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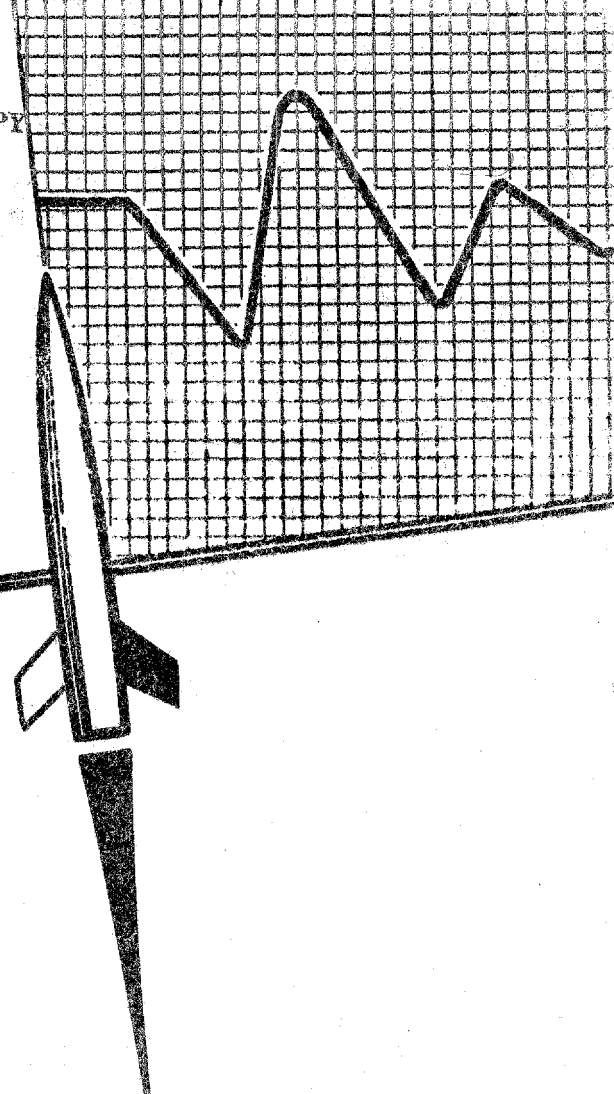
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History of Air Technical Intelligence Center

(AFCIN-4)

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1 JANUARY 1959 — 30 JUNE 1959

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**Commander, Air Technical Intelligence Center
Wright-Patterson Air Force Base, Ohio**

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GLOSSARY

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SECTION I

ATIC ORGANIZATION AND MANAGEMENT

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HISTORY OF
AIR TECHNICAL INTELLIGENCE CENTER
(AFCIN-4)
Wright-Patterson Air Force Base
Ohio

