

11 June 1965

EXCEPTION STATEMENT ON ADP COMMITTEE REPORT

1. The purpose of this exception statement by the DD/S&T Representative to the ADP Committee is to sharpen the focus on the nature of the organizational issue in question here and to provide Agency Management with some coverage of the economic and the technical considerations relevant thereto. Also included under "Conclusions" is a course of action for consideration.
2. The management question posed in Action Memorandum A-444 is:

Given CIA's increasingly heavy investment in computing activities, how should Agency Management organize those resources for the next five year period to maximize effectiveness at minimum cost?

Stated in alternative form, the basic question becomes:

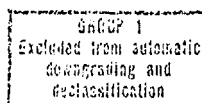
Shall CIA continue and extend until complete its present effort to centralize computing resources at the CIA level?

or

Shall CIA dissolve what is now structured at the CIA level (OCS) and reorganize its computing resources at the Directorate level?*

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- * The Office of Computer Services (OCS), established in 1963, now provides computing support to all CIA Directorates. OCS is the sole computer facility for Headquarters Building support to three (DD/I, DD/S, and DD/S&T) of the four Agency Directorates. -- DD/P has a separate facility, established prior to the creation of OCS, which is adjacent to the CIA Computer Center on the Ground Floor, Headquarters Building. (Outside the Headquarters Building there is an NPIC computer facility serving NPIC needs [redacted] [redacted] also established prior to the creation of OCS.)

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3. The ADP Committee's majority conclusion is that the CIA-level centralization thrust, which has characterized CIA organizational actions in recent years, should not be continued; instead, it should be checked. . . and even reversed. The Committee's report is intended to lay the groundwork for a) assuring continued separateness of the Agency's present computer centers, and b) creating a management climate within which additional centers might reasonably be expected to emerge.
4. There are three logical areas of consideration regarding the organization of CIA's computing resources: (a) technical, (b) economic, and (c) political. The Committee has seriously concerned itself in both its discussions and its report with but one of these areas: the political. *
5. If it is reasonable to assume that Management, before making this study assignment to the Committee, was already familiar with the major political considerations involved here, then what Management most needs is coverage of the other aspects of the question; i. e. , the economic and technical considerations. The Committee has not provided coverage of same to Management in its report because it was the majority opinion of the Committee that sufficiently reliable technical and economic projections were not now possible as ingredients to Management's decision on the organization of CIA EDP** resources. The DD/S&T Representative, however, feels economic and technical projections not only can be made but, indeed, must be made if Management is to be equipped to consider this organizational question. These are the sine qua non ingredients of such decision.

* The term "political" is not used to deride or belittle this area of consideration. Political considerations (such as present organizational lines, functions, habits, preferences, and plans) are important and must be taken into account by Management in any organizational decision. Directorate security concepts, as a specific, are part of these "political" considerations. (See Para. 8 below)

** The acronym "EDP" (Electronic Data Processing) is used in this report to mean "computing" or "relating to computers."

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6. TECHNICAL CONSIDERATIONS:

a. State of the EDP Science:

The computing science is moving into a dramatic third generation. New generation capabilities in both hardware and software constitute the largest step forward in both productivity and reduced costs in the history of the computing era. As a consequence, the new generation capabilities will have a major impact on all aspects of computing, including the organization of computing resources.

Some new generation characteristics:

- New generation gear is faster by several orders of magnitude.
- Its high speed memories have much larger capacities.
- Immediate "on-line" access to very large information files is now feasible (several billion characters of on-line storage).
- A vast array of remote terminals for input, query, and display can now be handled... a requirement in upcoming computing support to all CIA Directorates.
- New generation systems will operate under sophisticated Executive Control Programs which enable the computer to pace and control its own work... to the near exclusion of the Computer Operator in the traditional sense. Manual control of the computer from job to job (serial processing) will be grossly inefficient.
- The capacity for work is increased manyfold. Thruput for the IBM System 360 Mod 67, for example, is equivalent to eight 7090's or thirty 1410's or thirty-five RCA 501's... even when operated serially.

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- The larger models of the new generation computers provide major bonuses over the smaller models... in work capacity, in sophistication of techniques, and in significantly lower costs per unit of data processed.

b. Impact on Organization:

The impact of the above processing capacities of the new generation hardware and software will be felt in virtually all aspects of computing--management, user, and EDP areas alike.

