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(S) NATIONAL RECONNAISSANCE OFFICE

WASHINGTON, D.C.

THE NRO STAFF

15 February 1968

MEMORANDUM FOR GENERAL BERG

SUBJECT: SOC

REFERENCE: Your Memorandum, Subject: SOC, dated 18 Dec 1967

Representatives from SAFSP, CIA/OSP, and the SOC met during the week of 12 February 1968 to analyze the need for additional automation of the SOC. The SOC functions and operational procedures, both current and contemplated for 1970, were reviewed in-depth in order to provide a basis for the analysis.

Additional automated storage (data base) and retrieval of the reconnaissance data (e.g., photographic attempts vs successes), along with a limited analysis capability, will greatly enhance the ability of the SOC to maximize reconnaissance effectiveness. Specifically, a data base must be assembled and maintained. The data base will include the multi-sensor collection capabilities along with the requirements and all history of past missions. This data will be displayed and the information used for:

a. Determination of optimum mission tasking in view of system availability and collection requirements.

b. Evaluation of the mission performance and overall effectiveness of the reconnaissance efforts.

These are the major SOC functions which can be enhanced through use of a limited SOC computational facility. There is not a requirement to utilize operational software at the SOC to simulate various systems and missions.

The Committee recommended that an IBM 360 Model 40 Computer should be provided at the SOC for computational support.

Reconnaissance effectiveness, the data base and the computer configuration are further discussed in the attachments.

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Chairman, 1005 Committee

Attachments - 3
1. Reconnaissance Effectiveness
2. Data Base
3. Data Processing Requirements and Recommended Computer Configuration

RECONNAISSANCE EFFECTIVENESS

1. One of the key responsibilities of the SOC is that of insuring the effectiveness of the NRP collection systems in accomplishing the national intelligence objectives as specified by USIB. This function consists not only of the coordination of the interaction among the collection capabilities of the various systems to meet these objectives, but also the efficient utilization of each system. Basically, this is an evaluation and planning function that is required if full realization of the capabilities of the collection systems is to be achieved.

2. During the course of a detailed two-day review of current SOC operating procedures, data interfaces and computational capability, it was apparent that this key function was severely restricted by an inadequate data base and computational capability to utilize it. While some significant steps have been taken to accomplish many individual tasks on the UNIVAC 1005, no appreciable capability exists for realistic systems effectiveness evaluation.

3. It is apparent that the importance of NRP systems effectiveness analysis will increase in the future with the introduction of more sophisticated and costly systems that will provide both increased collection capabilities and operating flexibility. A limited computational capability in the SOC is thus imperative to the fulfillment of this responsibility.

4. There are two primary phases to this systems effectiveness responsibility. During actual missions, the function consists of a continuous evaluation of the current status of accomplishment of all collection requirements, providing input to the operational decision process concerning what the current assets are best expended against. The second phase is a longer range evaluation and planning function that is responsive to changes in requirements or feedback of recommended improvements to the procedures for determining current operations.

5. The requirement for this function being performed at the SOC is the fact that the SOC is the focal point for all collection requirements, operational data and accomplishment data, and, hence, has the only complete data base. To delegate this function to another

facility would require not only a prohibitive quantity of data transmission, but would also have the effect of decentralizing an important function. The resultant coordination problem would require manual assimilation of the varying inputs.

DATA BASE

1. Data Base Functions. The SOC should develop, maintain, and utilize a data base which will be primarily a dynamic library of collection criteria, requirements and capabilities assigned to the NRO by the USIB. The SOC will receive all requirements, translate them into the data base, and then use this basic information to provide specific outputs.

a. In a study mode, the data base will be used with a statement of projected capabilities and collection criteria to provide anticipated requirements for evaluation of new systems, or modifications of existing systems, in support of USIB-directed studies.

b. Operationally, the data base will be used in conjunction with statements of current collection capabilities and criteria, as furnished by the SPD(s) and the USIB, respectively, to define, first, system requirements and, second, mission requirements.

(1) System requirements are a subset of the total collection requirements to a particular type of system (expressed in terms operationally applicable to that system) based on its unique collection capabilities and how they relate to the total collection requirements and criteria.

