBI-3000 as the standard NFAC word-processing device. They wish to avail themselves of the benefits of both systems and consequently have expressed a need for a communications facility between a NBI and the VM systems such that VM data (including SCRIPT files) can be included in NBI-produced documents." (OER)

"The proper organizational placement of control over word processing, the relationship of that control to organizational control over computerized printing, and the relationship of both of those functions to the traditional functions of communications and ADP, involve organization issues which must be dealt with at the Agency level." (ODP)

c. Need to expand present word-processing capabilities to include general purpose office automation facilities such as document dissemination and routing.

"(An issue to be resolved is) should DDA analysts have access to SAFE or SAFE-like capabilities." (OL)

"(A management decision is required on the) plans for a wider use of SAFE and the SAFE-like concept to operating elements of CIA." (OSO)

d. Need for additional document-to-electronic transformation facilities:

"(Need for) development of a capability to transform hard-copy information into a digital form." (OSO)

". . . there has been mutual cooperation between Community library organizations for many years in the exchange of books, documents and microfilms. There is, however, no (electronic) communication systems available in the Washington metropolitan area that can handle this large exchange of non-digital intelligence material." (OCR)

3.3. Acquisition of Information

No significant problems identified.

3.4. Dissemination of Information

a. Perceived delays in dissemination processing.

"Delays in dissemination of electrically received intelligence products have become increasingly significant since April 1978. . . . The CDS does not include an automated print capability . . . resulting in user receipt delays. In addition, the CDS is unable to presort the document output thus requiring rereading at centralized points before analyst receipt." (OCR)

"Because of the time lag in the distribution process a parallel operation has been implemented to speed delivery of cables to OPA." (OPA)

b. Component responsibilities for dissemination need clarification.

"The Agency's present system for the dissemination of classified documents is handled by four separate CIA offices (OCR, PPG, Operations Center, and Cable Secretariat). In addition, a few documents are disseminated by the Executive Registry, SALT Support Staff, and others. None of these activities use the same set of requirements to provide their service resulting in disparate dissemination and no single record on how documents were disseminated. This decentralized approach to dissemination warrants review to determine if one centralized activity might improve Agency dissemination." (OCR)

"An information handling strategy should also address the flow, dissemination, storage, and retrieval of cable traffic. ORPA (OPA) analysts rely heavily on cable traffic coming into the Agency as a primary information source for political analysis. The Cable Dissemination System developed by the Office of Communications is a beginning. The SAFE project will further help. Any information handling strategy should ensure that cable traffic is available to analysts in a timely fashion and that the information remain available for a reasonable period of time, perhaps three or four weeks, in a computerized form for further querying." (OPA)

c. Need for additional dissemination support.

"There is a need for improvement in methods for selective and timely dissemination of substantive intelligence which is tailored to the individual user requirements instead of the present broadcast method of reporting this information." (NPIC)

"We are working with the Cable Secretariat to develop profiles to address all cable traffic to the branch level. If we can accomplish this, we plan to install a dedicated printer in the OER registry to handle all of our incoming cable traffic on a real-time basis." (OER)

3.5. Distribution of Information

a. Limited capacity of current electronic distribution facilities.

"The probability of greater volume of digital forms of information to be handled within, to, and from [redacted] will place additional requirements on the communications capabilities at NPIC." (NPIC) (S 9c(2.2)) 25X1

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"Here at Headquarters the DO needs an encrypted wide-band bus communications grid which will facilitate flexible growth in the number of convenient computer terminals to handle data, image, secure voice, facsimile, and word processing traffic. It is an ironic fact that we can today send a message back and forth several times between Headquarters and a field station in the same time that it takes to hand-deliver a message within the Headquarters building itself. An expensive communications network such as that we seek is difficult to justify for any one directorate. It must be justified as in everyone's interest." (DO) (S A9c(2.1))

b. Reliability of current electronic distribution facilities.

"(There are) problems in maintaining reliable communications circuits for outlying buildings." (OP)

c. Current limitation on the types of information that can be distributed electronically.

"There needs to be a closer integration of manual and computer- based systems, with perhaps greater reliance placed on use of 'electric mail'." (OL)

"(An Agency-wide management issue which needs attention is the) planning for the transition from predominantly published report dissemination to electronic dissemination, and filing and retrieval systems." (FBIS)

d. Need for communications standards to facilitate the distribution of information.

"We should reduce the diversity or variety of data communications protocols and character representations throughout the Agency and Intelligence Community as well." (NPIC)

3.6. Information Reference Services

a. Space to store increasing amounts of information.

"Technological advances have given us the capability to collect enormous amounts of information. There is such a proliferation of information and 'hard-copy' printout that managers are being inundated with mounds of information." (OL)

"Another management issue in information handling that in our view should be of significant Agency concern is the growth in the amount of information we are collecting and perhaps unable to use. This issue applies to the growth of our records both in hard-copy and computerized form. While we have acknowledged this growth problem in the hard-copy world, the compression capabilities of computers and microfiche have tended to make the problem less visible in these areas." (OS)

b. Standards for indexing and storing information to facilitate retrieval.

"We see the lack of standardization of information handling procedures now used in manual or semi-automated systems as a significant Agency-wide problem. Standardization is required for information security as well as for efficient application of technology to the administrative office environment." (DDA/ISS)

"There is a need for further standardization of terminology used in reporting intelligence events and objects." (NPIC)

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c. More flexible and user-oriented retrieval facilities.

"Generalized Information Management System (GIMS) does not have a language which is easy for managers to use. Rapid Access Management Information System (RAMIS) has file size and multiple user constraints. OL would like to see a management-oriented data base capability with good reports and graphics." (OL)

"We maintain one of the world's largest libraries of machine-readable statistics on international trade and finance. In total, the library contains over a half-billion statistics stored on some 4,000 reels of tape. We need to be able to retrieve this information according to criteria that we can program in a general language like APL." (OER) (C 3d(3))

d. Need to establish and maintain directories or catalogs of stored information and the facilities available to retrieve this information.

"Data resource banks are so fragmented...that it is difficult to know where and what type of information is available for individual office use." (OTS)

"Our analysts are not adequately informed about existing automated information handling systems, both within this Agency and in other Intelligence Community agencies. This is partly because these systems are poorly documented or the documentation is not kept up to date." (OWI)

e. Limitations of existing centrally supported files of administrative information.

"Current Agency data base support/utilization, from OC's viewpoint, is characterized by dated information and incorrect, incomplete reports. Such a situation results in inefficiency and justification for a component to acquire its own local system in order to overcome this problem and to realize the advantages of automatic data processing." (OC)

"(A major issue which needs attention is the lack of) automated transfer of administrative information between OMS, OP, OS, etc. to expedite case processing and research studies, while protecting individual medical confidentiality and privacy." (OMS)

f. Analysis required to review increasing amounts of information.

"The vast quantity collected is overwhelming our analysts. They are forced to spend time sifting through irrelevant data, time which would be better spent analyzing relevant data. And in the crush, sometimes important information is overlooked." (OWI)

"Collection systems are presenting larger quantities of more complex data which requires more analysis with concomitant increases in Agency computer resources." (OSI)

3.7. Reproduction of Information

(The proliferation and unrestricted use of reproduction equipment is categorized in paragraph 3.8. below because it is a security issue not a reproduction problem.)

Requirement for better remote printing facilities to satisfy a variety of remote printing needs:

"Will printer networks be established such that (components) can satisfy a variety of remote printing needs?" (OER)

"RMS would like . . . a multi-purpose printer/ graphic network so that a variety of RMS printing needs could be satisfied . . . ." (ICS/RMS)

3.8. Information Control and Accountability

Access Control:

a. Maintain a proper balance between the requirements for compartmentation/confidentiality and user need-to-know.

"Determination of the requirement for compartmentation and need-to-know protection in the electronic environment is a prerequisite to major decisions about the direction of future systems." (OC)

"(A major issue is the) protection of individual privacy and medical confidentiality." (OMS)

b. Need for better security facilities to control information in electronic form.

"Recent and perceived advances in end-to-end encryption techniques, file encryption, and verifiable software (secure operating systems) will enable processing systems to simultaneously execute multilevel classification and compartmentation jobs. The justification to operate separate processor centers based on sources and methods compartmentation is no longer valid." (OC)

". . . It is the opinion of this Office that the most important information handling issue facing the Agency and the Community today is computer security. In view of the lack of confidence and reliability in computer software and the growth of computers into large systems and networks, the threat of a major security incident is very real. Systems have been proven to be vulnerable and in view of the quantity of information we are now computerizing, the potential penetration loss and compromise could be devastating." (OS) (C 3d(5))

c. Need to record declassification and downgrading actions.

"It is essential that all decisions having to do with the declassification of Agency material should be reflected in (Agency) records." (D/NFAC)

Accountability:

d. Need for internal registry and document control systems.

"A growing problem is the handling of document control records. This is now done manually in PPG and other registries. Especially with the spectre of multiplying requirements for recording the handling of sensitive material until now not subject to individual control, this issue may mushroom." (PPG)

"A (need exists for a) standard approach to a document control system tailored to the needs of an organization, program, or project oriented toward research, development and engineering. This is not to imply that an Agency centralized system is the answer to our foreseen problems. Rather, we seek a community RD&E system that may or may not be compatible with other systems in the collection and production components." (OD&E)

e. Need for systems to record the release of information outside the Agency.

"Coordination of CIA release of information to the public remains the weakest element of information handling today. Our unconcerted approach to information disclosure in various forms via the Public Information Office, OGC, OLC, FOIA/PA and declassification channels has the potential for recurring embarrassment." (DO) (C 3d(5))

"Another problem that is symptomatic of our lack of strong central Agency management in this field is the Agency's present, decentralized ad hoc approach to monitoring the release of information to the public. At present, there is no centralized index where one can easily determine what material has been requested; what material has been released; and what material has been denied . . . It is essential, as a first step, that all decisions having to do with the declassification of Agency material be registered in a single place and that central records be maintained of these decisions." (D/NFAC) (C 3d(5))

f. Control of Reprographics

"Machine copying of documents in CIA is virtually without oversight or restriction, except for self-restraint exercised by individual employees. Under current practices, anybody can copy anything." (OS) (C 3d(5))

3.9. Computing Support Services

a. Optimal division of central and distributed facilities.

"State-of-the-art and Agency policy are both changing. We would like to consider a distributive system in which we would do most of our work from a dedicated mini, but would have access to mainframe support for storage and other tasks which can be done in batches." (DDA/ISS)

"While a large proportion of data processing applications require the power and storage capacity of a large computer system, other applications might be better served through a distributed processing approach. These applications would involve text editing, or relatively simple computations, which could be done locally, without tying up the main computer. There are many types of terminals or small computer systems which offer this stand-alone capability, as well as the capability to communicate with the main computer system, to transmit information or share data, for example." (OSO)

b. Extent of required hardware standardization.

"(There is a) need to achieve Agency standardization in dealing with a burgeoning hardware market which includes a profusion of minicomputers and microcomputers." (ODP)

"Entering the mini- and microcomputer era, which has great potential to assist us, we will need to guard against unwarranted proliferation and duplication of effort. This will require us to standardize to some extent." (DO)

c. Methodology for allocating (prioritizing) central resources to component users.

"With the move towards minicomputer, is ODP taking steps to assure they will be able to support customers in the future?" (OP)

"We in OER occasionally have high-priority demands for time-sharing services. To meet these demands, we would willingly require all OER users except one to stop using the time-sharing system. Under the current time-sharing system, the step of choosing among users would benefit OER very little. The computing resources that we would save would be distributed among all remaining users of the system, so our priority demand would get very little additional attention. In contrast, we could get the priority service we need, should we operate our own system. This same problem of local versus central control occurs in many other areas of information handling, such as batch processing and centralized word processing for producing finished intelligence." (OER)

d. Limitations in the availability, capacity, and responsiveness of the central facilities.

"(An information handling problem is) the availability and the allocation of user terminals (and) the availability of an adequate communications network to support these terminals." (ODP)

"The Office of Security views its most significant problem as being in the area of computer downtime. This factor, in many cases very subtle, has a cumulative effect that can result in major losses in resources and program effectiveness." (OS)

3.10. Systems Implementation and Maintenance

a. Optimal division of central and distributed facilities.

"Because of their increasing workload, it is becoming more and more difficult for ODP Central Services to provide timely support." (OSR)

"To what extent should each organization possess organic ADP support resources?" (OWI)

b. Extent of required standards for implementation methodology and documentation.

"A problem facing this organization is the need for a greater degree of standardization in the Agency's development of ADP software." (ODP)

"There is the need, however for a central office or group to coordinate and monitor data processing applications throughout the Agency, if only to avoid duplication of effort. They might also make an effort at standardization — of programming languages, data base management systems, programming techniques, etc.—among all user offices." (OSO)

c. Need for the development of standard data accessing languages.

"The number of digital data bases (both commercial, such as the New York Times Information Bank, and Governmental, such as NSA's SOLIS) is rapidly increasing. This proliferation of data bases forces OCR personnel to maintain a working knowledge of a variety of command languages for interrogating the various data bases. Some means must be developed to enable an individual to query multiple data bases in a single standard language which can then be machine translated to fit the appropriate file." (OCR)

" A major problem is the standardization of user retrieval languages for large systems such as COINS II." (OSR)

d. Need to develop data bases which can serve the widest population of users.

"There needs to be a greater effort towards the integrated development of information handling systems, with direction and coordination stratified at the directorate level." (OL)

"OF has expressed concern that the development of large administrative ADP systems within the DDA are commonly too parochial in scope and design. The observation is made that far too often data transactions must be processed (machine and manual) by several different systems because each system is designed to satisfy only the specific processing requirement of the sponsoring office. OF feels that economies of processing would be achieved if there were a DDA systems architect who would ensure that the design of any new, relatively large, ADP system reflects the applicable requirements of all DDA components." (OF)

e. The expressed need for additional graphic oriented data manipulation facilities.

"Graphic terminals and business graphics have not been adequately explored or exploited. OL would use these aids if they were available and easy to use." (OL)

"The advent of sophisticated intelligent computer terminals, more elaborate graphics capabilities using computer input, and the introduction of a mass storage system to lessen our dependence on magnetic tape for storage of data will contribute to OSR's mission. . . . A graphics package capable of tabulating and displaying order-of-battle data as well as overlaying disposition of forces data on computer-generated maps is being planned. This will rely on a micro-computer to display output and make it available in color hardcopy form." (OSR) (C 3d(3))

f. Insufficient analysis prior to implementation.

"With respect to the management issues, we feel that successful planning for the acquisition of information handling systems must be preceded by an analysis of the requirements for these systems... The design of information handling systems should encompass the procedures involved in using the systems. It is not sufficient that an information handling system merely automates the current work and paper flow - a fresh look is required which will look at both the procedures and the available technology." (ORD)

"Better organization is needed to ensure proper coordination among CIA offices on information handling decisions that impact on many other components. New information handling systems too often are based on automation of existing procedures rather than a detailed analysis of the problem and its interrelationships to other components. Recent actions in such areas as records management planning, cable dissemination, and security markings on documents are but a few illustrations of this deficiency." (OCR)

g. Resources required to maintain current systems.

"The increasing requirements to maintain existing systems reduces resources available to respond to new requirements. Old, costly, systems must be reviewed and either replaced or terminated." (OL)

3.11. Miscellaneous

Personnel Services:

a. Insuring an adequate availability of IH professionals.

"I also believe that this study should focus to some degree on the qualifications, or lack thereof, of the people currently involved in the information handling process. My own belief is that many of our current problems are caused by such lack of qualified personnel." (DDA/ISS)

"(A problem for ODP is) the attraction and retention of qualified ADP professionals given the inducements present in today's marketplace . . . ." (ODP)

b. Insuring that IH professionals receive the necessary training to support current systems and are kept aware of the advances in technology.

"Training is heavily booked and does not always match our needs, either in the nature of the training or in timeliness." (DDA/ISS)

"Skill profiles of employees required to design, install, operate, and maintain new information handling systems must reflect modern technological training... Significant increases in training are projected if the Agency is to effectively utilize its investment in newer/more sophisticated IH systems." (OC)

Data Management:

c. Data management services: Optimal level of central versus distributed support.

"(A major problem in IH is) should the Info Control Officer staff include a data base management function?" (OP)

Research & Development:

d. Prioritization of support efforts in R&D.

"Often times information handling projects proposed by OCR are overridden by other priorities in ORD. Long-term basic research is a necessity to meet future Agency information handling requirements." (OCR)

"(An Agency-wide management issue is) who will identify Agency- wide research and development needs and promote intra-component cooperation in research and development on information processing?" (O/DCI)

External Implications and Constraints:

e. Government regulations relative to procurement, records management and other IH standards.

"Legal constraints are highly significant inhibitors to efficient information flow, as we all have come to appreciate. They dictate what information we store, how and where we store it, for how long, how we may develop points of access to it, who may have access to it, to whom we may send it, and so on. In the DO, for example, we cannot permit use of minicomputers solely on the basis of their security or cost effectiveness because protection against improprieties, such as unwarranted storage of information on U.S. citizens, must also be assured." (DO)

"Despite the increasing availability and utility of minicomputers as a viable alternative to large scale centralized computers, restrictive procurement directives and budgetary decisions have imposed limitations on ODP which cripple its efforts to manage the development of this alternative in a logical and systematic manner." (ODP)

f. Oversight and review by elements of the Community, OMB, and Congress.

"Obviously, we are going to be measured against any (information handling) standard adopted by OMB and therefore the initial question is 'What need we do to maintain management control of those areas of real concern to OMB'." (DDS&T)

"An issue which will have an impact on ODP's ability to continue or expand services (is) increased external oversight." (ODP)

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4. DISCUSSION

In this section, a series of analyses of discrete issues leads, in some cases, to one or several tentative recommendations. Each analysis intertwines technical and policy analysis. In many cases, forecasts of technical trends underlie the analysis. These forecasts are independently derived in attachment C.

For the most part, the analyses have been grouped, after the fact, according to the nature of the tentatively proposed solution: managerial, structural, policy standards, and security/compartmentation.

The analyses derive from the expressed issues of chapter three, and the set of goals and objectives summarized in chapter 1. The goals and objectives allow an integrated evaluation of management alternatives, in chapter 5 with final management, program, policy and security recommendations in chapter 6.

Each analysis is designed to stand on its own, independent of the others, and they are so presented. Where the issues overlap in substance, the presentations are somewhat repetitive. This is usually flagged for the reader and is the price for guarding against misunderstandings which could arise if an analysis were otherwise taken out of context.

The chapter is divided into four major sections corresponding to the four major issues in the original Terms of Reference (Att. A), i.e.:

Management

Structure

Standards

Compartmentation

Section 4.1, ***Management of Information Handling Services***, provides a series of analyses which stress the need for a top-level view, a strategic plan, and an overall systems architecture. Conclusions revolve around the management structures needed to support this integration over the breadth of information services. Career management and contingency planning are also discussed.

Section 4.2, ***Structure for Providing Information Services***, presents a vision of how information services will be delivered in the future and, where appropriate, suggestions as to reapportionment of responsibility and tasking. Major conclusions are the need for a pre-planned integrated network with administrative and technical provision for compartmentation. This section deals both with the technical mechanisms and their organizational implications.

Section 4.3, ***Standards for Information Handling***, recognizes the clear benefits of standardization, tempered by a realization of the way in which premature standards can pre-empt economical use of changing technology.

Section 4.4, ***Compartmentation in Information Handling***, Analyzes the problems of control and accountability and the impact of changing technology. Major conclusions are a suggested swing from document- to information- accountability and a realization that, in spite of new technical threats and new technical defenses, personnel security remains the cornerstone. Technical discussions of the use of encryption for compartmentation and overseas quick destruction promise improved damage limitation.

4.1 Management of Information Handling Services

In this study, Information Handling was broadly defined. Included are: creation of information (keystroking, composition, editing . . .); movement of information (courier & cable); dissemination, storage, record keeping, reference & retrieval; and, ultimately, destruction . . . as well as the security and compartmentation measures needed to protect information. This vast panoply of services was bounded at one edge by excluding collection and the processing intimate to it. Excluded at the other extreme is analysis. These boundaries are meant to restrict attention only to those non-value-added services. The emphasis is on the "handling" of information.

This section deals with the management structures which might be needed to deal with such a breadth of services. The need for a top-level view, top-down strategic planning and an integrated, overall systems architecture are stressed. Career management and contingency planning are also discussed.

Section 4.1.1, ***Providing Clear Direction for IH***, proceeds from the broad concern within the Agency, expressed repeatedly to the Task Force and its predecessor fact finding activities, for the orderly development of information services. It proceeds, too, from a maturing view of the role of technology and a recognition of the increasing interdependence of systems upon one another. The premise is put forward that the uniqueness of the Agency's information handling needs is the exception, rather than the rule. From this flows the conclusions that if patience supplants premature development many of our needs can be met by commercial offerings to come. Required, however, may be a redefinition and regrouping of information handling tasks and concommitant organizational realignments. Planning is seen as the key.

Section 4.1.2, ***The Architectural Function***, recognizes all the human and organizational motives which conspire to yield designs "in the small". These are rejected as being too costly in the coming decade. Establishment of a clear authority within the Agency, to clearly define the scope of individual systems and to provide the blueprint for needed inter-systems integration, is recommended.

Section 4.1.3, ***The Ability to Acquire Needed Resources***, distinguishes between budget planning and defense by the provider of an information handling service, and budget planning and defense by the user of a service. Recent history demonstrates the efficacy of the latter, mission budgeting, over the former. While relatively easy to implement where the service is dedicated to a mission component, this can be chaotic in the case of indivisibly shared, central services.

Section 4.1.4, ***The ADP Review Process***, discusses the putative reasons for current EXCOM review procedures of ADP. Certain deficiencies are noted in this year's execution of that review, and alternate steps are urged. The exact nature of these, however, is contingent upon larger managerial and organizational realignments which may be contemplated.

Section 4.1.5, ***Career Management***, proceeds from a shortage of technically skilled information specialists, which is predicted to worsen over the decade. Because of the constraints we face in competing for these skills, emphasis is placed upon a vital program of career management. Emphasizing upgrading and refreshing of skills, and a planned pattern of career growth, this should also serve to lessen the "future shock" of the introduction of new information handling technologies.

Section 4.1.6, ***Contingency Planning***, addresses measures which must be taken to ensure that our information resources, gradually being entrusted to new, and perhaps more fragile technology, can survive the broad range of potential catastrophes . . . which in variety and frequency may increase over the coming decade.

4.1.1 Providing Clear Direction for IH

Summary

The absence of top-level guidance and coordination is contraindicated by the rapid pace of technology, its concommitant fundamental change in the nature of our jobs, potential economies of scale, and the size of the capital investment required.

A lack of direction is also at odds with the quantum steps in the effectiveness of information systems which can result from enlarging the subscriber communities and enlarging the information bases.

To reap technology's fruit in an era of tight resources and a shortage of skilled personnel will require top-down design, personnel management, and foregoing the luxury of treating all our needs as unique. Required above all is a well-charted course and a deft hand on the tiller.

Background

A careful analysis of the preceding sections is at once reassuring and discomforting. The activities and trends show a continuation of the progressive and innovative spirit of Agency employees that is commonly referred to as the "can-do" attitude. There is a broad range of developments in information handling carried out by a major percentage of Agency components, each intended to improve the efficiency and effectiveness of some part of Agency information handling.

The discomfort arises from the realization that developments and innovations are occurring largely in response to local needs and problems without benefit of higher level guidance that would ensure all developments pull together for the common good. This problem has been frequently identified by many of the Agency components and, in fact, was the primary motivation for the formation of this Task Force. The need for Agency-level guidance for the future development of information systems and services is clear.

The need for this top-level view of the future is made more urgent by the rapidity with which technology is changing the way information services are provided and the large capital investments those changes involve. People have grown accustomed to the flexibility and adaptability of manual systems. Major changes in manual systems can be implemented with comparatively little upper management involvement. Mistakes in implementation are easily detected and quickly corrected by the humans who form the system.

By contrast, employing technology to an increasing range of information services entails large equipment expenditures that necessitate more upper management involvement if only because of the budgetary impact. Application of technology also involves more demanding discipline in the execution of change. Whereas manual systems benefited from our most adaptable resource, the human, machine systems are insensitive and unforgiving employees. Misdirection and misapplication of technology can result in years of undesirable service.

The issues expressed to the Task Force demonstrate the broad concern within the Agency for the orderly development of information services. The issues also depict a maturing view of the role of technology in the delivery of services. While plans and programs still address local needs and problems, the issues demonstrate the awareness that systems are increasingly dependent upon each other and that, in fact, many of the needs are more universal than local.

Hence, while senior management is concerned with the fiscal effectiveness of information services and their development, the lower levels of the Agency are concerned with the operational effectiveness. Both parties point to the same need—the need for top-level guidance and coordination to help ensure that developments in information services are mutually supportive and directed toward common objectives.

The management problem in information services for the 80's will be to maximize the benefits of technology to Agency users in a projected environment of relatively constant buying power and increasing shortfalls of technical specialists required to develop, operate, and maintain a growing capital investment.

To do so will require more emphasis on top-down systems design, a centralized personnel management system for scarce technical specialists, increased reliance on external contractors to offset personnel shortfalls, and minimization of unique Agency systems and their attendant support costs.

Suggested Solutions

Agency-level strategic planning for information services is a viable and rational means of providing top-level guidance for the development of Agency systems. If senior management can convey desires and concepts for services and systems of the future and reinforce those top-level views within existing management systems such as MBO's, programs, and budgets, then positive effects on system development will result. The degree and rapidity with which these effects will be noticed will be in rough proportion to the management and organization changes introduced to ensure Agency response and in proportion to the degree of specificity contained in the guidance.

The specificity of the guidance that senior management is capable of providing will be constrained by the amount of executive time that can reasonably be devoted to services without detriment to management of primary missions and by the need for prudent restraint required to avoid stifling creativity and innovation. A reasonable estimate of a strategic goals program that might be managed by EXCOM is that response will be slow and erratic. The network of thirty goals suggested later in this report has resulted in only one substantive criticism, i.e., it is too extensive. But, to reduce the number of goals by any rational process leads to significant loss of specificity.

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This loss of specificity leads to a void in guidance between top-level goals and lower-level planning that will largely perpetuate the concerns and issues that exist today. Components will be left to define their own strategies through the middle ground, insuring continuation of component conflict and lack of systems compatibility.

What is suggested in addition to the Agency-level goals program is creation of a systems architectural function to coordinate planning at the Agency level and to help map the strategies between top-level goals and component-level planning. This function is seen as the answer to the broadly expressed need for Agency-level coordination of IH planning. To be effective the architectural function would have to be placed in the Agency hierarchy in such a way that meaningful influence could be exercised over issues such as what systems would be developed and when; assignment of organizational responsibility for implementation and operation; the nature and number of interfaces among systems; the location and structure of data bases; standards for development, management, and delivery of services; and career management of information service specialists. Also inherent in such a central function could be a single Agency voice to the community member and external oversight bodies concerned with Agency systems and their management.

Whether such a function would be implemented as an Agency-level staff function or assigned to an existing line function is largely a matter of senior management style and the degree of impact desired. It is reasonable to speculate that the function at any level will be in continuous jeopardy without solid support of top management.

With a reasonably compact set of strategic goals endorsed by EXCOM and the support of an architectural function coordinating the Agency response to top-level goals, a strategic planning process can become a continuing management system. Whether further organizational change is required or desired is a question that can be separately addressed. An estimate of the Agency resources devoted to providing information services as defined in this study is 20% of the personnel and 40% of the CIAP. These resources are distributed across communications, ADP, reference services, registries, couriers, security, and associated management functions. Allocation of these resources is related directly to the evolutionary development of information services. The current institutions can be said to have withstood the test of time. Why then question the current organization? (S A9c(3.2))

The answer to that question is that technology is driving us to question our historical categorizations of information and hence question our views on how to manage information. Stated otherwise, until now we have confused the concept of information with the media used to retain information. Our systems have been built around the concepts of media. Documents are handled by registries and libraries, messages are handled by communicators, data is peculiar to ADP, etc.

When technologists suggest that, in the abstract, information is independent of media and that technology can deal with information without regard to media, there is an organizational identity crisis. People begin to question why we differentiate messages from memoranda and dispatches. The technologist responds there is no need to differentiate when modern technology is at work. But that suggests redundancy and inefficiency in the current organization and raises questions of which systems should survive and which should be absorbed or abandoned. Such issues will continue to surface over the years as technology allows text, images, and voice information to be moved, processed, stored, and retrieved within common systems and procedures.

There are two management strategies for dealing with these developments. The first is to continue with existing organizations, dealing with the organizational issues as they arise and pursuing the policy of gradual evolution. The second option is to forecast the issues that are likely to occur and attempt to modify the current organization in such a way that issues are avoided or at least minimized in number and significance.

When permitted to focus on the questions of future services and organizational change as this Task Force has had the luxury of doing, there develops a clear preference for early and significant change resulting from a confident view of the future. This confidence derives from consistency of technology forecasts; parallelism between development of Agency information services and those of other departments, agencies, and industry; and the promise of top-level strategic planning that can improve the effectiveness of information services if properly supported.

4.1.2. The Architectural Function

Summary

An architectural function which transcends the design of individual information handling systems is needed. The absence of this function results in locally optimized systems which often fail to meet larger Agency needs.

At present, no component representing an Agency perspective is responsible for overall system design nor are there incentives for a systems designer to look beyond his immediate component context.

Establishment of that architectural function is recommended.

Background

CIA's information handling systems, large and small, are generally designed in response to a specific need. Usually, that need is expressed by a single component which subsequently becomes the advocate of the proposed solution. In some cases, this is satisfactory. Increasingly, however, we find that a single component's needs are not independent of those of another component. In those cases, a number of factors act in concert to prevent the solution from rising above the specific need to anticipate larger Agency needs:

— The advocate component may be unaware of larger Agency needs . . . there is no overall plan;

— Territorial imperatives and the golden rule argue against exploring problems outside a component's immediate sphere of influence;

— Resources, or a perceived need for an immediate solution constrain the amount of time which can be devoted to such exploration;

— Larger needs sometimes add complexity (at least from the designer's viewpoint);

— If a consideration of larger needs elevates the system design beyond immediate jurisdiction, coordination can be slow . . . and sometimes unpleasant.

There are, then, mechanical and emotional reasons why systems in the Agency tend to be designed "in the small". There are no incentives for the designer of a particular system to examine its requirements within the context of larger Agency needs. Rather, there are disincentives: the costs of a system may increase and its Initial Operating Capability (IOC) may be delayed. This is not to say that the system necessarily becomes more complex. Often as not a larger view leads to a simpler overall conception (though this may not be apparent from the component's perspective). Typically, however, a larger view leads to a system which crosses firmly established institutional boundaries. This immediately raises questions: Who should be responsible for the design of the larger system? for the implementation? for the operation? These are questions we cannot expect the designer of a particular system to answer. These are questions we can expect him to avoid. Raising these larger questions can be the responsibility of a systems architect inured to hardship and properly situated.

The lack of systems architecture and the need for a systems architect has been noted by previous students of the problem. The ASPIN report in 1970, for example recommended ". . .a central technical management review of major ADP projects be created under the present umbrella of Executive Director-Comptroller responsibility for Agency ADP management, that a full-time position of ADP advisor to the Executive Director-Comptroller be created to . . . review the various local plans, . . . (and) . . . develop a statement of long term ADP objectives for the Agency . . ." The report emphasized that ". . .the most critical need in automatic data processing control is a formal means for review of ADP activities."

Other agencies, too, have perceived the void and created a systems architect. Most relevant among these are NSA with their architectural board including data processing and communications architects, and the Department of Defense with their WWMCCS architect.

The term "systems architecture" is meant here to include:

— structure and interrelation of major hardware modules;

— interconnectivity of processes and processors;

— communications networks and protocols;

— structure and interrelation of major software modules;

— structure and interrelation of major data sets.

The term "systems architecture" is meant, here, to be unrelated to:

— specific choices of hardware and software;

— specific choices of communications protocol.

Instead, the focus of the Systems Architect is on functionality and the flow of information.

Duties and Responsibilities

The duties and responsibilities of the Systems Architect include: formulation of overall design (with help, of course); encouragement of programs to achieve the design; and the design review of all new or modified information systems whose procurement, implementation or revision will require a major expenditure of resources. Specifically, the Office of the System Architect will:

formulate overall architecture for information handling systems:

— publish functional specifications showing the composition and interconnections of major subsystems including, but not limited to:

- Central and Distributed Computing
- Electronic Communications, Dissemination, & Distribution
- Word Processing and Printing
- Micrographics
- Graphic Display and Plotting
- Remote Terminals
- System and Applications Software
- Substantive and Administrative Databases

— incorporate into the functional specifications, all available strategic guidance, expressed user needs, and changing technology.

encourage the formation of programs to implement the overall architecture:

— initiate planning and budgeting of programs required to fulfill overall architectural needs;

— commission the design of information systems to meet future needs;

— coordinate and represent resource requirements of overall architecture.

conduct a formal review of each proposed information system to:

— explore the functional needs which the system is designed to meet;

— identify larger Agency needs which may be subsumed or otherwise impacted;

— identify relevant interfaces with other current and future systems;

— comment upon the information security of the proposed design.

publish the results of the design review including:

— modifications recommended to meet larger needs;

— an estimate of additional resources required to satisfy those needs;

— an estimate of benefits to be derived;

— recommendations for needed coordination.

Recognizing the importance of timely review, the Systems Architect will ordinarily complete his review in sixty days.

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The Systems Architect will represent Agency information systems' designs as required in the larger community context. The Systems Architect will also keep abreast of National Programs and the interrelations of specific collection processing as these may impact Agency information systems.

The Systems Architect will not design information systems, nor be involved in the implementation of such systems. The Systems Architect will neither certify nor validate the need for an information system (except, of course, those which he commissions directly.)

The Recommendation

CIA/IHTF recommends:

establishment of a Systems Architect Staff;

the staff to consist of a Chief Systems Architect, responsible for administration and coordination, and Specialist Systems Architects, responsible for:

interrelationships of word/data-processing and telecommunications hardware;

software macro-design, and data-base interrelationships;

user interfaces, documentation and training standards.

The role of the Systems Architect will be advisory. Current decision-making mechanisms are unaltered—planning, budgeting, designing and implementing. The design review conducted by the Systems Architect will be public, thus available to all decision-makers. The extent to which decision-makers rely on the advice of the Systems Architects will depend upon:

the logic and persuasiveness of the advice;

the fervor of those advocates in opposition to the architect;

operational imperatives; and,

a sense of history on the decision-maker's part.

The clients whom the Systems Architect advises include:

user communities;

designers and implementers;

budget planners;

Office Directors;

The Executive Committee.