The direction of impact on organizational structure is patently clear. The tremendous work capacity, the far-reaching systems design implications, and the pronounced cost advantages of the larger models relative to the smaller models will force greater centralization throughout the computing field.

c. The new generation OCS Computer Center:

During the past twelve months, OCS has developed its plan to shift to new generation equipment as rapidly as possible. All computers in the present CIA Computer Center will be replaced by but two IBM 360/Mod 67 computers. The first one will be installed in nine months; the second twelve months thereafter. CIA will be one of the first major centers to shift to new generation capabilities. This is much more than a status symbol; the production and economy gains are truly remarkable.

Some specifics on the OCS third generation center:

- The OCS configuration will be a twin-Mod 67 system to which the full range of peripheral devices can be attached as required by Agency needs.
- The OCS system is a complete "fail-soft" system. That is, all components are duplicated in the system so that failure of any component does not stop the functioning of the system... it only reduces thruput. The on-line systems now in development in support of all Agency Directorates will require such fail-soft support. (This fail-soft structuring of the machine configuration will tend to characterize future computing centers of whatever size.)

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- The specific configuration of hardware selected by OCS is based on the OCS workload as OCS is now charged within CIA (all Headquarters computing except RID.)
- Projected scientific computing needs of themselves would require a system of similar scale to that planned for the CIA Computer Center because of the stringent speed, memory, and backup requirements which characterize such applications. The production capability of the system, however, would be only very partially tapped if limited to scientific applications alone.
- The Mod 67, selected for the CIA Computer Center, falls in the "upper middle" size range. There are two larger models and three smaller models announced to date. (The Mod 67 is the smallest model of the new IBM 360 series which possesses the I/O controller and sub-selector multiplexor capabilities. These capabilities, in themselves, represent a major third generation stride.) The next smaller model (Mod 50) does not have the capacity to support the Agency's more demanding scientific tasks... and is considerably more costly per unit of information processed.
- No change in the main frame configuration of the OCS Center would be required to do all Headquarters Building computing as anticipated for the next 3 to 5 years.
- If and when additional main frame processing power were needed at some future date, a third CPU could be very simply added to the planned configuration at a cost of about \$17,000/month. This additional CPU, at \$17,000/month, would provide additional processing power to the system equivalent to five Mod 50's... each one of which would cost much more.

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- OCS estimates that all Headquarters Building computing (OCS and RID) can be done on the Mod 67 system within a single shift. This is intended as a measure of work volume only. Any center, of course, which serves remote terminals in user areas must remain open during periods of authorized usage.
- d. Other pertinent specifics:
- New generation gear will process most efficiently with a job mix of maximum diversification. If restricted, organizationally or otherwise, to a single application, much of its thruput power is wasted.
 - The concept of re-structuring Agency EDP resources along Directorate lines suggests the following penalties:
 - 1) The Mod 67, while doing DD/S&T processing, could concurrently process all other Agency computing with less than 15% delay (under worst peak conditions) to DD/S&T processing.
 - 2) All non-DD/S&T internal computation tasks would be serviced by the Mod 67 in less than half the time required on Directorate centers equipped with their own Mod 50's (the next size down from the Mod 67) and all purely input/output flows (no computation) would run on the Mod 67 system in slightly better time.
 - Software extensions and improvements over time will continue to increase the thruput of the gear under discussion so that appreciable increases in workload can be absorbed without acquisition of additional main frame equipment. OCS has projected a utilization of 130 hours per month initially on the Mod 67. Software improvements should permit the handling of a four-fold increase in work in something less than double the machine time.

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- Can the IBM 360 software, which is yet to be proven in operations, be counted on to meet specifications? - OCS feels the risk here is a safe one. IBM has traditionally equipped its users with the strongest software packages in the computer industry. This massive corporation has staked its entire future on the success of the 360 system-- including software. IBM is less likely to fail in its commitments than its users are to fail to fully exploit the capabilities being offered.
- The full exploitation of new generation capabilities will require on the part of user organizations advanced technical capabilities in the systems programming area. Although OCS has made a strong start over the past two years at assembling a pool of such skills, system programming skills will be in short supply in CIA and throughout the computing industry with the advent of third generation processing. Decentralization of computing to the Directorates would serve to make the shortage of such hard-to-find and slow-to-grow skills all the more critical.
- The Committee's report contains the following statement: "... 'on-line' applications involving complex interplay between manual and computer based reference facilities... are most effectively managed under complete Directorate control."

The above statement is in no way concurred in by the DD/S&T representative. There are no technical arguments to support it, and it is directly contrary to good economics.