(2) Mission requirements are a more refined statement of the system requirements, again, expressed in compatible terms, based on current capabilities and requirements. The mission requirements are subject to the near-real-time dynamics based on feedback information through the reporting system and corollary sources of information acting through the USIB.

c. An essential by-product of the operational and study modes will be reports which will be used to inform the DNRO, USIB and the intelligence community of the status of tasks assigned to the NRO and the accomplishment and performance levels of NRP missions.

d. To maintain currency of the data base, the SOC will manage the internal data by receiving collection verification and confirmation

reports from the SPD(s) and intelligence community and, based on criteria established in close coordination with the USIB, purging or modifying the data base as a continuous process.

e. The SOC should have the necessary computational and data processing capability to be able to manage the data base to meet study, operations and reporting requirements in a timely and efficient manner.

2. Data Base Contents.

a. Collection Capabilities. The SOC will maintain close coordination with the USIB in the definition of capabilities of the NRP projects. This will be accomplished through a constant flow of technical information from the SPD(s) on the configuration of each system for a specific mission or group of missions. Interpretation and explanation of these capabilities by the SOC will be used to advise USIB concerning collection assets implied by stated requirements for a system or a mission, and to define system collection criteria. Additionally, a change of status in the collection capability occurring during mission operations will be reported, and the effect of this will be to modify the requirements and/or criteria for that mission.

b. Collection Criteria. In order to assure the most optimum accomplishment of unique mission objectives, the SOC will interpret and format USIB collection criteria and ground rules for use within the NRO system. Collection criteria will be specified in relative terms of:

(1) Target/area intelligence values,

(2) Operational mode values,

(3) Collection system values,

(4) Quality values;

and in absolute terms of:

(5) Limitations, constraints, and requirements of the above in terms of types of target areas,

(6) Frequency of coverage/intercept.

Collection criteria will be dynamically modified by the SOC, as reports to and from the user community on confirmed mission performance frequently impact on criteria. Additionally, adaptive enhancement in current capabilities of the systems can result in a SOC redefinition of collection criteria.

Ultimately, the current collection criteria is thus used by the SOC as an input to the data base for the determination of system and mission requirements when operated against the USIB collection requirements and SPD collection capabilities.

c. Collection Requirements and Status. Operational collection requirements will be provided by the USIB to the SOC based on current capabilities of NRP programs in the form of specific targets, areas or general tasks. The USIB will define specific characteristics for the targets/areas in the form of collection modes, emitter types, locations, quality requirements, and other characteristics which, when necessary, uniquely define a specific collection requirement. For each uniquely specified collection requirement, the following will be maintained within the data base:

(1) A file of all required targets with priority (absolute, implicit, or relative), location and other physical parameters, mode, frequency of coverage, and date of last confirmed coverage.

(2) A file of each attempt at the target, including time of attempt, payload/vehicle configuration and relative vehicle location.

(3) A file of verification of each attempt in various levels (e.g., verified weather, NPIC/AMS readout, and ICRS confirmation for photo; recognizer alarms and NSA confirmation for SIGINT).

Other tasks will be defined in terms of special missions to fulfill crisis management requirements, search functions, and other requirements which do not involve unique targets/areas. Continual coordination with the USIB to better interpret their collection requirements and transformation into the SOC data base will be a primary responsibility of the SOC staff. The SOC will update their collection requirements files in response to new or changing USIB requirements on an as-required basis.

Projected collection requirements will be provided in a similar manner, with the exception that the SOC will perform a major role in the definition and interpretation of these requirements for the USIB, so that they may be translated into language unique to the SOC data base, and easily operated against in study modes, as required, by existing computational equipment at the SPD/STC/OSP locations. The knowledge of current systems capabilities and the tools used in these systems, must, in many cases, be used to analyze and evaluate the requirements for modifications to existing systems or the development of new systems to fulfill projected requirements.