In order to serve properly the advisory role, the Systems Architect must have a master design against which new information systems are measured. Achieving a realistic, agreed-upon, forward-looking design will require:

as input, ENDORSED GOALS for information handling;

as building blocks, EXTANT INFORMATION HANDLING SYSTEMS;

the DESIGN INPUTS of all relevant components;

publication of a PRELIMINARY DESIGN;

a round of COMMENTS on the preliminary design by interested parties;

iterations resulting in a FINAL DESIGN; and,

MANAGEMENT APPROVAL of the final design.

4.1.3. The Ability to Acquire Needed Resources

Summary

Resources required to bring new information-handling systems on-line, and to operate and maintain needed information services are frequently denied us by the budget process.

Where inappropriate, this results from a focus on the aggregate of support services rather than on the individual mission supported by a specific information handling system.

It is recommended that budgeting for new information systems be done by the "users", the mission organizations who are the beneficiaries. It is further recommended that, where possible, this principle of beneficiary budgeting be applied to operations and maintenance.

The doctrine encounters practical difficulties with general purpose services or specific systems developments where marginal enhancements allow the system to serve broader needs. We cannot afford to forego these economies of scale. However, the principal benefit of beneficiary budgeting, the user's opportunity to balance information handling costs and benefits against other program considerations, is substantial.

User budgeting, together with a sound, well understood architecture for the development of information handling systems and services will enhance our information handling posture over the next decade.

Background

The pool of resources available to the Agency is shrinking. Many factors are responsible, a worsening government balance sheet, erosion of planned expenditures by inflation, competing needs of other agencies, closer inspection of Agency programs, and occasional disaffection with the Agency at large. In information handling, the general constriction of resources is exacerbated by well-meaning but misguided attempts to "control the growth of computers" or some similar malaprop. It is unlikely that any information handling recommendation will cure the economy or assuage the appetites of other, competing agencies. However, recommendations which allow us to more fairly and clearly represent the benefits of a proposed information system or an existing information handling service do ease the Agency problem.

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The Role of Information Handling

In the overall defense context, budget scrutineers enthusiastically endorse the concept of intelligence as a force multiplier. Good intelligence is worth a certain number of divisions; said differently, we can cut our military force if our intelligence is good. As the concept is applied, budget cuts have been accompanied by ratcheting up the force multiplier. The mathematical beauty of tiny changes in the force multiplier displacing significant military expenditures has been irresistible.

If there is validity to the concept, then information handling services, the new technologies and new systems, surely qualify as force multipliers. In fact, the Agency's record is quite good in this respect: a decade of relatively constant dollar expenditures have allowed a steady reduction in information handling personnel. Upcoming investment opportunities will allow us to continue the reduction and/or greatly improve the quality of information handling. When choosing between further resource reductions or improved services, consider: small improvements in intelligence are leveraged into large improvements in the nation's defense posture. We must not shrink, therefore, from aggressively seeking the resources needed to improve information handling . . . for they are twice multiplied into overall defense improvements.

Creating a Defensible Budget

Because of the importance of information handling investments, the budgetary case must be made as clearly and persuasively as possible. Capital and recurring costs must be well understood. More importantly, the benefits must be clearly presented in the context of the mission. This will:

— permit weighing an information system investment or information handling service expenditure against other mission budget elements;

— allow the ultimate intelligence contribution of that system or service to be easily understood; and

— promote to the larger national level the benefits to accrue from the outlay of resources.

Once having assumed its place within the overall mission priorities, the budget item should be immune to frivolous challenge as a general support item. The only legitimate reason for critical examination in the context of general support would be to identify potential savings which result from economies of scale. An integrated architectural plan will identify such savings or preemptively demonstrate that none exist.

This analysis emphasizes the importance of budget defense within the mission context. In implementation, however, we would not want to err at the other extreme—i.e., attempt to defend technically complex items without benefit of technical expertise.

Historical Lessons

An analysis of current budgeting practice shows an uneven record of defending resource requirements. In part, this appears to be process dependent. As an example, the Office of Communications calls for requirements, validates and consolidates these, and puts forward an integrated communications budget. This submittal necessarily prioritizes requirements within the overall communications program, recognizes only indirectly the priority of an individual mission, and does not specifically address the priority of the communications requirement within the overall mission plan. This process is magnified as the DDA places portions of the Communications budget within the overall, prioritized Directorate program. Thus, overall DDA guidance and priorities may heavily impact a mission's communications. The effect has been to subordinate new communications starts, in deference to ongoing activities . . . even though the new communication start thus denied may be an essential part of an ongoing overall mission. This results in post hoc reprogramming of mission funds in the current year thereby vitiating the original planning process. (C 3d(3))

Within the same Directorate of Administration, the Office of Data Processing offers an interesting contrast. Here, too, an Agency-wide call for requirements leads to a consolidated ADP budget submittal. However, the record shows an effective defense of resources required to take on the new jobs while improving ongoing service. The differences seem to be:

— the size of the capitalization required

— the non-identifiability of the separate requirements

— the dividends of improving technology

Now, we can expect communications increasingly to reap the cost-performance dividends of computer technology as the disciplines coalesce. Moreover, communications functions, properly viewed as applications on general purpose computers, submerge the individual identities of underlying requirements. Both of these factors can be expected to improve the communications resource picture. However, where it becomes desirable to preserve the identity of an individual requirement, or where the capital size mandates, closer ties to the mission may serve us best. (C 3d(3))

The SAFE Project illustrates the principle of users budgeting for the development of an information handling system. The project is administered and technically managed by the Office of Data Processing. However, budget requests have been carried in NFAC (formerly DDI) submittals since the inception of the SAFE effort. Each year, NFAC has weighed the benefits expected from SAFE against other intelligence production needs. On balance, NFAC decided that SAFE's relative priorities placed it on the margin between then current activity levels, and high-priority enhancements. Subsequently, a vigorous budgetary defense tied to intelligence production needs was successfully mounted. Excluding the dust raised by questions about a SAFE-ADISS relationship, the only serious challenge to SAFE's fiscal health came early in the planning when an ambitious [redacted] plan was scaled back to a dangerously lean [redacted] plan. (S A9c(3.2)) 25X1 25X1

The Offices of Communication and Data Processing have experience with the "user" budgeting for proximal personnel, OC with its field communicators who man S&T networks, and ODP with its "outlander" program. Other services, Finance, Security, Logistics, similarly have operated for some time with "users" providing the slots for seconded personnel.

Some Drawbacks

Having the "user" budget for information handling services—both capital items and personnel slots—has certain drawbacks:

— the user may balk at funding a part of the overall architecture whose short term local benefit is not obvious; and,

— the user may reduce needed information security expenditures and security personnel.

Outlays for these "overhead" items—security, standards, documentation, interface to other systems—may be traded-off against direct-benefit information services or other program expenditures only within prescribed limits. Doubtless, some tension will arise between the user and the architect or the information security officer. No different from the situation today, this highlights the need for overall management of information services.

The Recommendation

On balance, it is recommended that where possible, budgeting for new information handling systems be done within the beneficiary's mission budget. User budgeting for operations and maintenance of information services is similarly recommended, insofar as possible. Where the budgeting questions touch larger issues such as security, system standards, the needs of other users, and intersystems architecture, coordination will be required. The nature of this coordination is the subject of other recommendations in this series.

4.1.4. The ADP Review Process

Summary

Current EXCOM procedures for reviewing ADP projects stem from two faulty assumptions: insufficiency of, and contention for central ADP resource; and, an increasing share of the Agency budget devoted to ADP.

A third impetus was Congressional and OMB pressure for tighter management controls.

Ineluctably, a disproportionate amount of senior executive attention is focused on ADP which accounts for a modest [redacted]*f the Agency's budget. Moreover, the format and effectiveness of current review procedure is questioned. (S A9c(3.2))* 25X1

What EXCOM requires is a report on progress toward established information handling goals and a coherent budget briefing in the context of those goals, highlighting the overall architecture at which we aim. Life cycle costs and measures of effectiveness of major ADP programs also need to be discussed. Certain issues, with which EXCOM must deal, would result.

For programs which are major consumers of ADP resource, the mission managers should be directed to discuss, in context, the support of mission objectives via ADP, and measures of effectiveness of that support.

Background

In his 28 March 1977 memorandum, the Comptroller set the stage for current EXCOM review procedures. Two primary issues, raised on 16 December 1976 by the DDCI, were central to the formula:

> How can we monitor month-to-month use of central ADP resources to permit Agency-level resource allocation decisions when contentions arise?
>
> How can we plan for the future to ensure that the large ADP budget increases we are experiencing are in the overall interests of the agency?

In retrospect the assumed antecedents hardly materialized: major contentions for central ADP resources did not arise, and we did not continue to experience large ADP budget increases.

At the time, the Comptroller stated that

> ". . . ADP expenditures are not only continuing to increase steadily, but are consuming an ever-increasing portion of the Agency's total Budget . . ."

With the advantage of hindsight the portion of the Agency budget allocated to ADP is relatively constant at:

[redacted] 25X1

This represents an inflationary, not a real-dollar growth. Moreover, if we look at information handling services at large, we see no real dollar growth over a ten year period, and a modest decline in personnel which has resulted from the capital investment. This longer and larger perspective pre-empts the supposition that EXCOM's two years of reviews curbed an otherwise runaway ADP budget. (S A9c(3.2))

As for presumed growth in demand for central ADP services, we must distinguish demand for computing resource from demand for programming resource.

Computing Demand

Excepting new initiatives such as SAFE, the growth in demand for computatio is an orderly, linear increase. Steady improvements in price-performance characteristics of new hardware meet the rising needs with a modest CPU and disk replacement strategy. Such a replacement strategy would be indicated on grounds of maintainability absent a forecast rise in demand. When SAFE comes on-line, the apparent step-increase is more the result of procurement strategy than disorderly demand outstripping technology's offering. Denominating in dollars the demand for computation evidenced by SAFE, and allocating [redacted] expenditure to software development, leaves [redacted] dollars worth of computation demand amortized across 10 years, 1974-84. (S A9c(3.2)) 25X1 25X1

Software Demand

With regard to demand for centrally supplied software development, the picture may be substantially different. ODP has adopted the strategy of assigning the bulk of its in-house applications software development capability to a very small set of projects. Two or three projects occupy more than half of the applications staff. This results in a 1-2 year backlog of documented projects, excluding those where the

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customer is unwilling to wait in queue, and excluding those whose initial investigation has been prohibited by personnel scarcity. While quite serious, and worthy of EXCOM attention, this applications programming shortfall was not thoroughly vetted within the current review procedures. More to the point, since the backlog is measured in years, a month-by-month review would hardly be needed. (C 3d(3))

Dealing with Significant Issues

A perceived failure of the current EXCOM review of ADP is its failure to resolve, and sometimes even to recognize significant issues when they arose in the course of the briefings.

One such issue was the question of whether ADP support to National Programs should be provided for in the CIAP or the NRP. This was raised explicitly by the IG on several occasions. It had been dealt with by EXCOM on a per-project basis, previously. (S A9c(3.2))

Another issue, raised explicitly by the Comptroller in the context of an accelerated CRAFT initiative, was the possible shortage of skilled manpower. Because of the context in which the question was put, the issue was narrowly addressed. However, the shortage of skilled personnel is forecast to get worse, not better, as we must compete with increasing industrial demand for a scarce supply of good people. Among the questions which this raises are: how can we recruit, train, and retain manpower in this area? can we compensate them competitively? and, if we cannot compete for the scarce supply, what ADP initiatives will be foreclosed? (C 3d(3))

A third issue, raised but hardly attended to, was the possible need for . . . or, at least the effectiveness of vastly increased computational power. The DDS&T pointed out that certain engineering design exercises, already big batch number-crunchers, are in fact, shortcut approximations of more complete engineering calculations and that there would be benefit in more complete exploration of larger solution spaces. Moreover, there would be some benefit in affording the engineers a higher degree of interaction than is now possible with overnight, batch turnaround. (C 3d(3))

Another issue, one which was implicitly revealed on several occasions was the lack of appreciation of total life-cycle costing. This surfaced in discussions of Language Translation where the ADP acquisition costs paled beside the human operator requirements, and in the case of CRAFT aspirations which were presented independent of substantial communications costs. Yet another example was the apparent surprise to some that when PERSIGN comes online, a substantial programming effort will still be required for the foreseeable future.

An obvious incongruity in the EXCOM review of ADP is the omission of any reference to Project SAFE. Disregarding the fact that SAFE already has as many reviewing groups as programmers, it seems that its absence misrepresents the context in which other ADP activities should be viewed.

Recommendations

One remedy for the foregoing is embodied in organizational realignment options discussed elsewhere. If there were to be a clear line authority for all information services, EXCOM could play a more seemly upper management role, the setting of goals and the monitoring of progress thereto. The manager of information services could provide a context for budgetary review of a coherent program by revealing the information handling architecture which he is developing. (Absent an overall manager of information services, the sytems architect, discussed elsewhere, could provide the needed context.)

For some programs, ADP resources will comprise a substantial fraction of the total cost. It is recommended, in such cases, that the mission manager, in the course of normal management review of his program, should be instructed to address the questions of: why ADP resources of that magnitude are required, what alternatives might have been considered, and what measures of effectiveness he intends to apply to ADP contributions to his overall effort.

Finally, it is recommended that the individual charged with conducting the review, (manager, architect, whoever) be directed to flag a significant issue when it arises and prepare a coordinated discourse of that issue, including a suggested resolution thereof.

4.1.5. Career Management

Summary

The Agency is faced with meeting the challenge to provide qualified professional information handling specialists who have the training and experience to respond to burgeoning information services. With increased emphasis on developing technology, responding to FOIA/PA and litigation requirements, and intensified interest in managing information as a resource, we must be prepared to meet these demands with a cadre of information handling specialists who have been identified, trained, and developed within a career-oriented environment.

A well-defined career program would enable Agency management to use more effectively the scarce personnel resources which exist currently in many categories of information handling services. In addition, the Agency would be in a better position to attract and recruit qualified professional applicants from external sources if able to present a comprehensive career development program.

It is recommended that each Directorate establish a career service for Information Handling specialists which will meet current and long-range needs of the organization as well as foster the professional development of the employee.

An Information Handling specialist is defined as one whose primary job responsibility is concerned with the management of data or information. Computer programmers, communications specialists, systems analysts, document indexers, registry clerks, couriers, and micrographic technicians are examples of categories of personnel which may be identified as information handling specialists.

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Mission

A career service is not the panacea for all personnel management woes. It will not solve all recruitment problems nor will it necessarily produce better ADP systems. A career service for Information Handling (IH) specialists will, however, assign responsibility within each Directorate for career management, i.e., establish and maintain Agency standards for recruiting, developing, ranking, promoting, and assigning employees of a common discipline.

SCOPE

[redacted] Although a DDA centralized career service would be considerably larger than others, we believe it is manageable and we do not anticipate any significant problems beyond those posed by the career service of [redacted] managed by the Office of Communication (prior to OC's reduction to its current ceiling). (S A9c(3.2)) 25X1 25X1

The estimates presented in the accompanying table are based on our analysis of the "Agency's General Schedule Occupational Groups and Series" where those positions involved primarily in the management of data or information were selected and a total count effected in each Directorate. Specifically of interest were those IH activities concerned with recording and editing of information, e.g., word processing; acquisition of information, e.g., library acquisition of periodicals; dissemination, e.g., cable analysis; distribution, e.g., mail and courier functions; communications, e.g., telecommunications services; information reference, e.g., those functions supporting the storage and retrieval of both manual and automated data bases; printing, reproduction, and transformation, e.g., printing and publication services; information security, e.g., communications and computer security functions; information systems, e.g., computer programs and computer technical services. Excluded from the list are positions involved with collection, processing proximal to collection, and value added services such as analysis.

In some cases the list may be too broad in scope since the functions may vary significantly from one Directorate to another. The duties of an electrical engineer in the DDA for example may be cited as an IH activity while an electrical engineer in DDS&T should be excluded from the list. We have attempted to identify these unique positions and adjust the list accordingly. However, there are IH services which do not appear on the list since the functions are performed by personnel whose position title does not accurately reflect the assignment of IH duties. In such exceptional cases, the managers of these activities must assume the responsibility of identifying the positions within their offices as IH-related. Obviously there will be additional categories of personnel whose functions are somewhat equally divided between providing IH services and some additional speciality, such as production analyst. These cases will require a review by the mission component and the career service to decide which function takes precedence thereby determining which career service will administer the employee's career. In the final analysis, only Directorate management is in a position to review and reconcile the list of IH positions to ensure its completeness and accuracy.

CONCEPTS

Within a directorate career service, IH functions could be grouped into areas which are further identified by the career service or "functional" category. The assignment of functional categories facilitates the competitive evaluation process so that the performance of all members within a category can be evaluated against established standards. These standards, coordinated Agency-wide for use in all directorates and applied to all members of the IH occupational family, greatly enhance the comparative evaluation system.

In addition, the assignment of functional categories serves to correlate career paths. A functional category could logically include all personnel involved in records management, e.g., records management officers, records officers, archivists, etc. Another category could group ADP professionals, e.g., computer programmers, computer systems analysts, computer specialists, computer engineers, etc. A third category might include computer technicians, computer operators, technical writers, production control specialists, and computer support personnel. Although career progression would normally occur within the employee's career development area, lateral movement into other areas could be viewed as career enhancing for the employee and at the same time beneficial to the organizational component. Additional specialized training would be required, however, prior to assignment of a non-technical specialist into a technical position. Given the projected critical shortage of information specialists, especially computer personnel, we must use the personnel resources available within the IH occupational family as a feeder group into those areas plagued by personnel shortages.

Benefits to the Organization

1. Assignments

A centralized career service is more aware of Directorate and Agency-wide requirements and opportunities than individual components and is in a better position to respond quickly to demands for reallocation of personnel. Having the ability to draw from a large pool of resources, the Directorate would be able to respond to requests which require more experienced personnel than a single component controls. Indeed, centralized career management provides a Directorate with the unique opportunity to recruit from identified members of an occupational family across Directorate lines in order to fill positions with the most qualified personnel available. This is especially important where overseas assignment is perceived as beneficial to the employee's career development. The major benefits are twofold: the field stations's IH services improve when positions are staffed with the highest calibre of IH specialist; and, the employee profits from the opportunity to broaden his professional experience and further develop his skills in a mission oriented environment. The role of the IH specialist in an overseas station will, however, change significantly in the future with the installation of CRAFT. The OC-communicator will assume the new responsibility of the technical maintenance of the CRAFT system. This change will bring the communicator in closer affinity with ADP professionals. It is especially important in the development of costly systems, such as CRAFT, to select personnel with the technical expertise most often found resident in the component who is the major provider of that technical service. (C 3d(3))

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If an employee is to have optimal opportunity for career advancement, he should be a member of an "occupational family" which is represented by a career service with responsibility for all members of that family. Unless career development is focused on the occupational family rather than the organization, we cannot achieve maximum benefit from our career services. We believe that although career management should encourage assignment of personnel across directorate boundaries, compartmentation need not be threatened. Good compartmentation dictates the restriction of sensitive data to as few individuals as reasonable and also the implementation of security procedures by the mission component who has operational control. We conclude that the individual operating in a secure environment, regardless of which career service he represents, can be made sensitive to the security considerations of the mission component. As evidenced in the past by the long and successful relationship between the DO and OC-communicators in overseas field stations and, more recently, the enhanced level of support furnished by ODP in its operation of the DO Special Computer Center, it is clear that compartmentation can be effectively administered within an occupational family regardless of which directorate controls the career service.

2. Training

The Agency continues to commit substantial capital investments in information handling systems yet lacks a coordinated plan for furnishing requirements and direction to the Office of Training to ensure a timely, effective training program which bridges the transition to new technologies. A centralized career service would be the most logical organizational entity to develop a coherent training plan based on the skills required to support current systems and project future training needs. The benefits accrued would be reflected in the refinement of the training courses offered which would more closely relate to the skills needed to perform IH services and, in general, result in better scheduling which fit the needs of both employees and managers. Indeed, in the aggregate, the benefits that accrue would have a positive effect on all users of IH services.

3. Establishment of Evaluation Standards

An additional benefit accrued from a centralized approach to career management would be the establishment of uniform evaluation standards for Information Handling specialists and staffing of competitive promotion panels with Information Handling personnel who have an appreciation for the nature and value of the job performed.

Benefits to the Employee

1. Professionalism

Although the employee has to assume responsibility for managing his own career, the Agency is well served by providing him the training and career opportunities to allow him to develop his skills so that he may advance into more responsible positions. Amalgamating Information Handling specialists into a career service at the Directorate level will offer him some affinity with others of the same discipline and as part of a larger forum, help him to achieve recognition as a professional. As a member of a recognized and viable group with its own esprit de corps, one could reasonably expect to achieve better morale and a sense of professionalism within the group, as well as an overall improved image of the Information Handling specialist. The "professional" status allows him the opportunity to join external vocational groups whose seminars and educational information on the latest trends and technology would contribute to his career development.

2. Career Development Plan

A well-defined career program for information specialists is not complete without establishing a comprehensive career development plan (CDP). Although some career planning is administered by the Office of Personnel with its Senior Officer Development Program (SODP) and its Annual Personnel Plan (APP), in addition to some localized component planning, there is generally a lack of centralized career planning focused on information handling specialists.

With the exception of DO/Information Management Staff (IMS), component career planning traditionally focuses on a very select group, e.g., ODP, OC personnel. The DO has, however, a broad-based career development plan which encompasses all information handling specialists within the Directorate. Within the DO, information handling services and the career management of the information handling specialists are centralized in IMS. Th[redacted]H specialists are members of the DC career service and are home-based in IMS. The Staff is responsible for establishing recruitment requirements for new IMS employees as well as the assignment (or reassignment) of all IH specialists within the Directorate. The career management of all IMS employees is a shared responsibility between IMS management and employees played out through the career development plan. This recommendation, based on the DO model but projected at an Agency level, includes all information handling specialists as members of a recognized discipline. As such, it represents a significant effort in career management. (S A9c(3.2)) 25X1

A career development plan provides the architecture for an intelligent, orderly preparation for career progression. It is a tool intended for use by both managers and employees in their attempt to balance individual career interests and organizational goals. The objective of a career plan for IH specialists is to develop a group of skilled, versatile, and motivated professionals whose development contributes significantly to the improvement of IH services. To be effective, a career development plan must be interfaced with other management systems, e.g., vacancy notices, performance evaluations, OTR's testing facilities, career counseling, etc. A career development plan cannot survive in a vacuum; it must be supported by a strong personnel management structure.

The CDP, identified by a schematic, is a formal document which outlines performance requirements, training, and advancement opportunities in the field of information management. Development of the plan requires a considerable manpower investment to identify and perform a task analysis of all categories of IH functions, develop a career path structure for each functional category, and provide descriptions of career development requirements and advancement possibilities. Specifically, the plan should: identify the information handling positions within the Agency; describe the knowledge and performance skills desired of one entering an IH position; list the formal training courses to be completed while on-the-job; describe the knowledge and performance skills to be attained while in a position; and, describe the qualifications desired for the next logical level of advancement. Once orchestrated, the plan is personalized through career counseling sessions with the employee. During these sessions, a commitment is made by both employee and supervisor. Specifically, the supervisor is charged with providing work assignments which make optimal use of the employee's skills and experience. The employee, on the other hand, must accept the commitment to attain the skills needed to perform his current job through training, rotational assignment, etc. In addition, the plan is used to assist him make thoughtful decisions on his career progression and future assignments based on his skills, interests, and potential. An employee having access to this comprehensive body of information should be in a position to set achievable career goals and, in general, assume responsibility for his own career. Ideally, the plan represents a dynamic process which will continue to evolve as an employee progresses through various stages of his career.

Drawbacks of a Centralized Career Service

Although a career service offers the employee greater mobility in job assignments, there is obviously some erosion of the operational component's management control. In addition, mobility must be traded off with some loss of continuity and increased on-the-job training. However, the long term goal of developing the employee should outweigh the short term objective of retaining personnel in a narrow office environment.

Recommendation

It is recommended that each Directorate establish a career service for Information Handling specialists. The career service, managed at Directorate level, should be responsible for administering the career development program for all Information Handling specialists. In addition to providing career development opportunities and planning, the career service should be charged with establishing and maintaining standards for recruiting, ranking, training, and promoting information specialists. A Career Development Plan should be designed for all IH specialists.

4.1.6. Contingency Planning

Summary

Two trends, increasing application of technology to information service and decreasing confidence in the sanctity of the operating environment, are elevating concerns for contingency planning.

Such concerns are justified and imply a need for resources over and above those required for "fair weather" operation.

Future planning should address contingency operations from outset and budgeting/programmatic estimates should reflect associated costs.

Coherent contingency planning requires agreement on the range of operating conditions systems are expected to survive. An Agency policy statement is recommended as a first step.

Discussion

Continuity and survivability have always been key elements of communication planning. OC maintains detailed procedural planning and necessary resources to insure that mechanical failures and local disasters do not cause unacceptable interruptions to communications. That office rightfully takes pride from its repeated performance as an "only remaining channel" in crisis situations. The concern for contingency planning in OC systems is a direct result of the unstable nature of the overseas operating environment.

This reflection of instability overseas is also very visible in DO planning for CRAFT. In fact CRAFT may be viewed as a contingency resource since one of its major reasons for being is contingency planning. (C 3d(3))

By contrast, domestic planning has traditionally been "fair weather". The U.S. environment has been politically and environmentally stable. Probability of significant interruptions to service have been associated mainly with the systems and not the environment. Information processed by systems has always existed in some form outside the system so that we could "jury-rig" a process, bypassing the technical equipment to maintain the most urgent services.

The future is conspiring against this relaxed view of contingencies. The trend toward increased machine dependence will continue with or without our planning. More and more information will reside in machines, less in physical print. We will continue to institutionalize human thought processes and commit them to machines. Employees will learn new skills commensurate with new processes and, by default, lose competence and proficiency associated with current processes. In short we will continue to move toward total machine dependence because "fair weather" operations will be greatly improved by doing so.

Turning to the environment, there are at least two troublesome developments that point to declining stability for our systems. We have been quickly brought to face the possibility of terrorism and sabotage domestically. The need to plan for such domestic eventualities is now as much in our consciousness as the same need in the foreign field.

The second concern is not yet upon us, but projected to develop over the next 5-10 years. The energy situation and its economic consequences are retarding growth of the power utilities. Since the demand will inevitably continue growing even with conservation, there will be cross-over points in many of the country's power grids when demand exceeds supply. Planned energy rationing and/or unplanned "brown-outs" may occur with increasing frequency. While this prediction is based on current trends, there is nothing in view to suggest a substantial change for the better.

If we have allowed ourselves to increase machine dependence without making a parallel commitment to the stability of the environment required for reliable operation, the Agency mission may be in serious jeopardy.

Conclusion

Increasing use of machine systems for information handling is not to be denied. The problem is to develop information services capable of maintaining essential mission operations under adverse conditions domestically as well as abroad.

Recommendation

1. Promulgate an Agency policy statement on contingency planning for information services (suggested draft attached.)
2. Direct that future plans, programs, and budgets for new machine systems overtly acknowledge the resource commitment to contingency planning.

Policy for Contingency planning

1. Information is a key resource in Agency operations. Inability to move, access, and/or manipulate this resource effectively negates our ability to perform the Agency mission. For this reason, it is essential that information services and the systems that support those services maintain contingency capabilities to assure the availability of information under a range of adverse conditions.
2. There are two major elements to be considered in contingency plans: (A) the time criticality of the service to the users it supports, and (B) the geographic dependence of the users' missions.
   A. Information services and systems will maintain contingency plans that will assure continued response within maximum allowable times established by the missions supported.
   B. Information services and systems will provide a contingency capability to support geographic dispersion of Agency missions in instances of local disaster.
3. Contingency plans will consider loss of facilities due to mechanical failure, sabotage, and natural disaster. The plans may be based on the assumption that only one type of casualty will occur at one time.
4. Contingency planning for information services during general and nuclear war is necessary only when specifically directed by the DCI.

4.2. Structure for Providing Information Services

The rapidly changing technology foreshadows major changes in the way we do our jobs. These changes may suggest a reapportionment of tasking and responsibility.

Section 4.2.1, ***Technology's Effect on Existing Organization***, proceeds from an understanding of how earlier technological limitations, and capital spending, as well as desired flows of information have configured the organization which we have today. It is suggested that the organization needs to be continually revisited in light of changing technological constraints.

Section 4.2.2, ***ADP and Communications***, reviews historical distinctions between data processing and communications, and the manifestation of these differences in OC and ODP. The Agency orientation toward teleprocessing, and the inevitable resource constraints with which we must reckon, are seen to indicate an eventual merger between the providers of the respective information handling services.

Section 4.2.3, ***Information Distribution—The Role of Printing***, reviews changes in the way information is made available on paper to consumers. The strong conclusion is that the nature of the printing in this industry should be all around the periphery of a generalized information distribution network. To prepare for this, an organization merger of the now disparate components producing paper output of information is felt desirable. As pointed out in the section, this has provocative space implications, and beneficial security implications for controlled "copying".

Section 4.2.4, ***Information System Security***, points out the growing technical threat which will accompany entrusting more and more of our sensitive information resources to the new technologies. It is desirable, therefore, for the relevant technical security, information security, and communications security responsibilities to merge under a single line management, which recognizes the necessary professional career specialization required. The analysis does not downplay the traditional personnel and security functions. Quite the reverse, the fidelity and diligence of personnel permitted access becomes all the more crucial.

Section 4.2.5, ***User Satisfaction***, attempts to deal both with the reality of how legitimate user-needs for information services are met, and with the perception, as well. The starting point is a perceived deficiency in training and knowledge about the range of information services available, and the circumstances of their most effective use. This is compounded by the fact that to use a variety of services now requires dealing with a variety of components, even at the most preliminary level. Providing a single point of contact, a "customer service organization", is seen as desirable. An added benefit of the early establishment of same is the insulation it may provide the user from subsequent organizational and/or technological changes.

Section 4.2.6, ***Information Distribution Network***, reiterates the fundamental universality of information and recognizes the benefits of enlarging the subscriber community, and the on-line available information base. This is tempered by the need for compartmentation, leading to technical recommendations, amplified subsequently in section 4.2.7, as to how logical separation can be achieved to support the "need to know".

Section 4.2.7, ***The Universal Terminal Network***, recites the array of terminal networks already interconnected or potentially interconnected, and differentiates between electrical interconnection and logical (administratively approved) interconnection. Potential security risks posed thereby are discussed, concluding that planned interconnection, and an understood architecture, combined with certain technical measures can provide relief. Electrical isolation, but logical interconnection (via an exchange of magtapes) is not seen as the preferred solution.

Section 4.2.8, ***Centralized Dissemination and Reference***, distinguishes dissemination (who gets what?) from distribution (physical delivery), and points out the similarity of dissemination and reference (servicing a request for available or to-be-available information on a topic). The plethora of dissemination services which has materialized over time is deplored and an urge to re-integration is urged, with attention to compartmentation.

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4.2.1. Technology's Effect on Existing Organization

Summary

Changes in technology typically have an effect on existing organizations. In the case of information handling technologies, changes can heavily impact organizations:

- *organizations are often configured around an apportionment of tasks whose scope has been delimited by an earlier technology;*
- *organizations are often built around a level of capital investment or a prescribed number of personnel; and,*
- *organizations are often configured around the flow of information which may have been limited by an earlier technology.*

As technologies change, particularly information handling technologies, a former apportionment of tasks may no longer be appropriate. New and improved forms of communications, and radically different task durations often suggest a new breakdown or, more likely, a consolidation of task segments. Moreover, the nature of information handling technologies is that of capital investment and a small cadre of skilled individuals displacing a much larger number of less skilled workers. Thus, organizational structure built around formalisms of grade and span of control may no longer be appropriate.

Many of the organizational changes which will suggest themselves as technology changes can be anticipated. A careful analysis of why an extant organization's boundaries are as they are is required. When coupled with healthy skepticism and an appreciation of where technology might lead, new organizational options can be explored. Historically, this has been threatening because change is threatening . . . in part, because it has been unanticipated and its motivations are poorly understood by the affected.

It is recommended that, as workers are given formal training in the information handling nature of their present jobs, a continuing analysis be conducted as to when organizational change will be beneficial, given what changes in technology.

To retain (or regain) the vitality of the Agency, we must recognize that organizations are arbitrary social constructions to accomplish an overall job under specific conditions. As the conditions change, so must the organization. Understanding the forces underlying the change is the only why to receive the benefits with a minimum of costly disruption.

4.2.2. ADP and Communications

Summary

It has been recognized for some time that the technologies of telecommunications and data processing were gradually developing an interrelationship that will eventually see their convergence into one unified technology—teleprocessing.

The management of both OC and ODP have expressed a similar concern that they are finding it difficult to identify the boundary between the two disciplines. ODP, for example, has indicated that "the most serious (IH) problem identified . . . has to do with the gradual and inexorable blurring of the distinctions which once separated ADP functions from communications functions . . ."

The Agency evolution towards a teleprocessing orientation is clearly evidenced in the growth in the use of remote terminals and printing/graphic devices over the years. This, together with the anticipated expansion of ADP support to the overseas environment, necessitates a significant dependence on the telecommunications services of OC. Conversely, computers have become an indispensable part of the communications networks supported by OC.

The Task Force has identified a number of advantages which support consolidation. The functions of planning, operations, career management and information security would all be enhanced by an organizational realignment. In addition, user satisfaction and our ability to interface with external organizations on teleprocessing matters would be strengthened.

On the negative side, we would anticipate a number of problem areas that would be associated with any merger; the size of a new organization may be formidable, the integration of an essentially domestic oriented ODP with OC's worldwide responsibilities would create integration barriers, and the combined budget would make a tempting target for arbitrary budget reductions.

On balance, however, we feel that technology is dictating an eventual merger. In an era of increasing resource constraints, we can not afford to support what promises to be a unified technology with multiple, sometimes competitive, organizations. While the two components have shown considerable cooperation and mutual support in integrating their support activities, the justification for unique organizations seems to be eroding.

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Background

The worldwide communications services provided by OC and the central ADP support provided by ODP developed in relative isolation from each other until the advent, some ten years ago, of the remote ADP terminal and printer devices. In that these remote devices are linked to the host computer by communications transmission devices, the coordinated functional disciplines of both communications and ADP are required to support a growing demand for access to electronically based information and the related systems which transmit, process, and store this information. During the past decade, we have experienced a rather dramatic growth in these distributed processing facilities, primarily in the Headquarters area. Evidence would suggest that this growth has yet to reach its peak. It is also reasonable to expect that in the next ten years we will see a similar rate of growth in the use of terminals in overseas locations as well as domestic sites outside the Headquarters area. This burgeoning requirement for telecommunications support will necessitate a high degree of planning, coordination, and nonredundant activity by OC and ODP if the users of their combined services are to be effectively supported.