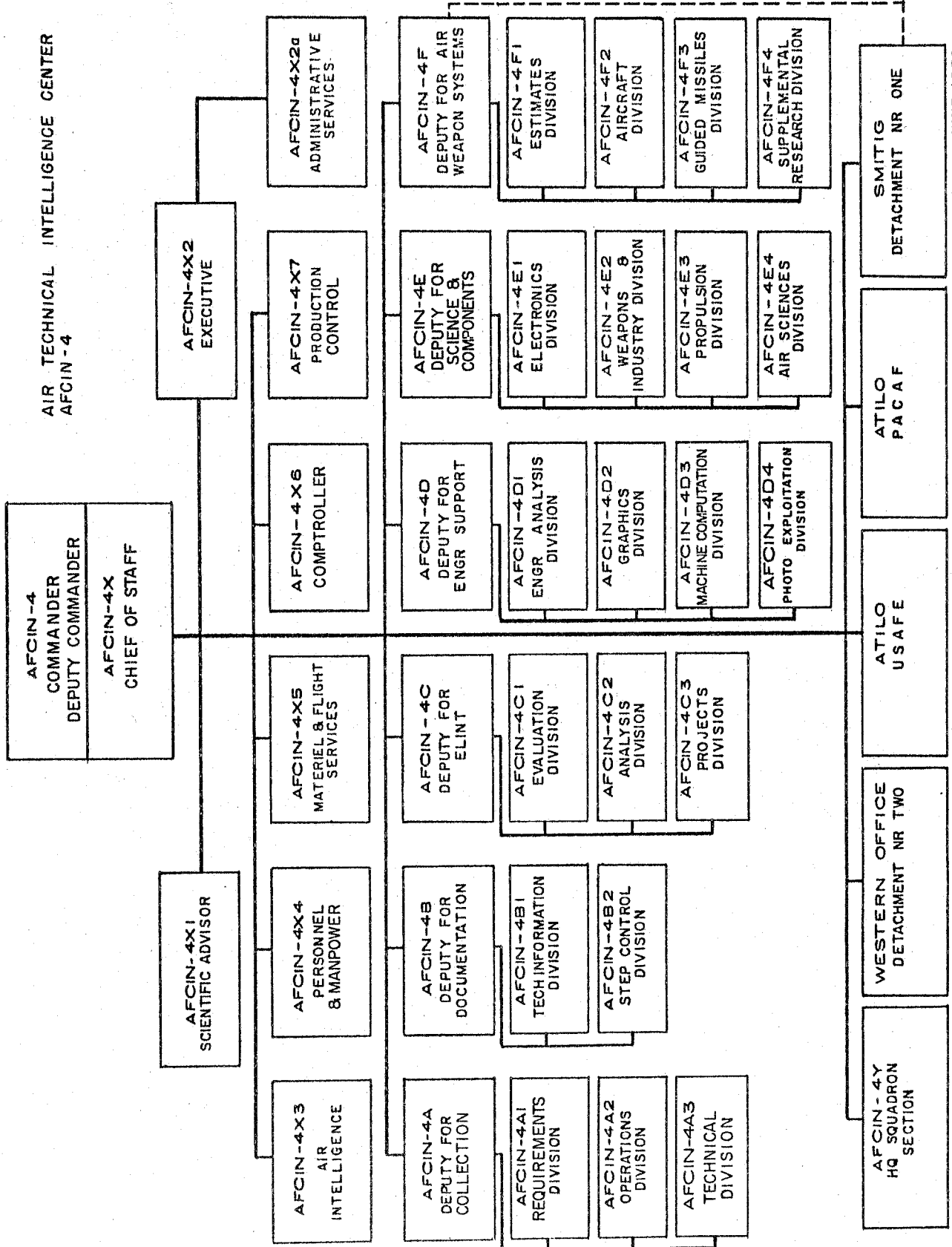
1 January 1959 - 30 June 1959

Prepared By
Air Intelligence Office
AIR TECHNICAL INTELLIGENCE CENTER
31 July 1959

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AIR TECHNICAL INTELLIGENCE CENTER



JUNE 1959

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CHAPTER 1

COMMAND ACTIVITIES

EVENTS:

On 20 January 1959 the Electronics Panel of the Scientific Advisory Board, USAF, and its consultants held its meeting at ATIC. ATIC gave a review of technical intelligence in the electronics field. The Panel spent 21 January at Detachment #1, ARDC. (UNCLASSIFIED)

The Scientific Intelligence Committee of USIB held its monthly meeting at ATIC on Thursday, 26 February 1959. (UNCLASSIFIED)

Maj Gen H. E. Watson, Deputy ACS/Intelligence, USAF, spent 27 March at ATIC for a general updating on AFCIN-4 activities. (UNCLASSIFIED)

Maj Gen John M. Willems, ACS/Intelligence, Army, visited the Center on 21 May for an over-all indoctrination on the mission and activities of ATIC. (UNCLASSIFIED)

General C. Pearee Cabell, Deputy Director of the Central Intelligence Agency, visited ATIC the morning of 28 May for a brief reorientation and inspection of the new ATIC building. (UNCLASSIFIED)

Lt Gen Lai, Ming Tang, Colonel Tu, Lung - Tan, Col Kuo, Wei-Li, Comdr Huang, Chih-Chieh, Maj Mao, Cheng-Tzu, and Captain Ross Hamlin--USAF Escort, visited ATIC 3 June. The visitors were given an ATIC orientation briefing followed by discussion, and question and answer session which was attended by representatives of all ATIC directorates. (UNCLASSIFIED)

Maj Gen I, Fu-En, Director of Intelligence, Chinese Air Force, accompanied by Col M. J. Piatnizta, Chief of ATIC's PACAF ATIL Office visited ATIC 8-10 June. General I was briefed on various ATIC activities and toured Center facilities. Maj Gen H. E. Watson of AFCIN spent 10 June at ATIC and participated in the meeting and discussion with General I. (UNCLASSIFIED)

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ACTIVITIES:

Mr. A. Francis Arcier was on TDY in the Office of the Assistant Chief of Staff, Intelligence, Hq USAF, during the month of January as a member of the Research & Development team to work out the reorganization of the ACS/I. (UNCLASSIFIED)

