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CODIB-AR-3
30 June 1961

UNITED STATES INTELLIGENCE BOARD

COMMITTEE ON DOCUMENTATION

Third Annual Report

Authorization

The USIB Committee on Documentation (CODIB) operates under DCID 1/4 (New Series) dated 26 June 1959.

Scope

This report covers CODIB activities during fiscal year 1961 in promoting means by which the intelligence community can best use available information of intelligence value. Following last year's pattern, the main report deals with activities and problems of general concern or interest. A list of CODIB documents issued during the reporting period is attached as Appendix "A". Developments in information handling within individual member agencies are reported in Appendix "B", distributed as a supplement to this report.

Activities

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CODIB held nine formal meetings and issued 53 staff papers during the year. Subcommittees and Working Groups held 19 meetings; five such sub-units currently exist (dealing with classification /indexing, cataloging, coding/,

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remote systems input, common information report and name-check formats, and emergency planning), and four others were dissolved during this reporting period (mechanical translation, facsimile service, biographic "black and white" lists, information systems compatibility - see discussion below). Briefings or demonstrations given or attended by CODIB members numbered 16, including a 10 day field trip to the West Coast to visit 11 equipment manufacturers or systems planning organizations and two military establishments, * and a two day field trip to the Boston-area to visit four others. ** In Washington, presentations were given by IBM, RCA, Haloid-Xerox, and National Cash Register; Verner Clapp, CODIB consultant and President, Council on Library Resources, Dr. Burton Adkinson of the National Science Foundation, and Dr. Samuel Alexander, CODIB Technical Advisor from the National Bureau of Standards, briefed CODIB on some of their organizations' projects; a tour was taken of the new State Department library; and the Navy and NSA members briefed the Committee on certain of their agency's activities. In addition, individual

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* Friden, Inc.; Ampex; Stanford Research Institute; IBM (San Jose); Systems Development Corp.; RAND; Ramo-Wooldridge; Benson-Lehner; Magnavox FMA, Inc.; Aeronutronic Systems Inc.; Navy Electronics Lab.; U.S. Army Electronic Proving Ground.

** Lincoln Laboratory/MIT; Information Technical Laboratories (ITEK); Technical Operations, Inc.; and The MITRE Corporation.

CODIB members attended the SAC Headquarters 438L Technical Conference and subsequent output demonstration and attended the monthly progress-report meetings in the Pentagon and at NSA.

Membership

Additional changes in representation occurred during the year. Mr. Donald B. McCue was designated State member vice Mr. Robert Elwood; Mr. Hollis C. Brown was named Defense representative vice Dr. John Gigrich; Mr. William O. Cregar became the FBI representative vice Mr. Meffert Kuhrtz. Increased interest in the Committee's work was indicated by more active participation than in the past year by AEC and FBI representatives.

Release of Intelligence Information

This subject, discussed in some detail in last year's Annual Report, particularly concerning problems in releasing material to contractors, continues to pose difficulties. The intensity of discussion of the problem was, however, somewhat modulated by attention to other priority interests described below, by letup in pressure on the State Department pending the reorganization of their intelligence component and their plans for modernizing information processing procedures, and by some disenchantment in view of the disappointingly slow success of the USIB Security Committee's coordination attempts in revising DCID 11/2, which document in its 11th draft, still

does not meet satisfactorily the problem of release of raw but non-sourced intelligence information. The Community has been unable over the years to agree on a definition of "finished" intelligence; this fact has delayed agreement on the DCID 11/2 revision and caused considerable difficulty in identifying what can and cannot be released to contractors and friendly foreign government representatives, without administratively back-breaking ad hoc report clearances; surely a solution, based on a statement of intent of the revised release policy statement, if not an agreed definition, is possible.