This growing technological dependence on communications facilities by ODP is mirrored somewhat by an increasing utilization of computers by OC to satisfy their mission. The MAX, DATEX and CDS systems, for example, are all based on software controlled computers.

This growing convergence of ADP and communications technologies is of great concern to the management of both OC and ODP. OC has indicated that "technological advances, primarily in electronic components, have fostered integral system design. It is no longer possible to identify the boundary between data processing and telecommunications." ODP has stated that "the most serious problem . . . has to do with the gradual and inexorable blurring of the distinctions which once separated ADP functions from communications functions."

It has been suggested that an organizational realignment which placed all or selected portions of OC and ODP under a single line manager would preclude any existing or potential areas of conflict or duplication. The following discussion addresses some of the merits and liabilities of any such restructuring.

Discussion

The advantages that might be realized by any OC/ODP merger are examined from six functional attributes: planning, operations, user satisfaction, career management, external oversight and coordination, and security. Some negative aspects of any organization realignment are also explored.

1. **Planning**

   Probably the greatest potential for improvement that would be realized by an organizational merger would be in the area of long-range planning. While periodic planning sessions are currently held between the two organizations, they are primarily ad hoc in nature and deal with relatively short-range issues. While there is general agreement on the functional capabilities and responsibilities of such forthcoming systems as MERCURY, the Headquarters BUS, and the COMTEN terminal control devices, additional longer-range problems such as the nature of the eventual CDS follow-on system and its relationship to the forthcoming ODP Message Processing System (MPS) need to be addressed.

While the creation of an Agency architect would do much to alleviate this strategic planning shortfall, establishing a joint planning function under a single line manager would provide the best insurance against any redundant or inefficiently competitive IH services.

2. Operational Control

a. *Software Development and Maintenance*

The discipline of computer software analysis and development is an area where functional alignment within a single organization could result in increased efficiencies. The creation of software, whether for a large general purpose mainframe or a more dedicated message switching unit, requires generally the same skills and can be enhanced by the utilization of the same developmental and documentation standards. ODP's experience in the development and use of programming languages, test procedures, documentation and other tools, is as applicable in the development of such OC systems as CDS and the AFT terminal as in a personnel or information retrieval system.

b. *Hardware Procurement and Maintenance*

Over the years both organizations have acquired a wide variety of devices designed to support the distribution and processing of information which has been recorded in an electronic media. ODP has concentrated on large general purpose computers which are used to support a variety of Agency data processing applications. The OC emphasis, appropriately, was to utilize processors which were easily interfaced to communications channels. Advances in technology are quickly rendering the distinction moot. Economies of scale, back-up facilities, common maintenance and operational support are all areas where uniformity of processing and storage devices would result in increased flexibilities and efficiencies. Current plans for OC to provide overseas maintenance support for CRAFT and the ODP standard terminal is indicative of the evolving similarities in hardware commonality and mutual support. (C 3d(3))

3. User Satisfaction

a. *Coordinated Requirements*

Currently, the Agency user of ADP or communications services is generally required to express separate requirements to ODP and OC respectively. Annual requirements surveys from ODP and OC are independently levied on the components they support. Under a single organization, user needs for teleprocessing support would be handled as an integrated requirements/planning activity. Routine requests for terminals, for example, could be more efficiently handled if a single organization had priority scheduling and installation responsibility.

b. *Single Point of Contact and Response*

A joint OC/ODP organization would present a single point of user contact for any perceived data dissemination, distribution or processing problem. The user should not be concerned, for example, if a system failure is the result of a terminal, communications line, encryption device, or computer failure. In addition to problem identification, solutions and estimated recovery times would be more accurate if a teleprocessing 'trouble desk' was responding to user complaints. A joint organization would also be in a better position to respond to users requests for system performance improvements. The recent decision to supplement the CDS distribution process by installing ODP driven HETRA printers in OCO for NFAC and CDS-driven APARS units for the DO appear to be two different solutions to the same basic problem. Whereas each of these solutions viewed independently may be valid, a more coordinated design for cable dissemination/distribution is required.

4. Career Management

There would appear to be a significant degree of similarity between several technical activities of each office. Because of the advantages of central career management described elsewhere, a merger of the following specialities would be beneficial:

a. Computer software development and maintenance

b. Engineering, especially that which is associated with environmental requirements

c. System operators

5. External Coordination and Interfaces

The past several years have seen a marked increase in Agency support to Community ADP systems. The CAMS[redacted]nd 4C systems are examples 25X1 of operational, and planned systems that support Community requirements on Agency housed equipment. Communications support is, of course, an integral part of each of these systems. Since it is reasonable to assume that the Agency's involvement in Community systems will continue to expand (including a wider participation in COINS), an OC/ODP organization would be in a better position to plan for and respond to additional requirements for Community support. (C 3d(3))

In addition, responses to inquiries relative to Agency teleprocessing plans or capabilities from the Community staff, OMB, or NFIB would be more efficiently handled by a single organization which represents both ADP and communications services.

6. Security

While there is a limited interaction today between OC and ODP on information security devices and techniques, the steady distribution of computer terminals and minicomputers is stimulating an increased awareness of the need for emanations protection and the use of encryption facilities. It is felt that the communications security expertise developed by OC could be applied most effectively to ADP applications by a single service component.

Data processing dependence on security facilities will become increasingly evident as ADP devices move out of the protected Headquarters environment and play a more integrated role in overseas operations.

7. Negative Aspects of Organizational Change

Countering the positive aspects of consolidation described above are the likely problems and disruptive ramifications of any such consolidation. The most significant of these disadvantages are:

a. *Size*

OC is currently the largest office in the Agency with a T/O of [redacted] 25X1
25X1 [redacted] Merging an ODP work force of [redacted] additional people 25X1
and encompassing both communications and ADP functions creates an organization which will tax the managerial capabilities of a single line manager. (S A9c(3.2))

b. *Budget Defense*

There is a danger that the combined budget of the two service organizations would be more susceptible to arbitrary budget reductions by any of the various echelons of budget review. It is felt that the service, rather than mission, orientation of such a large budget would make it more vulnerable.

c. *Overseas Orientation*

The one obvious dichotomy in the functional orientation of the two organizations today is the significant overseas support provided by OC. ODP, except for some small applications for OF and the planned use of the standard terminal, has had an exclusively domestic orientation. While not crucial, this historical and cultural perspective would inhibit integration.

Recommendation

While it is true that the current relationship between OC and ODP is marked by forthright communication and mutual support, it is the view of this Task Force that consolidation is inevitable. During the next ten years the technologies of communications and ADP will continue to merge until there is but one technology—teleprocessing. In an era of increasing resource restrictions, we can ill afford to support a single technology with multiple, sometimes competing, organizations. The current arrangement will become increasingly inadequate as digital communications becomes the technological standard. We recommend merger.

4.2.3. Information Distribution—The Role of Printing

Summary

Since Gutenberg, economies of scale have dictated highly centralized printing and a physical distribution system which delivers packages of paper to which the information is largely incidental. New technologies are changing the equation, however. To take maximal advantage of improvements attendant on these technologies, we must consider printing in the more global context of information distribution.

It is important, then, for the Agency to juxtapose printing with other information handling disciplines. This will allow us to:

- *view requirements in a broader context and design the needed integrated system;*
- *recover capital resources otherwise spent on needless duplication;*
- *preserve our human resource through comfortable transition to new technology; and,*
- *provide overall improved quality, timeliness, and security of service.*

It is recommended that the management of printing, photography and duplication within the Agency be consolidated within the overall management of information services. It is further recommended that a transition be made from the present disconnected system(s) for printing to a coherent information distribution network with printing nodes liberally distributed in locations convenient to the user. These user pickup points shall perform an information control and accountability function as required.

It is further recommended that the P&P building be dedicated to information services equipment, freeing HQs space.

Background

As computing and communications have matured, their interface to the users, printed output, has swelled in volume and improved in quality. These increases in quality and quantity have been both the cause of, and the result of increased computer storage, processing and retrieval of text. As the amount of textual material online exceeds a critical mass, the manipulation and re-manipulation of text, and its retrieval based on full-text search, lead to superior products with a more economical use of human resources.

Wet Ink Printing

Historically in the printing industry, the high initial cost of typesetting and the relative economies of large scale press runs tended to centralize the process, the capital investments, and the personnel training. Within the traditional printing industry itself, many factors have conspired to change this:

- rising labor costs, especially skilled (unionized) labor;
- increasing cost of physical distribution . . . rising energy and postal manpower costs;
- competition from other more timely information distribution media . . . radio and TV;
- competitive advantages of customized, short run printing.

Technology has responded with a steady schedule of improvement: cold type, linotype, photo-typesetting, photo-offset and imaging plate-makers, and most recently laser plate-making. Most interesting in this discussion is the emergent emphasis on an optical image and the new, raster-scan methods for producing that image. This allows direct conversion of computer compatible information into plates needed in conventional printing. It allows an almost-direct interface between computing and printing. However, the necessity of making plates and mounting them is not interactive (in the computer sense) and therefore undesirable.

Xerography and Related Technologies

Xerographic and related "printing" techniques allow an optical image to be converted to an electrostatic "charge" image on paper which differentially attracts dry "ink dust" (toner.) Heat then fuses the ink into the paper and results in a permanent "printed" page. The optical image can be produced by mirrors and lenses from a "facsimile" original as in ordinary office copiers. Alternatively, the optical image can be produced by CRT or laser, controlled by the computer. This allows the "copier" to produce copies without an original . . . every copy is an original. (This has important security implications to be considered below.)

Computing naturally gravitated to such optical methods for outputting information on paper as they had for film output (COM). The result is a more interactive method for producing high quality, human readable output. Moreover, because the production process is not labor intensive (and therefore not driven to concentrated capital investment to offset labor costs) and not intrinsically centralized (because the copier market has fostered small, low volume units) this paper output process lends itself to distributed printing—i.e., electrical distribution of the information and local printing of the paper, as opposed to centralized printing and physical distribution of the paper. This distributed printing feature nicely complements remote terminal access and/or distributed computing.

Today and Tomorrow

Today, we see an ever-narrowing gap between printing traditionally derived, and printing whose genesis is computing and copying. High volume, ultra-high quality, and full-color are, for now, the exclusive province of "iron press" printing, and may remain so for years to come. Customization, interaction and electrical distribution are otherwise. Color copying and large-bed copiers could narrow the gap further at a rate dependent on the whim of the marketplace.

To take advantage of the technology trends, it is essential that joint planning occur between the data processors, the communicators, and the printers. The goals of this joint planning should be:

— elimination of unnecessary duplication (of information as well as facilities);

— elimination of intervening manual operations between original text input and final paper output;

— continuation of current high standards of appearance;

— increased security and accountability of output;

— interconnection of relevant sources of input text and convenient access points for pickup.

The Recommendations

Pursuant to the above goals, it is recommended that:

a. ***Organizationally***, the currently disparate printing, duplication and photography functions be consolidated within the overall information service element.

b. ***Programmatically***, the newly consolidated output services group plan, design, implement and operate a highly interconnected, universally accessed network of conveniently distributed output points, each of which would provide security, compartmentation, and accountability features.

It is further recommended that:

c. ***Spatially***, as printing facilities disperse to user-convenient nodes, and as ADP/Communications inventories roll over, central ADP and Communications relocate from HQs building to the "P&P" building; when feasible, a second story be added . . . fully shielded to meet now and future TEMPEST requirements; special perimeter defenses be emplaced.

The Organization

Implementing the organizational recommendation will remove from the Office of Logistics the current P&PD and combine with these personnel those ODP and OC personnel responsible for printing and COM output (exemplified by HETRA and APARS operation).

The newly combined, multi-media output services function will be responsible for planning and oversight of (human-readable) output services, operation of shared-use facilities, and cognizance over all dedicated facilities. The output services function will also maintain cognizance over facsimile copiers.

Insofar as output services are a subset of customer services, it is recommended that the organizational hierarchy of the consolidated information service element reflect this. This will put output services organizationally and technically close to input services and to the reference and dissemination services which it supports.

The Network

It is recommended that design and development begin on an integrated information output network which will be:

— built upon the fully integrated, multi-level secure, cryptographically isolated information distribution network;

— provided with a large number of convenient pickup points in all Agency buildings, posts, bases, and stations;

— able to provide quick turn-around, high-quality, individually sorted and addressed copies of text ; and,. on paper, film, or other media; and,

— collocated with, and operated as an integral part of registry/mail rooms.

It is anticipated that as the network develops over the next decade, and as the bulk of our information goes on-line:

— distribution of documents will largely shift to electronic distribution and local reproduction;

- all copies of documents will be new, serialized originals so that today's uncontrolled facsimile copying will disappear; and
- the perceived easy retrieval of copies of documents will allow individuals to purge their major paper holdings; so that
- a "read and destroy" caveat will have much broader operational applicability . . . so that compartmentation access controls can become dynamic.

Irrespective of internal network procedures, the system will provide end-to-end acknowledgement (receipting) and end-to-end privacy (super-encipherment) where required.

The Space

We now have an opportunity to right the irony which inconveniently distances printing output from users while remotely accessible computers reside in the HQ's building:

- the printing technology is swinging toward smaller-scale, higher quality "printing" devices which output electronically communicated information;
- new security policy, in league with new technology, suggests individual accountability and unique serialization for printed documents.

Taken together with user convenience, which will facilitate decreased personal paper holdings, these factors suggest a migration of printing from its centralized location to peripheral locations. At the same time, we face:

- increasing demands for ADP equipment space . . . which already occupies a distressing fraction of the HQs building;
- stiff competition from components who recognize the intangible benefits of close encounter; and,
- growing security awareness which suggests sequestered computers with EM shielding, and secure perimeters.

In aggregate, these factors argue for an exchange whereby the bulk of printing services be dispersed to convenient "registries" and ADP and communications equipment relocate to the current P&P building. Naturally, this should not, indeed could not be a precipitous exchange. The specialized need for iron-press printing—high quality color, and very high volume—may remain for some time to come. However, as part of a long-term plan, it makes good sense to start the distribution of printing, as recommended above, and as new ADP and signals equipments are procured to receive them in the P&P building. If modest new construction in the HQs compound becomes practicable, a second story on the building is attractive, electrically shielded during original construction and built economically, not having to accommodate people. In fact, such a modest construction option competes favorably in cost with retrofitting TEMPEST shielding, or special TEMPEST engineering of otherwise commercially available equipments. And, while this study did not address any explicit community information services, perhaps we should reserve the third floor for these.

4.2.4. Information System Security

Summary

The ability to provide adequate protection to Agency information is a vital part of the management of information services.

In spite of the importance attached to this function, there is an enduring tendency to minimize the resources devoted to the security function in order to maximize the productivity of the missions.

When the information security problem exceeds the capability of traditional low cost physical and personnel security techniques and requires high-cost technical solutions, the tendency to sacrifice security for efficiency becomes markedly more pronounced.

With increasing investment in technical systems for provision of information services will come heavier pressures to ensure that maximal benefits are delivered from limited resources made available for information security.

Placing the several functions devoted to information security under single management would facilitate optimum allocation of security resources, minimize the negative effects of disparate national policy organizations, and expedite technological transfers across several disciplines.

Background

As technology rapidly changes our concepts of information and information handling, so does it change our perceptions of security threats and effective countermeasures. No longer can we be content to assume that the presence of physical barriers such as safes, vaults and guard posts will provide sufficient information security.

While traditional physical and personnel security measures are no less important, technology has added new disciplines such as computer and emanations security. These new disciplines require different skills and larger resource committments to keep pace with technological development. Modern information security personnel should have a depth of technical understanding that rivals that of systems designers, engineers and programmers and need a wide range of technical equipment to carry out their function.

Information security functions in the Agency today are divided because of historical developments of national policy.

The Office of Security is responsible for all information security except communications security. The Office of Communications is responsible for communications security primarily because of national policy decisions that have maintained national policy bodies composed of representatives from communications elements. Secondarily, the discipline of communications security has been highly technical and the OC personnel system has been uniquely qualified to provide the specialists required. (C 3d(3))

Computer security has developed within the Office of Security in parallel with the growth of Agency ADP. The Office of Security represents the Agency to the Community through the DCI Security Committee.

In contrast to the OC personnel system, the OS personnel system is not well suited to provide technical specialists for systems security. The security generalist assigned system security duties is well qualified to deal with policy issues but disadvantaged in dealing with questions of technical implementation that arise in profusion from systems designers.

As might be expected, the merging of computing and communications technologies also raises issues regarding computer and communications security. ADP systems are being networked through communications in ways that raise jurisdictional issues between the disciplines. Computers are increasingly applied to communications functions in applications that resemble traditional ADP. One clear example combining both problems is the CRAFT program. While intended to provide ADP support to field stations, it is planned to connect to the communications system and perform communications functions. (C 3d(3))

What is suggested is an amalgamation of those technical security functions devoted to protection of information systems. An integrated information systems security organization would ensure consistent protection across all systems, mitigate the negative effects of conflict at the national policy level, and, most importantly, allow freer flow of technical security techniques between ADP and communications technologies.

Drawback

In most amalgamations there is one party who is relatively advantaged and one relatively disadvantaged. Amalgamation alleviates this disparity by reallocation of resources. In this case, the Office of Security has been severely understaffed and underfunded with regard to computer security. The Office of Communications, by comparison, has a large resource investment in communications security. Integrating the two functions has the potential to provide improved computer security programs at the expense of security of communications.

Recommendation

It is recommended that those technical security functions involved in protection of information systems be merged into a unified Information System Security organization. Staffing of the organization should be accomplished by drawing from those career services capable of providing technical specialists qualified to deal with questions of policy implementation. This organization should be placed close to those components responsible for system design, operation and maintenance to facilitate policy implementation. In the interest of a unified security policy, systems security policies should be promulgated by the Director of Security.

4.2.5. User Satisfaction

Summary

User perceptions of IH services today are of a growing variety of computer terminal and word processing systems each different from the other, each operating under different rules and using different languages. Users perceive a multitude of organizationally disparate systems, difficult to use, characterized by dated and incomplete information. The perception all too frequently mirrors reality.

Given these problems and regardless of the degree of centrality of any organizational solution, a customer service function is needed to assure users quick and easy access to all information services.

Background Discussion

User satisfaction is defined as the degree to which individual employees find information services meet their requirements.

New employees are made aware of information services available to them through orientation training, on-the-job training in their new components, contact with counterparts in other components, through various functional directories (Agency telephone directory, DO telephone directory, OCR Bulletins describing available information services), through progressive experience on the job and sometimes by sheer accident. Few formal training courses are available.

There is no formal training course describing official information services available in the Agency or the procedures for using those services. There is no training course available covering informal information resources and channels. Individuals are largely left to their own devices in trying to tap the information resources in this Agency related to their needs.

Once aware of the service, employees in need of information normally go directly to the component(s) offering the service. For ADP support the procedure is to request the service through officially established channels.

Responses to various information studies and user satisfaction polls are replete with complaints about the quality of the information service, or the currency of the information. Users frequently cite the difficulty of obtaining good service and inevitably question the relevance and or completeness of responses. Are the complaints justified? Certainly there are cases of documents lost or delayed in the dissemination or distribution process, reference service that has been slow, printing support unresponsive, ADP support delayed.

The opposite view holds that users often levy unreasonable demands on the information system. Here too, there are cases of users demanding faster dissemination service and then failing to pick up the disseminated material when the faster service was provided. There are cases of urgent user requests with close-of-business deadlines, with the response made by the deadline only to find that the requestor had gone home without waiting for his answer. Although individual complaints are real, one gets the feeling that deficiencies are frequently more annoyance than serious. Where the deficiency is recognized as serious, corrective action is usually taken by the responsible organization.

We believe that a more significant problem is the user's difficulty in coping with the richness and variety of information services available. The user must not only become acquainted with the official and unofficial services but is faced with the task of learning how to use increasingly complex resources. This entails much more than surface appearances would suggest.

To illustrate the extent of the problem with more specific examples one has only to look at the multiple points of contact a user must exploit for needed information. Dissemination requirements are negotiated with OCR for hard-copy documents or Cable Secretariat for cables or with other disseminating components for more specialized material. The user obtains open-source publications from OCR's Acquisition Branch, maps from OGCR's Map Library, communications support from OC, computer support from his own shop or from ODP, data base management support from ODP, etc. Many more specialized support services are also available such as OCR's RSM system, the various automated systems in OCR's TAP room, the OGCR Genigraphics system, ODP's RAMIS system, etc. (C 3d(3))

Finally there are the information resources owned by the non-IH Service components; data bases and information systems that are created by operating components to satisfy their own requirements but which because of the non-unique nature of information are of potential use to many others, e.g., Office of Finance and Office of Personnel Policy Planning and Management require many of the same data elements in their work.

We have no measure of the extent of these information resources, though several surveys have attempted to catalog them. Neither do we have a good measure on the actual and potential population of users of these resources nor on the depth of their knowledge about the information base. Managers of any future information service should collect information, possibly by questionnaire, to resolve these unknowns and to determine minimum training requirements for both new and old employees.

The Task Force (CIA/IHTF) cataloged responses to the 1978 Comptroller questionnaire concerned with information services and subsequent responses to its own questions concerning the type of service provided by current information handling components. Because the responses were prepared at Office level the extent of individual concern is unknown. Without extensive polling, it is impossible to determine whether many of the problems identified are real or simply perceptions resulting from bad but isolated experiences. The sum of the complaints, however, suggests that a large number of users find it increasingly difficult to master their own work while simultaneously developing proficiency on available information systems, each one of which satisfies only part of the users requirement for information.

Major Agency information handling components have long recognized this problem and the utility of customer service units. The Office of Communications, Current Activities Branch, for example, assists users with any problems they have with the communications network, helps customers formulate requirements statements, and directs customers to appropriate contact points within OC.

Similarly, ODP has established a trouble desk to help customers with problems such as terminal outages. A control point provides a human front-end interface to the computer systems in ODP's Operations Center. A customer support staff prepares and publishes ODP Tech Notes and responds to user questions about the kinds of service offered by ODP.

OCR does not label similar functions as customer service activities but the concept of one-stop customer service is clearly built into the system. The most widely advertised customer service directory in the Agency is provided by the Office as a one-page outline of OCR services found just inside the front cover of the Agency telephone directory. The CIA Library offers a reference service that provides either the answer to a question or a referral to where the information might be found. The library also offers on-line information service through several commercial and classified information systems and provides the trained staff to operate the terminals thus relieving requestors of the need to learn several additional systems. The OCR Country Reference Analyst provides one-stop service against a variety of files and data bases. Finally, OCR has published four bulletins which describe in considerable detail the various information resources available in the office.

The DO/IMS has no component assigned specifically as a customer service contact point but the availability of the IMS functional directory in the DO telephone book, the functional organization of IMS itself, the DO training program and the long existence of IMS as a service unit obviate the need for any special customer interface.

The only other formal mechanism for identifying information services is the functional directory found in the back of the Agency telephone directory. The functional directory, however, is neither complete nor current.

The existing Agency organizational structure and people who have worked in that structure for some time constitute an institutional memory which functions as an informal directory of available information resources. Informal institutions, however, are deprived of any long-term continuity by transfers, retirements, etc.

To summarize, the users of information services have a variety of customer service contacts available to them none of which can provide definitive information on all available information services. The user understandably has reservations when searching for information as to whether significant information has been missed.

Is it possible to create a customer reference service that will assure users access to all available information services? Why hasn't such a service been installed? Should such a service be established? Where should it be located? How should it be staffed? Will users use it? Can it be kept current?

The need for a customer service function is unquestioned. OCR, ODP, OC and IMS all provide a level of customer service that is dictated by experience. ODP at one time created a user support division to assist do-it-yourself programmers in their work but the organization atrophied as users learned how to exploit terminal systems on their own. Catalogs or inventories of files and systems have been created in the past but were little used whether from lack of awareness of their existence or because they were not current. A referral service was an integral part of the CHIVE task force proposal but the concept was dropped when that project was terminated. Enthusiasm for such a service seems to rise and fall with some regularity.

A single point of contact for access to all customer information services is on the surface an attractive idea. If a customer wants a new terminal, a document, a subject search, a new software program, a change in dissemination profile, a word processing system, etc. the customer service would oblige. The service point could provide information directly to the customer, act as an intermediary between the user and the many available information systems and services, or function as a central referral service. Which of these functional configurations or combinations thereof is created depends on a number of factors. Certainly creation of a new Directorate of Information Services will result in different customer service requirements than will a decision to create an Office of Information Services in the DDA or in NFAC. Questions which require intermediary intervention to access large manual files preclude separation of the service person from the file and therefore limit assignment of the person to any kind of central service component. It will also be difficult to place individuals in a customer service component who have other duties in addition to their customer service responsibilities, e.g., a biographic analyst. On the other hand the increasing availability of documents and data in electronic form which can be recovered quickly makes possible the creation of very sophisticated technologically advanced customer service systems. Referral services too appear more attractive in this environment. Many IH activities take place throughout the Agency of which most people are unaware. Compartmentation, organizational change, and just plain parochialism conspire to restrict awareness of such information resources. A referral service would help overcome these barriers.

How much it would be used is unknown. Such a service would be useful to new employees. Experience suggests that need would diminish as users acquired a working knowledge of information resources. This argument is countered by a continued need for such a service by individuals whose knowledge of resources fades with less frequent use. Where should a customer service component(s) be placed organizationally in the Agency? The answer depends on what organizational option is selected for Agency management of information services. Placement of customer service components is discussed in each of the organizational options descriptions provided in the Executive Committee Decision Analysis package.

Recommendation

A customer service should be established. Its placement and configuration should correspond to the service described in the organizational option selected by the Executive Committee.

4.2.6. Information Distribution Network

Summary

We have ignored the universality of information as organizational structure and technological limitation fostered development of a variety of information distribution networks. Compartmentation reinforced the diaspora by requiring "special channels".

It is recommended that we transition from the welter of (electronic and other) networks to a universal information distribution network which will achieve compartmentation and command privacy by cryptographic separation. Although this integrated network will continue to have "manual" (i.e., pouch and courier) links, the electronic distribution should bear an ever-increasing fraction of the load, including facsimile transmission. Electronic authentication and release

procedures will support command and control, and originator control. Formal APEX controls will be supported on a per-document, per-subscriber basis. Irrespective of internal network procedures, the system will provide end-to-end acknowledgement and privacy where required.

Background

Both theory and practice remind us that information, in whatever form it originates, can be commonly represented. Once reduced to some canonical representation, the encoded information can be realized in a variety of media for communication and storage.

Suppose we have a series of discrete bits of information, say, sequences of yes/no decisions. With some convention about which bits go where, this binary information can be communicated as electrical impulses, flashes of light, puffs of smoke, sequences of tones, etc. The information can be stored as marks on paper, film and the like, magnetic regions on a magnetizeable surface, hills and valleys in a deformable plastic, etc.

Suppose we have discrete letters, numbers or punctuation marks. A simple coding scheme allows the representation of each character as a short, agreed-upon sequence of bits. Now the characters may be communicated/stored in all the ways to which we have previously alluded.

In the case of Shakespeare's Sonnets, messages from the COS, or editorials from Pravda, they are simply well-formed strings of characters. Thus, composed in turn of a series of bits, the sonnets, messages and editorials can be handled as previously described.

In the case of reconnaisance photos or renaissance paintings, a facsimile representation can be derived much like the "paint-by-the-numbers" schemes. Scanning the numbers in a well-defined way, say left to right, top to bottom, we can generate our familiar string of characters and, so, handle these as before.

In the case of operatic arias, telemetry signals, or political broadcasts, a similar facsimile representation can be established by periodically sampling the waveform and measuring it. This string of numerical measurements, our familiar string of characters, after all, can now be handled as before.

In facsimile schemes it is important to know how fine-grained is the real information in the original. The fineness of the sampling and the precision of the measurement are not at all constrained by the numerical representation. Therefore, no sensible information ever need be lost in the process; the danger is the reverse: we can be overwhelmed by uninformative detail. Any constraints in the process are those of the physical production processes.

Using a numerical representation scheme allows preservation of any desired degree of precision using a sufficiently long series of relatively imprecise physical quantities. This ultimate superiority of the numerical representation over the precision attainable with analogue physical quantities underlies the preference for digital encryption as opposed to any other forms of "scrambling". Thus, security, in addition to elegance, results from utilizing the underlying informational commonality of various forms of data.

Information Security and the Pouch

A number of personnel and physical security measures are taken to preserve the integrity of the pouch, or, failing that, to detect its compromise. In addition, a number of purely "informational" measures are employed, one inadvertently, and several, perhaps unofficially:

— ***levels of indirection***: personal and impersonal identities are protected by use of pseudonyms, including transient "IDENs", and cryptonyms;

— ***split transmissions***: the paper realization of a sensitive message is ever more finely halved until no single piece of paper is adjudged sensitive; then, with each containing instructions for reassembly by the intended recipient, the pieces are shuffled out into separate pouches;

— ***signal in noise***: the more the pouch is abused, by carrying non-official materials, the greater the cost and difficulty an intruder has in sorting wheat from chaff in a brief interlude (. . . presumably, this concept is not officially endorsed); (C 3d(3))

Closely allied with the signal-in-noise concept are two informational security measures, the practice of which is unconfirmed:

— ***disguise***: wherein all other applicable, sensible information security measures are deliberately not employed in hopes that the supremely sensitive message will be overlooked; and,

— ***"defensive" disinformation***: whereby the subsequent revelation of falsity calls into question the veracity of other transmissions in the same channel, thereby "protecting" those not independently confirmable.

In spite of such information measures, and in spite of physical security measures taken for pouch protection, cable transmission is regarded as more secure because of an additional information security measure, encryption of the information. However, encryption is not a property restricted to electrical transmission. Rather, it is a derives from the digital encoding incidental to cable transmission. As we have seen above a digital representation can be derived for any sort of information. Hence, encryption can be applied to pouched materials as well as to cables. Instead of sending a paper copy of the plaintext, we could send encrypted keystrokes captured when the material was originally typed (in the case of a dispatch, say) or digitized facsimile of materials otherwise acquired.

Recommendations

It is recommended that the extant bits and pieces of our information distribution systems be sewn together into an integrated, world-wide, multi-media, encrypted network.

Further, it is recommended that administrative mechanisms for compartmentation and command privacy be integral to the initial design, and fully supported by strong technical measures including dynamic electronic key distribution (EKDC) for cryptographic separation as required.

Finally, it is recommended that the network, insofar as possible, be geography independent and distance insensitive—at least from the end user's point of view—so that the headquarters area transmission system and the worldwide network are indistinguishable, excepting administrative impositions.

The blueprint for this, presumably the work of the System Architect, and coordinated with affected components, will include:

— the physical interconnection (backbone communications) network;

— the logical networks superimposed upon the backbone;

— the administrative and technical measures (e.g., cryptographic separation) which will keep logical networks distinct;

— the administrative and technical procedures for passing information (through a "gateway") from one logical network to another, including convenient "pouch" interfaces, i.e., interfaces to off-line exchange media (magtapes, cartridges, floppy disks, etc.)

— the clear apportionment of responsibility for implementation thereof.

4.2.7. The Universal Terminal Network

Summary

Functional specialization, compartmentation, and organizational structure, in the absence of an overall architecture, lead to a proliferation of disjoint terminal networks. However, specialization, structure, and compartmentation are neither absolute nor eternal. People's information needs are dynamic and the terminal network, as it becomes our primary access to information, must accommodate.

We must rediscover the universality of information, recognize administrative and substantive data as indistinguishable except by application, and distinguish between the access controls for information and the interconnectivity of the underlying network.

It is recommended that a blueprint be developed for the universal terminal network and that current and planned equipments be reconfigured in accordance with it.

It is further recommended that the convergence between word- and data-processing be accelerated: that the majority of our administrative memoranda be reduced to the data base transactions they really are . . . a clear opportunity to ***do more with less.***

The benefits in reduced numbers of terminals (in the aggregate and on any one desk), the attendant standardization of user interfaces and resulting simplifications in training, and the enhanced utility and flexibility of the network will be substantial rewards. The universality of the physical network should not preclude the superimposition, where necessary, of administratively discrete logical networks upon it.

Background

Like Topsy, information processing in CIA just grew. Now, disjoint applications run on a single mainframe computer, several mainframes are networked together, several dedicated minis are to join the network, while others stand alone running one or several related or unrelated applications. A variety of terminal networks serve these applications:

— ODP's network of Delta Data terminals which access, via COMTENs, the general purpose mainframes in the Ruffing Center;

— A network of Delta Data terminals accessing the CAMS application in the Special Center—this network is logically and administratively distinct from, but electrically interconnected with the above network via COMTENs;

— A network of Delta Data terminals accessing DO applications in the Special Center—logically and administratively distinct from, but electrically interconnected to the aforementioned networks via COMTEN interconnection;

— A network of STAR terminals tied directly to mainframes in the Special Center . . . and therefore electrically but not logically interconnected to all preceding networks;

— A group of four-phase input devices now on-line to Special Center mainframes . . . and therefore electrically but not logically connected to all above networks;

— A forthcoming network of SAFE terminals tied to segregated SAFE mainframes . . . which will be electrically interconnected with, and provide a logical gateway to general purpose Ruffing Center mainframes . . . and therefore electrically but not logically connected to all preceding networks;

— A network of CDS terminals tied to segregated CDS mainframes . . . which are electrically and logically interconnected with GC03 mainframes . . . thence to preceding networks;

— A network of Ann Arbor terminals serving two crisis management computers in the Office of Current Operations . . . which are connected to GC03 mainframes via COMTEN and to CDS (receive only);

— A network of ETECS terminals connected to a P&PD mini-computer network will be connected to VM GC03 mainframes . . . and therefore generally connected to above networks;

— A network of System 6 terminals are connected to OCO/PPG's System 6, connected in turn to VM GC03 mainframes via COMTEN network . . . and therefore generally connected to above networks;

— A network of Delta Data terminals dedicated to the NPIC Data System . . . logically and electrically connected through DATEX. (S 3d(3))

To understand the interconnections of these terminal networks, it is useful to introduce some computer science argot: "virtual", "logical", and "transparent". The terms virtual and logical, nearly synonomous in this context, imply that the functional description of a device can be divorced from its physical implementation. In this same context, transparent means that the user of a (logical/virtual) device should be unaware of the incongruity.

In the case of a communications network, then, we can have an underlying electrical interconnectivity upon which we can superimpose a number of different logical networks. The logical networks may be distinguished from one another by:

— use of different communications protocols; or

— administrative access controls; or

— the ignorance of subcultures of the overall community of subscribers.

