REVIEW OF THE IHS ARCHITECTURAL FUNCTION IN THE AGENCY

OBJECTIVE OF THE OFFICE OF THE IHSA

The Office of the IHSA was established in January 1981 in accordance with the directions of the EXCOM, based on its review of the findings and recommendations of the Information Handling Task Force. The office was established to plan, coordinate, guide, and approve the overall design of the Agency's information handling systems (IHS). The objective is to achieve an integrated, non-redundant total Agency IHS architecture that is responsive to the totality of user needs, while maximizing the payoff for the investment. The IHSA also is to serve as the prinicipal focal point for community contact and top-level information concerning the status of the Agency's IHSs. The office function is one of top-level management and planning, and does not involve development of system requirements or system implementation.

FOCUS OF THIS PRESENTATION

The IHSA has been assigned the responsibility of making an annual report to the EXCOM on the status of IHSs in the Agency. In this first report, the focus is on the key problems and proposed approach of the office of the IHSA in dealing with those problems.

In the memorandum reporting the conclusion of the EXCOM, it was stated that "The Committee agreed to adopt the proposed mission and function statements for the time being and review them for possible revision after the 'architect' has been in operation long enough to evaluate them." The office has now been organized, the staff selected, and has begun operation on the basis of the proposed mission and function statements. Principally, these are the mission and function statement of the Architect of Information Services that was prepared by the DDA in response to EXCOM guidance. It is now appropriate to review that mission and function guidance and change and ratify it as appropriate, in accordance with EXCOM findings. Clear guidance and a statement of missions and functions, from the EXCOM to the IHSA, is needed to direct the office and establish its acknowledged role in the Agency community.

Since discussing the entire package of findings and recommendations would be an excessively long and generally unproductive undertaking, this report focuses on the key problems and the recommended approach and authorities of the IHSA to deal with them. The concern is with key problems found by the IHSA, but for which no recommendations were made, and with other issues found by the IHSA to be fundamental to the execution of the general IHSA

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responsibility. Issues and approaches which are felt to be non-controversial are assumed to be accepted and have been omitted from discussion for the sake of brevity.

THE KEY PROBLEMS AND THEIR RESOLUTION

In the following paragraphs, the key problems in accordance with the above stated criteria, and as perceived by the IHSA are presented.

1. Approval of Systems

I believe the current top-level management involvement for IHSs to be primarily budgeting. The Directorates operate on the philosophy that once the money is available, spending it on the designated subject is at the discretion of that Directorate. In other words, it is a local-option environment.

I do not believe that the function of the IHSA has any significant value unless top-level management is instituted with respect to IHSs and this office plays a key role in that management. That is the only way IHSs can achieve interoperability as part of a larger architecture, precious resources can be used to develop and operate systems in an efficient and effective manner, and the planning and environment needed to support sysems development can be created.

The extant guidance on the approvals is scant and is contained in a DDCI memorandum of 26 July 1978 (DCI 78-8710/16). It specifies that all projects with an annual investment cost greater than $250,000 will be reviewed annually by the EAG (predecessor to the EXCOM). It does not specify any initial required documentation, such as functional requirements, development plan, or costs. There is also overlapping guidance with respect to ODP approval of ADP systems and ADPE in HR 25X1 [____]of 13 August 1975, which defines ODP's charter. The latter specifies approval authorities which are redundant to those now 25X1 assigned to the IHSA in [____] of 16 March 1981. Such approval redundancy needs to be resolved, since such a layered, duplicative process is not helpful.

Agency discretion with respect to the formulation of its top management process has recently been somewhat limited by two recent actions. Section 3506 of the Paperwork Reduction Act of 1980 specifies that each agency shall appoint a senior official, reporting to the agency head, to carry out agency responsibilities under the act. These include review, planning, budgeting, and training with respect to IHSs. Even if the Agency receives a general waiver from the terms of this act because its systems relate to such activities as the collection of foreign intelligence, the intent of Congress that there be a single, designated, agency management and control point for

IHSs is clear.