In addition to coordination efforts on DCID 11/2, other release matters considered included requests for release of national estimates to certain contractors, with subsequent negative ruling by the USIB; release of CIA's Intelligence Publications Index (IPI) to contractors, initially decided in the negative but reversed upon CODIB agreement that bibliographic citations to documents do not require the same kind of control as the documents or the substantive information contained therein;

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Study of USIB Information Processing Problems

Certainly the most significant and comprehensive subject occupying the Committee's attention during the second half of the reporting period was the development, at USIB direction (USIB-M-115), of terms of reference for the

community study. Of the 53 staff papers issued, nine were on this subject; the study was discussed in seven of the nine formal meetings held. To produce the initial draft away from office pressures, a group of 15 people, including technical advisors from the National Bureau of Standards, Navy's David Taylor Model Basin, and CIA's Automatic Data Processing Staff; non-CODIB representatives from the NPIC, NIC and DCI's Office; and CODIB members or representatives spent two days at CIA's relocation center. The USIB approved this terms of reference subsequent to the end of this reporting period (USIB-M-163).

USIB approval having been obtained, the immediate order of business is the selection of the Staff Director and other Staff personnel; this is now being attended to.

The study will be difficult, perhaps more so than any other study yet undertaken in the Community, and its success will depend upon the abilities of the staff assembled, how well they work, and how much cooperation they get. It is responsive also, to the position taken by the Joint Study Group which saw the need for (a) bringing into balance the development of automatic data processing equipments and the techniques for effectively utilizing them; (b) a more effective coordination of major efforts to develop automatic systems to store and retrieve information; and (c) a considerable strengthening of USIB's long-range planning effort (JSG Report, pp 125-131).

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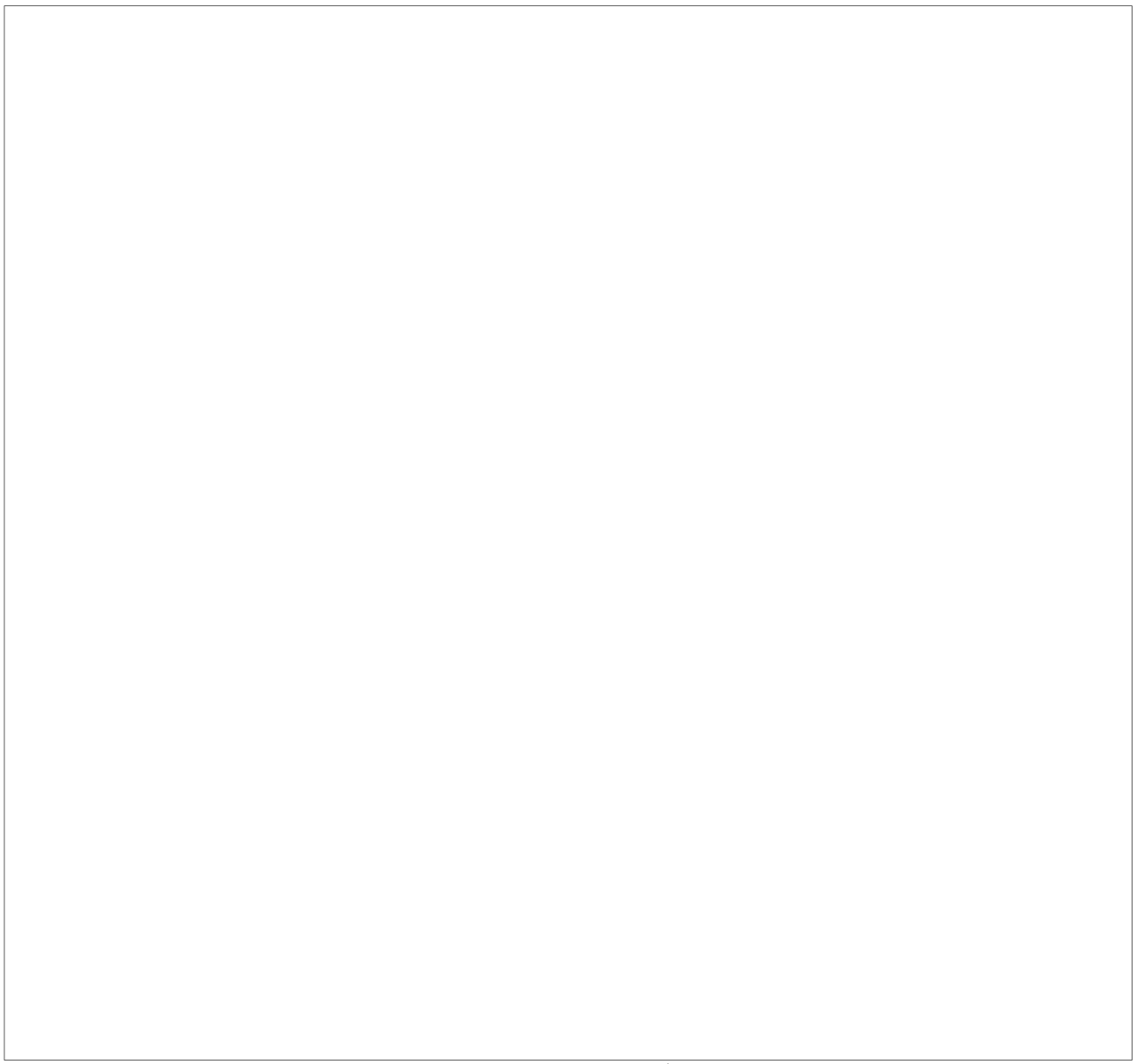