In turn, this suggests that if one wishes to compartment the various logical networks, keeping subscribers to one logical network from accessing another we can:

i. implement the logical networks so that they map one-to-one onto separate physical networks;

ii. utilize different communications protocols . . . which the individual user must be unable to modify;

iii. utilize a more general protocol which enforces administratively set access controls;

iv. hide the existence of a larger network from subscribers.

The last strategy, depending upon secrecy, is a risky one at best. It is overcome by curiosity, accident, and the sheer number of subscribers. Worse, having kept the very existence of a larger network secret, the discoverer will not appreciate the gravity of trespass.

The first strategy, physical separation, is technically foolproof, but operationally awkward if some subscribers are privy to more than one compartment and therefore must access more than one logical network. Specialized interconnections merely return us to the original problem, albeit sometimes disguised. The alternative is an array of specialized terminals for that user, and expensive, error-prone manual transport of information from one network to the other. (note that the more we automate the manual interconnection—say, by a tape-carry—the more we lose the original benefit, namely, the mind of the knowledgeable human serving as the gateway between two otherwise disconnected networks.)

The second strategy, depending upon different protocols, also disadvantages those subscribers common to more than one network. Its success, moreover, depends upon a user being unable to modify the protocols. The present state of the computer security art cautions that this is hard to prevent if the protocols are implemented in a general purpose, time-sharing environment. Thus, such protocols must be the province of specialized, dedicated communications processors. Simply moving protocols into hardware, while appealing on the surface, probably will collide with industry trends. Developing a protocol control chip costs about $250,000, making impractical the single protocol chip. The forecast is that commercially available chips will, therefore, handle many protocols; protocol selection will be based upon CPU control signals. If the CPU from which the control signals are derived is time-shared, general-purpose, then hostile-user code can abrogate the intended separation, again arguing for a specialized, dedicated communications processor.

The third strategy accomodates overlapping communities of interest, but like the second, today depends upon the access controls mechanisms being sequestered in a specialized, dedicated communications processor. A variant on this theme is the use of cryptographic separation, with dynamic key distribution on a per transaction basis; the Key Distribution Center (KDC) is responsible for enforcing access controls. Less operationally responsive, super-encipherment with static keying also can enforce logical separation; peripheral nodes must be intelligent enough to add communications headers after encipherment . . . we might refer to this as a Private Line Interface (PLI).

The Universality of the Terminal

The functionality of terminals is steadily increasing. They have more local processing power, allowing more efficient communications or stand-alone processing. Higher resolution, multiple character sets and graphics, including color, are all examples of the increased functionality. The base price of terminals of interest to the Agency continues to be dominated by the cost of CRT, keyboard, tempest-proof enclosure and power supply. Given this rather high fixed cost, functions which can be software-derived —local processing power, graphics and multiple fonts—add little to the cost. Marginal costs for higher resolution and color will be noticeable, however.

Because of the increased processing power which could be available, at small marginal cost, in all our terminals, there is no reason why terminals need to be dedicated to applications, excepting needs for high resolution color. Of course, certain configurations—keyboards, for example—might be optional for some applications. However, judicious procurement will allow a high degree of interchangeability. Thus, most of our terminals could be universally applicable to most of our applications. This is true even were the Agency to retreat from its ideal of a ***single*** standard terminal (Delta Data 7000).

The Universality of Data

The encoding of information for machine manipulation does not distinguish between substantive and administrative data, nor between word processing or data processing functions. At root, then, there is no reason to have separate networks for administrative data and for substantive intelligence data; in fact, there are good reasons to merge these. Similarly, we should strive to eliminate any distinction between word processing and data processing terminals. Insofar as these distinctions occur today in commercial offerings, they result from historically different starting points in the development of the two functions. Irrespective of starting point, word processing and data processing terminals (and the processes themselves) are converging. As word processing matures, the file management, communications, and sophisticated text processing algorithms of data processing (Key Word in Context, etc.) will be inextricably incorporated. Similarly, as data processing matures, loosely formatted strings of text become an increasingly important data-type.

Perhaps the most compelling evidence of the similarity, and the richest prospect for economies as a function of more automated information handling, arises from an inspection of adminstrative memoranda and forms. To communicate administrative information, request information, seek concurrence, or accomplish coordination, we compose a memorandum. As a particular species of communication is required over and over, human creativity overlays the few bits of data with poetic variation. The addressee must strip away the semantic disguise to recover the few data bits. Sometimes the process is noisy and the recovery flawed. Additional noise is introduced as the data included by the initiator may not be exactly congruent with the needs of the recipient. Ultimately, a form may be created which structures the communique. Thus, many of our adminstrative memoranda are basically simple database transaction, which, if the truth be recognized, could proceed directly from keyboard to data base much more efficiently. That is, much of today's word processing is really data processing gone agley. If ever there was the opportunity to "do more with less", it is here.

In the terminal proper, word processing will benefit from the incorporation of graphics (maps, charts, etc.), while data processing will benefit from the full page displays (50-60 lines of text) which exemplify the best word processing devices. The local processing power now being included in terminals accommodates word or data processing algorithms insofar as they may be distinct, as well as general communications protocols.

Access Control and Authentication

To achieve compartmentation, ensure command privacy, and bolster security it is essential to control the access of individuals to information. A quantity of information can be given only to an individual with a predetermined need-to-know. The three parts to this process are:

— ***authentication of the individual***—Who is he? Is he who he claims to be? In what capacity is he acting?

— ***identification of the information***—What information is being requested? (Or, what process is being initiated?)

— ***validation of the permission***—May that person access that information or initiate that process?

In essence, then, compartmentation is an ***incontrovertible*** decision based on an ***unimpeachable*** function which maps individuals to a quanta of information. The process can break down in two generic ways:

— ***the mechanism can be bypassed***—The information can be obtained outside the purview of the access control process

— ***the mechanism can be suborned***—An individual can masquerade as another, disquise the information requested, or tamper with the mapping function of individuals to information.

Drawing upon the computer science distinction between ***procedure*** and ***data***, bypassing the mechanism is procedural while suborning the mechanism is a function of data. In considering ways in which the mechanism can be suborned it is useful to consider individually the data required for authentication, identification, and validation.

Basically, all schemes for authenticating the individual come down to known information which can be supplied uniquely by that individual. This information can be a password, the bitting of a conventional key, a derived function of the fingerprint or speech pattern, information recorded on a badge, etc. The password can be elaborated to include an extended inquiry where the individual is randomly required to supply personal history details, the aggregation of which is probably known only to him and the system.

The authenticating data can be acquired by a malefactor from three sources: from the individual himself, from the system's records, or the malefactor can alter to a known state the system's records.

An individual can reveal his password, or (temporarily) lose control of his key or his badge. The malefactor needs a means of copying that information for later production . . . easy for a password, and not hard for key or badge information. Copying information carried in fingerprint or voiceprint is technically no harder for the malefactor than for the system, and does not really require the cooperation of the individual. However, the capital investment required for fingerprint information currently exceeds badge and voiceprint, while no capital investment is required in the case of the password, and little in the case of a conventional key. The mix of such authentication devices must be based upon a threat analysis which reveals the casual or determined nature of the potential malefactors and the protective custody which can/will be exercised by the individual.

Recommendations

It is recommended that a blueprint be developed for the universal terminal network and that current and planned equipments be reconfigured in accordance with it. The blueprint, presumably the work of the System Architect, and coordinated with affected components, will include:

— the physical interconnection (backbone communications) network;

— the logical networks superimposed upon the backbone;

— the administrative and technical measures (i.e. cryptographic separation) which will keep logical networks distinct;

— the administrative and technical procedures for passing information (through a "gateway") from one logical network to another, including necessary authentications;

— the clear apportionment of responsibility for implementation thereof.

This will require a vigorous research program to further the principles of dynamic electronic key distribution to support cryptographic separation of logical networks.

It is further recommended that all new terminal acquisitions, and word processing devices (for as long as the two remain distinct) be procured so as to serve multiple function, and equipped with compatible communications options. It is ***not recommended*** that the terminals be provided with local storage; instead, it is recommended that the network provided storage . . . distributed as required in vaulted "registries".

Finally, it is recommended that the convergence between word- and data-processing be accelerated: that the majority of our administrative memoranda be reduced to the database transactions they really are. At this point, conventional typewriters should begin to phase out (unless we institute a robust, conveniently distributed OCR interface to the general information distribution network.) A particular target for replacement should be those with local magnetic media storage.

4.2.8. Centralized Dissemination and Reference

Summary

To its detriment, the Agency has permitted development of a disharmony of information services. Acting as if the media were the message, different dissemination systems and different storage and retrieval systems service different incoming information streams. Thus the Agency denies its roots as coordinator of information and impedes fulfillment of its all-source analysis role.

Providers of the disjoint dissemination and retrieval services needlessly duplicate the design, development and operation of systems to satisfy user needs. Worse, would-be users must supplicate many suppliers, never sure of the completeness of their inquiry.

Task Force analysis of dissemination sharpens two distinctions and blurs one:

- *distinguish dissemination (cognitive, who gets what?) from distribution (physical delivery)*
- *distinguish centralized data base of dissemination requirements, from the centralization of disseminators and/or the centralization of release policy*
- *recognize the similarity of dissemination (requesting to-be-available information on a topic) and reference (requesting available information on a topic).*

It is recommended that the Agency recentralize dissemination and reference services as these are increasingly done "on-line", and that an integrated database of dissemination requirements be kept, accessible to all would-be disseminators. Where security/compartmentation dictates, levels of indirection may be used.

DISSEMINATION SYSTEMS

Two components are responsible for the bulk of document dissemination in the Agency. They are the Office of Communications (cables) and the Office of Central Reference (hard-copy intelligence documents and open-source publications). On a more limited scale, OD&E, FBIS, OCO and RES Watch Offices, DO/IMS, various registries, and the originators of documents are all involved in dissemination functions. (C 3d(3))

Although reasonably well satisfied with dissemination support, users identify three types of dissemination problems; delays in user receipt of electrically received intelligence products, a need for dissemination tailored to users (branch, individual) requirements, and a concern that the various Agency components involved in the dissemination process do not use the same set of reading requirements with the inevitable result that information is missed.

REFERENCE SYSTEMS

As in the dissemination function, many components are involved in storing and retrieving information. OCR manages the AEGIS/RECON Subject file, Biographic files, files, Rapid Search Machine files and Interim SAFE. OC maintains reference and archival files on Agency cables. DO/IMS manages, among others, the Special Trace and Retrieval system, the Documentation Reference System, the COMET Cable file and the Walnut Microfilm file. The Exploitation Products file, the Objects Data file and the Installation Data file are major NPIC data bases. Hundreds of files are maintained by other Agency components as data bases in ODP systems oron dedicated mini and microcomputers located in Agency components. (C 3d(3))

Users of reference systems see a need for more flexible and user- oriented retrieval facilities and a need for directories or catalogs of stored information and information handling systems.

User Difficulties with Multiple Systems

Agency personnel in need of information can request that information from one or more of the several reference systems. All of the dissemination and reference systems, however, operate independently. The user must first learn what dissemination and reference systems exist and what source materials each disseminates or stores. The user then must go through the bureaucratic drill of levying information requirements against each of the separate dissemination systems and requests against each of the separate reference systems to be sure that he has obtained all available information on his subject.

This partitioning of dissemination and reference systems, while understandable given the evolutionary development of information handling over the life of the Agency, pressures for compartmentation, isolated locations, etc., makes the job of the user considerably more time consuming. Partitioning inevitably raises doubts in the user's mind as to whether all available information sources have been fully exploited.

Simplification Needed

We assume the average user is able to cope with the multiple systems available to him once they have been identified. But, each additional system demands more of his time. There are other pressures, too, for simplicity and standardization of dissemination and reference systems. The sheer cost of developing and operating overlapping systems . . . including multiple indexing and data entry, on occasion . . . pushes us toward standardization and integration in a time of fiscal austerity.

There is an obvious need to simplify the user interface with dissemination and reference systems, to reduce training costs, provide more information on what is available, and to combine systems where possible. Simplification is not easy to achieve, however. Functionally related systems, dissemination, for example, exist in several organizationally autonomous components of the Agency. Combination of systems would require not only that technical barriers be overcome but organizational barriers as well. Two alternatives, a requirements registry and a catalog of reference services provide some relief and avoid the organization issue.

Requirements Registry

Rather than submit redundant requirements to each of the many organizations having dissemination responsibility, the user would submit his requirements (e.g., subject, area, source, category . . .) to a reading requirements registry. The requirement would be entered into an automated requirements database to which controlled, shared access would be available to all would-be disseminators . . . who would be required to use it. Such a database would save the user time, assure higher quality, and help the disseminators, as well . . . assuming the latter had remote terminal access. Giving the disseminator a search capability against this data base would simplify the matching of requirements with incoming material. The requirements could be automatically run against stored collections of material.

The on-line system would provide tools for the maintenance and updating of the database so that flows of information could be easily terminated when no longer required. Also provided would be clearance and compartmentation data about the requestor.

Reference Service Catalog

The interface between users of intelligence information and the various reference services must be simplified. A catalog of available reference and dissemination services has been suggested on a number of occasions. Inventories of reference systems have, on occasion, been completed, sometimes for other purposes. These have not, however, been widely enough circulated nor have they been maintained, thus quickly falling into disrepair and, understandably, disuse. Nor has thoroughness always been the goal, again diminishing the usefulness of past inventories. Maintaining such a catalog should be recognized for the time-consuming job it is. Automation of such a catalog would help keep it current, and remotely accessible.

Combining Dissemination and Reference Service

Because both dissemination and reference functions are, today, labor intensive, combining the two to save manpower is attractive. Conceptually, the two services are alike.. Both attempt to match user requirements for information with available information. The dissemination process attempts to match user requirements with newly-arrived information. The reference process attempts to match user requirements with stored (previously received) information.

Historical Developments

One of the earliest attempts to combine dissemination and reference activities took place in June 1949. At that time the Agency's Office of Collection and Dissemination conducted an experiment to determine the feasibility of having one person do both coding for retrieval and reading for dissemination of documents. At that time the reference function was already supported by an IBM punched card system. A two week test proved little except that all agreed that keeping current with changing reading requirements was the hard part.

A later (mid-50's) test explored the feasibility of automatic dissemination based on a match between punched card subject/area code representations of documents and reading requirements indexed with the same codes. Accuracy of dissemination was good but dissemination was slowed because of delays in coding the documents (which equation, presumably changed with electrical receipt and computer advances . . . culminating in MAD).

Looking forward to increased electronic receipts and holdings, including internally produced, word-processed documents, and incorporating modern computing technology makes possible what was formerly only desirable.

The Continuing Present

OC's Cable Dissemination System, CDS, is now the primary dissemination vehicle for electrical messages (cables). CDS incorporates, vitally, the MAD automated dissemination concepts (and execution). To support electrical distribution to current analysts, the distribution portion of the MAD software has been reborn in ODP's Message Routing Service. Electronic delivery of selected messages to NFAC analysts is provided by Project SAFE (which, in its selectivity is a dissemination/reference system.) NPIC's installation of the High Speed Text Search (HSTS) machine will provide key word in context dissemination/retrieval. The DO-OC plan for remote APARS will incorporate second-level dissemination at the periphery of the distribution network (in the registries) whose terminal mini-computers and human ingenuity will create irresistible pressures for automated dissemination. (C 3d(3))

Finally, much reference activity has been automated. OCR's Rapid Search Machine (RSM), Interim SAFE, RECON, DO's COMET, NPIC's Integrated Information System (IIS) are examples of successful automated information reference systems. All are independent systems created to meet individually perceived needs which are, nonetheless, common. (C 3d(3))

Recommendations

It is recommended that:

— dissemination and reference be considered together for planning and technical design;

— a consolidated requirements registry be instituted to maintain an on-line database which will be remotely accessed by all would-be disseminators;

— a more rational blueprint for the (system of) dissemination and reference systems be promulgated;

— a catalog of information dissemination and reference services be compiled and maintained on-line.

4.3. Standards for Information Handling

At the inception of this study, there was the belief that were standards adopted, many of our perceived difficulties would be eased. Certainly, this is true of good standards, but the simplicity of the statement may serve to mask the need for an infrastructure of planning and architectural design. Inasmuch as these needs have been dealt with previously, this section concentrates on the perceived benefits of good standards, while cautioning against premature standards which can pre-empt economical use of changing technology. Section 4.3.1 develops this general theme, observing that promulgating a standard may be merely an acknowledgement that standardization has occurred.

Section 4.3.2, ***Networking Standards***, discusses the disarray of national/international network standards, concludes that for the near future we will have to manage a variety of protocols, and suggests that the set can be kept smallest by a solely responsible component.

Section 4.3.3, ***Data Base Standards***, (to be supplied) recognizes the highly leveraged growth in usefulness as data bases are inter-related, and therefore the desirability of standards. Also recognized, however, are the (motivated?) incompatibilities in the market place. As previously, the conclusion is that focusing administrative responsibility in the organization will limit the number of protocols we must concurrently support.

4.3.1. Information Handling Standards

Summary

Well chosen, well designed standards contribute to efficiency, cost effectiveness, uniformity and, often, security. Unfortunately, the reverse is also true.

The question of technical standards for information services is not what but when.

Discussion

Throughout this report there is the underlying thesis that little is unique to the Agency in the use and provision of information services. When addressing the subject of standards this thesis is of great significance. If we are to achieve maximum effectiveness from limited resources then we will fare better with no standards than Agency standards that are unique from those widely accepted in the rest of government and industry.

Unique standards will commit the Agency to sole support of design, production, and maintenance and, hence, unnecessarily sap resources. Conversely, adopting standards that meet essential needs and that are widely accepted by other organizations will lower costs.

While these thoughts state the obvious, they belie the difficulty of implementing a good standards program in a rapidly developing area of activity such as information services. Our ability to invent new devices, applications and services far outraces our management ability to reach consensus across a wide enough population to describe associated procedures and specifications as standard. The time interval between invention and standardization frequently exceeds a decade. When standards are agreed upon they may appear at any one of several hierarchical levels; community, government, national, or international. It is not uncommon to see the same function addressed by disparate standards from different hierarchical levels.

The problem of standardization for the Agency then is more that of timing than substance. Recognizing that standardization in a given instance could improve effectiveness is not sufficient. Knowing when standardization becomes economically attractive is key.

One pragmatic observation of the standards process is that formal acceptance of a standard is frequently an anticlimactic acknowledgement that standardization has been implemented.

4.3.2. Networking Standards

Summary

Networking of computer systems requires agreement on conventions for the format and content of messages to be exchanged.

Standardization of these conventions, or protocols, will greatly enhance our ability to maximize return on investment in information services.

While a number of protocols have achieved popular acceptance, emergence of one overwhelming favorite remains in the indefinite future.

For the near term, the Agency will be best served by managing a minimum set of protocols rather than striving for a single standard.

Discussion

While the desirability of a standard protocol for intercommunication among machines has long been recognized, development of that standard has been painfully slow. There now exists an international standard protocol developed by the CCITT and referred to as X.25.

Unfortunately, the U.S. market was not content to await a standard. To gain the benefits of distributed processing, U.S. industry proceeded in the absence of standards. The result is a variety of protocols that are, for the most part, vendor unique. The common complaint heard that one vendor's computer cannot talk to a second vendor's product is usually a result of incompatible protocols.

Major vendors find a marketing advantage in unique protocols since customers have yet one more compelling reason to stay with a vendor's product line, i.e., communication compatibility. Hence, the prospect of quick agreement on a U.S. standard is bleak. Resolution will likely occur as a result of the competitive market forces and not organizational fiat. One will see a lengthy period of evolution marked by the appearance of specialty firms who will exploit incompatibility by marketing conversion or translation systems that will negate the need for the computers at either end of a link to be modified. In parallel will develop an option set of protocols from the computer manufacturers that will resolve incompatibilities between vendor protocols at added cost. Over a period of several years there may develop a discernible movement towards one standard as evidenced by the pattern of protocol options offered.

How the Agency deals with this fluid situation can have a significant impact on how rapidly development of systems occurs. Resources expended to deal with incompatibilities are obviously lost to development of new services. On the other side, economies gained from forced standardization can quickly evaporate if history proves our anticipatory efforts in error.

For the near term there appears no alternative to accepting multiple protocols within the Agency system. What is indicated is a strategy that will minimize the number of protocols we are forced to live with. The X.25 protocol mentioned earlier will become standard in international communications. Therefore OC's decision to implement MERCURY with X.25 protocol is reasonable and establishes one standard for overseas operations. Whether X.25 will ultimately become a domestic standard remains questionable. In the interim the Agency will be well served by assigning responsibility for networking standards to one organization with a charge to minimize the cost of networking by evolution to standards emerging in industry.

Recommendation

Responsibility for network standards should be assigned to one organization which will attempt to minimize the costs of networking by limiting the number of protocols within the Agency and evolving Agency standards in consonance with industry trends.

4.3.3. Data Base Standards

Summary

Databases are the stock-in-trade of the intelligence process. Nonetheless, the computer, with its changing software, has lured us from the database standards of our manual files. Each new datamanagement system brings with it unique database "standards".

Theory tells us that new datamanagement systems should be able to separate the user's model of the database from the storage strategy used by the system. Until recently, however, datamanagement systems did not fulfill this promise. More importantly, the introduction of a new datamanagement system is, historically, the occasion for a reformatting of the database, a new conceptualization by the users, and a recoding of the elements of the database. As a consequence, database conversions are extremely costly . . . out of proportion to the benefit, often. Moreover, interchange between databases is difficult and costly. The result is separately maintained copies of a database, each in its own format, and generally out of synchrony with the others. Occasionally noticeable analytic differences are derived therefrom; the result is somewhat diminished credibility . . . of the analyst to the policy maker and of the datbase to the analysts.

As we come to recognize how many component functions are, at their root, database administration . . . with management or analytic reports derived therefrom . . . and as new datamanagement systems are introduced which accord with new DBMS theory, we have the opportunity to make substan-

tial improvements. A process for setting, maintaining (and changing when necessary) the standards for databases in the Agency will become crucial. As we recognize the benefits of integrated yet distributed databases, whose parts are separately administered as required by security or logical task breakdown, the need will become yet more crucial.

Unfortunately, the commercial world is not moving as fast toward standardization in the database area as in, say, the telecommunications area ... although they share our exact needs for standardization of databases. It will, then, be tempting to move out smartly and set standards of our own. The attendant risk of diverging irreconcilably from the commercial, (cost effective) trend is obvious. The Systems Architect will need to keep a weather eye on commercial movements.

4.4. Compartmentation in Information Handling

Previous sections have discussed benefits of inter-relation of databases, and inter-connectivity of networks of subscribers. These discussions have been coupled with technical discussions as to how separation, for compartmentation and/or command-privacy might be accomplished. This section analyzes the problems of control and accountability in light of the changing technology and the changing operational concepts, suggested in previous sections, which will result. Underlying this section is a projected policy swing from document accountability to personal information accountability.

Section 4.4.1, ***Information Security and Compartmentation***, lays the policy and cost benefit tradeoffs for instituting new information security measures. A distinction is drawn, insofar as possible, between security and compartmentation. While admitting the increasing technical threat which may be posed by the new technologies, this section reminds us that personnel security must lay the firm keel, and physical security the sound hull on which a technical security superstructure may be erected.

Section 4.4.2, ***Computer Security***, alerts us to certain generic technical threats, promotes the value of audit trails, and concludes that in computer security, as in other areas of information handling, our needs may not be so unique as once thought, and might, thus, be met by commercial offerings. Uniform personnel and physical security standards for the Community, and development of and stress on damage limiting techniques for databases, may allow us to maximize networking and its associated benefits.

Section 4.4.3, ***Encryption, Storage, Compartmentation and Destruction***, analyzes the context in which overseas ADP can promote quick destruction, highlights conditions which might make quick destruction illusory, and concludes that encrypted storage may provide an extra margin of safety, both in normal operation by supporting compartmentation, and in emergency operation by supporting quick destruction and reconstitution.

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4.4.1. Information Security and Compartmentation

Summary

The information security program should strive to:

- *Prevent unauthorized disclosure*
- *Prevent accidental or purposeful damage to information*
- *Quickly detect failures of protective systems*
- *Provide quick, accurate and complete damage assessments*
- *Provide rapid recovery from system failures*

The foundation of information security is a personnel security program that verifies the trustworthiness of employees and a physical security program to assure information is available only to trustworthy personnel.

Compartmentation is an administrative formalization of the need-to-know principle intended to restrict access to a minimum essential core of personnel within the total population of trusted employees.

The fundamental vulnerability of information security is the fact that information is not physical property, i.e., paper, magnetic media, microfilm, etc. Information is knowledge which can be transferred without benefit of physical media.

Therefore, any investment in systems designed to protect the physical representation of information must be balanced against the state of our defenses against loss of information through the abstract channel represented by the mind.

An effective information security program will address personal accountability for knowledge and its disposition. To the extent that technical and administrative systems can aid the individual in responsibly and accurately fulfilling his obligation, they should be valued.

Systems whose purpose is damage assessment and/or recovery should be transparent to the employee. Procedures that reduce the efficiency of employee job performance in order to allow after-the-fact analysis of loss are to be avoided. Technology can provide substantial cost benefits in this instance.

Background

While those at the center of security policy may have always appreciated the subtle difficulties of protecting information, the line components responsible for policy enforcement frequently have not. This can and has resulted in establishment of systems and procedures that are expensive, cumbersome and obviously vulnerable.

A system to protect documentary information that requires an employee to take positive action to place himself on the record as having accessed information is so patently vulnerable that the most conscientious employees will view the procedure with disdain.

An improvement to that system which requires a second person to be accountable for recording accesses to information substantively increases respect for system effectiveness but without substantially improving absolute security. Knowledge still transfers without benefit of accountability other than personal accountability.

It is the employee's willingness to uphold and defend the trust placed in him by management that provides the only effective information security. As employees perceive management imposing inefficiencies on job performance in the name of improved security, the effectiveness of protective systems will decrease.

Since, in the final analysis, it is each employee's commitment to personal accountability that provides effective information security, gains from management and control systems to increase security of the physical media containing information should be weighed against gains from equivalent investments in employee indoctrination and repolygraph programs that reinforce individual commitment to personal accountability.

It is more appropriate to view investments in formalized systems of information control as aids to investigative procedures and damage assessments. These systems exist to allow us to detect and correct failures, accidents and malevolence. As such, they are ill-conceived if effective operation is based on overt acknowledgement by an individual who does not recognize or who does not want to have recognized the results of his actions. Effective systems require independent, competent and trustworthy monitors.

The Headquarters Security Task Force embodied this thought in their recommendation that sensitive material be contained in registry reading rooms along with copy machines under independent and, hopefully, competent supervision of information specialists. Our collective reluctance to accept such a recommendation can be interpreted as an intuitive understanding that we were being asked to pay a high price to prepare for a low probability event. We were asked to invest in protection of physical media without measurable gain in protection of knowledge. We were asked to impose inefficiencies on job performance for a control system that the employee recognized as vulnerable. (C 3d(5))

Technology-based systems hold promise for improving the cost effectiveness of information control. While technology will do little more to protect knowledge, it will provide ways to detect and correct accidents and failures in administrative control of physical media at reasonable cost and with minimal impact on employee efficiency. There will also be new ways to protect employees from mistakes. While technology will not prevent malevolence, it promises to reduce the probability of occurrence and contain the effects as well as present manual systems.

Conclusion

The major line of defense in information security is personnel security and individual commitment to the principle of personal accountability.

Management artifices such as compartmentation and document controls are, in the final analysis, only of value in detecting and correcting failures after the fact, assuming failure is defined as passage of knowledge to personnel whose trust is open to question.

While technology will not appreciably improve our ability to protect information, it will greatly enhance the effectiveness and efficiency with which physical media can be controlled.

There is no reason to believe that technology will guarantee protection from the malevolent person but every reason to believe that technology can limit damage to the same extent as current systems.

4.4.2. Computer Security

Summary

Computer security can be defined as all physical, personnel and technical security measures taken to protect a computer system and its information. The more common definition is those measures taken to protect the instructions and data within the computer hardware. This paper assumes the common definition.

From a historical perspective, the development of computer security can be viewed as paralleling development of physical and personnel security. The end objective in each case is achievement of acceptable cost vs. risk trade-offs that allow Agency operations to proceed at acceptable costs but with finite probability of compromise.

An impressive inventory of protective techniques already exist for safeguarding computer software and data. The major remaining obstacle to wider networking is damage-limiting technology for sensitive data.

Within a homogeneous physical and personnel security environment as exists in the Agency today, multi-compartmented networks are achievable within acceptable costs vs. risk boundaries.

Development of damage-limiting techniques combined with careful construction of policy can present acceptable cost vs. risk options for multi-level secure networking and wider Community networking within the planning period.

Background

The security disciplines came to an early realization that impenetrable defenses could not be designed. The security problem inevitably reduced to cost vs. risk. When further improvements to one protective technique became too costly and difficult, the concept called rings of security allowed lower cost protective systems to be chained together to further reduce risk at acceptable cost. In this fashion we have arrived at a highly developed set of physical security standards that, given a particular operating environment, allow us to quickly determine what combination of guards, vaults, safes and alarms will reduce vulnerability of sensitive documentary information to an acceptable level.

The creation of large electronic data bases and computer networking has literally short-circuited decades of physical security development. The ability to move information electronically has created the need to devise new rings of protective systems.

There are now access controls that are as adequate as badging systems for authenticating individuals requesting access to computer systems. Extensions of the access control mechanisms allow the computer to ascertain those categories of data the individual has a need-to-know.

Data Base Management systems provide users capability to prescribe in detail requirements for privacy of their data.

Audit routines are capable of recording with unprecedented accuracy and detail the nature of information accesses. The huge volumes of audit data recorded can be thoroughly searched by security routines to point out anomalous patterns of individual behavior.

While instructions controlling system operation are expected to remain vulnerable, efforts to date have developed an inventory of techniques for trapping and alarming unauthorized transgressors that can make attempted subversion of systems an intellectual challenge of high order.

The largest area of concern remaining is damage limitation. Given the new rings of security as described above, there is still the real probability that penetration can and will occur by accident or intent. Therefore, the task before technologists is to devise ways to minimize losses. There are analogues available in the document world that suggest answers to this problem.

One approach is to geographically distribute information so that any one failure results in loss of an acceptably small part of the data base. This is translatable to relatively small computer systems and data bases distributed throughout the Agency, each logically disconnected from the other.

Another approach would be to emulate safes and vaults, i.e., distribute a large data base within one geographic location into a large number of security containers, each of which requires a significant effort to open. This principle is translatable to electronic data bases by application of encryption. By encrypting suitably small subsets of the data base under different keys (combinations) one will have emulated a large number of safes each with the potential to withstand attempts at forced and surreptitious entry of much longer duration than the physical analog.

As in most areas of information service there is little unique to the Agency on the subject of computer security. Industry, banking, and virtually every sector of society is increasingly concerned with computer security. The prevalence of computer crime and its impact on the economy are great incentives to development of protective techniques.

Conclusions

Adequate protection exists to permit multi-compartment networking within the Agency today. This protection is a combination of homogeneous physical and personnel security systems combined with currently available computer security technology.

Networking can proceed within the Community with further standardization of security procedures and/or development of damage limiting techniques for computer systems.

Multi-level operation within acceptable cost vs. risk considerations will depend on development of damage limiting technology.

By taking advantage of protective systems developed within the commercial sector, we will be able to achieve acceptable cost vs. risk tradeoffs with modest investment.

Recommendations

1. The Agency should take the initiative to establish uniform physical and personnel security standards for the Community.
2. Emphasis should be placed on developing damage limiting techniques for data bases so that the efficiencies of networking can be maximized within the Agency and the Community.

4.4.3. Encryption, Storage, Compartmentation and Destruction

Summary

Recent events have re-emphasized the need for quick destruction of sensitive material. The use of computers has been suggested in order to replace paper files with computer files thought to be more easily destroyed.

This paper examines the premise of easily destroyed computer files, and illustrates some practical limitations. Two scenarios are examined: the use of an on-site minicomputer; and, interactive use of a remote computer. More importantly, the hypothesis underlying the need for quick destruction are examined from a decision theoretic viewpoint. This provides an interesting viewpoint and argues for cryptographic protection of computer files as the most effective way of providing quick "destruction".

Unarguably, there exists a need for the safe and rapid destruction of sensitive material under emergency conditions. Recent events have prompted a re-examination of the use of computer technology to provide that emergency destruction capability. The hypothesis is that reliance on computer management of information will: effectively eliminate paper files; and, the computer files that replace these will either: be located remotely in safe haven; or, be easily destroyed. These assumptions are examined in detail, last first.

Easy destruction of computer files springs readily to the mind of anyone who has had to rely on computer storage of data. A confluence of factors make the accidental "destruction" of our data a too-frequent occurrence. Whether these accidents are caused by hardware "glitches", software "bugs", or operator error, the incidence of unusable data is quite real. It is worthwhile to look in more detail at such events, and at the normal procedures which protect against such accidental destruction, thus minimizing the impact on everyday work. When the computer informs us, arcanely: "Abend/parity error/file not found" or the like, it is saying only that the data is not normally recoverable (i.e., it may not be recoverable in its entirety, and extraordinary techniques might be needed for its retrieval.) Such examples of quick "destruction" provide little comfort in the face of a determined, and modestly sophisticated foe with reasonable time to recover the data.

More importantly, however, the frequency of such accidental unavailability of data leads to operating procedures which keep "backup" copies of the files on "backup" disks, with "backup" tapes . . . and, typically, with hard-copy, paper "backup". We should not lose sight of the fact that the computer is the largest generator of paper in any organization.

Suppose, however, we have conquered the accidental unavailability problems, (an important design constraint for such an application) thus obviating the need for extensive paper backup. Now we can concentrate on purposeful destruction of computer stored data. Three major types of destruction are considered: electrically altering the appearance of the data; electrically/magnetically destroying the data; and physical destruction of the storage media.

electrical alteration refers to the practice of overwriting the data with new, meaningless data which obscures the original. This technique can be used with (nearly) all types of computer storage (solid state memory, core, disk, tape) and requires the storage to be on-line (another important design constraint).

electrical destruction depends on the fact that some computer storage retains data only when powered ("volatile" solid state memory) so that powering down the memory destroys the data.

magnetic destruction refers to the degaussing of magnetic storage media (disk and tape) and works best with demountable storage media.

physical destruction is the mechanical/chemical disintegration of the media upon which the data are stored, and works best with smaller, less dense storage media, the less rigid (floppy disk as opposed to hard Winchester technology) the better. The storage media must be demounted.

Procedurally, each form of destruction would proceed in turn for ultimate assurance against determined recovery: electrically alter, demount and degauss, and then disintegrate.