Colonel William E. Boyd and Mr. Spencer Whedon briefed the Assistant Chief of Staff, Intelligence and Staff, Department of the Army in Washington on 9 February. This briefing and discussion led to Maj Gen Willem's visit to ATIC on 21 May. (UNCLASSIFIED)

Col John G. Eriksen departed on 5 February to attend the Air Attache Conference held in Wiesbaden, Germany the week of 9 February. Col Eriksen also visited the ATIC Detachment in Wiesbaden and returned to Wright-Patterson AFB on 19 February. (UNCLASSIFIED)

On 27 February 1959, Maj Gen Dougher gave a briefing on "Soviet R&D Trends and Resultant Technical Capabilities in Air Weapons and Associated Systems," to the Air Council, USAF. (~~CONFIDENTIAL~~)

General Dougher attended a Design Review of Subsystem I, SENTRY System presented by Thompson Ramo-Wooldridge, Inc. at Denver, Colorado on 25-26 March 1959. (UNCLASSIFIED)

Maj Gen Dougher and Col Boyd departed 16 May for an "around-the-world" orientation and inspection trip which included Germany, Turkey, Saudi-Arabia, Iran, Pakistan, India, Thailand, Phillipines, Japan and Hawaii and returned on 1 June 1959. (UNCLASSIFIED)

SCIENTIFIC ADVISORY GROUP (SAG):

At the last meeting in 1958, it was decided that the Scientific Advisory Group (SAG) would be more concerned with coming scientific events and less with the evaluation of existing programs. This change of emphasis gave the Group more latitude and greater scope. The SAG further strengthened its capability to deal

~~CONFIDENTIAL~~

effectively with the scientific problems of the Center by strengthening personnel working relationships with AFOSR, AFCRC, and WADC. Dr. H. A. Miley attended an Indoctrination Course at WADC, 8-10 June, with the view of using this increased acquaintance in establishing better liaison with scientists of this organization.

(~~CONFIDENTIAL~~)

WORKING RELATIONSHIPS WITH SAB:

The SAG maintained good working relationships with the Scientific Advisory Board (SAB) of the Air Force and thereby greatly strengthened the scientific capability of the Center for directing its program towards feasible objectives. A new list of ATIC-SAB counterparts was prepared to coincide as much as possible with the scientific and technical panels of the SAB. This list contains thirty-two names of officers and analysts chosen from the six Deputies of ATIC. One or two of these representatives attend each meeting of nine panels. None of the ATIC representatives, except the Chairman of the SAG, is accredited to attend the meetings of more than two panels. (UNCLASSIFIED)

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CHAPTER 2

MANAGEMENT, CONTROL AND SERVICES

BUDGET AND ACCOUNTING:

During the first half of 1959, ATIC designed and implemented a new cost accounting system, based upon the new functional programming system being placed in use in the Center. Simplified expeditious funding procedures were worked out with the other services. New funding procedures were developed with AFSSO concerning communications thereby improving ATIC service at greatly reduced costs. PACAF/ATILO accounts were transferred from Hickam AFB, Honolulu to Fuchu, Japan. (UNCLASSIFIED)

STATISTICAL SERVICES:

During this period ATIC finalized work details for the preparation of a monthly Statistical Summary. As the first objective, all previously published Comptroller reports were incorporated into the summary. As the second objective, an attempt was made to include in the summary a sizeable portion of the managerial type information needed by management personnel. ATIC completed arrangements to maintain mechanized Classification and Index files covering all military and civilian personnel assigned to the Center. This system provides current personnel reports to the Commander, Staff or Deputies as required. (UNCLASSIFIED)

PLANS AND PROGRAMS:

The 400 page ATIC FY60 Program Planning Document, delineating the Center Requirements, objectives, programs, projects and tasks for the utilization of all Center resources was completed and distributed throughout the offices of ACS/I in April. Schematics were included showing the relationship of each Center task to specific Support and Air Warfare Systems. This has two basic advantages: first, it provides a valid basis for costing each weapons system and ATI product;

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secondly, it identifies the detailed support of the tasks as they are progressively integrated and finally culminate in an air technical intelligence estimate. The Air Weapon and Air Warfare Systems approach was effectively used in presenting the FY60 ATIC programs to the Director of the Budget. This resulted in the acceptance of all ATIC program requirements, and provision for the necessary funds as 1st and 2nd quarter FY60 obligation rates shows the need. (UNCLASSIFIED)