7. ECONOMIC CONSIDERATIONS:

This section presents some measure of the price tag attached to decentralizing Agency EDP resources to the Directorate level. Three types of resources have been considered: a) machine rental (dollars); b) people; and c) Headquarters floor space. The figures given are minimum figures in each instance. Although this section on economics is brief, its relevance and import to the organizational issue is second to none.*

* Major economic overtones are apparent in the preceding section on
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a. Additional Rental Costs

In measuring the hardware rental costs for additional centers, the following guidelines were followed:

- (1) Costs of "remote on-line" devices and extra capacity peripheral equipments (such as multiple data cells) were excluded. (Basically, they are constant costs whether hooked to Directorate Centers or to the CIA Center and are thus irrelevant to Management as a decision factor).
- (2) Only those peripheral devices necessary to the operation of a stand-alone center have been included.
- (3) A double-thruput configuration has been assumed for all centers because:

EDP systems in development to support all Directorates (CHIVE, MIS, scientific systems, WALNUT, etc.) call for remote terminals in user areas. The machine language data store for such systems is retrievable only with great difficulty in the event of equipment failure. Thus, in practice, it would be highly improbable that any center, centralized or decentralized, would not find valid justification for double thruput support within the first two years of the five year period under consideration.

The minimum additional annual rental for equipment for any Directorate-level center is presented in Table 1 on the next page.

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b. Additional People:

The personnel figures given in Table 2 are, in each case, minimum extra personnel requirements to be expected with the endorsement of Directorate-level centers instead of CIA-level centralization.

Computer Operators - Multiple computing centers, of course, mean more computers (2 per center) and more computers mean more Computer Operators. Two-shift operations are assumed in Table 2.

Systems Programmers - As pointed out in Paragraph 6, above, third generation gear and remote terminal systems will force the development and use of Executive Programs for automatic control of operations. Systems Programming will become a must in staffing any center. Our figure of four Systems Programmers per local center is an initial level only; expansion to more than twice that level would soon become a requirement.

Managers/Supervisors/Secretaries - The additional personnel needs in this category stem from the requirement that each EDP center appoint the following: Chief of Operations/Deputy/Secretary; Chief, Systems Programming; Chief, Job Programming/Secretary; Chief, Systems Design/Secretary; Chief, Punch Section; Shift Supervisor of computer room, etc. The figures given in Table 2 are thus very conservative.

Systems Designers/Job Programmers - EDP Systems Designers and Job Programmers have been omitted entirely from Table 2 because of the difficulty of finding an agreed-upon algorithm. Decentralization would, nonetheless, consume additional Designer and Job Programmer man-hours and would retard development of skills.

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c. Headquarters Building Floor Space:

The entries in Table 2 are self-explanatory.

The NPIC Center [redacted] will remain as a physically separate center whether or not full centralization of Agency EDP resources is determined upon by Management... unless or until adequate and secure communications facilities are installed between the Headquarters Building and [redacted]. Thus, in this Section on Economic Considerations, NPIC has not been reflected. Full centralization of CIA EDP resources would produce technical and some manpower gains (in the management/administrative, programming, and career development areas) but hardware and space costs would not be affected.

For the additional dollar, people, and space resources required by decentralization of EDP operations to the Directorates, see Table 2 on the following page.

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8. POLITICAL CONSIDERATIONS

There are four parts to "Political Considerations." The first of these is clearly anti-centralization at the CIA level; the second and third of these support such centralization; the fourth (security) is, perhaps, a matter of opinion and can be viewed either way.

a. The "Directorate" Focus:

From a purely parochial view, each Directorate (and NPIC) would probably prefer to have its own EDP resources... people and machines. The majority of the Directorate Representatives to the Committee have reflected this kind of judgment. Some of them feel very strongly about it. It must be noted that this attitude is the only element of this entire organizational question which does not support centralization at the CIA-level. Thus, Management must pay it particular attention and weigh it carefully.

In sum, DD/P wants its own center, NPIC wants its own center. DD/I wants its own center. DD/S has traditionally supported centralization at the CIA level but in Committee discussions has generally acquiesced in the drift of the Committee's thinking toward multiple centers. DD/S&T is, no doubt, subject to the same parochial temptations as any other Directorate but DD/S&T policies in computing and in other areas have traditionally supported centralization across the Agency; the DD/S&T position on the subject issue is that the economic and technical pressures supporting centralization clearly over-ride political considerations and that the objective of CIA policy on EDP should be centralization at the CIA level. The OBPAM Representative to the Committee has voiced no objection to the majority view of the Committee members.

b. Momentum of Past CIA Centralization Actions:

The momentum of past CIA centralization actions support increasing centralization within the Agency. Major centralization actions by CIA Management in the EDP field are as follows:

- 1) DD/I Automation Staff (functions, personnel, and slots) centralized into CIA ADP Staff with Agency-wide functions (1961).