The second action derives from the Agency's request, along with those of several other agencies, for a general delegation of authority for waivers from the NBS Federal Information Processing Standards (FIPS), managed for the Governnment by the Department of Commerce. In its letter of 6 April 1981, the Commerce has responded that it is now coordinating action "to amend the FIPS to delegate to heads of agencies the authority to approve waivers." It is the view of NBS that the letter represents a statement of clear intention to delegate the waiver authority by DOC, subject to approval by OMB and possibly Congress. The delegation would be made in a formal instruction that clearly specifies the acceptable conditions for such waivers. As in the Paperwork Reduction Act, a senior individual reporting directly to top-Agency management would have to be delegated the waiver management responsibility. This individual should not also be responsible for systems implementation, but would review the waiver requests of parties responsible for such systems implementation.

We thus have three factors pointing towards the necessity of assigning the IHSA approval authority of IHSs: the basic need for top-level, centralized management of IHSs; the agency responsibilities under the Paperwork Reductions Act; and the DOC delegation of waiver authority with respect to the FIPS. Even if the EXCOM had not recommended such authority, it would seem to be mandatory at this point if the Agency's top-management responsibilities are to be met.

2. Accreditation of System Requirements

The source of the problem is probably the old aphorism, "The user is responsible for requirements." While this functional assignment sounds logical, it is a simplistic concept that can lead to real problems if interpreted as the delegation of an exclusive prerogative to the user. Some of the principal sources of such problems are:

o Lack of a reconciliation of the user's requirements with the implementation environment;

o Inadequate attention to adjunct user requirements; and

o Lack of a consolidation and validation mechanism for requirements derived from a community of users.

The lack of reconciliation involves an interactive process between the user and developer. The system requirements should evolve from the functional requirements as the consequence of an interplay between the techniques and mechanisms of their implementation and the

restructuring of user organizations or operations in conjunction with the new system. One of the worst mistakes that can be made is simply to automate current manual procedures; the result is usually a system several times the size and cost as would satisfy the need. The implications of such a direct transformation approach are not always well understood by user organizations.

With reference to adjunct requirements, there is an increasing functional complexity of Agency systems due to the increasing involvement of adjunct users. Instead of a system like PERSIGN, which is a personnel management system with a homogenous set of users, we are now developing systems like LIMS, a logistics system with many adjunct user organizations. The problem of the definition of the requirements for such a system can be difficult, particularly when an IOC date and funding constraints force compromises.

Lastly, there is the problem of requirements for general services systems. The requirements for these systems drive their cost, availability, and acceptance just as they do for any other. The problem is the establishment of an acceptable, but not excessive, set of requirements. The Agency history has been that the developer sets the requirements for such systems, based on user surveys and/or projections of historical use data. A distinct hazard with this process once it has begun is the natural migration of management concern to the technical issues of implementation, to the detriment of user interest.

All of these examples reflect a strong need for accreditation of a new systems functional requirements. For complex systems, this can only be done at an Agency-wide level, since the problem is an ecumencial one. It also requires concentrated top-level attention, since the problems are complex. They cannot be successfully dealt with in an EXCOM-type project review unless the key issues and tradeoffs have already been identified and analyzed.

3. Lack of Systems Development Guidance and Training

The Agency is in an almost unique position among major Government agencies in providing no Agency-wide guidance for the development of IHSs. Some formal guidance has been developed in some groups, and there is a lot of high-powered expertise, but little of it has been formalized, even at the group level.

This lack of guidance is a major problem because there is a tremendous variation in the way developments are done among groups in the Agency. Compounding the problem is the fact that because of the constrained budget situation, experience in the development of large or moderate-sized systems is quite limited. While Agency experience

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tends to be in terms of things built with just a few people, we are now looking at the catch-up need to develop many moderate and large-sized systems. Our people need guidance, training, and standards to execute this new phase with any degree of success.