Common Formatting and Indexing

Standardization of information report format within the Community has been the concern of a CODIB working group (and its two predecessor organizations) since 1955. Last year's Annual Report reflected CIA and Army adoption

of a standard; today CIA, Army and Air Force have agreed upon a common format; Navy plans to implement a modified version of it during FY 1962. State Department has not yet been convinced, as we reported in the Progress Report to the Board at mid-year (again, see USIB-D-39.5/5) but it is expected that this subject will be one of the first problem areas studied when their current automatic data processing staff recruitment is completed. Extension of the standard format concept to cable traffic and other information carriers or systems input media is a matter of considerable interest which was highlighted in the SAC 438L experiment, and which will be a principal area for investigation by the Community Study Staff.

Standard indexing will also be carefully studied. We reported the first major revision of the Intelligence Subject Code (ISC) under CODIB sponsorship in the last report. A procedure for further revisions, as current needs dictate, was developed this year by the Subcommittee on Classification. Understanding of the capabilities of the ISC and the role of any single code in an over-all systems plan is required to clear away the misconceptions that have arisen alleging certain limitations of the ISC, and leading to the expenditure of considerable man-hours in developing other codes to apply to departmental storage and retrieval problems that the ISC could resolve. This subject will be one of the first to command the attention of the Community Study Staff.

Machine Translation (MT)

The CODIB Subcommittee on Machine Translation established in FY 60 and discussed in last year's report was abolished, since there was later established a Government-wide MT committee under the chairmanship of the National Science Foundation, which committee included the same intelligence component representatives as those on the CODIB group. [redacted] 25X1 of CIA was designated liaison representative between CODIB and the NSF Committee. Efforts toward the development of an operational MT capability proceeded independently, with the Air Force and CIA most active, through their contractors IBM and Georgetown University respectively. No one technique has yet demonstrated its superiority over another, hence CODIB has not proposed a common facility or endorsed a single program.*

Communication Links

One aspect of the inter-agency communication problem as related to information processing was consideration of the need for facsimile or some similar transmission of stored information from CIA's new headquarters building in Langley to other agencies' buildings. The Working Group

* A useful summary of the MT problem, including a brief view of the various U.S. R&D efforts in the field can be found in "The DOD Problem in the Mechanical Translation Field" by S. J. Deitchman. Technical Note 60-25, revised Jan 61 (Institute for Defense Analyses, Contract SD-50).

established to study this subject found a lack of community interest in such a system and was dissolved. Now it appears that the subject (particularly concerning secure transmission of classified information) will have to be re-considered, because of such specific needs as those of the State Department 25X1

25X1 but more generally because of the requirement in an integrated Community information processing scheme for communication capability between systems.