The reconstitution would, of course, depend upon the stage to which destruction had been carried. The media might have to be replaced, perhaps from stock. Replacement of information, however, puts a severe demand upon the telecommunications, precisely at the time when other demands are being placed upon it, for command and control, and reporting, and precisely at the time when it is likely to be severely degraded, due to environment or host government actions. Ponder the notion of writing a disk memory over a 100wpm teletype circuit shared with other traffic, and with message overhead and error control which effectively halves the bandwidth. At an effective 25bps, a modern 300mb disk would require over 3 years to re-create.

The preceding analysis has been largely directed to on-site computer use. Operational considerations attendant on use of remote ADP, traditionally dictate reserve paper files as well as redundant, high-bandwidth (expensive) telecommunications.

Otherwise, inevitable communications outages seriously degrade day to day operations. Remember, too, that good telecommunications are least likely to be available precisely during the periods in which it is necessary to have a quick destruction window, and there will be an irresistible temptation to keep backup paper files. Thus, the quick destruction goal must be achieved in harmony with adequate normal operation, and acceptable, if degraded emergency operation. This must mean quick reconstitution, or guaranteed all-weather remote access to safe haven computing, which again implies expensive telecommunications.

As we have seen, destruction and reconstitution must be considered together. Let us formalize this slightly. There ultimately will be a decision between two alternatives: DESTROY, or RETAIN. Applicable to that decision are two states of the world: Destruction Really Required, or Destruction Not Really Required. In the face of imperfect knowledge, and imperfect decision makers, four outcomes are possible:

a. We destroyed when it was required;

b. We retained and destruction was not really required;

c. We retained when destruction was required;

d. We destroyed when destruction was not really required.

Costs/benefits can be assigned to each outcome. The first two outcomes, a and b, were good; the last two outcomes, c and d, were unfortunate. This is shown below.

a decision is made to:

when, in fact,	**DESTROY**	**RETAIN**
Destruction REQUIRED probability = P	(a) GOOD OUTCOME Loss prevention	(c) BAD OUTCOME Possible loss of assets & other grave damage
Destruction NOT REQUIRED probability = (1-P)	(d) BAD OUTCOME Cost a function of time/expense to reconstitute	(b) GOOD OUTCOME Normal operations unimpaired

Current events focus our attention on the cost of outcome c. However, it is just as important to focus on the cost of outcome d because our decision as to whether to destroy or retain is influenced by the entire outcome cost/benefit matrix as well as our apriori assessment of the probability that destruction will really be required.

Uncertainty in assessing the probability that destruction will, in fact, be required, coupled with the cost of outcome d (the cost of reconstitution) tempts us to postpone as long as possible the actual decision. And, the desire to postpone "as long as possible" the decision to destroy, forces us into demanding, say, a reduction in holdings to a one-hour destruct cycle.

Thus, reducing the reconstitution time is a very important, sometimes overlooked design constraint . . . not only because it impairs subsequent operations, but because it impacts our decision as to when to destroy.

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Encrypted storage of information allows us to add a new type of "destruction" to our list above:

> ***Key destruction***—destroying the crypto keys which had been used to encrypt a data file renders that data unintelligible; the key volume, being much smaller than the volume of total information allows quicker destruction by any of the previously discussed techniques. More importantly the small volume of key material can be quickly reconstituted, thereby quickly reconstituting the information.

Encrypted storage of information, no matter the media on which it is stored (disk, tape, cassette, etc.), also affords much better protection overall, inasmuch as it is the smaller amount of key which must be most strongly protected.

In assessing the utility of encrypted storage, several constraints must be examined. First, there is the question of how secure the encrypted material is? How resistant is it to concerted attack? If not resistant to attack, we would certainly not wish to hand to a determined adversary a disk-full of data. For the field station, however, it is useful to remember how the bulk of the data was received, or sent . . . by encrypted telecommunications. Any realistic threat assessment must assume that the determined adversaries already have disks full of our encrypted data. We are, then, no more constrained by the encryption algorithm's robustness (or lack thereof) for static storage than we were for communication of that same information.

A second constraint is the increased key management which would be required. Today, the domain of keys managed (generated, indexed and stored for retrieval, and destroyed) is limited. Use of cryptography for static storage would, perhaps: double the amount of key which would need to be generated (and, perhaps halve the design life of an algorithm); double the amount of key which would need to be destroyed, in steady state; and increase more markedly the amount and velocity of index, storage, and retrieval.

Another constraint which would need to be examined is the possible difference between keys for static storage, and transient communication use. (Although the image of our adversary's National Storage Agency full of statically stored, encrypted data should provide the Occam's razor for this perceived dilemma.)

A third constraint is the granularity with which keys are assigned to data. Some alternative assignment strategies include:

— key per physical storage space . . . key per disk

— key per logical storage device

— key per physical/logical record

— key per entity/attribute in a database

We move from the former to the latter strategies as our goal changes from simply overall protection and quick destruction/reconstitution to compartmentation and command privacy at an elemental level.

Another design factor is the use of a master key to encrypt the individual keys required by our choice of granularity, which enforces the command privacy and appears to reduce still further the amount of material which needs immediate destruction. Whether this weakens the overall security afforded is equivalent to our faith in deterministic key generation by (presumably) known algorithm from a starting seed. (A blade for Occam's razor.) The desirability of repeatedly changing the master key is a function of the depth of the algorithm.

Another constraint to be investigated is the problem of updating data files and retrieving a portion of a file if a key of coarse granularity has been decided upon. Choice of design strategy here is the same as the dilemma of having a sequential-access device of finite speed serve as a random access memory, and the same blocking issues suffice. We need be no more constrained in using an encrypted disk than a clear text disk, inasmuch as the disk is, at best, block-sequential. (Another blade for Occam.) Another proven strategy for dealing with the update problem is that used with write-once media (from paper tape to optical disks to journals) or extremely large, sequential files—i.e., update by "posting" transactions, and (infrequent) batch reorganizations.

A first cut design, then, argues for a policy-high, red computer with all dynamic, solid-state memory; all other memory devices are I/O devices with crypto on the red side of error control protocols (e.g., CRC calculation.)

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5. ALTERNATIVE MANAGEMENT STRUCTURES

In addressing alternative management systems for information services, the consideration is to what degree management of information services should be centralized or decentralized.

However, the problem cannot be dealt with in such global form. One must decide what is to be centralized or decentralized. The management alternatives that follow are derived by viewing the problem from three levels of management control. This analysis technique is employed by IBM in their methodology for business systems planning which is in turn based on a method of organizational analysis developed at Harvard.

The methodology speaks to three levels of control:

Level 1: Strategic Planning—the process of deciding on objectives of the organization, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of resources.

Level 2: Management Control—the process by which managers assure that resources are obtained and used efficiently in the accomplishment of the organization's objectives.

Level 3: Operational Control—the process of assuring that specific tasks are carried out effectively and efficiently.

As applied to Agency Information Handling, the questions become:

— How should we organize to set goals for information services, decide investment strategies, and set policy on system acquisition, use and disposition?

— Who should prepare and defend, budgets, control positions, and manage the careers of information service specialists?

— Who should be in day-to-day command of operational systems and their staffs?

If one considers the possibility of placing each of these controls at different organizational levels, i.e., Agency, directorate, or office level then many options are made available for evaluation. Adding to the possible list of line options is the concept of addressing strategic planning through staff organizations.

The option tree which follows depicts the range of alternatives selected by the Task Force for study. This tree identifies six families (enclosed in boxes) of options that are described in some detail in Attachment C.

5.1. Executive Committee Guidance

The DCI's Executive Committee has reviewed all options presented in Attachment C of this report. In selecting the preferred option, the major factors considered were:

A. User Satisfaction—the degree to which information services produce satisfaction both internally and externally.

B. Planning and Budgeting—the degree to which an organization allows us to assess the current state of affairs, forecast the future, defend and allocate resources rationally.

C. Disruption—the degree to which an organizational change will interfere with the provision and use of current information services.

D. Information Control—the degree to which an organization allows us to insure that information is provided only to those with an officially approved need-to-know.

E. Personnel Resources—the organization's ability to recruit, train, and maintain a skilled cadre of information specialists.

The findings of EXCOM were:

A. There is a need for a central planning function in CIA to provide a more coherent development of future information systems.

B. While there may be justification for structural change along the lines recommended by this report, creating a total new directorate is judged undesirable due to the decrease in user satisfaction that results from the inertia and insensitivity of an overly large organization.

C. An increase in Agency level career management was judged to be unwarranted at this time. Furthermore, at least one senior manager views authority over career services as a key element in maintenance of effective compartmentation.

D. There may be virtue in greater use of mission budgeting for some forms of information services. However, rapid shifts in budgeting strategy can have negative effects in terms of external relationships. For the near term, it is judged better to maintain the central service budgets but with a more relaxed view toward mission budgeting as a means to capture necessary resources when central services are unable to adequately defend the total Agency need.

In sum, it was the consensus of the Executive Committee that the only change in Agency level management justified at this time is the creation of a System Architectural function to plan for future information systems from the broader Agency viewpoint.

Further organization and management change that may be indicated by the results of this report and the establishment of the Architect is the responsibility of each Deputy Director.

The remainder of this chapter addresses itself to regulatory establishment of a Systems Architect.

5.2. Architect of Information Services

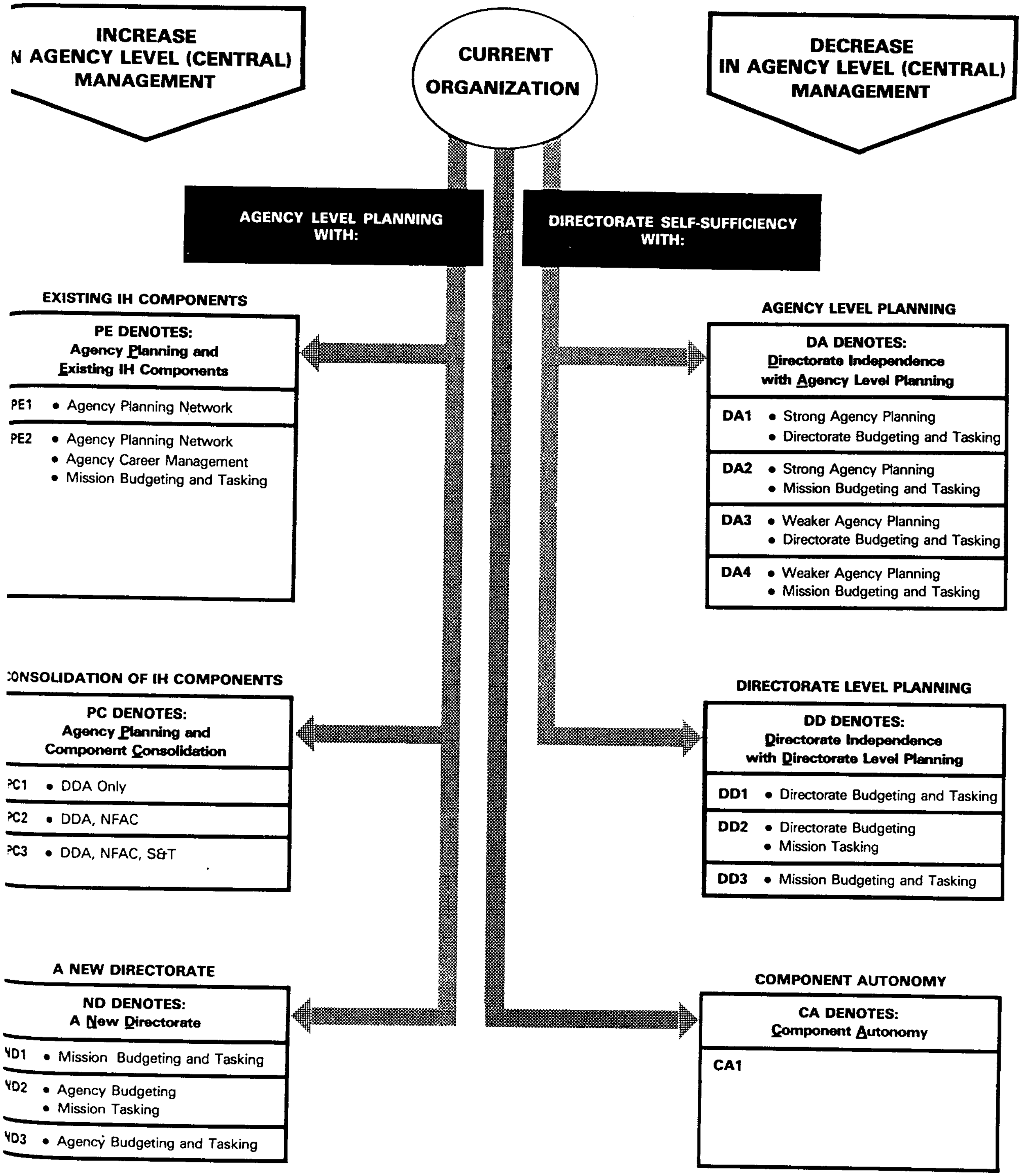
Mission:

Performs Agency level planning for Information services with particular emphasis on application of technology.

Functions:

1. Publishes Strategic goals and objectives for purpose of program guidance.
2. Monitors progress toward goals and objectives and reports state of Information Handling to EXCOM (incorporates ADP review).

Organizational Options for IH Management



3. Consolidates requirements for IH to maximize commonality and minimize unique development.
4. Conducts design reviews during conceptual design phase.
5. Maintains technology forecast and reports trends to management.
6. Acts as Agency focal point to Community on matters of IH.
7. Commissions system designs to fulfill architecture.
8. Initiates studies and analyses for the purpose of identifying ways to improve effectiveness and efficiency of IH.
9. Maintains a current data base on the status of information systems and their interrelationships.

5.3. The Appeal Mechanism

The reasons for appeal are:

1. Failure of the Agency plan to satisfy Directorate requirements.
2. Failure of a Directorate to adequately program for fulfillment of the approved plan.
3. An irreconcilable policy difference between or among the Architect and the Directorates that impedes planning and implementation.

The process of appeal may be initiated by the Architect or a Deputy Director. The appeal will be addressed to the DDCI and will contain a well defined statement of the issue, a succinct statement of the rationale supporting the originator's position, and a recommended alternative course of action. A copy of the appeal will be provided to contending parties who will prepare respective position papers for the DDCI.

The DDCI may refer the issue to EXCOM for further advice and may refer the issue to the DCI for resolution.

5.4. The Architectural Staff

The Architectural Staff should consist of a Chief Architect, four technical specialists, and clerical support.

The Chief Architect should be of senior grade, have substantial experience and interest in management of technical activities, a proven record of high calibre representation and ability to maintain good interpersonal relationships with subordinates, peers and superiors. Broad technical background encompassing communications and ADP is highly desirable. The position is expected to demand aggressive advocacy of controversial concepts. The incumbent should have a knowledge of Agency organization and management processes.

The technical specialists should consist of:

1. A systems engineer widely knowledgeable of telecommunications, ADP, and word processing technologies. This person should have reasonable experience in project management of large systems, exhibit good interpersonal relationships, be articulate, capable of producing well written correspondence.

2. A software specialist widely knowledgeable of operating systems, applications, and have experience with project management of software development. Personal characteristics should be similar to those above.
3. A database specialist broadly knowledgeable of principles of information storage and retrieval regardless of media, familiar with Federal regulations concerning storage and disposal of official records, and having personal experience with design and maintenance of electronic data bases. Personal characteristics as above.
4. A human factors specialist with a wide-range of experience in dealing with man-machine interfaces, knowledgeable of system documentations systems and procedures, and capable of providing guidance on user training courses and their construction. Personal characteristics as above.
5. A senior clerical with broad knowledge of Agency administrative procedures, qualified operator of word processing and computer terminals, capable of performing as a para-professional to Staff Officers in addition to performing normal secretarial functions.

5.5. Positioning the Architect

There are two organizational locations considered for the Agency Architect. One location is the Office of the DCI and the other is within an existing Directorate.

Within the Office of the DCI the Architect could be directly supervised or seconded to an existing staff organization such as the Comptroller or EXCOM Staff. From the Architect's perspective there will be a desire to have the DCI as organizationally close and accessible as possible in order to enhance power and authority over the planning function. However, placing the Architect immediately under the DCI is judged unsatisfactory because it inevitably diverts DCI time and attention to highly technical subject matters in greater depth, out of proportion to other areas of DCI responsibility.

This leads to examination of other possibilities within O/DCI that would provide a supervisory buffer between the DCI and the Architect. One possibility is the EXCOM Staff. But, while the architectural function may bear some similarity to the Agency strategic planning function recently installed in that Staff, the architectural function has a vital need to be institutionalized in a way that guarantees more permanence than historically exhibited by staff organizations at the DCI level. The Office of the Comptroller represents an O/DCI organization with permanence. However, there is wide concern that seconding the architectural function to the Comptroller will result in overriding emphasis on perceived resource constraints as a planning criteria.

In sum, it appears that the advantages of positioning the Architect in O/DCI accrue only to the Architect in terms of enhanced prestige and implied authority. The disadvantages are excessive demands on DCI time and attention for lower level technical issues or questionable survivability of the function beyond the tenure of current Agency leadership or over-riding emphasis on resource constraints in the planning process.

The second option, delegating the architectural function to a Directorate appears to avoid the major disadvantages associated with placement in O/DCI. However, this advantage is at least partially offset by the lesser prestige and potential diminution of authority and influence inevitably resulting from competitive forces among the Directorates.

If delegation to a Directorate is considered, then the logical candidate is the DDA. This Directorate has the bulk of the resources and expertise peculiar to the IH function. It also holds a unique responsibility among Directorates to ensure equality of service Agency-wide.

From the DDA perspective there is advantage to having a staff function that can provide impartial advice and assistance to Directorate management on the large number of technical issues arising among DDA components in provision of information services.

Placement in the DDA will be seen as a disadvantage by users since they will reasonably expect planning efforts to reflect the dominant concerns of DDA support elements at varying degrees of sacrifice of user satisfaction. To ensure a proper balance of user and provider concerns, there should be heavy emphasis on meaningful user participation in planning and well defined appeal mechanisms.

One means of redressing the perceived provider/user imbalance is a larger committment to mission budgeting which gives users increased resource control and hence, more influence in the planning process. In fact, mission-budgeting implemented in its most extreme form could over-compensate the system to the detriment of both central services and architectural function.

In lieu of significant shifts in budgeting responsibility, the best candidate solution for providing provider/user balance is formalization of a user group that can deal with requirement consolidation, requirement priorities, and critical review of architectural plans. Representatives to the group would be Directorate spokesmen. The Architect would assume the role of arbitrator amongst users and providers. Appeals above the Architect would be first to the Deputy Director level, and beyond that, the DCI/EXCOM level.

The alternative of legislating inter-directorate representation on the architectural staff itself is considered too constraining on the personnel selection process to warrant serious consideration. This is not to say that all expertise should be drawn from within the DDA, but that the selection process should place prime emphasis on job qualification without regard to current career allegiance.

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6. RECOMMENDATIONS

6.1. Organizational Changes

6.1.1. Create an Information Services Architect to maintain and publish an Agency strategic plan for the development of information services. (ref. 4.1.2)

Approve: Disapprove:

(Approved)

6.1.2. Assign the Information Services Architect to the Deputy Director for Administration. (ref. 5.)

Approve: Disapprove:

(Approved)

6.1.3. Charge the Deputy Director of Administration with responsibility for accomplishing within six months:

A. Establishment of a joint planning mechanism to produce a unified plan for information services of OC, ODP, and OL/P&PD.

B. Creation of a plan and time table for restructuring DDA line components in accordance with the needs of this strategic plan and with due consideration of the issues raised by this report. (ref. 4.2.2, 4.2.3, 4.2.4, 4.2.6, 4.2.7, 4.4.2)

Approve: Disapprove:

(The DDA intends to complete an organizational review within the year)

6.2. Management Change

6.2.1. Expand the scope of the current EXCOM ADP review to incorporate all information services and charge the Architect for Information Services with management of the preparation and presentation of that review. (ref. 4.1.4)

Approve: Disapprove:

(Approved)

6.2.2. Mission components should program, budget and defend capital investments required to provide dedicated information services. (ref. 4.1.3)

Approve: Disapprove:

(For disposition see pg 5-1)

6.2.3. Directorates should develop and implement plans to centralize career management of personnel devoted to provision of information services. Early attention should be given to centralized management of ADP and registry personnel. (ref. 4.1.5)

Approve: Disapprove:

(For disposition see pg 5-1)

6.3. Programmatic Objectives

6.3.1. Assign responsibility to the DDA for design and implementation of a unified information distribution network whose nodes are conveniently located throughout Agency facilities and which contain facilities for storage, transmission, printing and sorting of electrical information. Management of those nodes will emphasize security, compartmentation and accountability for information. (ref. 4.2.6) (C 3d(3))

Approve: Disapprove:

(The DDA will initiate planning)

6.3.2. Assign responsibility to the DDA for evolutionary development of a universal terminal network that will provide wide electrical interconnectivity with compartmentation and command privacy enforced through cryptographic separation. (ref. 4.2.7) (C 3d(3))

Approve: Disapprove:

(The DDA will initiate planning)

6.3.3. Charge the Architect for Information Services with developing a concept and commissioning the design of a centralized data base of dissemination requirements that allows controlled, shared access to all Agency disseminators. (ref. 4.2.8) (C 3d(3))

Approve: Disapprove:

(The DDA will initiate planning)

6.3.4. Place Agency priority on modernization of the communications plant to expand capacity, quality and interconnectivity required to support increased electrical flow. (C 3d(3))

Approve: Disapprove:

(The DDA will initiate planning)

6.3.5. In the interests of security, legality, and public image, there needs to be a central, easily accessed repository of data regarding information released to the public, the media, and outside the Executive Branch. A central system should be useable by and responsive to users concerned with FOIA and Privacy requests, Public Affairs Office, OLC, OGC, Office of Comptroller, DCI and DDCI Staffs. The purposes of this repository would be consistency of judgements with regard to releasability, maintenance of operational integrity, and more efficient administration. It is recommended that analysis of alternative means for establishing such a system, including use of commercial bibliographic reference services, be commissioned by EXCOM. (ref. 3.8.e.)

Approve: Disapprove:

(Disapproved due to degree of difficulty)

6.4. Security Procedures

6.4.1. Establish systems of control and accountability for all transportable, machine writeable, non-human readable storage media, e.g., magnetic cards, tapes and disks. Such media must be presumed to contain information of the highest sensitivity. (S 3d(5))

Approve: Disapprove:

(DDA has accepted action)

6.4.2. With increasing application of technology comes enhanced ability to positively account for sensitive information. This opportunity should be exploited to implement complete audit trails on all Top Secret and compartmented information within Agency computer data bases. The Office of Security should implement systems and procedures to frequently review audit information for anomalous accesses. (S 3d(5))

Approve: Disapprove:

(DDA has accepted action)

6.4.3. As classified databases more and more exist on-line, encouragement should be given to on-line queries from a terminal. Second-hand queries made via telephone should be discouraged. Accesses via terminal are easily recorded and audited. Most important, the terminal provides a more positive authentication of the requestor than the telephone. (S 3d(5))

Approve: Disapprove:

(DDA has accepted action)

6.5. Personnel Activities

6.5.1. The gradual extension of information handling technology into the office environment creates a need for more informed users. It is recommended that all career services incorporate some form of familiarization training in career development plans. Such training might include ADP familiarization, Office Automation, and information management depending upon the nature of the service and the level of the employee.

Approve: Disapprove:

(No action)

6.5.2. The Task Force has observed instances of user ignorance or apathy with respect to current information services. It is recommended that an indoctrination program be designed for all employees. This indoctrination, which can be integrated into other Agency-wide programs, should provide information on available services with emphasis on the user responsibility to the service, e.g., establishing and maintaining dissemination profiles.

Approve: Disapprove:

(DDA has accepted action)

6.6. Policy and Administrative Action

6.6.1. There needs to be a definitive policy statement for contingency planning. This policy should cover a range of eventualities from brown-outs to natural disaster and nuclear conflict. (ref. 4.1.6)

Approve: Disapprove:

(Action deferred pending development of larger Agency issue)

6.6.2. Future programs and budgets should address contingency planning by separately identifying added costs.

Approve: Disapprove:

(Action deferred)

6.6.3. It is recommended that this report be given wide distribution within the Agency as a means of publicizing the goals program and the rationale underlying the accompanying management decisions.

Approve: Disapprove:

(DDA action)

ALL PORTIONS THIS CHAPTER UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

2 SEPTEMBER 1980

ATTACHMENT A

INFORMATION HANDLING STUDY PLAN

The following paragraphs outline a plan for conduct of a study of information handling within CIA. The primary objective of this study is development of a strategic plan for the provision and use of information services.

In formulating a methodology for the study, one factor was of primary influence:

Participation by those components affected by the plan is critical to its ultimate acceptance and implementation.

The schedule has been developed within the 12-month constraint stipulated. Seven tasks are defined below and a milestone chart is attached.

While priority will be given to production of the strategic plan, it is anticipated that near-term issues will be found that should be resolved by senior Agency management within the study time frame. Therefore, the Task Force will submit separate issue papers to EXCOM with recommendations for resolution whenever warranted.

There is no apparent need for sustained contractual support. Limited amounts of consultative service may be desirable. FY-80 funding of $IOK appears ample for consultation and limited team travel.

Task one of the study will be interaction with each component which provides information services. The end result will be a coherent and consistent representation of each component's services and plans, prepared by the study group and verified by the respective component.

Task two will be an analysis of the provider component plans for the purpose of identifying required coordination. Task two will highlight the assumptions of information service use on which near-term investments are predicated.

Task three will be the process of developing with each component a representation of its plans for the use of information services.

Although there is some risk that the amount of Task Force time that might be consumed by tasks one and three may be greater than estimated, current estimates are judged to be reasonable. However, alternate strategies are available to stay within schedule and will be proposed if experience dictates the need.

Task four will be the analysis and aggregation of the projections for the use of information services and the identification of issues related to the use of these services.

Task five of the study will involve the correlation of the planning for the provision and use of information services. The collection and analysis steps in tasks one through four will enable the Task Force to develop a cross-impact matrix which will show the plans of both providers and users of information services. This matrix should be available on/about the ninth month of the study.

Task six will be an analysis of the matrix developed in task five to yield:

— residual, unresolved areas of overlap and duplication

— major gaps between the demand for information services and their supply

— the impact of postponing or accelerating resource investments.

With this information in hand, the Task Force will develop various applicable planning strategies for EXCOM consideration. EXCOM's choice(s) among these alternate strategies will determine the direction of the Task Force's remaining task—the preparation of the final report.

Task seven—Based on the guidance received from EXCOM, the strategic plan will be finalized and submitted for their review and approval. Any remaining unresolved issues will be documented along with recommendations for resolution.

TERMS OF REFERENCE—INFORMATION HANDLING STUDY

The following paragraphs constitute the proposed terms of reference for the Information Handling Study approved by the DDCI on 7 May 1979.

The definition of Information Handling contained in EXCOM-19-79 is accepted as the most appropriate for the purposes of this study:

> ***Information handling in CIA is the systematic creation, movement, use, storage, retrieval, and disposal of intelligence and management information with the support of automated or other clearly identifiable processes and with due regard for control of sensitive and compartmented data.***

The Information Handling problem has been restated to clarify the reason for the study.

> **Problem:** ***There is concern that traditional institutions dealing with provision of information services are becoming less effective as new technologies evolve, demand for service grows, and Agency resources shrink. There needs to be a reconciliation of demand vs. supply, a strategy for future investment, and assurance that appropriate institutions exist to execute the strategy.***

The major goal of the Information Handling Study is to develop a comprehensive information handling strategy for the Agency and, if appropriate, define a management structure for more formal continuing coordination of the Agency's information handling activities. The strategy will evolve from a clear definition of needs and plans to meet these within resource constraints. The proposed elements of the strategy are: management, organization, operation, security, technology, and personnel.

The study will focus on the provision and use of information services within the Agency. Information services will be defined as those disciplines and technologies whose purpose is to facilitate information handling. The study will address the interface of the Agency information systems with collection and processing systems.

The primary product of the study will be a strategic plan covering the next ten-year period, addressing provision and use of information services. The strategic plan will establish goals and priorities, speak to the resources required to address those goals, and set policy governing acquisition, use and disposition of resources. The structure of the plan will be such that subsequent planning for implementation can be delegated to lower levels. The plan will allow for orderly piecewise execution in consonance with resource allocations and operational imperatives.

If warranted, the plan will be accompanied by recommendations for changes in management systems and organizational structure.

Issues which the study will include, but not be limited to are:

a. Management

To what degree can central management of information handling contribute to the provision of information services? While there is popular enthusiasm for further centralization of management functions associated with information handling, there needs to be a careful assessment of what functions need to be centralized to improve provision and use of information services.

b. Standards

To what degree can standardization contribute to the efficiency and effectiveness with which information services are provided? Standards could cover equipment, programming, engineering, documentation, or management systems.

c. Structure

To what degree should technology influence Agency organization? The apportionment of missions to some components is based, in part, on historic technological definitions which may now be obsolete. As technology evolves, a reallocation of the division of labor might be useful and even necessary to clarify roles. However, the value of organizational realignment must be weighed against the employee morale, personnel management, and budgetary impact of change.

d. Compartmentation

To what degree can systems and data bases be shared without jeopardy to security and compartmentation? Increased efficiency will often result from aggregation of user needs and resource sharing. Strategies need to be identified that will maximize efficiencies within constraints imposed by security and compartmentation.

THIS ATTACHMENT IS UNCLASSIFIED IN ITS ENTIRETY.

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ATTACHMENT B

INFORMATION HANDLING SERVICES

Introduction (U)

This Attachment describes in some additional detail, the current status and trends of the various categories of information handling services briefly presented in the Synopsis Section of the report. (U)

The information contained in this attachment is not intended to be exhaustive. Sufficient coverage has been provided however to familiarize the reader with the variety of systems encompassed by the term 'information handling' and to illustrate the magnitude of information handling activities in the Agency today. (U)

The first six categories will be addressed primarily by the media in which the information has been recorded. We have defined three media classes that will be referenced:

1. Electronic/Magnetic

   Electronic encompasses the media in which information can be stored, processed or transmitted by telecommunications or computing hardware devices. The primary repositories for this class of media are magnetic drum, disk, card and tape storage devices associated with communications, text or data processing systems. (U)

2. Document

   Documents are any printed or typed paper media containing textual data which is human readable. This class includes hard-copy representations of information that may have been stored or transmitted in electronic form. (U)

3. Graphic

   Graphics include all film based media such as microforms and photographs plus maps, graphs, and other non-textual representations. (U)

Each category or media based subcategory will address:

1. The primary facilities and/or providers of the service. (U)
2. Recent (last year or two) significant trends or activities in this area. The purpose here is to provide some sense of how dynamic this service area is and the direction in which the Agency seems to be moving. (U)
3. Anticipated (next year or two) system implementations or events that can be expected to impact this category. The purpose of this information is to alert the reader to the near-term implication of systems or procedures that are contemplated or being implemented but not yet operational or deployed. (U)

B.1. Recording of Information

This category includes all facilities which enable the generation or capture of information in a medium that will support subsequent storage and exploitation of that information. It encompasses the mechanisms by which Agency components can put information into a retention medium.

a. Recording of Information in an Electronic Media

(1) Significant Facilities

(a) Data Entry Keying

Both ODP and IMS provide central facilities which are used to key information into a magnetic medium for eventual transfer to computer storage.

(b) Terminal Input

The large population of remote terminals connected to the central computer facilities of ODP and NPIC provide a capability for users to directly record information into computer-based files.

(c) Optical Character Reading (OCR)

The primary OCR capability for converting typed information to electronic media is provided by OC's ACT-O facility. This device enables the entry of typed cables into the CDS system for subsequent distribution.

(d) Map Digitizing

OGCR utilizes several minicomputer based systems which convert printed maps to electronic form. These digitized files (essentially World Data Banks I and II) are used for dynamic map recreation on both graphic terminals and plotters.

(2) Recent Activities

(a) The Agency is experiencing a significant growth in the availability of remote terminal devices. This has largely been in response to users' requirements for data entry facilities.

(b) This growth in terminal devices has been augmented by the development of terminal related software which provides services such as menu selection and data validation support to data entry functions.

(c) The Electronic Time and Attendance Reporting System (ETARS) illustrates an initial step in providing a facility to electronically capture information from overseas locations.

(d) Software has recently been implemented which enables a user to compose a cable on the ODP time-sharing system and subsequently print the cable in a format and type font which is compatible for input to the OCR facility of CDS.

(3) Anticipated Events

(a) The SAFE system, when fully implemented, will offer the NFAC users an additional capability for recording information. This will be provided via the COMPOSE function.

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(b) The advent of CRAFT and CLASS A systems will extend the overseas entry facilities initiated by ETARS.

(c) OCR will be investigating (Project OSCAR) the availability and applicability of utilizing advanced multi-font optical character readers to convert documents to electronic media for subsequent exploitation by SAFE.

(d) The implementation of ODP's Message Processing System (MPS) will enable a user to compose a cable in the time-sharing system and transfer it electrically to CDS for subsequent distribution.

b. Recording Information in Document Media

Facilities for recording information in a document medium will be further subdivided into three printing types:

Word processing facilities (WP)

Traditional printing press facilities

Computer controlled printing facilities.

(1) Word Processing

While many word processing devices are capable of storing their information in electronic form, and thus could be considered a mechanism for recording electronic information, the primary purpose is to directly or indirectly produce a document, thus for descriptive purposes, WP is considered a facility for recording information in a document medium.

(a) Primary Facilities

— Standard Typewriters—The primary method for creating documents continues to be the large population of standard electric and manual typewriters which have no electronic recording or communications capabilities.

— Independent Word Processors—These facilities consist of the non-communicating typewriters or display terminals with electronic recording and display capability. These stand-alone units are typified by the ubiquitous IBM magnetic card devices.

— Communicating Word Processors—These word processing devices are local units which have a communications capability with other local devices or the central computing systems. This type of WP device is represented by the communicating magnetic card devices, NBI 3000 and IBM System 6 systems.

— Central WP Services—Word processing facilities are available to ODP terminal users via the SCRIPT time-sharing service and the related XEROX 9700, IBM 6670 and Design 100 high-quality printing devices.

(b) Recent Activities

— In recognition of the fact that the functional similarities between WP and ADP are becoming more interrelated, the responsibility to monitor and approve the acquisition of word processing equipment was transferred from DDA/ISS to DDA/ODP in July 1979.

— NFAC has selected the NBI 3000 as its standard WP device. This is viewed as an interim standard pending the development and deployment of the Agency standard terminal and its associated WP facilities.

— The DO plans to experiment with several different WP devices in an attempt to identify a standard device for overseas use.

(c) Anticipated Events

— The SAFE and CRAFT systems will provide their users with WP types of services.

— The new standard soft-copy terminal will provide the user with local as well as centrally supported WP services.