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- 2) CIA ADP Staff (including its IBM 7090, 1410, 1401 center) and ADP Division (including its RCA 501, 301 center) centralized into the Office of Computer Services for Agency-wide support (1963).
- 3) Two NPIC computing facilities centralized into the Information Processing Division for NPIC-wide support (1964).
- 4) The bulk of DD/P computing has been centralized in RID from the start.

The five-year evolution of OCS into CIA's all-Directorate computing organization is the dominant theme of the above management actions. The Office of Computer Services is now charged with all Headquarters Building computing for three (DD/I, DD/S, and DD/S&T) of the four CIA Directorates. To turn back now toward Directorate structuring of OCS EDP resources will, of course, be to fragment again what has, since the beginning of this decade, grown together.

c. Extra-CIA Pressures on CIA's Top Management:

The substance of BOB and other Department Circulars and of proposed Congressional actions in the EDP field supports the theme of centralization. These external pressures, although of course based on economic considerations, constitute inputs to the "political" climate in which Agency Management functions.

As a specific, the most recent and most authoritative Government Directive in this area (BOB Circular A-71, dated 6 March 1965) includes the following as a responsibility of the Heads of all Executive Agencies:

"Merger or integration of data systems irrespective of intra-agency or interagency organizational lines, when cost effectiveness in equipment utilization, data systems management, or program accomplishment can be increased."

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d. Security:

The Committee has discussed the question of security in connection with centralization of EDP resources. In such context, security becomes an element of the "political" considerations to be considered. It is directly tied to organizational lines and attitudes. This kind of security concept is called "organizational compartmentation" and for the computing function its rule reads: "EDP people inside the organizational boundaries of a Directorate may handle the sensitive materials processed by that Directorate; EDP personnel in a CIA center may not." The distinguishing factor here is the organizational boundary.

Security is a very difficult area to penetrate with the intellect. And, it is often embedded in very strong feelings. A few comments, however, on this security issue as it relates to EDP centralization may be helpful.

1) Issue has already been fully staffed out:

The entire question of handling sensitive materials in the CIA Computer Center arose soon after OCS was formed. As a result, the Executive Director, in Action Memorandum No. A-365, dated 10 March 1964, requested a thorough study of the question. The issue was analyzed in detail and very comprehensive security control procedures were devised for the Agency's central computing facility and for components using the services of OCS. These detailed security procedures were thoroughly coordinated with all Directorates and then formally approved by the Executive Director.*

OCS has the most studied and presumably the tightest physical and procedural security protection of any computing facility in the Agency. The surfacing of this issue at this point in time tends to reduce a very valid area of CIA concern to a polemic anachronism.

* See Staff Study on Security Compartmentation within OCS, DD/S&T, dated 26 March 1964.

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2) The rule of security control:

A basic rule for protection of data might be the following: "Access to sensitive data by the fewest people feasible, in a highly secure area, under tight procedural controls over both data and personnel."

The Agency has invested a great deal of thought, time, and money in assuring that its centralized computing facility fits that rule.

(As for the "Fewest people feasible"--Data processed by computer is in machine-language; not human language. It is translated into human language by the machine as it is printed on the computer's printing device. Computer Operators tend such printing devices and can observe its outputs. From the Agency-wide point of view, there would, of course, be significantly fewer Computer Operators in a fully centralized shop than in localized centers... as pointed out in Paragraph 7 of this statement.)

3) Centralized processing of sensitive data not limited to EDP:

Centralized processing of sensitive data is the pattern in several functional areas in the Agency in addition to computing; to wit: security, finance, personnel, printing services, communications, the Cable Secretariat, etc., which serve as offices of common concern for the processing and control of much, if not all, of the sensitive operational, intelligence, and support data in question in computer processing.

4) In sum, because of all the attention already given this question of data protection in the Agency's centralized computer shop, it seems doubtful that Directorate-level centers would be able to improve appreciably security controls so that 1) fewer people would have access to the data or that 2) less likelihood would exist of releasing data to unauthorized persons.