Compatibility

The compatibility concept, whether or not a precise definition of the word is agreed upon, remains a dominant part of CODIB's thinking, and, as discussed in our CODIB program for FY 61 (CODIB-D-5/3, 8 Nov 60), includes not only equipment considerations but common coding, standardization of report formats, standardized dissemination procedures, common use of specialized facilities, early communication of new ideas, fostering greater analyst-to-analyst contact between agencies, and incorporation of the analyst in the systems within agencies. With this broader view of compatibility in mind, and with some of its facets the subject of other working groups or of the approved community study plan, the Working Group on Information Systems Compatibility, established specifically to assess the original Air Force 438L system, was dissolved. Continuing awareness of systems developments

within the various agencies and state-of-the-art developments in industry was accomplished in large measure by briefings and field trips, and by distribution of status reports on Army's ACSI-MATIC system, SAC's 438L (now AIDS) experiment, Navy's Fleet Intelligence Center program, a NORAD systems proposal, and pertinent reports by such outside groups as RAND, Systems Development Corporation, and Stanford Research Institute. A central file of such reports and other related information is maintained for CODIB by the CIA Library.

Summary

Looking back at the four major topics requiring CODIB emphasis listed in our FY 61 Program (CODIB-D-5/3), that of 1) informing members was well carried out; 2) improving existing individual systems was confined principally to training in the use of the revised ISC, with classes conducted in CIA or with CIA personnel detailed temporarily in ONI, in USAFE, and at SAC Headquarters. Dissemination practices were not specifically tackled but will be studied under the community investigation; 3) improving existing interdepartmental operations followed an up and down pattern with partial success in obtaining inauguration of the revised ISC, slow though still steady progress toward adoption of the common report format, no progress in standardizing name-check formats, and with much room for improvement on these and other subjects of common interest; and 4) forward planning was the major accomplishment

of this reporting period, taking the form of the approved community study plan (USIB-D-39.7/1; CODIB-D-82/9).

Outlook

The need for delegation of responsibilities in information processing on a Community basis to assign the proper importance to this link between collection and production in the intelligence cycle remains as basic today as when stated in the "Over-All Problem and Outlook" section of last year's report (pgs. 15-18). There is undoubtedly a greater awareness of this fact today on the senior management levels because of 1) the needs of commanders and policy makers for faster retrieval and greater manipulation of information in this missile age; 2) the steadily increasing volume of the information received; 3) the considerable cost of independent departmental solutions to systems design problems; 4) the obvious illogic in the face of such volume and retrieval speed requirements for each agency to process separately but essentially in duplicative fashion, the same incoming information.

We expect (or more accurately we very much hope) that the community study will point us in the right direction. 25X1

Chairman

Appendix "A": Checklist of Documents Issued in FY 1961
Appendix "B": Information Processing Programs in USIB Member Agencies (distributed separately)

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UNITED STATES INTELLIGENCE BOARD

COMMITTEE ON DOCUMENTATION

Information Processing Programs in USIB Member Agencies
(Supplement to CODIB-AR-3)

Attached, as outlined below, are the reports received from contributing USIB-member agencies reflecting their information processing programs during Fiscal Year 1961:

Section	Departmental Organization
1	Central Intelligence Agency
2	Department of the Navy
3	Department of the Air Force
4	National Security Agency
5	Department of State
6	Department of the Army
7	National Photographic Interpretation Center

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CENTRAL INTELLIGENCE AGENCY

INTELLOFAX REVISION

1. As planned and announced in the last annual report, investigation of possible improvements in the Intellofax system continued during the first half of this reporting period, with implementation of the revised system on 1 November. Specifically, a dictionary and a coding manual were developed to improve input quality through greater standardization, and a clear text provision was added to increase the flexibility of the Intelligence Subject Code (ISC) and improve retrieval relevance. Clear text entries are made for organizations, commodities, place names, and subject subclasses. Toward the end of the reporting period, a questionnaire was developed for distribution within the Agency to assess reaction to the revised system; returns received will be analyzed during early FY 62.

2. Other changes involved exclusion of finished intelligence and of unclassified translations from Intellofax since these materials are otherwise indexed in the Intelligence Publications Index (IPI) and the Foreign Document Division (FDD) index. A new internal numbering system for Foreign Service despatches received, reflecting both originating post and despatch serial number, was implemented to obviate one step in the retrieval process; this seven digit numbering system has been proposed to the State Department for consideration, both to remove the burden of CIA's superimposing a new number on despatches received (42% of CIA's total information report receipts) and to provide a Departmental numbering system compatible with the rest of the Community. Finally, a study was made of the so-called Nodex (i.e., not indexed) document procedures, which exclude certain current and perishible, administrative, or otherwise controlled information from Intellofax, the purpose of the study being to consider possible minimal indexing rather than no indexing; the findings of this study are under consideration.