By itself, guidance will be of very limited value; it needs to be supplemented by an effective training program. I believe that a significant portion of the Agency's IHSs professionals have been relatively isolated in recent years from mainstream advances in systems development technology. Many are simply unaware of systems design and development procedures and technologies that have been standard within the commercial and DoD arenas for years now. Others believe that such technologies are only appropriate if a system involving $100M in acquisition cost is involved; since they think they are dealing with the development of smaller systems, they think they do not need formal procedures.

We need to develop a common culture, a common understanding. To do that we need to put a major emphasis on training. To do the job it has to do, that training has to be centralized. The engineer acquiring software for MERCURY in OC should have the same approach and contractor procedural and documentation requirements as that acquiring the CAMS-II in ODP, as that acquiring CRAFT in IMS. If they do not the problem of making these systems interoperate is made immeasurably more difficult.

There are two types of training required: skills and disciplinary. We have a comprehensive course structure for the former, generally, dispensed throughout the Agency. ODP now does Agency-wide skills training relevant to the use of ODP systems. Because this program was established as component training, however, there are substantial waiting periods to get into most courses. The waiting period for the Basic VM course, for example, is about six months.

The Agency handles disciplinary training on an ad hoc basis. Sometimes Agency personnel teach a course under a university's auspices, and frequently staff members attend the numerous three or five-day short courses sponsored by professional societies, universities or other groups. But we do not present such courses internally in the manner that the Information Services's program in OT&E offer courses in analytic tools to the intelligence community. Our ability to develop a common IHS culture, in my judgement, requires that we offer internally, from a centralized source, a full curriculum of skills and disciplinary training.

OT&E was recently tasked by the DDA at the IHSA's request to perform a study of Agency training requirements for IHSs. A report of

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the study is appended (Appendix B). Precise results were not available because components, for the most part, had not begun to think specifically about and plan for the problem. Basically, however, it shows that a very substantial jump in the Agency-wide IHS training requirements is imminent. This is compounded by the fact that we are not even keeping up with our current training requirement.

To bound the problem, OT&E estimated the resources required if all the training, including component-unique training which is normally done by the components, were done centrally. They found that their resources in terms of people, space, and equipment dedicated to the purpose, would approximately have to triple. This estimate also was based on the assumption of totally scheduled training, that is no ad hoc training. Actually there is ad hoc training, and the more distributed it is, the higher the proportion of the total it represents. Ad hoc training significantly decreases the efficiency of training. These would also be component-unique training done by the components, again decreasing efficiency.

Very clearly, if this IHS training requirement is not centrally managed, there will be a substantial growth in component training. Each of the Directorates would shortly have IHS training centers and dedicated resources several times that currently existing in OT&E. I would estimate that such a distributed training approach would be no better than about half as efficient as a centralized one.

A greater concern, however, is the development of a common IHS culture. Distributed IHS training would destroy any possibility of developing such a common IHS culture within the Agency. Developing a training program that will meet all the needs of the Agency will require top-level guidance and support.

The other part of the environment problem is the development of standards. We need standards in three areas relative to IHS development:

   o Management procedures and development processes standards

   o Interface control standards

   o Data item specifications (e.g., per CDRL)

Examples of documents in each category exist, some of them excellent. But these are not standards or guidances even at the Directorate level. A moderate or large-sized systems development can readily require the adherence to or production of 20 different documents. For the project personnel to figure all that out de novo is an unreasonable requirement, and it certainly is not going to produce a

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homogenous environment. It is, however, our current situation. The ability of systems to interoperate in a unified architecture is probably as much a function of how they are built as what interface requirements are levied upon them.

In order to have a single set of standards and have them for the entire Agency we need centralized development and promulgation of such standards.

4. Robustness and "User Friendly" Systems

Over the past five to ten years, I believe the impact of the tightly constrained Agency budgets has been to force the IHSs into an increasingly cost-effective posture. Unfortunately, this increased cost-effectiveness has been achieved at the expense of robustness. As a consequence, we now have highly fragile data processing and communications systems architectures. User availability of the central systems is significantly below expectations, point failures tend to cascade through the systems, and the ability to respond to contingencies is not adequate for an Agency that is to support contingency and wartime operations.