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9. CONCLUSIONS:

The above economic and technical considerations outweigh that portion of the political considerations hostile to continuation and extension of CIA-level centralization policy.

Therefore, CIA should continue its CIA-level centralization policy:

- 1) As opposed to Directorate-level structuring, centralization will:



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(See Table 2)

- 2) It is technically feasible and is most in harmony with the future trend of the EDP science.
- 3) It is in harmony with the extra-CIA pressures from BOB and other Departments.
- 4) It continues to build on what CIA has already built at the cost of past dislocations.
- 5) Given renewed management support, it is manageable. (Without that support, it is totally unmanageable.)

To reverse directions and go the Directorate route would mean:

- 1) Splitting up the present CIA-level organization (OCS) into Directorate pieces.
- 2) Physically dividing the present CIA Computer Center and its peripheral rooms into separate Directorate areas.

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- 3) Building a new computer center for the DD/I.
- 4) Continued operation of a separate DD/P center.
- 5) Committing this Agency to all the personnel and hardware and software and space redundancies and inefficiencies pointed out in Paragraphs 6 and 7 above.
- 6) Impairment to acquisition, training and Career Development of computing personnel.
- 7) Moving counter to a) the direction increasingly urged by BOB and other government departments, b) the direction of past CIA organizational actions, and c) the direction which the "third-generation" state of the EDP science virtually dictates.

Firm assertion by Top Management that CIA policy should be to support the centralization progression for this Agency's computing resources need not, of course, --and indeed must not-- lead to operationally destructive implementation actions from any quarter. With the clear assertion of Management's policy determination, we can then proceed over time to constructive integration.

The Agency can reasonably proceed toward more effective centralization via the following gradual (phased) program:

- 1) Issue policy statement now clearly supporting centralization at the CIA level of computing resources but scheduling such centralization in two phases:

Phase I - Centralization of hardware/ operations resources now.

Phase II - Centralization of outlying EDP Systems Design and Job Programming skills after the full completion of Phase I (2 yrs. hence).

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- 2) Centralize over the next few months the day-to-day management and supervision of CIA computer operations (hardware, operators of hardware, and systems programming)--leaving OCS, NPIC, and DD/P equipment in place, pro tem.
- 3) Physically consolidate all Headquarters hardware at the earliest date possible following the introduction of third generation equipment to the CIA Computer Center.
- 4) Leave present NPIC, DD/P, and DD/S&T EDP systems design and job programming resources under their present components until full realization of step "3" immediately above is achieved.

NOTE: It is recognized that, although already feasible technically, it may be some years before (if ever) it proves profitable to install the necessary communications facilities between Headquarters and [] to permit performing on-line NPIC mensuration computing from the Headquarters Building. Thus, computer operations in [] can be placed under the central computing component but must be operated as a second physical site unless or until adequate communication facilities are installed.

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A separate CIA-level EDP management policy and control staff?

- 1) Certain control, policy, liaison, and reporting functions in the computing field must be performed for the Agency.
- 2) Responsibility for same now resides with the AD/CS. (These Agency-wide "staff" functions had resided with the former CIA ADP Staff from the inception of that Staff and came to OCS with the merger of the ADP Staff into the Office of Computer Services in 1963.)
- 3) The Committee has talked at length about breaking this function out from OCS and establishing it in the Office of the Director.

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- 4) There is no question but that such "staff" functions must be performed. How extensive they should be and where they should be placed organizationally within the Agency are direct functions of which way Management decides the major organizational question: CIA-level or Directorate-level structuring of this Agency's EDP resources.

(If Management opts to organize its EDP resources by Directorate, a multiple-person staff should clearly be established at the Agency level; if, however, Management determines upon CIA-level centralization of Agency EDP resources, most of these "staff" functions will be inherent to the tasks of that central EDP organization and there will be very little, if anything, a separate staff could more properly do.)

- 5) Therefore, considerations of this issue (and it is a reasonably simple one) logically must follow determination by Management of the major issue... whether to proceed with the centralization of Agency EDP resources or break-up OCS and provide full EDP resources to each Directorate.

There is a strong need for Agency Management decision now on this EDP organizational question. Whether rightly or wrongly, management resolve on the EDP organizational issue is in full and common question. In the absence of clarification, the ability of our EDP leaders to cooperate or even think constructively about our mutual tasks and objectives is in jeopardy. The direction in which CIA computing resources are to be structured must be set, and quickly, to avoid serious damage to the collective capabilities of this segment of CIA activity.



DD/S&T Member
CIA ADP Committee

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