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REQUIREMENTS REGISTER EXPERIMENT

4. As a partial response to recommendations of the Joint Study Group, a study was undertaken to design a system providing for a centralized register of collection requirements to reduce undesirable duplication in levying requests on field collectors, to provide more effective tie-in between requirements and responses, and to improve feed-back from consumer to collector. Initial concentration was given to internal CIA requirements and collection since the Services preferred to await the establishment of the new Defense Intelligence Agency (DIA) before tackling a Community effort. The system was designed to provide for later expansion when this becomes feasible. At the close of the reporting period, the study was entering its final phase. 25X1

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ASSISTANCE TO OTHERS: OTHER EQUIPMENT DEVELOPMENT

8. In addition to the revised ISC training for headquarters and field military personnel described in the body of the CODIB report, the Agency assisted ATIC in establishing an aperture card file, furnished duplicate decks of ISC index cards or machine listings of the index to Air Force and Navy components, supplied copies of the special intelligence indices to AFIC's Unifile system, and otherwise found itself responding to an increasing number of requests for machine input formats as other agencies introduce automation into their systems.

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NATIONAL SECURITY AGENCY

During the past year, NSA has continued to improve its Uniterm Coordinate indexing system for technical documents.

It has put into operational use its new method of automatic posting of uniterms employing an IBM 705 computer. Input is a deck of punched cards, each containing a document number and one of its uniterms. Output is an updated, ten column, uniterm posting card suitable for manual manipulation, plus a magnetic tape of all document numbers and their uniterms suitable for use in automatic information retrieval.

NSA is also continuing its research in the use of the Association Factor to find documents related to a request even though they may not be indexed by the exact terms of the request. Machine programs are now being written to test the effectiveness of these findings. A description of this project has been published in the Journal of ACM, April 1961.

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DEPARTMENT OF STATE

In February 1961, a concept paper, recommending the establishment of an Information Retrieval and Analysis Program in the Department of State, was approved and establishment of the Program was begun.

The Department is now recruiting an Information Systems Development Staff as part of the Data Processing Systems Staff.

A survey to identify problems in compiling, storing, retrieving, and analyzing information is planned. If this indicates an ADP system would probably be successful for some of these purposes, the Department will do a complete analysis and systems design study.

In addition to members of its own Information Systems Development Staff, the Department of State plans to use individual consultants and private consulting firms as they may be required in the survey.

Representatives of the Information Retrieval and Analysis Team will continue close cooperation with CODIB and the individual members to keep abreast of all developments.

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DEPARTMENT OF THE ARMY
ANNUAL REVIEW OF PROJECT ACSI-MATIC, FY 1961 (U)

1. (U) General. FY 1961 marked the year of the greatest advance so far in Project ACSI-MATIC since its inception in 1957. An initial staff of thirty-six (36) spaces (eleven officers, nine enlisted men and sixteen civilians) was authorized for the OACSI Computer Center, the center to be operated by the USA ADP Detachment, ACSI, commanded by Colonel Fred B. Keller, Jr. An additional fifteen (15) MI spaces were authorized for a two-year period for preparing the required machinable data base. Space for the Computer Center was allocated in the Pentagon building (Room 2B537). Authorization was obtained from the Assistant Secretary of the Army (FM) and the Deputy Assistant Secretary of Defense (COMP) for leasing the large-scale Sylvania 9400 computer, delivery of which is scheduled for December 1961. An intensive training program began for OACSI Computer Center personnel starting with a formal training course by Sylvania on programming for the S-9400, followed by on-the-job training by OACSI programmers working with Radio Corporation of America (RCA), the prime contractor for Project ACSI-MATIC. RCA also began an intensive effort on program developments for the S-9400. Starting in June 1961, the Sylvania-owned first model of the 9400, located at Needham, Mass., was employed for debugging the RCA programs. The first limited operational ACSI-MATIC programs are scheduled for activation in March 1962, followed by activation of the research collation system in July 1962.