Robustness, like security, costs money and contributes little, if anything, to performance. Working our way out of the fragility corner requires reordered priorities and an advocate--the user's concern tends to be with solving his immediate problems and the supplier of the service with meeting the user's needs. Robustness is an architectural concern and one that needs concentrated attention in the near term future.

As our user base expands rapidly, we need to develop "user friendly systems." We have made a very substantial investment in developing our central systems and have now, as a consequence, some unique and remarkable capabilities. We also have a system that requires high degree of expertise to use in many areas. Expertise, unfortunately, can also be correlated directly with the amount of training required.

User friendly systems involve both the simpler interfaces, as seen by users on their visual display terminals (VDT), and simpler facilities. This greater use of menu-driven functionalities is needed so that users will not have to become experts in the instruction sets, operational structure and syllogism of particular functionalities, such as a data base management system. We also need simple functionalities for the facile implementation of small-scale applications. Users become frustrated when they have to learn how to use complex functionalities in order to perform a simple task.

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Development of "user friendly" systems requires priority and investment. The user payoff is diffuse and hard to measure. As a consequence, I believe achieving it requires an advocate to guide and support it.

5. Scientific Programming

Scientific programming to support intelligence analysis is a particular problem area at the present time. The Agency used to have a group dedicated to scientific programming, but there were a series of reorganization moves involving it, and gradually, its members either left the Agency or joined user groups. We no longer have a scientific programming group and I believe this to be a major concern.

We have some highly skilled individuals in analytic user organizations, but not many. We are plagued by the problem that such individuals can command high salaries in the commercial market place where their promotability is not hampered by a need to move into management, as it tends to be here. Here their careers cap out fairly quickly if they are in an intelligence analysis career path, and the only option they have to continue to advance their career is to leave.

Because we have lost the scientific programming group and cannot retain highly skilled scientific programmers in user organizations, the Agency now primarily depends on contractors for scientific programming support. Using contractors is certainly not a problem, but depending on them is. I understand the impact on our program was severe when one contractor recently had to be terminated because of security violations. When we lack a solid in-house scientific programming resource base, we are in a very tenuous position. In addition, I believe the demand for scientific programming is likely to be rapidly increasing. It is typically what happens next after analysts learn how to operate on a terminal and get word processing and analyst file functions under their belts.

Rebuilding a scientific programming capability is going to take top-management attention. I believe that we need to develop a "critical mass" of such people in a coherent organization with a clear career path. They need to see SIS-level scientific programmers in leadership positions and an appropriate GS grade-level profile. Obtaining these conditions implies organizational changes in both implementing and user organizations to achieve an environment attractive to such highly skilled people. Only with the Agency career attractiveness could we afford to hire and make the substantial continuing education investments that such personnel require.

6. Efficient Utilization of the IHS Resources

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My perception is that there has been a tremendous shift in attitude within the Agency regarding IHSs just within the past several years. A few years ago, most professionals with analytic or operational responsibilities seemed to view IHSs as an arcane technology that was the province of highly trained specialists. Today I believe the current perception to be that an ability to utilize IHSs is important to all professionals if they are to develop and apply their skills at a level of effectiveness reflecting the contemporary environment.

This very rapid growth of interest has produced an explosion of demand. Very clearly, our IHS user community is going to expand by an order of magnitude in just a few years. Managing that explosion of demand to provide efficient use of the IHS resources is a major concern. Given our budget constraints, the penalty for not effectively managing that demand is going to be falling badly behind in terms of processing, storage, and applications development.

The provision of IHS resources in the Agency has been based on a top-management review and budgeting process. The guiding philosophy for this process is understood to have been the provision of whatever is needed to get the job done. A primary objective has been identified as "encouraging innovation" and the use of "computer resources, as opposed to human resources, by making them free" to the user.

I believe we have passed through the era where we need to encourage the use of IHSs and are now approaching one in which the emphasis should fall on managing it for efficient utilization. We have a limited amount of time to prepare for a certainly predictable future. If we do not use this time effectively to develop needed procedures and implement functionalities, then we are going to find ourselves "behind the power curve." It is a very difficult position from which to extract an organization in an environment of rapidly advancing demand and technology.