— ODP plans to develop an office automation facility which will be a logical extension to the current WP facilities available in the SCRIPT system. This service will provide the time-sharing user with additional 'electronic mail' type functions.

— Communications links are planned which will enable data to be transmitted through the ODP central time sharing facility, the System 6 in PPG, NBI 3000 terminals in NFAC and the ETEC system in P&PD. While the ETEC system does provide WP services, for purposes of this discussion, it is included as part of the printing press facility described below.

(2) Printing Presses

(a) Significant Facilities

— Traditional printing facilities are found in P&PD, NPIC and JPRS. P&PD, in addition, utilizes the minicomputer-based ETEC system to enable users and P&PD personnel to prepare text for photo-typeset printing.

(b) Recent Activities

— The acceptance of the ETEC facility to prepare text for publication-quality printing has necessitated a steady growth in the amount of equipment required. A third CPU and related peripherals have recently been added to keep up with user requirements.

(c) Anticipated Activities

— A communication link which will enable the transfer of textual data between ETECS and the ODP central systems will be implemented shortly. This will enable ODP users to transfer ODP resident files to ETECS for print preparation and receive the edited files from ETECS for subsequent storage or additional processing.

— The growing availability of computer-driven high-quality printing devices such as the XEROX 9700 and the IBM 6670 will offer the user an increasing access to a variety of printing systems other than the traditional printing facilities of the type offered by P&PD.

(3) Computer Controlled Printing Devices

This facility refers to the ability to use the printing devices associated with communications and data processing devices to produce a document.

(a) Significant Facilities

— Printers which are controlled by the central computing facilities of ODP and NPIC enable a variety of computer-based files to be printed.

— Printers associated with OC's communications facilities are used to create hard-copy cables.

— Wire service printers located in OCO.

(b) Recent Activities

— To speed the delivery of cable traffic to NFAC current intelligence analysts, ODP printers were recently installed in OCO. Cables are now electronically transferred from the OC CDS system to the ODP central system which then sorts the cables prior to printing in OCO.

— Use of the XEROX 9700 in ODP now enables the production of high-quality printed reports which formerly required P&PD facilities.

(c) Anticipated Events

— When implemented, the SAFE system will provide a network of printers which will enable the NFAC user to create reports at local, regional, or central facilities.

— The ADSTAR and DORIC-W microfilm storage and retrieval systems will provide regionally located devices to provide printed copies of the stored images.

— Automated Printing and Reproduction Systems (APARS) devices are planned to improve the efficiency of printing and delivering cables that have been processed by the CDS system. Units are to be installed in the OC Secretariat and four DO registries.

c. Recording Information in a Graphic Media

(1) Primary Facilities

(a) Microforms

A number of Agency components utilize micrographics equipment to record information. The most extensive facilities are currently found in P&PD, IMS and OCR.

(b) Map Creation

OGCR provides map creation facilities primarily through the use of their own high-speed plotting devices and a computerized store of cartographic information.

(c) Computer Graphic Terminals and Plotting Devices

ODP central facilities enable the user to display graphic cartographic information on display terminals, and if desired, produce a hard-copy representation of the display. In addition, high-speed plotting devices are available to produce higher quality or more complicated graphic representations.

(d) Visual Aids

Several organizations currently support the creation of viewgraphs, slides, briefing boards and other graphic representations of information. P&PD and OGCR provide the most extensive facilities.

(2) Recent Activities

(a) OGCR recently installed the GENIGRAPHICS system which enables the creation of color 35 mm slides and viewgraphs.

(b) OGCR has also recently introduced a CRT-head equipped plotter which has drastically reduced the time needed to generate highly detailed thematic maps.

(c) PPG has established a center to evaluate the advantages of using video recording techniques to support the presentation of intelligence topics.

(d) The last two years have shown a significant growth in the use of graphic terminals available to the ODP computer center users and the introduction of the first color graphics devices.

(3) Anticipated Events

(a) The forthcoming implementation of OGCR's Meteorological, Agronomical, Geographical Analysis System (MAGAS) will enable a user to dynamically manipulate a variety of cartographic variables to produce CRT or plotter generated maps.

(b) The ADSTAR & DORIC-W systems will provide additional facilities to capture information in a graphic (film) medium.

B.2. Acquisition of Information

Acquisition refers to the receipt of information which has been collected or generated by non-CIA resources and acquired for Agency use. This category of service b. identifies the Agency windows through which externally produced information is made available for Agency exploitation.

a. Electronic Acquisition

(1) Primary Facilities:

— OCR subscribes to a number of on-line information systems which provide Agency personnel access to both classified community and unclassified commercial data bases and files. On-line facilities are located in OCR's TAP room and in the main library.

— OCR acquires magnetic tapes from commercial sources for NFAC consumers, e.g., OER.

— OC acquires both message and data transmissions from other US government components via the MAX and DATEX facilities.

— FBIS acquires/captures foreign broadcasts and transmits the results in electronic form to Agency users.

— OCO subscribes to all the major wire services and provides that information to Agency consumers.

— NPIC subscribes to [redacted] The OCR/NPIC duplication on these services is necessary because of the wide separation of the two facilities. 25X1 25X1

— NPIC obtains magnetic tapes from DIA on DIA target headers. The tape is used to produce hard-copy listings of DIA targets not contained in NPIC's IDF file.

— Several NFAC components are linked to the COINS system and to the NPIC Data System. The NDS provides direct access to imagery exploitation files as well as to the daily cables generated by NPIC.

(2) Recent Activities: 25X1

The Office of Economic Research has a recently negotiated contract with [redacted] a private corporation, to provide an on-line terminal link to [redacted] owned economic data files. [redacted] collects economic information which it stores in its own computers from a variety of Government and commercial organizations. 25X1 25X1

(3) Anticipated Events:

There is a trend to acquisition of more messages and data in electronic form driven by the growth of word processing and the expansion of computer-controlled communications networks. Current and planned developments in the Agency attest to the momentum of this trend. Project MERCURY, the upgrading of OC's worldwide communications facilities is one response. Project SAFE, the development of electronic support tools for the intelligence analyst is another.

b. Document Acquisition

(1) Primary Facilities:

The Office of Central Reference has primary responsibility for acquiring unclassified foreign and domestic publications for the Agency. Because the office is responsible for the dissemination of hard-copy (paper) classified documents it has an implied responsibility to negotiate for new sources of classified information as well.

(2) Recent Activities:

OCR's open-source acquisition function is presently being automated. The objective is to move from a highly labor intensive paper based system to one that permits manipulation of a wide variety of stored information on publication orders, subscriptions, receipts, billings, bibliographic data and customer information. The system covers both foreign and domestic acquisitions. The system uses software developed at the University of Minnesota under contract to HEW.

(3) Anticipated Events:

As the system becomes established in the Agency, OCR plans to expand the network to other community agencies to collect their requirements for publications. This would create a community acquisitions network. Some agencies are already generating publications requirements on their own computers but there is currently no available facility for interconnecting to OCR.

25X1

[redacted]

B.3. Dissemination of Information

Dissemination is the process of determining the component or individual that should be made aware of recorded or acquired information. Dissemination may consist of automated procedures which match the information content to a user interest profile or reading list and/or manual procedures in which a dissemination analyst reads the information to match content with user interest.

a. Electronic Dissemination

(1) Primary Facilities

— OC's Cable Dissemination System (CDS) is one of two major providers of electronic dissemination service. CDS software performs a comparison of the bibliographic and text portions of incoming cables with computer stored profiles of user requirements. Because of the limited text analysis capability, cable analysts review much of the message traffic on CRT screens and make additional dissemination decisions. The comparison of messages with requirements yields the computer generated name and address of the requester. Actual delivery to the requester is a distribution function which is described in the next section.

Responses to the comptroller's request to identify information handling problems and issues and to the subsequent requests by this task force to elaborate on such problems and issues identified much concern with delays in the dissemination process, concern that dissemination decisions did not account for requirements at a lower organizational level, and concern that various components involved in the dissemination process did not all use the same set of requirements on which to base dissemination decisions.

— OCR's Interim SAFE system is the second major provider of electronic dissemination service. The SAFE system stores the complete text of State cables (excluding EXDIS) and codeword materials (excluding GAMMA) for five days in electronic mail files which are selected by user defined profiles. The files are updated 12 times in 24 hours. Eight of the twelve updates occur between 0700 and 1500 hours daily. In addition, companion text files store State cables including (EXDIS), codeword (including GAMMA and some Agency traffic), [redacted] 25X1 military cables, DoD IR's and FBIS worldwide field traffic. The text files are updated once daily between 0300 and 0800 hours and stored for four weeks.

— A third electrical dissemination process is accomplished by the use of the OCR MAD software running in the ODP Ruffing Center. Electrically received OAK messages are received in the Headquarters Building sixth floor DATACOM Center, transmitted electrically to ODP where MAD Class 1 software matches the message with user profiles and prints sorted copies for subsequent distribution by OCR's Dissemination Branch.

— FBIS disseminates priority information from the field on a 24-hour FBIS wire service.

— The Office of Current Operations provides dissemination support to its various task forces using a Crisis Management Automated Support System (CMASS) minicomputer. Electrical messages are received from OC's Cable Dissemination System, and from the FBIS, Reuters, and Associated Press wire services and made available to NFAC analysts assigned to crisis task teams.

(2) Recent Activities

No significant information.

(3) Anticipated Events

— With increased use of telepouch and the installation of remote APARS in DO registries, the DO will assume increased responsibilities for cable dissemination.

— OCR's Interim SAFE project currently provides dissemination support to a limited number of NFAC consumers. The interim system will be replaced by a permanent system now under development which will greatly expand the dissemination service to several hundred users.

— ODP will develop office automation facilities to enable dissemination of documents created through ODP word processing facilities.

b. Document Dissemination

(1) Primary Facilities

— Each Agency component is essentially responsible for the dissemination of its own documents and publications. Most finished intelligence is disseminated by the originating component.

— OCR has the charter for developing and implementing dissemination policies and procedures in coordination with other Agency components. In actual practice, OCR disseminates the large majority of CIA and non-CIA hard-copy documents.

— DO/IMS disseminates pouched documents and FBI documents to DO area divisions.

— The Office of Development and Engineering disseminates special designee cables (BTKH) to all CIA components with requirements for Special Compartmented Intelligence (SCI).

— The Office of Technical Services operates the DIRTECH Signal Center which is part of the Agency Staff Network. OTS disseminates about 50,000 incoming and outgoing cables annually mostly within the OTS organization.

— OCO and RSG Watch Officers disseminate a variety of documents to Agency customers as part of their responsibility for alerting key Agency personnel to current developments.

— PPG registry and dissemination functions handle the product of eight NFAC offices and the NIO account.

— Various registries perform dissemination functions by redisseminating cables and documents to additional addressees at lower levels in the organization for which the registry is the primary delivery point.

(2) Recent Activities

No significant information.

(3) Anticipated Events

OCR has undertaken a study to determine the feasibility of converting hard-copy documents to electrical form via optical character reader. If the results are positive, Project OSCAR could result in reducing the number of hard-copy documents to be disseminated.

c. Graphic Dissemination

(1) Major Providers

NPIC Registry controls and disseminates all reports and graphics produced by tenants and host tenants in the center.

(2) Recent Activities

No significant information.

(3) Anticipated Events

No significant information.

B.4 Distribution of Information

Distribution refers to the physical movement of information in whatever media it is recorded.

a. Electronic Distribution

(1) Primary Facilities

— The Office of Communications is the major distributor of information recorded in electronic form followed by ODP. OC's Data Exchange (DATEX) and the Message Automated Switch (MAX) are the receipt and transfer points in Headquarters building for most electronic data entering the Agency. DATEX processes both data and message traffic and supports such varied customers as the COMIREX Automated Management System (CAMS), Remote Job Entry (RJE) to ODP's computers, and OCR's Interim SAFE. MAX processes narrative traffic (cables) which is passed to the Cable Dissemination System (CDS) and/or to Interim SAFE and to OCO. Both DATEX and MAX also process outgoing traffic.

— Although CDS is primarily a dissemination system, it also functions as a distribution system by passing high precedence cable traffic to OCO based on current intelligence requirements. The CDS also distributes message traffic directly to OCO's Crisis Management System (CMASS) computer based on geographic area interest profiles. The RSG and Imagery Watch Offices also receive electrical message traffic from CDS as well as directly from NSA and NPIC.

— Press reporting bypasses the DATEX and MAX facilities. FBIS wire service and the press wire services are distributed electrically to printers located in OCO. In addition to FBIS, Reuters traffic is distributed electrically to the CMASS computer.

— ODP's Automated Message Processor System (AMPS) links OC's CDS system and users who wish to receive message traffic electrically. AMPS distributes messages electrically (according to CDS applied dissemination codes) to NFAC's Message Routing Service (MRS), DO's document storage and retrieval system (COMET), the OF Electronic Time and Attendance Reporting System (ETARS), OCR's Interim SAFE, and others.

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(2) Recent Activities

A Message Routing System (MRS) was recently installed to cut down on the time delay between dissemination of a message by CDS and the subsequent receipt of the message by the NFAC customer. Messages are sent electrically by CDS to ODP's Automated Message Processing System (AMPS). AMPS feeds the MRS which sorts messages according to CDS dissemination instructions. The MRS then sends the sorted messages electrically to OCO where they are printed and placed in bins for NFAC customer pickup.

(3) Anticipated Events

— The Office of Communications is replacing current message switching systems (MAX'es) with state-of-the-art switching technology. This project (MERCURY) will increase Agency switching capacity and provide a broader range of data services to the foreign field.

— The Office of Communications has contracted with XEROX Corporation for an Automated Print and Reproduction System (APARS). The APARS unit operates under control of a built-in computer. The computer receives messages and distribution instructions from the CDS system, prints the appropriate number of copies, and sorts the copies into addressee bins for manual distribution. The DO has contracted for additional APARS units which will be used for the same purpose within the DO registries.

— The Office of Communications plans direct communications links to the SAFE and COMET systems. Interim SAFE is currently provided with OC cables via the ODP AMPS system. In the case of COMET, message traffic is recorded on magnetic tape and the tape physically transported to the DO system. There is no electrical link between ODP's Ruffing Center and the DO Special Center which could effect an electrical transfer between the AMPS and COMET systems.

— ODP plans a Message Processing System (MPS) to replace AMPS. The new system will permit messages to be routed electrically to various Agency components and will also support message traffic from an originating office via ODP to the OC systems of CDS, DATEX, and MAX.

— A large capacity electrical communications BUS facility is being installed under SAFE auspices. The BUS will have sufficient capacity to satisfy OC, ODP, and SAFE communication requirements within the Headquarters Building. Terminal and computer facilities now linked via the grid system will be transferred to the new BUS. The released capacity in the existing GRID will be used for an expanded secure phone system.

b. Non-Electronic Distribution of Information

(1) Primary Facilities

— The definition of distribution encompasses mail room and registry functions and courier and pneumatic tube services. Under this definition the following organizations/systems are the major providers of distribution service.

- OL/P&PD—Packages and mails printed products according to dissemination instructions of the originator.
- OCR/ADD—Packages and mails hard-copy intelligence documents according to dissemination decisions made by division dissemination analysts.
- All other Agency registries and mail rooms including DO/IMS and NFAC/OCO/PPG registries and the OL-operated main mail room.
- DO/IMS operation of an Agency-wide pouch service in support of overseas operations.
- OL, OS, OD&E and other Agency courier systems.

(2) Recent Activities

An Agency-wide study of the registry function has been completed by ISS. The study identifies functions which are common to all registries with the objective of promoting standardization prior to automation.

B.5 Information Reference Services

These services involve the storage and subsequent retrieval of information in whatever media it is recorded. A reference service is also defined to include any indexing or abstracting performed to facilitate retrieval and any information sanitization needed to release information to Agency or non-Agency recipients.

Information reference services are catalogued here according to whether they are electronic-, paper-, or microfilm-based. When different elements of a single system fall in different categories, each element is described under the most appropriate heading. e.g., in AEGIS, the index to the file is described as electronic-based, and different parts of the main file under document-based and microfilm- based systems.

a. Electronic-Based Information Reference Service

(1) Major Providers and Facilities

— The Office of Central Reference manages several storage and retrieval systems where part if not all of the information in each system is stored in electronic form. These systems are:

AEGIS/RECON Subject File—References (index records) to hard-copy and microfilm document files are stored on magnetic media. Queries can be batched or on- line. Output from the batch search is normally a machine printed listing of related hits. On-line searches are made via Cathode Ray Tube terminals. Output is available on the CRT screen, can be printed at a local printer, or can be printed off-line on a high-speed central printer.

Rapid Search Machine Files—Full-text documents are stored in a special format on magnetic tape. Queries recorded on punched cards are matched against the document text. Hits are recorded at an output printer where part or all of the document can be printed.

Interim SAFE—This system stores the full text of documents in mail and text files and document bibliographic records in a third file. Searches are made using a CRT. Output is available on the CRT or can be printed on an attached printer. Users have the capability to create their own private files. The mail file contains the complete text of State and codeword cables for a five-da [redacted] the full text of State and codeword cables, [redacted] Military cables, DOD/IR's and FBIS field traffic [redacted] e bibliographic file is a copy of the AEGIS subject file. 25X1

— The Office of Communications Cable Secretariat maintained, until recently, a 20-year cable archival file of (except Restricted Handling) Agency messages sent and received. No indexing or abstracting is done. Retrieval service presumes the requestor has sufficient data on messages sought to allow retrieval in a straightforward clerical fashion. Retrieval by key word and/or subject alone is not possible.

— The DO/IMS manages a variety of automated and manual files in support of the DO Area Divisions. The acronym, DORIC, for Directorate of Operations Records and Information Control System, is the umbrella acronym which encompasses all the various records subsystems in the DO information system. Three of the subsystems provide automated search capabilities. The STAR (Special Trace and Retrieval) System supports personality name traces. Output is a reference to a document/cable or a 201 file. The DRS (Document Reference System) stores charge-out information, access instructions, and location information on files and/or documents. The full text of the document might be located in the COMET cable file, various hard-copy and microfiche 201 files, or the WALNUT microfilm files.

— NPIC maintains three major electronic-based files. They are:

Exploitation Products File (EPF)—an automated index to exploitation reports and memoranda.

Objects Data File (ODF)—a computerized file that enumerates, categorizes, and describes foreign objects, equipment, weapons, and weapon systems of intelligence interest.

Installations Data File (IDF)—a data file containing information on 65,000 installations. The file is searched using a CRT terminal. Output is a printed listing showing all information on a specific installation or preformatted subset of the data such as a chronological description of the facility.

— There also exist throughout the Agency, a multitude of functional data files maintained by components on both the large general-purpose devices operated by ODP and the dedicated mini- and microcomputers in Agency components.

(2) Recent Activities

— The Rapid Access Management Information System (RAMIS) provides non-ADP professionals with a simple, easy-to-use data base management package. The significance of this development is that data

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processing is brought closer to the user by giving him the capability to build and manage his own private reference system without professional ADP assistance. The expanded use of this service in recent months testifies to its popularity.

— Another recent development is the DO decision to build a full-text file of DO cables—the COMET System. COMET provides the capability to search cables and supports DO archival responsibilities.

— Joint ORD/OCO development of mini-computer support to a crisis task force allows personal receipt, storage and retrieval of cables via CDS and press & FBIS wire services, and previously produced SITREPS.

(3) Anticipated Events

— Development contracts have been let with TRW Inc. to create and implement an expanded and permanent SAFE system for NFAC with initial operation by December of 1982.

— OCR's RECON Subject Index to Intelligence Documents has been offered to the Intelligence Community. The proposal is being studied by Presearch, Inc., a private systems group under contract with the Information Handling Committee (IHC).

— A joint ORD/NPIC study of high-speed text search is underway. Some hardware has been installed at NPIC. The system will provide high-speed search of free- form textual data stored on disk for internal NPIC users. The initial capability will be operational in the spring of 1980 and will allow queries against the Exploitation Products File (EDF), the Cable Reports File (CRF), and header records from the Installations Data File (IDF). Plans are for external community users access to HSTS by way of COINS.

— We expect increased pressure for mini-computers to service reference needs perceived by the user to be unique.

b. Document-Based Information Reference Services

(1) Major Providers

— The Agency Archives and Records Center operated by ISS/RMD provides storage facilities for Agency archival records and for records on which frequency of use does not warrant primary storage in Headquarters.

— OCR manages extensive document-based files. These include:

Biographic, organization, and category files stored in legal-sized folders and 5 X 8 card form. Each of the five geographic area divisions stores and manages its own files.

Document holdings which are part of OCR's document subject file but for whatever reason were not microfilmed.

— IMS manages a variety of hard-copy files to support DO requirements.

A hard-copy cable chrono (incoming and outgoing) covering a 3—6 month period.

A one-year abstract file of administrative dispatches.

DO operational activity files and subject files. Personality (201) files are stored in hard-copy or microfiche.

(2) Recent Activities

— Project RAMS is concerned with automation of the records storage and retrieval functions at the Agency Records Center. The project will include a reference service with an on-line data link between Records Center and headquarters components.

— A ten-year data base shows hard-copy document volume dropping relative to cable traffic which is increasing.

(3) Anticipated Events

— OCR has proposed a contract systems study of manual processes to determine if automation of biographic files is feasible.

c. Graphic-Based Information Reference Services

(1) Major Providers

— OCR stores about 12,000,000 all-source intelligence documents in its major document file. The bulk of this collection is in aperture card or microfiche format. The file covers the period 1947 to date. Access is by document number or by search of the AEGIS/RECON subject file.

— The OCR Library stores motion picture film and video tape. Access to these holdings is through search of a machine-stored index called MOPIRE. The Film Branch also stores large numbers of foreign personality photographic negatives. The file is arranged by photograph number (P.No.). Prints of these negatives are filed in OCR area divisions by country and by personality name.

— THE OGCR Map Library Division maintains three basic collections. The first is a comprehensive collection of approximately 600,000 foreign-produced maps of topographic, economic, political and sociological coverage; other materials on foreign areas include city plans, atlases, guidebooks, and selected geographic publications. The second collection is composed of foreign area topographic, aeronautical and hydrographic charts produced by the US Department of Defense. The third contains CIA-produced maps which are, with limited exception, small scale, thematic, and wholly problem oriented. Access to the file is supported by the DATMAP system which contains comprehensive bibliographic information on the maps held.

— NPIC manages an extensive collection of overhead imagery. The Office also maintains a comprehensive collection of ground (non-personality) photography and a collection of maps and charts required by NPIC.

— IMS stores a large collection of documents in the WALNUT system. The film stored in the WALNUT equipment is reproduced on aperture cards for requestors. Specific documents in the WALNUT file are identified for retrieval by the Document Reference System (DRS) mentioned above.

IMS is a major producer and user of computer output microfilm. IMS is also a joint sponsor with OCR of an automated document storage and retrieval system (ADSTAR). See anticipated events below. The IMS version of ADSTAR is named DORIC/W.

— Smaller microform collections exist in other Agency components. Every office in the DDA has ongoing microfilm applications. All DDA microfilming is done by P&PD with the exception of two small applications, one in the Office of Finance and one in the Office of Security. Two offices in DDS&T—NPIC and OD&E—operate microfilm facilities.

(2) Recent Activities

OGCR has automated its map library with the DATMAP system. The DATMAP file contains comprehensive bibliographic information on 600,000 foreign-produced maps.

(3) Anticipated Events

At present, an automated document storage and retrieval system (ADSTAR) is being installed in OCR and IMS. The ADSTAR project is a joint effort of NFAC/OCR and DO/IMS under the management of DDA/ODP. The system will store documents on 16 mm cartridge microfilm housed in automatic retrieval modules. "Soft-copy" display, paper output, and microfiche output will be available at local and remote locations through the use of sophisticated, solid-state, image scanners.

B.6. Reproduction of Information

This category includes all facilities which enable the production of one or more copies of an information item in the same medium as the original.

a. Reproduction of Information in an Electronic Media

(1) Primary Facilities

Virtually all hardware devices in the Agency which are capable of storing information in an electronic medium are also capable of creating copies of that medium. Normally, the medium involves some form of magnetic tape but increasingly magnetic disks are being used as the storage medium.

b. Document Based Reproduction

(1) Primary Facilities

The vast majority of information reproduction activity centers around the use of the ubiquitous 'Xerox' type copier machines. While there are a number of large devices which provide central reproduction facilities, the availability of small, inexpensive devices has permitted the justification and acquisition of these devices by virtually every component in the organization.

(2) Recent Activities

Copier devices in the Agency at the beginning of this year numbered 267 machines; an increase of 3% over the previous year. Average monthly copy volumes in 1979 ran about 11.6 million; again about a 3% increase over 1978.

(3) Anticipated Events

While it is unlikely that the total number of copier devices will be reduced in the near future, the continued expansion of word processing and office automation services will have a restrictive influence on the continued need for and growth of document reproduction services.

c. Graphic Reproduction

(1) Primary Facilities

A number of Agency components involved in the creation and use of microforms also maintain the necessary equipments to create film copies. The most significant facilities are found in P&PD, IMS, and OCR.

B.7. Security

The Agency Security Task Force examined the personnel, physical and information security programs of this Agency. The task force described the personnel and physical security programs as essentially sound. The information control program was described as ineffectual. This Task Force (Information Handling) is concerned primarily with information control. Physical security will be discussed only as a particular activity is specifically related to the protection of information, e.g., vaulted area alarm systems.

Information control refers to those facilities or procedures designed to enforce the need-to-know principle and to prevent unauthorized access to or unauthorized release of classified information. Information control also implies accountability. Information accountability refers to those facilities or procedures which enable the determination of the location of information and the identification of the components or individuals who have been exposed to that information. We recognize, of course, that enforcement of accountability has a direct impact on the control of information.

Control functions include the encryption of information, the requirement for passwords to access computer-held information, the use of classification and dissemination control caveats on documents, the establishment of security compartments for sensitive types of information, etc. Accountability functions include all the record-keeping activities which permit the location of a document or the identification of people who have seen or who have had access to the document, i.e., registry activities, logs, documents and courier receipts, document manifests, etc.

Information Control and Accountability

a. Control/Decontrol of Electronic Based Information

(1) ***Major Providers***

— The Office of Communications encrypts and decrypts message traffic leaving and entering the Agency. OC also provides secure voice facilities.

— ODP provides computer security services by administering user identification/password access procedures for each of its systems which can be accessed remotely.

— OC is responsible for enforcing National emanations (TEMPEST) standards for all Agency equipment which processes classified information. This function is implemented through laboratory testing, engineering advice to user components, and periodic testing of installed systems.

— OS Information Systems Security Group approves the physical location of electronic devices to limit emanations from the building.

— OC Cable Dissemination Branch exercises security control over the dissemination of electronic information through use of computer-stored reading requirement profiles. The profiles approved in writing by requirements authorities in Agency offices, e.g., Office of D/NFAC represent a predetermined need-to-know decision.

— Agency components which maintain central holdings of documents in electronic form exercise a security control function by determining whether a customer has the appropriate clearances to receive requested information. DO/IMS, for example, maintains compartmentation of centrally stored DO documents/files by restricting access to personnel with a demonstrated "need to know", and authenticating user identification via the DO Badge Office Authorization Table (BOAT). OCR, on the other hand, authenticates user identification for access to RSM files either through badge check or bigot lists.

(2) Recent Activities

No Significant Information.

(3) Anticipated Events

[redacted] 25X1

— OCR's ADSTAR system will authenticate requester clearances by matching user supplied identification data against a copy of [redacted] 25X1
[redacted] which will be stored in the ADSTAR computer. Requesters will be denied information for which they lack the appropriate clearances. 25X1

b. Control/Decontrol of Non-Electronic Based Information

(1) Providers of Security Control Function

Control of non-electronic information is diffused throughout the Agency. Responsibility rests with:

— Originators of documents in many cases make the original dissemination (need-to-know) decision.

— Organizations with major dissemination responsibility such as OCR's Acquisition and Dissemination Division exercise security control over the dissemination of hard-copy documents through use of standard reading lists. These approved reading lists, like OC's computer-stored reading profiles, represent a predetermined need-to-know decision.

— Registries, in so far as they determine who will see controlled documents, exercise a security control function.

— Users of information are the largest security-control group and perhaps the weakest link in the security control function. Users can and do reproduce classified documents, extract information from one document for use in another document or for use in various files, and send documents to counterparts in other offices. Users also attend meetings where they exchange ideas/information as they do in meetings with their counterparts. The Security Task Force characterized weaknesses in the security control system attributable to individuals in these words:

> ***"inadequate knowledge and understanding of information security by many employees; and a lack of ardor on the part of many employees, both individuals and supervisors, to accept and discharge responsibilities for information control and protection beyond the barest minimum."***

— The DDA/ISS Classification Review Division is responsible for the mandatory review of classified material for downgrading and declassification purposes. The ISS Information and Privacy Division manages FOIA, Privacy Act, and Executive Order requests for the DDA. Downgrading, declassification, and release are all security control functions.

(2) Recent Activities That Affect Security Control of Information

— The implementation of briefcase and package checks.

— Restrictions on authority to remove classified material from Agency buildings to approved couriers and to individuals authorized on a case-by-case basis by Agency Document Control Officers.

— Installation of the OS Automated Alarm Monitoring System (AAMS) which monitors protected areas of the Headquarters Building and alerts OS personnel when possible intrusions are detected.

(3) Anticipated Events (that will affect security control of information)

The recent establishment of the APEX Steering Group and the establishment of a Special Assistant to the DCI for Compartmentation to chair the APEX Steering Group will have a major impact on the administration of information security in the Agency. We cannot, at this time, predict the nature of, nor the extent of change which these events will generate, but we anticipate the need for close liaison between this group and any planning/architectural function developing from the IH Study recommendations.

B.8. Computing Support Facilities

This category includes all computers and the peripheral devices attached to those computers which support the storage and processing of information. This support includes the operation and maintenance of these facilities and the provision of any systems (non-application) software needed to ensure efficient utilization of the hardware devices.

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a. Primary Providers

1. Central services providing common or general purpose support:

ODP maintains a large complex of processors and storage devices in the Headquarters Ruffing Center to support some fifty Agency and Community components. Services offered fall into five support categories:

— Interactive Time Sharing—which supports user controlled remote terminals to perform such activities as on-line file creation and update, program creation and execution, and interaction with the batch processor.

— Batch Processing—which handles processing jobs or requirements which generally require the use of large data bases and/or computing capabilities and do not require interactive communications with the user or job submitter.

— Data Base Management—which utilizes the GIMS system to support large complex information handling requirements.

— Office of Central Reference Support—which provides on-line computing and storage facilities to the OCR AEGIS/RECON and Interim SAFE systems.

— Message Processing—which accepts cables in electronic form from OC's CDS system and distributes these cables to a variety of users for subsequent storage and processing.

2. Large systems dedicated to specific functions:

— ODP provides dedicated computing facilities in its Special Center to support the DO's information storage and retrieval systems collectively known as ALLSTAR.

— ODP also provides a dedicated facility in the Special Center to support the COMIREX Automated Management System (CAMS).

— NPIC maintains its own large-scale computer center which supports imagery exploitation by NPIC and other community photo interpreters, measurement of photo discernable objects and information storage and retrieval services which are made available to Agency, Community, and COINS users.

— When the Telemetry Analysis and Display System (TADS) becomes operational, it will utilize a large dedicated computer that will be housed and operated by ODP.

3. Small systems dedicated to specific functions. This category of computing service is represented by a growing inventory of mini- and microcomputers that are generally located in, operated by, and directly support a user component. A sampling of these systems follows:

DDA/OL—In addition to the three minicomputers that are used to support the ETECS facility, P&PD has recently installed a minicomputer to help manage its inventory and production activities.

DDA/OP—Minicomputers are used to support the Credit Union and insurance/hospitalization functions.

DDA/OS—Minicomputers have been installed which control and record access to the Headquarters Building and to the vaulted areas within the building.

DDA/OMS—A minicomputer is used to interface special medical testing facilities to the ODP computers and to provide a mechanism which ensures the confidentiality of OMS medical records.

DDA/OC—A dedicated minicomputer is used to control the distribution of cryptographic materials.

DDA/OTR—OTR uses its own minicomputer to support training courses which deal with the functional ways in which a computer can facilitate intelligence analysis and production.

NFAC/OCR—A dedicated minicomputer supports the OCR central library activities.

NFAC/OCO—Minicomputers are used to support the collection and processing of information for analytical task teams assembled to report on specific international crises.

NFAC/OGCR—OGCR uses minicomputers to control their digitizing, map creation and visual aids production facilities. In addition, they have recently installed a system which supports interactive geographic and cartographic analysis of a variety of locationally related sets of information.

DO—The DO utilizes minicomputers to maintain a registry for Agency issued pseudonym, cryptonym and alias data and to support a community accessible data base on terrorist activities.

DDS&T/NPIC—In addition to the large computer systems mentioned above, NPIC also uses minicomputers to perform mensuration and image enhancement activities.

DDS&T/OSO—OSO operates and maintains minicomputers in the field as well as a computer center located in Headquarters. Functions include the collection, sorting, storage, transmission and processing of signal data.

DDS&T/OTS—Minicomputers are used to provide the facilities to support several laboratory test and evaluation functions in OTS.

b. Recent Activities

Activity in the area of computing support over the last few years has been characterized by a steady growth in:

— The capacity of the computers providing general purpose support functions and the amount of on-line storage they provide for user files.

— The number of installed minicomputers and the diversity of applications to which they are being applied.

— The number of remote general purpose terminals and printers available to users and the wider use of graphic display and plotting devices.

c. Anticipated Events

(1) The installation of the Headquarters BUS will provide a communications environment that will facilitate the exploitation of Agency computing services by the widest possible population of users.

(2) There will be a sizeable increment in the computing facilities of the Agency when the separate SAFE computer center is operational.

(3) ODP is involved in an effort to identify a minicomputer that could be used to satisfy a large majority of Agency minicomputer needs. Because of its software compatibility with the large IBM mainframes, it is anticipated that the IBM 4300 minicomputer can serve as a mini 'standard' for a variety of data processing applications.

(4) As the new standard soft-copy terminal is deployed, it will greatly enhance the users ability to perform local word and data processing activities.

(5) The CRAFT concept will introduce comparatively sophisticated computing facilities to the overseas environment. CRAFT will also have impact on the use of Headquarters computing services to support overseas requirements.

B.9. Information Systems Development and Maintenance

This category includes the analysis, design, implementation, and subsequent maintenance of systems used to support specific user requirements in information handling. This activity is primarily related to the development and maintenance of computer and communications systems but can involve non-automated systems as well.

a. Primary Providers

(1) Organizations which include resources involved in the development and maintenance of information handling systems fall into three categories characterized by size and function.