2. (C) Programming Developments.

a. Geographic Divisions Collation System, OB, USSR, ChiCom. This task consists of a detailed systems analysis flow-charting and computer coding for the 9400 of all the processes involved in the man-machine system for accomplishing the objectives. In addition to the programming requirements, this area is concerned with formulating the limitations of the input material, the interrogation capabilities of the system and specification of input formats.

(1) File Structures. Considerable work was spent on the structures of the files which will contain the information within the ACSI-MATIC

system. Derived from the original concept of an integrated file structure, the organization of the files was finalized. It was developed by RCA in close coordination with OACSI intelligence research specialists. A few of these have obtained training as systems analysts and they have been able to help RCA in establishing the rules for the collation system, including the actual generation of flow charts and programming of these for the computer.

(a) Parenthetically, it should be stated that this is the first year when OACSI has been able to provide sufficient training in systems analysis work to a few intelligence specialists for active participation with RCA in program developments. Their sizeable contributions to the finalization of systems concepts point out the necessity of having intelligence specialists combining the knowledge of computer systems analysis techniques for developing a computer system which reflects the practical requirements of any given ADP application to intelligence functions. Dependence solely upon computer specialists per se is therefore not an adequate criterion for establishing a realistic foundation for an intelligence ADP system.

(b) The file structure is described in detail in RCA Report IR-60-2. No detailed description of this file structure is given here. Suffice it to state, however, that the OACSI file structure represents a combination of a variety of working files and accepted intelligence files. In most cases, the accepted intelligence files are so organized that once any change has been made in any given item within these files, a formatized print-out of these updated files can be obtained at any time desired. The structure of this file is the basis around which the programs operate. An important characteristic of these files is that they are closely interlinked with a series of glossaries and hierarchies. Basically, this means that in order to begin operations on the computer, the ACSI-MATIC system must have available lists of terms which are pertinent to the OACSI intelligence functions. To this end, RCA and OACSI began to form the glossaries in the following areas for the initial operational system: unit names (unit identification), branch of military service, location names and geographic coordinates (prepared initially for USSR, ChiCom, Poland and East Germany), unit, echelon, equipment, honorific, job title, miscellaneous, personality, qualifier, reporting agency, rank, source and unit type.

These glossaries have been encoded by RCA in Flexicode, i.e., the code which will be used within the ACSI-MATIC files. This is a special code which RCA developed for encoding terms hierarchically related. This coding system is described in detail in RCA Report IR-60-2, ACSI-MATIC File Structure. It has certain unique features which make it a more efficient way of handling related terms in a computer system than has been previously possible with existing coding schemes. So far, two volumes of the glossaries have been issued under RCA Report SR-61-1. Volumes 1 and 2. A third and final volume will be forthcoming shortly. When these glossaries have been coordinated with all intelligence analysts concerned in OACSI and have been reviewed by them they will be re-issued for the initial operational system.

(2) Considerable progress has been made in definition of the overall system for ACSI-MATIC, including the definition of a special programming language which will facilitate programing, the routines which will automatically provide memory space allocations (which is necessary because of the magnetic memory system combining a tape system with a random access disc system with the central processor, including the core memory) and the various executive routines which will control the entire processing operation. Many of the routines which are necessary to perform these operations have already been resolved in master logical flow charts. Encoding and debugging of these routines began in the course of FY 1961. Concerning programming routines, the ACSI-MATIC system has reached a point where it has been possible to begin designing, master logical flow-charting and coding many of the routines which perform detailed operations. Development of these routines has, in fact, been the major task of the RCA OACSI programmers during most of FY 1961. Detailed descriptions of these routines will be submitted in the course of FY 1962.

(3) There are many so-called "house-keeping" routines which perform many operations not obvious at first but necessary to keep the files in order and the processing underway. Many of these routines which update and maintain the glossaries, the hierarchy and information records, and provide the necessary machine interpretation that keeps the various computer operations, including magnetic memory systems, functioning during the course of processing, have been defined, master logical

flow-charted, and some of these have been coded and debugged. The other routines which enable the analyst to make direct orders to the computer have been written. Processing for the initial ACSI-MATIC system will be largely that defined as "input processing," and the routines which take care of input data have formed a major part of the programming effort by RCA and OACSI programmers.