There are two areas of IHS use that, I believe, need attention: on-line data storage and processing. (There are also problems in this context relevant to applications development of which the need for "user friendly systems" was discussed.)

While the current information/data generation rate is high, it is going to increase substantially. The exploitation processes associated with overhead collection systems are generating data at an astonishing rate and are due to increase by a factor of maybe four in just a few years. There is also the steadily increasing influx of cable traffic from a variety of sources for analysis by intelligence analysts. In addition we are acquiring powerful word processing

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equipment to be broadly distributed throughout the Agency and operate off the central systems. This type of equipment approximately doubles the productivity of a typical staff.

All of these sources produce data that is being retained on disk for real time retrieval. The Ruffing Center disk farm, for example, now almost totally fills its allocated first floor space and is still growing. A large part of this data could be eliminated by tape storage, archival, and purging. There usually is no justification for keeping special applications programs, data or allocated space on-line when there has been no activity regarding it for months. Much of the data, particularly that generated in the WP context, is simply the detritus of the daily work of the Agency's professionals and should be disposed of.

The other efficiency issue is the use of our processing resources. There are several key dimensions to this concern. We need to:

o Establish an effective priority system that enduces users with lower priority processing to accept longer job turnarounds, offloading peak hours.

o Focus on using the most efficient program that will meet the needs of the instant problem, and the latest most efficient analytic technology in developing analytic tools.

o Provide motivation for the management of operational systems to invest more of their enhancement resources in improving the applications system efficiency.

Our processing resources are sized very much like electrical power generation systems--offloading the peak hours reduces that requirement. We need to motivate users in similar manner to use off-prime time hours. For example, can an interoffice message appropriately be processed in batch at night for delivery the next day, or must it go to the addressees immediately; can a sequence of fourier analyses of missile data be packaged for a night time batch run, or must they be done one at a time in prime time as they are analyzed?

In developing on-line systems, the primary emphasis is on meeting the functional specifications instead of efficiency. After they become operational, however, the enhancement process begins. In environments where there are dedicated resources supporting the system and they are saturated, there is no shortage of motivation for efficiency. Users annoyed by slow system response provide plenty of it. In shared processing resource environments, however, motivation is needed. Otherwise the user is naturally inclined to want all the

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enhancement resources to be invested in new functionalities.

Hardware technology continues to advance rapidly in the data processing environment. More powerful processors and higher density on-line storage devices are continuously being offered, and assuredly we will continue to take advantage of them. We are talking, however, about going from 300 to 3000 on-line users in three years. That is an explosion of demand that I do not believe technological replacement alone can keep up with. It is certainly the history of the data processing industry that users develop new applications at a pace that outstrips technology. I see no basis for assuming that will change; rather, that our planned explosion in demand will only exaccerbate it.

Overall, there do not appear to be adequate forcing functions or motivators to control the distribution of data, limit its retention, use processing resources in the most efficient manner, and develop efficient applications packages. We rely on a few administrative procedures and ad hoc reviews by ODP. We also have our data disposal problem compounded by the archaic regulations of the National Archives Record Service (NARS). While we need to refine our administrative controls and get relief from the archaic NARS regulations which deal in "records" and not "data," neither is likely to be adequate to deal with the problem. We need a coordinated and centralized approach to efficient use of IHS resources. Better control functionalities resident in the central system, and greater motivation for the users to use the resources efficiently are needed.

It takes time and priority sponsorship to develop the needed system utilization control tools. Relief from the archaic NARS regulations I believe requires that we take a constructive approach and define regulations that we believe will work and make sense in our environment. If our data control environment has not changed substantially two years from now, I believe we will find our ability to advance our IHS capabilities absorbed by wasteful and non-productive service and administrator requirements.

RECOMMENDED ACTIONS CONCERNING THE IHSA

My specific recommendations in approximate order are as follows.