— Large, centralized, general purpose support. ODP provides a staff of approximately 100 individuals whose mission is to respond to Agency and Community requests for the development of new systems or the modification/enhancement of existing production applications. OC provides approximately 300 engineers, programmers and technicians to design, install and maintain Communications Systems for the Agency and the Community.

— Medium-sized, dedicated support. Both NPIC and the DO maintain ADP personnel to create and service systems unique to their respective organizations. Each of these components contains approximately fifty individuals.

— Small, dedicated support. A number of Agency components have found a need to provide their own software expertise which is dedicated to supporting their own unique mission requirements. The resources found in these groups are relatively small, seldom exceeding a half dozen people. ADP resources of this category are found in the following representative components: OCR, OSO, OER, and OL.

(2) It should also be noted that most of the larger software support groups utilize contractors to provide unique or temporary skills which are not available from Agency staff personnel.

b. Recent Activities

(1) Because of limited personnel resources, ODP has not always been able to respond to user requests within the time constraints requested. This has lead increasingly to an arrangement whereby the using component provides a permanent position or slot in their organization which is occupied by an ADP professional from ODP. This assignment is temporary in nature and after two or three years ODP rotates another individual into the component position. Under these arrangements, the ADP professional works with user personnel in direct response to user established priorities but follows ODP professional standards and procedures.

(2) A recently established ADP standards committee has been constituted to develop Agency-wide standards relative to defining systems requirements and the preparation of documentation associated with the design, implementation, testing, and maintenance of computer systems. All of the major Agency components having software development capabilities are participating in this effort.

c. Anticipated Events

(1) The growth in the use of ODP professionals in rotational assignments is expected to continue. The current population of about thirty rotatees should expand at the rate of about five per year.

(2) Further efforts to adopt standard Agency procedures and techniques for software development can be expected to continue.

B.10. Miscellaneous Services

This category includes two services which warrant some discussion but which do not logically reside in the nine categories described above. They are:

Formal training in IH services

Data management services

a. Training

(1) Primary Facilities

- OTR conducts IH related courses in such subjects as records management, micrographics, FOIA/PA and surveys of Agency and Community information systems.
- OC provides an extensive training facility to support their communications and equipment maintenance responsibilities.
- IMS/Training Staff serves as the DO focal point for records system training. This includes determining the requirements for, developing, and conducting DO records training for CIA personnel, other U.S. Government agencies, and foreign liaison personnel.

— ODP offers computer related courses that are available to any Agency component that has a need to improve their ADP skills.

— Many components support small, specialized training courses that are run on an ad hoc basis and are usually restricted to component personnel. Illustrative examples are:

OF's course on information science techniques for financial management

OER's courses on the use of specialized languages (e.g., APL & TROLL) for economic analysts.

(2) Recent Activities

An interesting development in ADP training support is the use by OTR of a dedicated minicomputer which enables student access during normal classroom hours as well as a remote capability to permit students to perform out of class 'homework' activities.

(3) Anticipated Events

The SAFE system, when implemented, will provide an extensive Computer Assisted Instruction (CAI) facility that will support the training of the new SAFE user or refresh the knowledge of the experienced user. The CAI facility will allow the user to either experiment with the system or enter into a structured lesson. Certain users will also be allowed to create or modify lessons.

b. Data Management Services

This category includes data base backup, recovery and other integrity services which ensure that the information stored and retrieved is accurate and available. These services are performed on behalf of the owner of the data who does not have the resources or expertise to ensure the required integrity.

(1) Primary Facilities

— ODP's Production Division provides data management and job production services to a number of computer applications running in the Ruffing Center. These applications range from periodic batch submissions to monitoring on-line data base management systems and cable distribution services.

— Other organizations which are responsible for large collections of data provide similar services. NPIC personnel ensure the integrity of the NDS files, IMS/SG ensures that the DORIC data bases are accurate and available and OCR provides the resources to ensure that the AEGIS/RECON and Interim SAFE files are available for user exploitation.

(2) Recent Activities

— The owners of the data are assuming more responsibility for validating data base integrity. OF's establishment of a data base management function which monitors the state of the FRS and GAS data bases in a good example.

— Multiple users of the same data base are beginning to share responsibility for their joint store of information. OSR and OIA have assumed joint responsibility for maintaining the OASIS order-of-battle data base.

(3) Anticipated Events

When SAFE becomes operational, it will continue the data management support philosophy initiated in Interim-SAFE by establishing a SAFE User Representative Element (SURE) which will provide data base management functions for all SAFE files.

THIS ATTACHMENT IS CLASSIFIED SECRET EXCEPT THE INTRODUCTION WHICH IS UNCLASSIFIED AND SO MARKED.

ATTACHMENT C

ALTERNATIVE MANAGEMENT STRUCTURES

In addressing alternative management systems for information services, the consideration is to what degree management of information services should be centralized or decentralized.

However, the problem cannot be dealt with in such global form. One must decide what is to be centralized or decentralized. The management alternatives that follow are derived by viewing the problem from three levels of management control. This analysis technique is employed by IBM in their methodology for business systems planning which is in turn based on a method of organizational analysis developed at Harvard.

The methodology speaks to three levels of control:

Level 1: Strategic Planning—the process of deciding on objectives of the organization, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of resources.

Level 2: Management Control—the process by which managers assure that resources are obtained and used efficiently in the accomplishment of the organization's objectives.

Level 3: Operational Control—the process of assuring that specific tasks are carried out effectively and efficiently.

As applied to Agency Information Handling, the questions become:

- — How should we organize to set goals for information services, decide investment strategies, and set policy on system acquisition, use and disposition?
- — Who should prepare and defend, budgets, control positions, and manage the careers of information service specialists?
- — Who should be in day-to-day command of operational systems and their staffs?

If one considers the possibility of placing each of these controls at different organizational levels, i.e., Agency, directorate, or office level then many options are made available for evaluation. Adding to the possible list of line options is the concept of addressing strategic planning through staff organizations.

The option tree which follows depicts the range of alternatives selected by the Task Force for study. This tree identifies six families (enclosed in boxes) of options that are described in some detail below. Each family has been assigned a two character mnemonic (PA, DA, etc.) and a single digit numeric suffix to distinguish the options within each family. The boxes identifying the family options also briefly indicate the salient differences which separate the members within each family.

Table C-1 contains brief definitions of some terms used throughout this section of the report. Definitions are included for:

- — A Directorate of Information Services (DIS)
- — An Office of Information Services (OIS)
- — Career Management
- — Mission Budgeting
- — Mission Tasking
- — Strong and Weak Architects

Organizational Options for IH Management

INCREASE IN AGENCY LEVEL (CENTRAL) MANAGEMENT

CURRENT ORGANIZATION

DECREASE IN AGENCY LEVEL (CENTRAL) MANAGEMENT

AGENCY LEVEL PLANNING WITH:

EXISTING IH COMPONENTS

PE DENOTES:
Agency Planning and Existing IH Components

- **PE1** • Agency Planning Network
- **PE2** • Agency Planning Network
  • Agency Career Management
  • Mission Budgeting and Tasking

CONSOLIDATION OF IH COMPONENTS

PC DENOTES:
Agency Planning and Component Consolidation

- **PC1** • DDA Only
- **PC2** • DDA, NFAC
- **PC3** • DDA, NFAC, S&T

A NEW DIRECTORATE

ND DENOTES:
A New Directorate

- **ND1** • Mission Budgeting and Tasking
- **ND2** • Agency Budgeting
  • Mission Tasking
- **ND3** • Agency Budgeting and Tasking

DIRECTORATE SELF-SUFFICIENCY WITH:

AGENCY LEVEL PLANNING

DA DENOTES:
Directorate Independence with Agency Level Planning

- **DA1** • Strong Agency Planning
  • Directorate Budgeting and Tasking
- **DA2** • Strong Agency Planning
  • Mission Budgeting and Tasking
- **DA3** • Weaker Agency Planning
  • Directorate Budgeting and Tasking
- **DA4** • Weaker Agency Planning
  • Mission Budgeting and Tasking

DIRECTORATE LEVEL PLANNING

DD DENOTES:
Directorate Independence with Directorate Level Planning

- **DD1** • Directorate Budgeting and Tasking
- **DD2** • Directorate Budgeting
  • Mission Tasking
- **DD3** • Mission Budgeting and Tasking

COMPONENT AUTONOMY

CA DENOTES:
Component Autonomy

- **CA1**

27 AUGUST 1980

Table C-1
DIRECTORATE OF INFORMATION SERVICES (DIS)

A new, i.e., fifth, Directorate which consolidates all of the Agency's IH functions and resources under one manager. The Director of this organization, or his appointee, functions as the Agency Architect for IH planning activities.

OFFICE OF INFORMATION SERVICES (OIS)

An organization which consolidates all of a Directorate's IH functions under one manager. IMS currently provides an "OIS" function for the DO. The OIS' envisioned as part of the DA and DD family of options also allows the Directorate OIS' to acquire information resources currently managed by another Directorate, e.g., ADP hardware, communication facilities, etc. The OIS concept does not necessitate the creation of a single 'office' as the organizational term is commonly used. An OIS could be composed of several existing components which have been placed under central directorate control. For example, an OIS in the DDA could be implemented as a single new office or existing IH oriented components could be placed under the control of a directorate level manager of IH services.

CAREER MANAGEMENT

A term used to describe those personnel practices which are designed to foster an employee's professional development. These include counseling, training, and planning for future job assignments. Career management does not imply position or operational/tasking control.

MISSION BUDGETING

Mission budgeting stipulates that if a user (Directorate or Office) can be identified as the sole or principal beneficiary of an IH system or service, that component should be responsible for the budgetary justification of that service.

MISSION TASKING

Mission tasking stipulates that if a user (Directorate or Office) can be identified as the sole or principal beneficiary of an IH system or service, that component should be responsible for operational control or tasking of the resources used to support that service. Mission tasking enables the user to establish the requirements and priorities for the utilization of the supporting services.

STRONG ARCHITECT

An Architect who derives his authority directly from the DCI or from the DDIS. His authority is in direct proportion to the extent that he is granted authority by them to initiate and promulgate Agency-wide IH plans in their name. This option can be viewed as a top-down, i.e., Agency level to Directorate level, approach to Strategic IH Planning.

WEAK ARCHITECT

An Architect who derives his authority directly from the DCI. His role under this option is to coordinate Directorate initiated IH plans into an Agency Strategic Plan. This option can be viewed as a bottom-up approach to Strategic IH Planning, i.e., Directorate level to Agency level.

C.1. DESCRIPTION OF OPTIONS

OPTION CO

(**C**URRENT **O**RGANIZATION)

Summary

The status quo is an intriguing blend of Agency, directorate and office level centralization. If it has only one virtue, that virtue would be flexibility, i.e., there is a management system for every occasion. Information services are provided by a variety of organizations which have evolved over thirty years to meet the unique demands of Agency institutions. IH functions are generally managed by an Office, or in the case of DO, by a Staff. Services provided are Directorate wide, as in the case of IMS service to the DO, or Agency wide, as in ODP or OC. Agency-wide planning for integrated information services is non-existent. Some Agency-wide IH planning is done by components having functional responsibility for a particular IH service, e.g., OC for communications. (C 3d(3))

ORGANIZATIONAL IMPLICATIONS

Responsibility for information handling activities in the current organization rest, for the most part, in eight major components. There are exceptions which do absorb IH resource dollars and manpower but they are small by comparison and usually unique. The eight major components and their areas of responsibility are:

Office of Communications	Design, installation, operation and maintenance of foreign and domestic electrical communications and dissemination.
Office of Data Processing	Operation of computer hardware, provision of systems analysis and programming support to Agency components, storage and maintenance of data bases, word processing management.
Information Management Staff	Management of all IH activities for the DO.
Office of Central Reference	Agency-wide reference support,dissemination of hard copy intelligence documents, Community biographic support on non-military personalities, acquisition of foreign publications.
Printing and Photography Division	The bulk of Agency printing of publications and microfilming operations.
Information Services Staff	Administers Agency FOIA and Privacy Act programs and Agency Records Management activities.
FBIS	Disseminates foreign press, radio and TV information. Publishes JPRS Translations.
NPIC	Computer support to overhead reconnaissance activities. Dissemination of PI reports. (S 3d(3))

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PLANNING RESPONSIBILITIES

There is no Agency Information Handling Plan. Until recently only DO had a Directorate-wide IH plan. NFAC, ODP and OC have independently initiated five-year IH planning exercises in their own areas of responsibility. Although ODP and OC compile Agency-wide requirements for computer and communications support annually, coordination on planning is informal and ad hoc. Some planning on major expenditures is forced by the budget process, e.g., SAFE. There is an annual ADP Project Review by EXCOM. (C 3d(3))

CAREER MANAGEMENT

Career Management for "IH Careerists" is essentially a component responsibility with a few exceptions. DO/IMS manages all DO IH careerists. ODP has career management responsibility for some ODP programmers on rotational assignments in non-ODP slots. OC has career management responsibility for OC personnel assigned to DDS&T Program slots. (C 3d(3))

BUDGET MANAGEMENT

DDA components attempt to budget at the Agency level. OC, ODP, and OL budget at the Agency level for commo, ADP, and printing services insofar as that is consistent with the management systems of other directorates. (C 3d(3))

The DO relies on OC and OL budgeting for communications and printing support but shares budgeting responsibility for ADP with ODP. DO/IMS typically will budget for new ADP systems and applications while ODP budgets ongoing support for the DO computer center. (C 3d(3))

NFAC relies heavily on Agency-level budgeting by the DDA to meets its needs. However, NFAC offices are beginning to budget for unique needs such as special purpose minicomputers and software support. (C 3d(3))

DDS&T inputs requirements to DDA Agency-level budgets but also does significant program and mission budgeting for unique communications and ADP. (C 3d(3))

OPERATIONAL CONTROL (TASKING)

In the DDA, OC, ODP, and OL control the large, shared facilities such as the ODP center, OC base stations, and OL printing plant. Otherwise, user control is the rule. (C 3d(3))

Within the DO, DO/IMS performs operational control at the directorate level. (C 3d(3))

NFAC is largely dependent on shared facilities but in the area of reference services, OCR has control. PPG is establishing control over recording and editing as it is applied to NFAC publications. (C 3d(3))

Within DDS&T the control lies principally with the offices and programs. While there is significant reliance on the central services of OC and ODP, there is heavy emphasis on mission services and their control. (C 3d(3))

IMPACT ON USERS

Several IH service organizations provide customer service functions to simplify user access to information support. Examples are OC's Foreign Network Division Current Activities Branch, ODP's Customer Services Staff and Production Division, OCR's Country Reference Analyst, IMS records referent at the desk program, etc. (C 3d(3))

IMPLEMENTATION PHASING

Not applicable.

PE FAMILY OF OPTIONS

(AGENCY LEVEL **P**LANNING IN CONJUNCTION WITH **E**XISTING IH COMPONENTS)

Summary

Options PE1 and PE2 leave existing IH service components unchanged. Both options provide information handling planning staffs at the DCI level, and IH coordinators in each of the four Directorates. Career management of personnel, budgeting and operational control of resources remain unchanged in option PE1. Career management is centralized in one component where possible in option PE2. Responsibility for budgeting and operational control of resources in option PE2 is passed to the mission manager whenever the mission manager is the primary beneficiary of the service. For example, overseas COMMO operations which directly support the DO would be budgeted by the DO, not OC. (C 3d(3))

ORGANIZATIONAL IMPLICATIONS

Existing service components are unchanged. A DCI staff is established to provide Agency level strategic IH planning. Directorate IH staffs provide directorate coordination with the DCI staff.

PLANNING RESPONSIBILITIES

The Architect at the DCI level is responsible for initiating information handling planning for the Agency. After coordination with the Directorates, the Architect prepares and presents the IH Strategic Plan to the EXCOM for its concurrence. The Architect will take the lead in strategic planning for information services and will reconcile Agency policy statements and Agency goals on intelligence collection and production with knowledge of information service activities and technology advances to formulate information service goals for the Agency. A shorter term plan developed in conjunction with Directorate and Office level IH coordinators is created at the Architect's initiative and integrates information service planning with budget planning. The Architect is responsible also for presenting an annual Agency IH review to the EXCOM. The presentation would replace the present annual ADP review conducted by the EXCOM. The Architect monitors Agency ADP activities as required to ensure that they are in harmony with the Strategic Plan. The Architect is the Agency IH representative to the Intelligence Community.

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CAREER MANAGEMENT

Career management remains unchanged in option PE1. Career management is centralized in one component wherever possible in option PE2, e.g., ODP for ADP careerists, OC for Communication careerists.

BUDGET MANAGEMENT

Budget management varies. In option PE1, budgeting remains unchanged, e.g., IMS budgets directorate wide for DO IH services, ODP and OC budget Agency wide for ADP and Communications services, OCR budgets for the Agency on acquisition of foreign publications. In option PE2 budget management is shifted wherever possible so that the mission manager budgets for those IH services dedicated to his mission.

OPERATIONAL CONTROL (TASKING)

Operational control is under the manager who provides the IH service. Generally speaking, resource tasking is controlled by the component which has budgeting responsibility for the resources.

IMPACT ON USER

Because there are no organizational changes contemplated in the components providing information services, little impact on the user is anticipated.

IMPLEMENTATION PHASING

The initial phase in either of these options is to create the DCI staff. This would be followed closely by the identification or establishment of the directorate coordination staffs. Identification of career management, budgeting and operational control changes under option PE2 would follow the creation of this planning network.

PC FAMILY OF OPTIONS

(AGENCY LEVEL **P**LANNING IN CONJUNCTION WITH **C**ONSOLIDATED IH COMPONENTS

Summary

The attributes of the PC family are as follows: A DCI level Architectural Staff is created. A mechanism is established at the Directorate level (if none exists) to coordinate with the Architect. The information handling services are consolidated within the existing Directorate(s) into an Office of Information Services (OIS). Three incremental consolidation options are suggested: DDA/OIS (PC1), NFAC/OIS (PC2), DD/S&T/OIS (PC3). The IH specialists career service is Agency-wide. Budgeting and operational control remain as closely aligned to the mission component as possible. Current central services such as communications, data processing,and central reference remain in their current Directorates.

ORGANIZATIONAL IMPLICATIONS

A DCI level Architectural Staff is created. An Office of Information Services (OIS) is created within the Directorate(s). The OIS includes a realignment of the information handling functions within a centralized component (there would be no organizational change to the DO which has already centralized its information handling services in IMS).

OPTION PC1 establishes an OIS in the DDA only. The IH functions performed presently by the Office of Communications, the Office of Data Processing, the Printing and Photography Division, the Information Services Staff, the Office of Logistics courier and registry operations, and the Office of Security's Information Systems Security Group would be incorporated in the new OIS. Personnel of these components would be reassigned to several functional Divisions within OIS, namely: Systems Engineering, Applications, Operations and Maintenance, Customer Service, and Information Security. If the OIS structure is considered too large to be manageable, an alternate option would create an Associate Deputy Director for Information Services and an Associate Deputy Director for Administrative Services within the DDA. (C 3d(3))

OPTION PC2 establishes an OIS in NFAC in addition to the DDA/OIS (as described). The NFAC/OIS would include, but not be limited to, those functions related to records management, FOIA, systems, registry, map/film library, acquisition and dissemination, etc.

OPTION PC3 completes the Directorate centralization of IH services by establishing an OIS in DD/S&T. The OIS would consolidate registry, courier, ADP, and records management functions in S&T.

PLANNING RESPONSIBILITIES

CAREER MANAGEMENT

Agency-wide career management is centralized in the DDA/OIS for ADP, Communications, Registry, Courier, Printing, Photography, Records Management careerists, etc. Career management for librarians, indexers, disseminators, etc., is centralized in NFAC.

BUDGET MANAGEMENT

Where the IH service can be identified as uniquely supporting a mission, the mission manager will budget for the service, e.g., NFAC will budget for SAFE. However, general purpose services will continue to be budgeted by the central support component, e.g., OC, ODP.

OPERATIONAL CONTROL (TASKING)

Where the IH services can be identified as uniquely supporting a mission, the mission manager directs the day-to-day use of resources supporting the mission. For example, registry personnel whose career is managed by an OIS would still be subject to tasking by the Component to which they are providing registry support.

IMPACT ON USERS

An OIS/Customer Services component will serve as a single point of entry for the user so that the selection of IH services is optimized and not up to chance or ignorance. This component will function as an integrated customer service organization and will act as a buffer between the user and IH systems. Although systems may change, the user interface will remain quite constant. Therefore, early introduction of this component is desirable to shield the user from disruptions that normally accompany organizational change.

IMPLEMENTATION PHASING

We envision a phased implementation which spread over a three year period would include the following chronology: Creation of the DCI IH Staff which would be responsible for the transition planning and the Architectural function, and related IH coordinating mechanisms; Creation of a Customer Service Component in each Directorate; creation of the DDA/OIS; DDA/OIS assumes career management responsibility for most IH specialists; create NFAC/OIS; NFAC assumes career management of indexers, disseminators, etc.; create DDS&T/OIS.

ND FAMILY OF OPTIONS

(**N**EW **D**IRECTORATE)

Summary

In options ND1, ND2, and ND3, a new Directorate of Information Services (DIS) is created and assumes management responsibility for all Agency information handling activities. An Architectural Staff established within the new DIS does Agency-wide planning for all information handling activities. Each of the four existing Directorates identifies or creates a formal IH staff to plan for and to coordinate Directorate IH plans with the DIS Architect. Career management of all IH careerists is assumed by the new Directorate. In option ND1, budget management is shared between the DIS, which budgets for all central IH services, and the mission component which budgets for dedicated services. Operational control follows the same pattern with the DIS manager exercising operational control over most resources and the mission manager exercising operational control over resources dedicated to his mission. In option ND2, the DIS assumes total responsibility for budgeting while continuing to share operational control over IH resources with mission managers. Option ND3 is totally centralized with the DIS assuming full control of planning, career management, budgeting, and operational control of resources.

ORGANIZATIONAL IMPLICATIONS

A new Directorate of Information Services (DIS) is created in options ND1, ND2, and ND3. The DDIS assumes full management responsibility for all information handling activities in the Agency. IH components in the four existing Directorates are disestablished and their functions and personnel reorganized into the new Directorate. An Agency level Architectural Staff is created in the new DIS. IH staffs are identified or created in each of the four existing Directorates to coordinate IH plans and requirements with the new DIS Architect.

PLANNING RESPONSIBILITIES

Because the new DIS is responsible for all Agency information management, the DIS Architect becomes the de facto Agency Architect. He is, therefore, responsible for preparing and maintaining the Agency IH Strategic Plan, review of the new IH project proposals initiated by Agency components for conformity to the Strategic Plan, is the principal advisor to the DDIS and, through him, the EXCOM on IH matters, and is the Agency IH representative to the Intelligence Community. The Architect also functions as a coordinator on technical matters within the DIS.

CAREER MANAGEMENT

The DIS is responsible for Agency-wide career management of IH careerists under all three options.

BUDGET MANAGEMENT

Under ND2 and ND3, the Director, DIS, budgets for all Agency IH services. Under ND1 budget authority is shared with mission managers. The mission manager budgets for those IH activities which are dedicated to his mission.

OPERATIONAL CONTROL (TASKING)

Option ND3 is the most centralized. The DIS is vested with operational control over all IH resources. Under options ND1 and ND2, DIS shares operational control with mission managers. The latter assume control of dedicated IH resources.

IMPACT ON USERS

Because all three options involve extensive organizational change a customer service organization is included in the new DIS. This organization minimizes disruption by acting as an intermediary between the user and newly reorganized and relocated systems.

IMPLEMENTATION PHASING

The creation of a new Directorate and the disestablishment and transfer of IH functions in existing Directorates to the new Directorate could be accomplished in any one of a number of ways. The following phasing is a logical approach.

1. Establishment of a new Directorate of Information Services. Functions to be transferred to that organization are word processing, dissemination, distribution storage and retrieval, communications, printing, automatic data processing and information security.

2. Appointment of a Deputy Director to head the new organization with appropriate budget and staffing authority to create an implementing staff.

3. Development of an implementation plan coordinated with existing Directorate Staffs.

4. Implementation of the reorganization in accordance with the plan developed by the planning staff beginning with creation of a customer service component.

5. Disestablishment of the implementation staff.

DA FAMILY OF OPTIONS

(**D**IRECTORATE INDEPENDENCE WITH **A**GENCY LEVEL PLANNING)

Summary

This family of options emphasizes IH self sufficiency for each of the four Directorates. This independence is tempered however by the presence of a DCI level staff architect which initiates and/or coordinates IH planning with the Directorates. Each Directorate would consolidate all of its own IH services into a single component; an Office of Information Services (OIS). DO/IMS already represents this consolidated component for the DO. Each OIS (or DO/IMS) could also develop and maintain its own IH support services which it currently receives from a central service oriented component. (C 3d(3))

ORGANIZATIONAL IMPLICATIONS

A DCI staff is established to provide Agency level strategic IH planning. DO/IMS remains unchanged. Each of the other Directorates would consolidate its IH services into a single component (OIS) which would assume all IH planning and service responsibilities for the Directorate. Each OIS (including DO/IMS) has the option of assuming central support functions currently being performed by another Directorate. For example, the NFAC/OIS could budget for and operate it's own ADP center if it chose to assume this responsibility from ODP. (C 3d(3))

PLANNING RESPONSIBILITIES

While this family of options calls for the creation of a DCI level staff to provide an Agency Architect for IH planning, the role of the Architect in options DA1 and DA2 is stronger than in DA3 and DA4. Under DA3 and DA4 the architect would act as a coordinator of Directorate submitted IH plans, advising the EXCOM as to their applicability and compatibility.

In all of the options, the OIS' created in each of the Directorates (or DO/IMS) would provide planning coordination with the DCI staff Architect.

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CAREER MANAGEMENT

DO/IMS retains, and the three OIS components assume, career management responsibility for all IH specialists in their own Directorate. There is no Agency-wide career management.

BUDGET MANAGEMENT

Under options DA1 and DA3, the OIS (or DO/IMS) budget for all IH support provided to the respective Directorate. Options DA2 and DA4 specify that mission budgeting is to be encouraged.

OPERATIONAL CONTROL (TASKING)

Options DA1 and DA3 require the OIS (or DO/IMS) to provide tasking for all IH resources in their respective Directorates. DA2 and DA4 require that the mission components assume tasking responsibilities where appropriate.

IMPACT ON USERS

The impact on DO users should be minimal in that IMS already serves as the focal point for IH services in that Directorate. The creation of a Directorate OIS would be preceded by the establishment of a customer services component that would assist the directorate user in any shift from central to directorate oriented services. If no existing central services are subsumed by the OIS (or IMS), the impact on the users should be relatively insignificant. If central responsibilities (e.g., ADP) are established by an OIS, the impact could be substantial if non-standard (different from central) devices, languages, procedures or standards are implemented by the OIS.

IMPLEMENTATION PHASING

Implementation of any of the options in this family would probably adhere to the following phases:

1. Creation of the DCI level staff architect
2. Assumption of central functions (if any) by DO/IMS
3. Creation of an OIS in NFAC
4. Creation of an OIS in S&T
5. Creation of an OIS in DDA which would retain any central service functions not transferred to DO/IMS or a new directorate OIS.

DD FAMILY OF OPTIONS

(**D**IRECTORATE INDEPENDENCE WITH **D**IRECTORATE LEVEL PLANNING)

Summary

This family of options emphasizes IH self sufficiency for each of the four Directorates. Each Directorate is responsible for its own IH planning. There is no Agency level IH planning capability. Each Directorate would consolidate all of its own

IH services into a single component; an Office of Information Services (OIS). DO/IMS already represents this consolidated component for the DO. Each OIS (or DO/IMS) could also develop and maintain its own IH support services which it currently receives from a central service oriented component. (C 3d(3))

ORGANIZATIONAL IMPLICATIONS

DO/IMS remains unchanged. Each of the other three Directorates would consolidate their IH services into a single component (OIS) which would assume all IH planning and service responsibilities for the Directorate. Each OIS (including DO/IMS) has the option of assuming central support functions currently being performed by another Directorate. For example, the NFAC/OIS could budget for and operate its' own ADP center if it chose to assume this responsibility from ODP.

PLANNING RESPONSIBILITIES

In all of the options of this family, the OIS' created in each of the Directorates (or DO/IMS) would plan independently for their own Directorate oriented information services. There is no Agency-wide planning function. There is no Agency Architect.

CAREER MANAGEMENT

DO/IMS and the three OIS components assume career management responsibility for all IH specialists in their own Directorate. There is no Agency-wide career management.

BUDGET MANAGEMENT

Under options DD1 and DD2, the OIS (or DO/IMS) budget for all IH support provided to the respective Directorates. Option DD3 specifies that mission budgeting is to be encouraged.

OPERATIONAL CONTROL (TASKING)

Option DD1 requires the OIS (or DO/IMS) to provide tasking for all IH resources in their respective Directorates. DD2 and DD3 require that the mission components assume tasking responsibilities.

IMPACT ON USERS

The impact on DO users should be minimal in that IMS already serves as the focal point for IH services in that Directorate. The creation of a Directorate OIS would be preceded by the establishment of a customer services component that would assist the directorate user in any shift from central to directorate oriented services. If no existing central services are subsumed by the OIS (or IMS), the impact on the users should be relatively insignificant. If central responsibilities (e.g., ADP) are established by an OIS, the impact could be substantial if non-standard (different from central) devices, languages, procedures or standards are implemented by the OIS.

IMPLEMENTATION PHASING

Implementation of any of the options in this family would probably adhere to the following phases:

1. Assumption of central functions (if any) by DO/IMS
2. Creation of an OIS in NFAC
3. Creation of an OIS in S&T
4. Creation of an OIS in DDA which would retain any central service functions not transferred to DO/IMS or a new directorate OIS.

CA FAMILY OF OPTIONS

(**C**OMPONENT **A**UTONOMY)

Summary

All existing information services components are disestablished and their functions assumed by existing office level and DO division level components. Each component thus becomes responsible for its own ADP support, its own communications, acquisition of foreign publications in its own field of interest, provides its own couriers, etc. Complete decentralization of IH functions is the intent.

ORGANIZATIONAL IMPLICATIONS

Existing central information handling organizations, e.g., OC, ODP, OCR, IMS, are disestablished. Individual Agency components, e.g., Office of Finance, Office of Economic Research, each assume responsibility for providing their own IH support. (C 3d(3))

PLANNING RESPONSIBILITIES

Individual Agency components plan for their own information support. There is no directorate or agency level planning activity.

CAREER MANAGEMENT

Individual Agency components retain career management responsibility for people already assigned to the component and would assume additional responsibility for those central IH personnel reassigned to their component.

BUDGET MANAGEMENT

Each component budgets for its own IH services.

OPERATIONAL CONTROL (TASKING)

Each component has operational control over its own resources.

IMPACT ON USERS

The disestablishment of the central services would have a severe impact on the current population of centrally supported users. The possibility that their parent component could replicate the eliminated central service such that the change would be transparent or the quality maintained is very unlikely. Of all the options considered, this would have the most significant ramification on the way users acquire IH services.

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IMPLEMENTATION PHASING

Time period is indeterminate. Phasing would require:

1. Creation of a central planning and implementation group.
2. Creation of planning groups in each Office or DO Division level component.
3. Preparation of a phasing plan.
4. Transfer of IH personnel to components, acquisition of minicomputer and other hardware by individual components, release of central leased hardware to vendors, release of central, purchased hardware to government surplus, all in compliance with the phasing plan.
5. Disestablishment of planning group after reorganization is complete.

C.2 STRUCTURING THE DECISION

In addition to an awareness of what options are available to the decision maker, there needs to be agreement on what criteria will be used to select the desired option. A complex question such as Agency management and organization of information services presents a seemingly endless list of factors that might be significant in evaluating options. Hence, establishing the criteria for decision making is in itself a complex problem.

Therefore, the Task Force perceived its task not only to include development of a range of organizational alternatives but also a tentative criteria for the decision.

A tentative list of decision factors was developed by the Task Force. This tentative list was then modified by suggestions from selected major Office Directors. Five major factors were further subdivided into component parts for ease of discussion and analysis. The decision factors are listed below. The definitions of these factors are contained in the accompanying table.

A. Management
   (1) Planning and Allocation
   (2) Acquisition of Resources
   (3) Organizational Clarity
   (4) Life Cycle Costs
   (5) Span of Control
   (6) Utilization of Technology
   (7) External Oversight
B. User Satisfaction
   (1) Access and Quality of Services
      (a) Quality of Service
      (b) Response Time of Service
      (c) Ease of Access to Service

(2) Responsiveness and Flexibility

(a) Large Requirements

(b) Small Requirements

C. Personnel Resources

D. Information Control

(1) Compartmentation

(2) Physical Security

(3) Technical Security

E. Disruption

(1) Disruption to Providers

(2) Disruption to Users

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Table C-2

DEFINITIONS FOR DECISION FACTORS

Planning and Allocation of information handling resources—The degree to which the organization improves our ability to assess the current state of affairs, forecast the future, and allocate scarce resources rationally.

Acquisition of Resources—The degree to which the organization is able to compete with mission oriented components to capture dollars for the IH function.

Organizational Clarity—The degree to which the organization reflects the mission, responsibility, and authority of information service components, in a simple, understandable hierarchy with a modest span of control and low-level delegation of authority.

Life Cycle Costs—The degree to which the organization allows us to fully appreciate the total life cycle costs—development, implementation, operations and maintenance, salvage value and replacement costs—of current and proposed ways of delivering needed information services.

Span of Control—The degree to which the organization limits the number of individuals who report directly to the manager and who require significant planning and control efforts on his part.

Utilization of Technology—The degree to which the organization is capable of adopting new technology to improve the delivery of information services.

External Oversight—The degree to which the organization is able to satisfy the demands from Congress, the White House, OMB, etc., for information relative to the information handling function.

Quality of Service—The degree to which the organization assures that data bases are accurate, current and relevant to user needs.

Response Time—The degree to which information systems are able to provide substantive information to users on a timely basis.

Ease of Access—The degree to which the organization is able to assure simple, direct access to information resources without being inhibited by bureaucratic procedures or technological barriers.

Responsiveness and Flexibility—The degree to which the organization (provider of information services) is able to respond in a timely fashion to new or modified user requirements for information support, i.e., new information systems. (Includes large and small requests)

Personnel Resources—The degree to which the organization allows us to recruit, train, and maintain a skilled cadre of information specialists sufficient to meet the growing demands.

Compartmentation—The degree to which the organization is able to limit information to those with an officially approved need to know while operating within minimum policy standards for release of information.

Physical Security—The degree to which the organization is able to deny entry by unauthorized persons to a protected facility.

Technical Security—The degree to which the organization is able to guard against technical threats (primarily electronic) directed against the Agency's information handling resources.

Disruption—The degree to which the organizational change will lead to short-term disruptions of on going activities, the losses therefrom, and any lasting effects.