(4) The input data itself must be formatized in such a way that a programming system can interpret it, and to this end, RCA and OACSI have defined in detail the type of information which can be entered into the ACSI-MATIC system. This has been described in the RCA Report SR-61-4, ACSI-MATIC Input Message Format. The collation processing and integration capability of the system, which will complete the processing within the ACSI-MATIC system began towards the end of FY 1961. All of the above programs are scheduled for completion in the course of FY 1962. It should be noted that this is one of the most comprehensive programming efforts undertaken so far within the Intelligence Community. Upwards of 100,000 instructions are estimated by RCA to be needed to complete this system.

b. Scientific and Technical (S&T) Intelligence. This task began in FY 1961 and the initial effort involved an investigation of processing activities within selected S&T intelligence subject groups in order to determine how the research processing can be aided by digital computers. Four exploratory programs, initially developed for the RCA 501 computer, have been developed. Three of these have already been demonstrated and the last mentioned in this series should be ready for demonstration in September 1961.

(1) Damage Assessment Problem. A program was written by RCA for OACSI, using the RCA 501 computer available at the RCA Princeton, N. J. facility, to permit the evaluation of enemy potential after nuclear attack, especially as pertains to ground forces. Called Damage Assessment, the OACSI program is able to supply pertinent data to an operational Damage and Contamination Model (the Air Force Intelligence Center [AFIC] model), and rearrange and collate the damage results to provide the OACSI intelligence analysts with the ability to readily evaluate the enemy residual strength after a nuclear attack. In order to tie in with the ACSI-MATIC system as a whole, future revised versions of the RGF (Residual Ground Forces) program will be programmed for the S-9400 computer. This will

permit it to take advantage of the flexibility and power of the collation system. This program was given several demonstrations at OACSI. A report will be issued by RCA shortly covering this computer program.

(2) Radar Characteristic Determination. The radar characteristic determination program developed by RCA is designed to take ELINT data and correlate it with other information such as that derived from siting and photographs. The purpose of this correlation is to determine the characteristics of artillery-support radar used in East Germany. This program again was conducted on the RCA 501, and a number of standard service routines proved of considerable use. The final program enables an analyst considerable freedom in interrogating the files and of correlating data within the ELINT information itself, thus enabling an analyst to conduct research along lines which might seem fruitful to him but which are not obvious during direct correlation by the computer. This will be completely covered in a report soon to be issued by RCA. Because of the infrequent use of this program, resulting from the small volume of raw data, this program will not be translated to the S-9400. Instead, an effort is being made to obtain time on CIA's 501 computer as and when needed.

(3) Transportation Problem. This problem has not been completed as yet, but many of the flow charts have been drawn, and much of the coding debugged. The aim of the initial exploratory transportation program being written for the RCA 501 is to enable the formation of master files on the rail transportation facilities of Poland, to calculate the capacities of each line of tracks and the network capabilities for different equipments or loads, and to provide data retrieval for analysis by a programmer. A report on this activity will follow the testing of the program and the presentations to the people concerned. The 501 program will be translated for the S-9400 in FY 1962. The data base will be expanded to include all Sino-Soviet Bloc countries.

(4) Missile Range Activity Analysis (MRAA). A fourth program is being initiated by RCA on the RCA 501, pertaining to the detection of Missile Range Activity Analysis (MRAA) by means of accoustical intelligence (ACOUSTINT). This program just began to take shape at the close of the fiscal year.

3. (C) Language Control Studies. The objective of the Language Control studies was to investigate the various techniques which facilitate the computer processing of natural languages. This investigation was aimed at generating restricted languages or computer techniques which would aid collation or information retrieval in the ACSI-MATIC system. The work under this task was terminated during this fiscal year. The findings have been made available to NSA with the expectation that they will contribute to the related studies of this agency.

a. Automatic Syntax Analysis. Because most of the intelligence information to be processed by ACSI-MATIC is stated largely in a narrative language, RCA undertook the development of an automatic computer program which would parse (analyze) English sentences. It was felt that this RCA 501 program would be a useful tool for the investigation of many problems such as automatic indexing. Proceeding along the lines laid down by the linguist Zelig Harris and his associates at the University of Pennsylvania, RCA completed the program during the past fiscal year. The program determines the grammatical class and sub-class of each word in a sentence, isolates phrases such as noun phrases within a sentence, determines the class relationships, and checks for the completeness (that is the inclusion of a subject, verb and object) of a sentence. This program was demonstrated on several occasions and a report numbered SR-60-2 was issued which completely describes all of its details along with relevant examples of its operation.