1. IHSA Accredit System Requirements and Approve Systems at Major Milestone Reviews

To define a managerially practical environment, it is recommended that there be three categories of systems: Class I (large), Class II (medium), and Class III (small). The two thresholds defining the boundaries are acquisition cost values. It is recommended that the top-management responsibility for the smaller two be delegated to the

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Directorates, and that the Directorates delegate that for the smallest to the constituent Offices. An exception to all such delegations is systems with multiple user components, viewed from the next higher level.

The recommended top-management review process consists of three milestones: the planning milestone, which is a budgetary milestone and which should interface with periodic budgetary processes; the system specification milestone, which is a management milestone; and the preliminary design review milestone, which is a management milestone. The scheduling of the last two are determined by the characteristics of the project, and are not synchronized with any periodic process. This basic management review process would apply to all three categories of systems, and there should be documentation requirements for each milestone. Review of the conformance of developments with documentation requirements for delegated responsibilities would be done by the Inspector General's office as part of their regular periodic management audit of offices.

A format for such a top-management process for managing the development of systems is attached as Appendix A. This format was prepared because it became clear that it was important to clarify the mechanism of the intended approval authority for the EXCOM to be able to make a knowledgeable judgment.

It is recommended that the IHSA be authorized to develop a DCI Directive concerning accreditation of requirements and approval of systems based on this format as it may be modified by the EXCOM.

It is recommended that the system approval responsibilities currently assigned to ODP be assigned to the IHSA, per the approved format, in the update of [   ] and a new HR defining the responsibilities of the IHSA. In this context it is the intent of the IHSA to delegate responsibility to ODP for review of all ADPE embedded in new systems for compliance with FIPS, and conformity with our central environment where appropriate. ADPE not embedded in new systems would remain the direct responsibility of ODP. The interest of this structure is to assure that developers of new systems have only one review point, and that the review that is provided is as thorough as is the current process.

2. <u>IHSA Prepare and Promulgate Agency-wide Procedures and Standards</u>

Pursuant to the IHSA responsibilities under [   ] ODP has   25X1
passed responsibility for the Agency Standards Committee to this office. It is recommended that the IHSA's chairmanship of this committee and responsibility for promulgating the Agency's procedures and standards, supported by this committee, be affirmed.

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3. IHSA Plan and Guide IHS Training

It is recommended that the IHSA provide the top-management guidance and support needed to establish a centralized IHSs training program. This program would focus on non-component-unique IHS training and be implemented within OT&E.

The process should proceed along three paths simultaneously: there should be a follow-on to the training requirements study (Appendix B) with all of the Directorates tasked to work with OT&E in developing a comprehensive and specific statement of IHS training requirements for the fiscal year 1982 through 1985; OT&E should evaluate the implications to the organization staffing and regular requirements of the Information Science Center of the cost of centralized training requirements identified in Appendix B; and contractor provided training should be procured by OT&E to respond to the immediate training needs of the Agency. A hold should be put on the expansion of component IHS training and by both indigenous and contractor personnel until the definitive study is complete and decisions made. The IHSA will guide the two study efforts and the contractor-based quick-response training.

4. IHSA Guide Resource Allocations with Respect to Long Range Architectural Investment Planning

It is recommended that the IHSA have authority to task various Agency offices responsible for the provision of IHS services to perform studies of system architecture alternatives relevant to their systems. The studies would be designed to support both the strategic planning responsibilities of the IHSA and more immediate concerns relevant to robustness and provisions of "user friendly" systems.

The objective of these evaluations will be to achieve through as an adjacent of new investments, rather than to restructure the existing system--in other words, to take the more economical approach of "working our way out." On the basis of the studies, the IHSA should review the office resource allocations, and adjust priorities, where appropriate, to begin achieving robustness and "user friendly" system objectives.

5. IHSA Guide and Direct the Establishment of a Scientific Programming Capability

It is recommended that a scientific programming capability be established within ODP to support scientific programming requirements, Agency-wide. The group would be relatively senior, compared to the data processing applications development staff. Initially the group

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would have twenty mathematical programmer slots, the majority drawn from ODP's 1983 programmer increase of 35.