Provider Disruption—The degree to which the organizational change will interfere with information handling component's ability to provide at least the same level of services as currently are available.

User Disruption—The degree to which the organizational change will interfere with a user's ability to obtain information service.

Having agreed upon options and criteria upon which to base a decision, the remainder of the task consists of a judgement as to the relative goodness of each option for each decision factor and a judgement of the relative importance of each decision factor with respect to all other factors.

While these judgements can be delegated, the end result will be of questionable value to the senior manager. Judgements reflect a combination of education, background, experience and organizational perspective. The acceptable decision to the senior manager is the one that best agrees with his sense of what is correct. The sum total of all of these judgements is the decision-making process.

C.3 AIDING THE DECISION PROCESS

In the complex decision problem presented in this report, the difficulty of making each judgment is not great. The difficulty is in mentally tracking the significance of the sum total of all judgments integral to the larger decision. It is this function of book-keeping that is facilitated by machine assistance. Software exists that presents a display of the decision problem in the form of a matrix. Management options are arranged along one dimension, decision factors along the opposing dimension. Each square within the matrix ultimately contains a ranking of the relative goodness of an option for one particular factor.

Provisions are included to assign and account for the relative importance of factors by the assignment of weights. Thus, if acquisition of resources is felt to be twice as important as planning and allocation, numerical weighting will be assigned accordingly. When the matrix is complete these weights will be applied to the contents of the matrix to arrive at an ordered list of options reflecting the decision-maker's preferences based on the sum total of his judgments.

Once all entries in the matrix are complete, the machine system provides a quick and efficient means of demonstrating to the decision-maker what the most influential judgments are in reaching a final decision and allows confidence in the outcome to be built by varying entries in cases where uncertainty of judgments remain.

While the decision-making environment of discussion, debate, and consensus remains undisturbed, the background availability of machine assistance helps focus discussion and expedite conclusions.

ALL PORTIONS THIS SECTION UNCLASSIFIED EXCEPT PARAGRAPHS OTHERWISE MARKED.

TABLE

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ATTACHMENT D

CIA/IHTF GLOSSARY

AAMS: OS Automated Alarm Monitoring System. A minicomputer-based system which monitors protected areas of the Headquarters Building and alerts OS personnel when possible intrusions are detected. (C A9c(3.7))

access: The ability and the means to approach, communicate with (input to or receive output from), or otherwise make use of any material or component in an ADP system or network. Access also has a security context, i.e., access to a security compartment through a clearance issuance.

access control: (Software) Validation and enforcement of a user's privilege.

accountability: The systems and procedures established to assure that responsibility for maintenance and protection of information can be traced to an organization and/or individual.

accreditation: A formal declaration by the responsible NFIB member or his designee, as appropriate, that the ADP system or network provides an acceptable level of protection for processing and/or storing intelligence information. An accreditation should state the operating mode and other parameters peculiar to the ADP system or network being accredited.

ACF: APEX Control Facility. A facility for the receipt, control, storage, and use of APEX materials.

ACM: Agency Copier Management System. Provides information on copiers, counters, and costs.

ACO: APEX Control Officer.

ACT-O: OC's Automated Communications Terminal—Originating. The CDS system relays traffic for addresses external to the Agency to ACT-O which reformats traffic for target nets and passes traffic to MAX for transmission.

ADISS: DIA's Advanced Defense Intelligence Support System. This was the original designation for the system which is now more commonly known as DIA-SAFE.

ADP: Automatic Data Processing.

ADPE: Automatic Data Processing Equipment.

ADP System: The central computer facility and any remote processors, terminals, or other input/output/storage devices connected to it by communications links.

ADSTAR (C): OCR's Automatic Document Storage and Retrieval System. ADSTAR will be NFAC's system for the storage and retrieval of hard-copy documents being retained in microform. A similar system being implemented by the DO is referred to as DORIC-W . (C A9c(4.1))

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AEGIS: OCR's Already Existing Generalized Information System. A file management system which supports a number of OCR-maintained data files.

AEGSUBJ: The Subject Index file within the AEGIS system. This file records bibliographic and content indexing information used to search for OCR retained documents.

AEGOL: OCR's AEGIS On-line. The facility to conduct on-line queries of an AEGIS data file.

AEMMS: Agency Equipment Monitoring and Maintenance System. Documents preventive maintenance, cost status, etc.

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AFT: OC's Automated Field Terminal. A communications device which provides automatic originating and terminating message processing with a minimum of operator intervention. (S A9c(2.1))

AGMET: OGCR's Agricultural Meterological System. A system to predict the production of a variety of crops in denied countries.

AIRES: DIA's Advanced Imagery Requirements and Exploitation System.

AKDC: Automatic Key Distribution Center.

ALDOCS: Maintains records on all alias operational documentation and disguise materials which have been issued. (C 3d(3))

ALGOL: An algorithmic and procedure-oriented computer language used principally in the programming of scientific problems.

allocated circuit: A communications circuit provided for Agency use from the communications resources of another Government element, e.g., DoD.

ALLSTAR (C): The DO's name search and document retrieval system, developed and maintained by IMS, which includes the Document Reference Subsystem (DRS), the Special Trace and Retrieval (STAR) subsystem, the Collection of Operational Messages Electrically Transmitted (COMET) subsystem, and the Subject and Operational File Activity (SOFA) subsystem. (C A9c(4.1))

ALLSTAR/CARD (C): System for the processing, storage, and retrieval of retired document/file location and status information, being developed by IMS. (C A9c(4.1))

ALLSTAR/COMET II (C): System for on-line analysis of electrically transmitted messages, being developed by IMS. (C A9c(4.1))

ALLSTAR/SMART (C): Decentralized name searching system, being developed by IMS. (C A9c(4.1))

AMPS: ODP's Automated Message Processing System. AMPS receives messages from CDS, stores the messages for each customer designated by CDS and then activates customer software to process the message. AMPS will be replaced by the MPS system in 1980. (C 3d(3))

APARS: Automated Printing and Reproduction System. OC system that will automate the printing and sorting of messages. System components will be installed in OC Cable Secretariat and four DO registries. Similar to State Department's ARCS system. (S A9c(2.1))

APEX: The APEX Special Access Control System will be the single Intelligence Community program for the security, control, and safeguarding of intelligence programs and materials which cannot be adequately protected at standard levels of classification.

ARC: Provides information on DO documents returned to Records Center, an IMS developed system.

ARCINS: Archives and Records Center Inventory System. A batch-mode ADP system operated by DDA/ISS to control documents in these repositories.

ARCS: Automated Reproduction and Collation System. A State Department system designed to reproduce and collate messages for State distribution. Agency version is known as APARS. (q.v.)

ASO: APEX Security Officer.

ATMH: DoD's Automated Text Message Handler.

AUDIO: Provides information on audio operations, an IMS developed system. (C 3d(3))

authentication: A positive identification, with a degree of certainty sufficient for permitting certain rights or privileges to the person or thing positively identified.

AUTODIN: Automatic Digital Network. A DoD message and data communications network.

automatic data processing system security: The organized collection of hardware and software united by regulated interaction and designed to accomplish a specific data processing objective. All of the technological safeguards and managerial procedures established and applied to computer hardware, software, and data in order to ensure the protection of organizational assets and individual privacy; it includes: all hardware/software functions, characteristics, and features; operational procedures, accounting procedures,and access controls at the central computer facility; remote computer and terminal facilities, management constraints, physical structures and devices; and the personnel and communication controls needed to provide an acceptable level of protection for classified material to be contained in the computer system.

AVR: Agency Vehicle Records System. Provides procurement and operation information of Agency vehicles.

BADGILE: OS system that provides reports in various sequences of all badges assigned on a temporary basis. (C A9c(3.7))

baud: A unit of signaling speed equal to the number of code elements per second.

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BLANKET: Provides listings of Agency-devised facilities that are controlled by CCS, an IMS developed system. (C 3d(3))

BOAT: Badge Office Authorization Table. An IMS developed system that identifies requesters authorized access to DO files. (C A9c(3.7))

BUS: A generic term used to describe intrabuilding wideband communications systems utilizing either coaxial or fiber optics. The salient feature of a bus system is its capacity to accommodate extremely high bit rates and many users.

CAAR: Central APEX Access Registry. Contains name of individual and lists all approvals for access to APEX compartments. (C A9c(3.7))

CAI: Computer Assisted Instruction.

CAMAPER: IMS developed system which furnishes location data for microform document storage and retrieval system.

camp-on: With call-back—A feature of an electronic telephone switch which allows it to remember when a call is placed to a busy telephone called camp-on. The call-back feature allows the caller to hang-up and the switch automatically rings his phone when the called station becomes "unbusy".

CAMS: (1) COMIREX Automated Management System run by ODP to assist the Intelligence Community in the management of the National imagery collection, processing, dissemination, and exploitation requirements. (C 3d(3))

(2) OGCR's Cartographic Automatic Mapping System. Software system which enables graphics terminal and plotter creation of maps in various scales and projections.

CARS: Common-use Automated Registry System.

CARTOMAP: This is a cartographic mapping project processed by ODP on behalf of OGCR the primary output of which is computer-generated maps and plot tapes. Synonymous with CAMS (2).

CASTLE (C): CRAFT large-station domestic testbed, being developed by IMS. (C A9c(4.1))

CDS: Cable Disemination System. An OC facility which disseminates Agency cable traffic.

CEMLOC: Central Emergency and Locator Record System. This OS system provides locator information on Agency personnel. (C A9c(3.7))

CENBAD: OS system that controls the issuance of badges and credentials. (C A9c(3.7))

CENCO (C): This project, run by ODP on behalf of the Central Cover Staff, provides assignment and related data on all Agency personnel under cover. (C A9c(4.1))

central computer facility: One or more computers with their peripherals, storage units, central processing units, and communications equipment in a single controlled area.

CI: Counterintelligence.

circuit: A means of two-way communicatiion between two points.

circuit switching: Procedure which enables the connection of any one of several input communications lines to any one of several output or trunk communications lines.

CLASS A: Provides overseas-based accounting systems for Class A field stations using standard Agency soft-copy terminals. (C 3d(3))

CLASS B: Provides Headquarters-based accounting systems for Class B field stations via VM systems. (C 3d(3))

CMASS: OCO's Crisis Management Analytical Support System. A developmental information management system which is being used to support NFAC analysts during crisis situations. (S A9c(7.2))

coaxial cable: A transmission line or cable in which one conductor completely surrounds the other, the two being coaxial and separated by insulating material.

CODIB: Committee on Documentation of the US Intelligence Board.

COINS: Community On-Line Intelligence System.

collateral: All National security information classified under the provision of an Executive Order for which special Intelligence Community systems of compartmentation (i.e., sensitive compartmented information) are not formally established.

collection/ acquisition: The Agency acquires a wide variety of classified and unclassified information through its various components, i.e., open-source publications; cables from DoD, State Department and NSA; reports from other government agencies; reports from DO collection operations; foreign broadcast information via FBIS; etc. (C 3d(3))

COLTS: OCR's On-Line Text Search. A facility to conduct free text searches of electrically held documents and cables.

COM: Computer Output Microfilm.

COMA: Contractor Mailing Addresses.

COMET: Collection of Operational Messages Electronically Transmitted. DO system which collects and stores electrically transmitted documents from Cable Dissemination System (CDS). (S A9c(2.1))

COMIREX: Committee on Imagery Requirements and Exploitation.

communications security (COMSEC): The protection resulting from any measures taken to deny unauthorized persons information of value which might be derived from telecommunications, or to ensure the authenticity of such telecommunications.

CONIF: A contract information system run by ODP in support of the Offices of Logistics and Finance to provide management information on Agency contracts.

COMTEN: The communications control units which interface the ODP mainframes to remote terminal/printer devices.

control: The process of governing the distribution and use of information, documents, or other material.

courier: (1) An overt official professional messenger traveling outside the continental US under military or diplomatic sanction as the custodian of official pouches or other material in transit.

(2) A Headquarters employee responsible for the secure transportation and delivery of material between Headquarters and external agencies in the headquarters area, or between Headquarters and points in the continental US other than in the headquarters area.

CPU: Central Processing Unit. The component of a computer that includes the circuits to control the interpretation and execution of computer instructions.

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CRAFT: Projected Clandestine Records Automated (Applications) Field Terminal. DO concept to provide field stations with automated information system support which affords reduced paper holdings, enhances security, provides timely information and support services, and enhances human productivity. (C 3d(3))

CRAMS: Computer Run on Agency Metropolitan Area Space.

CRT: Cathode Ray Tube Terminal.

CSPO: ODP's Consolidated SAFE Project Office.

[redacted] 25X1

CTS: Collection Tasking Staff.

current intelligence: Intelligence of all types and forms of immediate interest to the users of intelligence; it may be disseminated without the delays incident to complete evaluation, interpretation, analysis, or integration.

DAC: OER's Development and Analysis Center. Provides Information Handling support to OER components.

DACOM: A USAF encrypted facsimile network between major US and overseas military commands. NFAC/OCO is a subscriber. (C 3d(3))

DAILYMAD: The OCR software facility within Interim-SAFE which disseminates electrically received cables.

[redacted] 25X1

DARE: Declassification and Review System of DDA/ISS.

data base: A collection of interrelated data stored together with minimum redundancy to serve multiple applications.

data base management system: The collection of software required for using a data base.

DATEX: Data Exchange. An OC data communications switch. Largest users are CAMS, ODP, and OCR's Interim SAFE. (S A9c(2.1))

DBMS: Data Base Management System.

DCID: Director of Central Intelligence Directive.

DEC: Digital Equipment Corporation.

DECAL: A small AEGIS file used as an index to some of the documents released by the Agency.

dedicated circuit: A communications circuit made available for a customer's full-time use.

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dedicated computer: A computer whose processing facilities are reserved for a single, or a unique class of applications.

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demuxed: The act of having separated two or more signals that were previously combined by a compatible multiplexer and transmitted over a signal channel.

DIA: Defense Intelligence Agency.

DIRS: Document Information Retrieval System used to control and track documents controlled by the DDS&T Registry.

dispatch: An official written communication which is transmitted by pouch between Headquarters and field or between field stations.

dissemination: The intellectual process of matching the content of a document to stated user interest requirements.

distributed data base: A data base which is geographically dispersed to several separate computer facilities.

distributed processing: The technique of various arrangements of computers within an organization in which the organization's computer complex has many separate computer facilities all working in a cooperative manner, rather than the single computer at a single location.

distribution: The physical movement of information in whatever media it is recorded.

DLSC: Defense Logistics Supply Center System. Updates ICS's Federal Stock Number and Part Number File.

document: Used broadly in this paper to describe any form of message, cable, report, or communication.

DoD: Department of Defense.

DORIC: Directorate of Operations Records and Information Control System. The umbrella acronym which encompasses all of the various central records subsystems in the DO system. (C 3d(3))

DORIC/W: DORIC/WALNUT replacement. DO version of the ADSTAR microform storage and retrieval system. (C 3d(3))

DRS: Document Reference System. An IMS-developed system which provides for computer terminal update of the location, restrictions, and charge-out information of DO documents and files. (C 3d(3))

DTS: Diplomatic Telecommunications Service.

[redacted] 25X1

EDP: Electronic Data Processing.

electrical: An Agency-unique term used colloquially to refer to information received in the Agency via communications channels. Synonymous with message.

electronic mail: A loosely defined term referring to electronic means of approximating postal service for delivery of information.

ELINT: Electronic Intelligence.

emanations security (EMSEC): The protection resulting from all measures designed to deny unauthorized persons information of value which might be derived from intercept and analysis of compromising emanations from other than cryptographic equipment and telecommunications systems.

escort: Duly designated personnel who have appropriate clearances and access approvals for the material contained in the ADP system and are sufficiently knowledgeable to understand the security implications and to control the activities and access of the individual being escorted.

ETARS: Electronic Time and Attendance Reporting System. An OF project designed to transmit field-generated T&A reports to Headquarters, to store the reports in computer files for subsequent payroll processing, and to transmit OF-generated T&A traffic to the field. (C 3d(3))

ETECS: OL/P&PD's Electronic Text Editing and Composition System.

[redacted] 25X1

EXCOM: Executive Committee.

Executive Agent Program: A program wherein a single department, agency, or organization collects or processes foreign intelligence for the Intelligence Community at the direction of the DCI or higher national authority. Executive Agent Program can also be used to identify a single Agency providing a service of common concern, e.g., OCR acquisition of foreign publications, etc.

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facsimile: A technique for transmitting images electronically. This can also mean to make an exact copy.

FAMPS: Field Automated Message Processing System. An ODP facility which enables electronic cables to be transmitted from ODP to CDS. FAMPS will be replaced by MPS in 1980. (C 3d(3))

FARMS: Provides an index to all forms and reports used by the Agency.

FARS: Federal Automated Requisition System. FARS enables OL to access the Federal Standard Requisitioning and Issue Procedures (FEDSTRIP) for requisitions from GSA and Military Standards Requisitioning and Issue Procedures (MILSTRIP) for military requisitions. (C A9c(2.10))

file: A collection of related records, in manual or ADP machine form, considered as a unit.

FIS: Foreign Instrumentation Signals. Electromagnetic emissions associated with the testing and operational deployment of foreign weapons and space systems. Includes telemetry, beaconry, electronic interrogators, tracking signals, command links and satellite data links.

FOIA: Freedom of Information Act.

front-end processor: A computer associated with a host computer that performs preprocessing functions. It may perform line control, message handling, code conversion, error control, data control, data management, terminal handling etc.

FRS: Financial Resource System. This project is run by ODP on behalf of OF to provide budgetary controls and resource allocations and utilization figures for use throughout the Agency.

GAS: This project, the General Accounting System, is processed by ODP primarily on behalf of OF to maintain official records reflecting status, use, and accountability for all funds, property, and other assets for which the CIA is accountable.

GIMS: Generalized Information Management System. GIMS is a DBMS (q.v.) provided by ODP for those customers who have large, complex, information handling requirements.

goal: The desired future position which the Agency wants to attain.

HATS: Headquarters Area Transmission System.

HF: High Frequency.

HSTS: (1) High Speed Text Search. A software/hardware approach to optimize the speed of searching massive text files.

(2) Headquarters Secure Telephone System.

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HUMINT: Human Intelligence.

IC: Intelligence Community.

ICS: OL's Inventory Control System.

IFARS: Interim Federal Automated Requisitioning System. Provides information on supplies requisitioned from other government agencies and is the backup system for FARS. (C A9c(2.10))

IIS: Integrated Information System. An NPIC computer system with programs for storing, updating, and retrieving information from the Installation Data File (IDF), the Exploitation Products Data File (EPDF), and the Objects Data File (ODF). (C 3d(3))

IMINT: Imagery Intelligence.

IMS: Information Management Staff of the DO.

information: Unevaluated material of every description, at all levels of reliability, and from any source which may contain intelligence information.

information handling: (1) Management of data or information which may occur in connection with any step in the intelligence cycle; such management may involve activities to transform, manipulate, index, code, categorize, store, select, retrieve, associate or display intelligence materials; it may involve the use of printing, photographic, computer or communications equipment, systems or networks; it may include software programs to operate computers and process data and/or information; and may include information contained in reports, files, data bases, reference services and libraries. For the purposes of this report we have excluded collection, processing proximal to collection, and value added services such as analysis.

(2) The systematic creation, movement, use, storage, retrieval, and disposal of intelligence and management information with the support of automated or other clearly identifiable processes and with due regard for control of sensitive and compartmented data.

information security: Safeguarding knowledge against unauthorized disclosure; or, the result of any system of administrative policies and procedures for identifying, controlling, and protecting from unauthorized disclosure or release to the public, information, the protection of which, is authorized by Executive Order or statute.

Interim-SAFE: OCR's Interim-SAFE processes electrical traffic received from DATEX, MAX, and CDS. It distributes this traffic to various NFAC users based on message content and dissemination codes that have been assigned by CDS. (S A9c(2.1))

interactive: When used in conjunction with a computing system, refers to the ability of a terminal user to communicate with the system such that a conversational dialog is sustained.

interactive computing: Use of a computer such that the user is in control and may enter data or make other demands on the system which responds by the immediate processing of user requests and returning appropriate replies to these requests.

IOC: Initial Operating Capability.

IPANA: Information Process for Analysis. An ORD exploratory development of advanced information processing techniques for the support of intelligence analysis.

[redacted] 25X1

IPS-LOG: A GIMS program used by ISS to keep track of Information and Privacy Division requests.

IRO: Information Resources Office/RMS.

ISGTRAIN: Provides IMS information on employee training, an IMS developed system.

ITD: Provides index to international travel documents, an IMS developed system. (C 3d(3))

ITS-W: Imagery Transmission System—Washington. Photo transmission network of ten units located throughout the Intelligence Community. A unit is located in the Imagery Watch Office of RSG. (S A9c(2.1))

JES3: Job Entry Subsystem Three. IBM product which facilitates the entry and scheduling of jobs in the batch processing environment controlled by the MVS Operating System.

[redacted] 25X1

LASERFAX: Facsimile transmission terminal which utilizes a laser recording device. See ITS-W.

LASERFAX Network: An imagery transmission system—Washington.

LDX: Long Distance Xerography. See WASHFAX.

leased-line circuit: A communications circuit, normally dedicated, obtained from a public communications utility on a rental basis.

logic line disconnect: A feature of an electronic telephone switch in which the disconnection of the telephones from the switch is controlled by the central or microprocessor computing element within the switch.

MAD: Machine Assisted Dissemination. A facility which distributes electrically received information based on user requirements profiles. Originally developed and used by OCR, later most of its functions were incorporated in OC's CDS.

MAGAS: OGCR's Meteorological Agronomical, Geographical Analysis System. A minicomputer-based system to support interactive geographical manipulations.

mainframe: Term used to refer to computers with large processing, memory and storage capacities.

MAX: Message Automated Switch. Office of Communications message switch.

MERCURY: Office of Communications program to replace message switches with packet switches.

message: A unit of information treated as a transaction within a communications network. Synonymous with electrical.

milestone: A discrete event within an activity that is observable and useful for measuring progress.

MIDAS: The new version of RAPID. Media Intelligence Dissemination Automated System.

MIPS: (1) Medical Information Processing System. A composite of all projects processed by ODP on behalf of OMS.

(2) Millions of (computer) instructions per second. An indication of the speed of a CPU.

MIS: Management Information System for P&PD.

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MPS: Message Processing System. A software system that will enable the transfer of information between ODP's Ruffing Center and OC's CDS and DATEX systems. This system will replace the AMPS and FAMPS facilities in 1980. (C 3d(3))

MPX, MUX: Abbreviations for multiplex. A communications device that permits a small set of users to interleave or simultaneously transmit two or more messages on a single commmunications channel.

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MTST: Magnetic Tape Selectric Typewriter.

multiplexer: A device which combines two or more signals for simultaneous transmission over a common transmission medium.

MVS: Multiple Virtual Storage. An IBM Operating System (O/S, q.v.) which controls all of the CPU's being used in the batch processing complex. Used in both the Ruffing and Special Centers.

MVT: Multiple Jobs with Variable Tasking. An IBM operating system.

NBIDI: National Base of Imagery Derived Information. This NPIC system includes the Installation Data File (IDF), the Exploitation Products Data File (EPDF), and the Objects Data File (ODF). (C 3d(3))

NDS: NPIC Data System. An on-line, interactive data system to support exploitation of overhead reconnaissance derived in the Agency. (S 3d(3))

near-real-time: The brief interval between the collection of information regarding an event and reception of the data at some other location, caused by the time required for processing, communications, and display.

netted: A communications term applied when more than two locations can converse using the same physical circuit or when more than two locations share the same cryptographic keysetting.

NFAC/MRS: NFAC Message Routing System. MRS is an OCR-developed software package that sorts cable traffic that AMPS has received from CDS. The sorted messages are then printed in OCO for distribution to NFAC current intelligence analysts.

NFIB: National Foreign Intelligence Board.

NIO: National Intelligence Officers.

NIPS: National Military Command System, Information Processing System. A data base management system used for batch and on-line applications primarily in the Special Center. Provides informatiion storage and retrieval capability.

NITC: National Intelligence Tasking Center.

NOC: Non Official Cover. (C 3d(3))

NOCC: NOC Communications. (C 3d(3))

NOCPERS: Non-Official Cover Personnel System, being developed by IMS. (C 3d(3))

NOIWON: National Operations and Intelligence Watch Officers Net.

non-pro communicator: A term applied to Agency employees who perform communicator duties as a secondary job function.

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non-pro courier: A term applied to Agency employees who perform courier duties as a secondary job function.

NSA: National Security Agency.

NSCID: National Security Council Intelligence Directive.

OAK (C): Photographic interpretation reports published by NPIC. (C 3d(3))

OASIS: (1) OSR Automated Strategic Information System. This system developed by ODP enables analysts to efficiently and accurately identify, evaluate, and monitor the strength, deployment and organization of military units. (C 3d(3))

(2) An on-line system operating in NPIC's Dissemination Control Branch to support the recording, dissemination, distribution, and control of classified materials. (C 3d(3))

objective: Identifiable and specific activities which are to be achieved in the pursuit of Agency goals. Progress is measured in terms of timely accomplishment of objectives.

OCR: (1) Optical Character Reader.

(2) Office of Central Reference

OCRDIR: OCR Directories. This project supports the automated production of biographic reference aids such as directories of foreign officials for the Office of Central Reference

OLDE: On-Line Data Entry. Office of Central Reference software used primarily to enter information into the AEGSUBJ file.

operational compartment: A compartment designed to protect policy, planning, research and development, contracting, budgeting, and mission-related information pertaining to systems of foreign intelligence collection.

optical fibers: Transparent glass fibers which have the ability to transmit great amounts of information with extremely low losses by a process of total reflection of a light source.

O/S: Operating System. An integrated collection of service routines for supervising the sequencing and processing of programs by a computer.

packet switching: The method of segmenting and reconstructing messages so that each segment can be transmitted via a different route, if necessary, to minimize communication delays in complex, remote terminal computer systems.

Packet switching is a telecommunications technique that dynamically allocates bandwidth to a number of low-to-medium duty cycle users by blocking information into numbered "packets" and transmitting these packets over the communications channel in a pipeline mode. This technique makes extremely efficient use of bandwidth, but requires substantial computing power at the switching nodes. Error-protection of data by error detecting codes and packet retransmission is an inherent feature of this technique.

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PAYROLL: This is an aggregate of some 13 related payroll projects processed on behalf of OF to provide for the payroll of all Agency employees, retirees, and agents. (C 3d(3))

PCS: Defector system.

PCTG: Programmable Channel Termination Groups. Minicomputers that serve as input/output controller subsystems for the DATEX and MAX systems.

[redacted] 25X1

PERCON: This OP system maintains information on contract employees.

PERFIT: Performance Appraisal Call-Up and Control System. This OP system tracks the submission and rating of Agency fitness reports.

PERSIGN: The Personnel assignment project for OP is a composite of five related projects, all dealing with information on each Agency employee, and is used to provide managers with statistical reports or explicit data on their employee's current status and assignment.

PHOTO: Provides an index to file of photographs, an IMS developed system. (C 3d(3))

[redacted] 25X1

P&L: Prescribed and Limited. DO procedure used to establish a channel to limit distribution of sensitive operational information and intelligence information reports. P&L correspondence is identified by the operational activity cryptonym prefixed by the digraph PL. (C 3d(3))

precedence: The priority system used to determine the order in which messages will be processed in OC systems. They are FLASH, IMMEDIATE, PRIORITY, and ROUTINE.

privileged instruction: Computer instructions which because of their capability to affect system integrity, are not normally available for application program development.

processing and/or storing: All inclusive term used to include in addition to processing and storing such functions as manipulating, deleting, modifying, editing, outputting, etc.

protocol: A set of conventions between communicating processors on the format and content of messages to be exchanged.

RAMIS: Rapid Access Management Information System. A DBMS (q.v.) supported by ODP which enables a user to create and manipulate a wide variety of data files.

RAMS: Records Center and Archives Management System. A proposed on-line system to allow components to recall material using local terminals and to automate the Records Center suspense system.

RAPID: A system to automate the word processing, editing, and publication of FBIS documents. (Arch. see MIDAS)

RCO: ROYAL Control Officer.

reading requirements: A statement which defines user or component interests in receiving disseminated information.

REAL-ESTATE: Agency Real Property Summary Reporting System.

REARCS: Remote ARCS (q.v.)

RECON: Remote Console. An OCR on-line file management system used to support its document reference facilities.

registry: A functional component which receives and distributes mail and normally records this transmission activity in a limited retention register.

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repertory dial: A feature of an electronic telephone switch which allows the switch to originate a call by the user dialing only an abbreviated code for lengthy numbers.

RIS: Records Information System.

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RJE: Remote Job Entry. The facility to submit jobs through an input unit that has access to a computer through a communications link.

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ROYAL: An APEX control used to indicate a small body of extremely sensitive intelligence which is disseminated on a named-individual basis only.

Ruffing Center: ODP's central computer support facility located in GC-03.

RYBAT (C): A sensitivity indicator for correspondence between Headquarters and field or between field components. Used in addition to the security classification when, in the judgment of the originator, a cable or dispatch concerns administrative or operational matters of such sensitivity that initial cognizance should be limited to a station chief, division chief, staff chief, or higher authority. At Headquarters, cables bearing this sensitivity indicator will be disseminated to the head of the action unit and information unit(s) authorized by the appropriate deputy director to receive such cables. The head of the action unit is responsible for ensuring that other officials are kept informed on a need-to-know basis. (C A9c(4.1))

SACS: OS Security Access Control System Minicomputer. Associated with the badge machines. (C A9c(3.7))

SAF: OC's Special Activities Facility. This facility decrypts non-routine TCF (q.v.) activities such as double encrypted messages, VIP circuits, an NSA circuit,a set of 10 telephone circuits, and encryption/decryption for a line to the White House. (S A9c(2.1))

SAFE: Support for the Analysts' File Environment. The system being developed for NFAC which will support the rapid dissemination of incoming or locally composed intelligence messages and documents and the creation, storage, retrieval, and exchange of documentary intelligence.

SANCA (C): OS system that manages an index for name traces. (C 3d(3))

SARS: Security Access Records System provides automated file search of SACS records for badged personnel and those individuals with Visitor-No-Escort badges. (C A9c(3.7))

SCAM: OSR's Strategic Cost Analysis Model. This project performs analysis of Soviet and Chinese data to produce estimated defense expenditures.

SCIPS: Staff for Community Information Processing Study. A committee established by the Committee on Documentation (CODIB) of the United States Intellience Board (USIB). CODIB existed from 1958—1968 and was reestablished as the Information Handling Committee at that time.

SCI: Sensitive Compartmented Information. All information and material bearing special controls for restricted handling within compartmented foreign intelligence systems.

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SCRIPT: An ODP provided on-line word processing system. Supports data entry, storage, text editing, formatting, and print-outs of information. DO uses a separate copy of this software package in the Special Center.

SECOND: Security Contractor Data System Support. Provides data on industrial security program, contractor personnel, and company data. (C A9c(3.7))

Senior Intelligence Officer of the Intelligence Community: Those officials who represent their departments or agencies on the National Foreign Intelligence Board (NFIB).

SI: Special Intelligence.

SIGINT: Signal Intelligence.

simulate: To imitate one system with another, primarily by computer software, such that the imitating system achieves the same results as the imitated system.

SMOSA: System for Management of Small Arms.

SOCOMM: Special Operations Communications Network. An NRO system operated by the Air Force. (S 3d(3))

SOFA: Subject Operational File Activity. DO on-line system, developed by IMS, to locate files on subjects and operations. (C 3d(3))

[redacted] 25X1

Special Center: Computer Center located in GC47 which is used to support DO and CAMS activities. (C 3d(3))

[redacted] 25X1

stand-alone: Independent; without electrical connection to other processing devices.

STAR: DO's Special Trace and Retrieval System, developed by IMS. (C 3d(3))

STEPS: DDS&T's Science and Technology Evaluation and Planning System.

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store and forward: A communications switching technique in which blocks of data or messages are received and stored before onward transmission. Used to maximize the efficiency of circuit utilization.

SUPPLYMAN: OL's Inventory Control System.

[redacted] 25X1

switched circuit: A communications path that is shared by a number of parties by changing the electrical connection from one terminal to another.

T-1 rate: A rate of data transmission designated by the Bell System at 1.544 million bits per second.

TACK: A dynamic graphics system which plots geo-referrent data on maps drawn from the World Data Base. This ORD-developed system knows about orbital mechanics, look angles, and footprints.

TADS: Telemetry Analysis Display System. An OWI project which is designed to support interactive analysis of technical sources to determine the characteristics of foreign aerospace vehicles. (C 3d(3))

TAGS: Traffic Analysis by Geographic and Subject. State Department key line dissemination system.

TAP: Terminal Access Point. A facility provided by OCR which allows on-line access to a number of external data bases.

TCF: OC's Technical Control Facility. Location where incoming signals are decrypted before being passed to subsequent OC systems for processing.

[redacted] 25X1

telecommunications: Any transmission, emission, or reception of signs, signals, writing, images, and sounds or information of any nature by wire, radio, visual, or other electromagnetic systems.

telenote: An unauthorized message format occasionally used for informal communications between two Agency locations.

telepouch: A unique message format (deferred cable) used for information that has no time criticality and that requires proprietary protection.

teleprocessing: The overall function of an information transmission system which combines telecommunicatons, automatic data processing, and man/machine interface equipment and their interaction as an integrated whole.

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TEMPEST: An unclassified term referring to technical investigations for compromising emanations from electrically operated, information processing equipment; they are conducted in support of emanations and emission security.

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[redacted]

TSCADS: Top Secret Control and Distribution System. A system run in the Ruffing Center for OS to support TS document accountability. (C A9c(3.7))

TSO: Time-Sharing Option. An IBM product which provides the applications programmer with the capability to perform on-line software development.

VM: Virtual Machine. An IBM Operating System run in the ODP Ruffing Center which supports a wide variety of interactive ADP services to Agency users.

WASHFAX: A Defense Communications Agency encrypted communications system managed by the National Communications System. Transmits facsimile material at all classification levels and all compartments. A WASHFAX terminal is located in OCO. (S A9c(2.1))

WBCS: Wideband Bus Communication System. A SAFE communications subsystem to transmit information to remote locations within the Headquarters Building. System will be encrypted. NSA assigned task of developing cryptographic subsystem. (S A9c(2.1))

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[redacted]

WWMCCS: WWMCCS is the World Wide Military Command and Control System that provides the means for operational direction and technical administrative support involved in the function of command and control of US Military Forces.

4C: Projected Community-wide, computer-assisted compartmentation control system.

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ATTACHMENT E

BIBLIOGRAPHY OF COMPONENT INPUTS IN RESPONSE TO CIA/IHTF SURVEYS

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