b. Document Condensation. The automatic syntax analysis program was applied to the condensation of material by means of special techniques developed by RCA. By such means as deleting or footnoting the secondary phrases within a document, it was found possible to reduce documents to about 35 per cent of the original length of the text without significant loss of information. Other schemes were also investigated for achieving document condensation. The report numbered SR-60-2 also describes this activity and presents the results of a condensation application.

c. Document Auto-Indexing. A survey and theoretical study was made into the problems of automatic indexing, and a comprehensive report (Appendix A in report numbered MR-60-11) was issued during this fiscal year. The main results

of this study were to clarify the nature and function of an index, and to point out the features of an index which could be automated. Additionally, the automatic syntax analysis program was realized to be useful in this respect.

4. (C) Equipment Implementation. This task consists of evaluating and recommending data processing equipment which will most adequately meet the needs of the finally proposed man-machine collation processing system. This includes facilities planning, installation and testing plans, equipment integration and interconnection.

a. Peripheral Equipment Studies. A specification was written (Appendix A in report numbered MR-60-12) for a magnetic tape subsystem for the ACSI-MATIC system and submitted to OACSI. The various peripheral equipments associated first with the MOBIDIC computer and the S-9400 were investigated in detail for integration into the ACSI-MATIC system.

b. Computer Studies. RCA originally devoted considerable effort towards studying the MOBIDIC D computer for the ACSI-MATIC system. But when the 9400 computer was suggested, the effort concentrated on that computer. Since the MOBIDIC D is the prototype of the 9400, much of the effort was extremely useful. A continued series of conferences and trips were conducted with Sylvania in order to arrive at the necessary technical understanding of the 9400 to integrate it into the ACSI-MATIC system. This exchange between Sylvania and RCA enabled the former to provide certain needs in the 9400 which would make it more suited to the ACSI-MATIC system. In particular, since the computer would be used with the Telex Mass Memory Modules (the Telex disc files), there were certain considerations which had to be met. Computer details are summarized in report numbered IR-60-2.

c. Facilities Planning and Preparation. After considerable exchange between OACSI, RCA and Sylvania, a proposed floor plan and installation cost schedule was arrived at for the initial ACSI-MATIC system to be implemented by March 1962. Details of installation, maintenance and off-line equipment requirements completed this scheduling. An evacuation S.O.P. was formulated which would enable the rapid disassembly and reassembly of the computer in the event of an emergency. Sylvania was subcontracted to complete the installation of the equipment in the Pentagon. A preliminary version of this planning is given in report numbered IR-60-2.

d. Telex Disc File. Trips and conferences were held with Telex, Inc., to determine the technical characteristics and features of the magnetic disc memory system. Tests to assure the acceptance of the equipment were formulated, and the test equipment fabrication was begun at RCA, Princeton, N. J. The details of the Telex Disc File are described in report numbered IR-60-2.

e. Disc Control Unit (DCU). The Disc Control Unit (DCU) is necessary to match the 9400 computer requirements to those supplied by the Telex Disc File. The unit was designed originally for the MOBIDIC D computer, and the changes were made after some of the circuits and logic had been generated during the middle of the fiscal year. The DCU is nearing completion and it will be available by the time the installation is made to serve as the so-called interface between the computer and the disc files in the ACSI-MATIC system.

f. Prototype Analyst Console (PAC). The Prototype Analyst Console (PAC) is a unique man-machine communication and buffering device developed by RCA to study the problems encountered in ACSI-MATIC in this area. Described in the final engineering report, SR-60-4, this console allows individuals such as research analysts not trained in computer languages to use a computer directly. The equipment was operational towards the middle of the fiscal year, and numerous demonstrations were given to show the efficacy of the original concept. PAC will enable the complete evaluation of a console, and will lead to the development of operational intelligence analyst consoles which may become part of the system following testing.

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