The IHSA should be tasked to direct a joint study with NFAC and ODP to determine the organization, placement and method of operation of this group. The objective of the study is to determine the best way to provide thrust of an environment needed to make an Agency career attractive to such personnel, while meeting the operational requirements of NFAC and the management requirements of ODP. The study report will be made to the EXCOM.

6. IHSA Chair a Committee to Examine Methods for Improving Efficiency of Utilizations of IHSA Resources

It is recommended that the IHSA be tasked to develop a set of recommended techniques for controlling the efficiency of utilization of IHS services. It is recommended that a committee with Agency-wide representation be appointed to advise the IHSA in the development of this package. To be specifically included are user monitoring systems, developing an Agency proposal for a revised NARS regulation governing records disposal, and chargeback. A report will be made to the EXCOM of the evaluations made and recommended actions.

7. Publication of a Revised Headquarters Notice Signed by the DCI

It is recommended that a revised Headquarters Notice be prepared and promulgated, pursuant to the findings and direction of this EXCOM. In order to avoid lengthy staffing delays, it is recommended that that notice be part of the findings documentation.

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APPENDIX A

Policy and Procedures for Management for Information Systems

A. PURPOSE

This document is to set forth Agency policy regarding management responsibilities for the acquisition of new or enhanced Information System capabilities.

B. APPLICABILITY AND SCOPE

The provisions of this document apply to automated or other clearly identifiable processes used for creation, movement, use, storage, retrieval, or dissemination of intelligence and management information. Included are ADP hardware and software systems, communications sytems, terminals, word-processing, printers and copiers, image processing and display, and collection systems.

C. POLICY

1. General

Information System acquisitions shall be reviewed and approved at decision milestones by appropriate management levels. Systems of extraordinary cost, risk, or interest shall be reviewed by the EXCOM; the Information Handling Systems Architect (IHSA) and the Program Management Component shall support the EXCOM review process. Information Systems falling below the EXCOM review threshold, but nevertheless important in the context of Agency Information Systems Architecture and Planning, may be reviewed by the IHSA at decision milestones.

2. Specific

For purposes of management and coordination there are three classes of information systems, determined by investment cost thresholds. Class I and II systems shall comply with the procedures, standards, and documentation requirements for major programs. Class III programs shall comply with the procedures, standards and documentation requirements for minor programs.

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a) Class I Informations Systems shall be reviewed and
   approved at decision milestones by the EXCOM. Any
   Information System, or any significant revision of an
   existing Information System, meeting any one of the
   following criteria shall be designated a Class I
   Information System:

   i) Has anticipated acquisition costs in excess of
      $8 million during the span from program
      initiation to the time the system becomes
      operational; or

   ii) Has estimated costs in excess of $2 million in
       any year; or

   iii) Is designated as being of special interest.

   iv) Information Systems which do not meet the
       criteria for Class I Information System
       designation, but which are considered to have
       Agency-wide or community importance shall be
       reviewed and approved by the IHSA. In
       particular, a number of information systems of
       similar character, but less than Class I
       threshold, may be aggregated and considered as
       a Class I system. Review procedures used for
       such Class I systems will be tailored as
       appropriate by the IHSA.

b) Class II Information Systems shall be reviewed and
   approved at decision milestones by the Deputy
   Director responsible for the system. Any Information
   System, or any significant revision of an existing
   Information System, meeting any of the following
   criteria shall be designated a Class II Information
   System:

   i) Has anticipated acquisition costs in excess of
      $1 million during the year from program
      initiation to the time the system becomes
      operational; or

   ii) Has estimated acquisition costs in excess of
       $250,000 in any year; or

   iii) Is designated as being of special interest.

c) Class III Information Systems shall be reviewed and

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approved as the responsible Deputy Director may direct. In general, it is anticipated that he will delegate that authority to the next lower level of management. Any information system, or any significant revision of an information system which is in cost or importance less than Class II is a Class III system.

d) For the purpose of estimating acquisition costs the value of one person-year of professional effort will be $100,000 regardless of the sources.