3. Reports Management and Operations. A reporting system will be operated, using the data processing equipment, to reflect requirements and accomplishments.

a. This system will reflect the interpretation of collection requirements and criteria, as managed in the data base by the SOC, and will be reported to the DNRO and the USIB. Such reports will inform the DNRO and USIB of what specific collection requirements have been assigned to particular systems/missions based on the criteria provided by the USIB and translated by the SOC.

b. Reports will be prepared on current and projected mission schedules which will assist the SOC in planning workloads with the USIB and the intelligence community.

c. The SPD will report mission accomplishment and status in terms and formats which will identify probable collection operations to the SOC. The SOC will be responsible for translating the operational formats into terms useful to the appropriate agencies in the intelligence community. The SOC will also use such accomplishment and status reports to manage the collection requirements, capabilities, and criteria in the data base and to modify the mission requirements and advise the DNRO and the USIB of current progress and performance of collection activities.

d. The feedback from the intelligence community will be received through the reporting system to reflect actual mission accomplishment. This information will be in terms and formats which the SOC can translate and then use to modify collection requirements and criteria in the data base. These operations will again be reported to the DNRO and the USIB to reflect mission status and accomplishment.

DATA PROCESSING REQUIREMENTS AND RECOMMENDED COMPUTER CONFIGURATION

1. The SOC obtains the reconnaissance objectives from USIB and translates these into specific targeting requirements and criteria for each satellite system. These requirements along with the collection capabilities of the various systems will be a part of the SOC data base. In addition the data base will include targeting status.

2. The data base concept requires large bulk computer storage devices plus rapid access to this storage. The accomplishment of multi-mission optimization (multi-system coverage trade-offs) implies some modest computational capability. The CORONA/HEXAGON area cells (12 x 18 n.m.) and the GAMBIT target deck require identification and storage for approximately 250,000 and 8,000 discreet items, respectively. The required description information for each of these items will include, but may not be limited to the previously described data base contents.

3. The sizing of the data base indicates storage requirements of over 45 million bytes (8 binary bits) of data. The following table shows approximate number of items for current and planned programs:

	Targets	Attempts Per Mission	Verifications Per Mission
CORONA/HEXAGON Area Cells (12 x 18 n.m.)	250,000 (World-Wide)	28,000C 90,000H	28,000C 90,000H
CORONA/HEXAGON High Priority List (HPL) (Points)	50	150	150
GAMBIT (Points)	8,000	5,000	5,000
EARPOP [redacted] 989, 770) (High Priority Emitters)	80	43,000 (6 mos)	Indef.
EARPOP (EOB Radars)	8,000	Indef.	Indef.

DORIAN	15,000	6,000	6,000

4. The computer system configuration required to accomplish the SOC functions must have the following capabilities:

a. Direct access disk pack storage.

b. Some arithmetic computational capability.

c. Card/tape input-output.

d. Growth potential (more peripherial equipment, larger core, etc.)

e. Higher order programming language (JOVIAL, FORTRAN, COBOL, etc.)

f. Compatability with available computer configurations for use during development and as a backup.

5. Because of the size of the data base and other considerations, an IBM 360/40 computer configured with the IBM 2314 disk packs is recommended. This recommendation is based upon the following factors:

a. IBM system/360 unique storage and hardware growth potential.

b. Software is upward compatible, i.e., software developed for the 360/40 model can be used on the 50, 65, 75, and 91 models.

c. This proposed computer configuration will fit into existing SOC facility space.

d. A secure, compatible computer system and communication complex exist at CIA Headquarters to backup a catastrophic SOC computer failure.

e. IBM 360/40 has both COBOL and FORTRAN programming language.

f. Existing IBM system operating (data processing) software library would have direct SOC data base applications.

6. The following is the recommended computer configuration and equipment rental costs: (Based upon 176 hours per month)

a. Processor Group		Lease Price/Month
2040 - G	Central Processor Unit	$ 6,400
4427	Floating Point Arithmetic	100
6980	Selector Channel	400
6981	Selector Channel	300
b. Tape Group		
2403-3	Tape Control - 1 Drive	1,300
	7-Track Compatibility - 2 each	100
2401-3	Single Tape Units - 2 each	1,600
c. Random Access Group		
2314	Disks - 1 each	5,300
d. Printer - Card Read/Punch		
1442	Read Punch - 1 each	500
1403	N1 Printer - 1 each	900
2821-2	Control Unit - 1 each	600
1416	Train	100
	TOTAL	$17,600

Note: The monthly cost (rental plus maintenance) of two CDC 3800 computers is $123,000. The monthly cost of the current two UNIVAC 1005 computers is $7,000 per month.