3. Milestone Decisions

Three milestone decisions are defined for acquisition of Major Information Systems.

o Milestone 0 Decision -- Approval of Mission Need Statement approval of the budget and schedule, and authorization to proceed to the next program phase. The Mission Need Statement shall define the need for the system, and shall be accompanied by Preliminary System Requirements, acquisition strategy, schedule goals, and the total and annual investment of resources estimated. The next program phase for a simple package (no program development investment, e.g., a computer with standard support software) is the actual procurement, or for a complex system development. The next phase is the Concept Development Phase.

o Milestone 1 Decision -- Approval of the System Design Concept, System Requirements, and Program Development Plan; and authorization to proceed with the next program phase. For large complex systems, alternate concepts are to be explored and evaluated before settling on a chosen concept, the reasons for a particular selection are to be presented. Documentation at this stage shall include baseline System Requirements, System Design Concept, and a Program Development Plan. System requirements will be accredited by the IHSA. Cost and schedule goals are reassessed. Equipment plans are presented for approval, and acquisition of fully designed, commercial hardware will normally be executed pursuant to this approval

or direction. Approved programs then proceed to the Preliminary Design Phase.

o Milestone 2 Decision -- Approval of the Preliminary Design and Revised Program Development. All acquisition programs, however phased, will have a single Preliminary Design Review (PDR) covering the entire program. This review is coordinated with the program's internal PDR so that issues arising as a result of the PDR process can be evaluated. At this milestone review the program cost, functionality, and schedule objectives, primarily as defined and determined at the PDR, are reassessed. Approved programs then proceed to full-scale development.

At each decision milestone, guidance and direction to the program are documented.

At any point at which a program deviation in cost or schedule goals of more than 15 percent is estimated, the IHSA will be notified. He may, at his discretion convene an ad hoc review of the project status.

4. Procedures

At least six months prior to Milestone 1 or 2 review of Class I and II systems the program sponsor will notify the IHSA. For Class I systems, the IHSA will coordinate and schedule an EXCOM review.

The IHSA will appoint a member of his staff to coordinate with the program office concerning preparation for the Milestone review. The program office will brief the IHSA office with respect to the program status for Class I and II systems. Questions which the office of the IHSA has with the project will be addressed to the project management. The intent is to resolve all the questions that pertain to such matters as the project formulation, completeness of planning and design, interoperability, conformity with standards, and supportability prior to the Milestone review.

Shortly prior to the review, the IHSA will prepare brief point papers covering any points of concern or disagreement relative to the information system's

development. Approximately one week prior to the EXCOM Milestone review of Class I systems, the IHSA will prebrief the EXCOM concerning unresolved issues and concerns. The project management will then brief the EXCOM on the system at the Milestone review. The IHSA will then prepare a decision coordinating paper documenting the EXCOM guidance and direction to the project.

For Class II systems, if the IHSA feels that there are significant architectural concerns, he may join the Milestone review. If those concerns still remain following the review, the IHSA may schedule an EXCOM review.

5. IHSA Responsibilities

The Information System review process is the management compliment to the budgeting process. Information System decisions must fit into the affordability framework of the budget, and further, must fit into the Agency architecture and planning framework for Information Systems. In that context specific IHSA responsibilities include:

  a) Formulating overall architecture tenets for Information Systems

  b) Conducting formal reviews of proposed Information Systems to:

    o Accredit requirements

    o Determine compliance with architecture tenets

    o Validate Functional Requirements

    o Validate System Concept

    o Ensure that relevant interfaces are considered

    o Validate information security of proposed design

  c) Advising on relative priorities of Information

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Systems

d) Focusing the issues for EXCOM reviews

e) Making an annual report to the EXCOM on the
   status of IHSs in the Agency and advising EXCOM
   on Information Systems decisions

f) Designated individual for the Agency assuring
   compliance with government-wide standards and
   procedures. Included is assuring Agency
   compliance with Federal Information Processing
   Standards, or granting waivers these to in
   accordance with delegated authorities and
   specified procedures.

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