In line with this decision, a number of procedures were established to identify all problem areas with the view of insuring the accomplishment of our procurement phasing as programmed. "Produc-Trol Boards", visually showing the status of all programmed procurement actions, were prepared and maintained to show the current status of each programmed procurement action. A procedure was also established for reporting program changes to the Commander for his approval on a routine basis. Programmed ATIE projects which require ACS/I attention because they are dependent on positive timely action of other agencies, were reported to the ACS/I in an initial "Current Status Report", 24 June 1959. Thus, using the ATIC Program Planning Document as the basic reference, provision has been made to identify actual and potential problem areas for staff and command attention in sufficient time to prevent undesirable changes in the approved ATI program. (UNCLASSIFIED)

Priorities and precedences for each task have been established. Used in conjunction with the Program Planning Document it is expected that this will provide an effective basis for assignment of personnel, use of Center facilities and for scheduling all ATIC effort. It also is a sound basis for reprogramming in event of changes in availability of Center resources. (UNCLASSIFIED)

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WAR PLANNING:

The need for effective, current war planning was pointed up by the "Berlin Crisis." A briefing on ATIC Continuity of Operations Plan and Emergency Operation Plan was presented to the ACS/I, 10 Mar 59. The Combat Intelligence Reports, developed by the Ad Hoc Committee on Air Force Requirements for Combat Intelligence Reporting, were published as AFR 55-82, 13 Apr 59. The Office Instruction on ATIC War Plans was published 16 Apr 59; it was revised as ATICOI 355-1, ATIC Emergency Operation Plans, 15 Jun 59. The "ATIC Preparedness Plan for Limited War" dated 21 Jul 58 was revised and published as the "ATIC Emergency Operations Plan," 1 Jun 59. (UNCLASSIFIED)

PROCUREMENT AND CONTRACTING:

The Aeronautical Systems Center of the AMC Procurement Organization built up within their Special Procurement Section two branches whose primary function is the negotiation of intelligence contracts on an expedited basis. By the first of February all FY59 contractual contracts from ATIC were in their hands for necessary action except for emergency high priority action or modifications to contracts because of changes in the intelligence situation. (UNCLASSIFIED)

Of the 302 purchase requests handled during this past year more than 75% were initiated and obligated between 1 January and 30 June 1959. All requirements in their hands for action were completed and obligated leaving no carry-over to upset ATIC FY60 buying program. During May meetings were held between the ATIC Contract and Program Staff with the Special Procurement heads to schedule realistically the FY60 procurements. This was done so that it will fit with the USAF Budget Cycle and thereby smooth out the workload of contract negotiation. This FY60 program plan will key into the new fiscal plans for allocation of funds by quarters for contractual support of designated programs. (UNCLASSIFIED)

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ATIC PRODUCTION BOARD:

The primary accomplishment of the Production Board has been to document a production schedule of ATIC products. This schedule identifies the type of product, (i.e., study, handbook, working paper, etc;) task number, frequency of report, schedule date of completion, title and classification of title. This schedule does not represent all ATIC products since many of those accomplished in response to external queries are not included, however it provided management with an informative and useful planning tool. (UNCLASSIFIED)

ATIC AUTOMATION WORKING GROUP:

In recognition of the forthcoming era of automation in processing production and display of intelligence, an Automation Working Group was established in April. Working Group sessions so far have been exploratory; however, it is foreseen that recommendations will be forthcoming in conjunction with the introduction of the 438L integration into the Center operations. The group met several times to discuss various means of obtaining higher speeds and greater capacities in information processing, analysis, display, dissemination and storage of data pertaining to the technical intelligence problem. (UNCLASSIFIED)

PRODUCTION SCHEDULING:

Publications:

A special IBM run of the ATIC Production Schedule was established for internal management purposes. The format contains production data and title listings without descriptive material. The run is designed to utilize the sorting capabilities of IBM to provide status reports, specialized listings for ATIC customers, and ultimately other documents such as the Annual Cumulative Index on a demand basis. (UNCLASSIFIED)

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R & D IN SUPPORT OF INTELLIGENCE:

Action was taken to implement recommendations of the Ritland Committee relative to ARDC support of intelligence. A proposed AFR "R & D in Support of Intelligence" was forwarded to the ACS/I in May 1959 for USAF coordination and publication. Concepts contained in the AFR were designed to overcome difficulties experienced in getting timely response to urgent intelligence needs for techniques and devices, and funding of same. The effort represented an intensive investigation of environmental factors within ATIC elements, and coordination with Hq, ARDC (Special Assistant for Intelligence) and appropriate Air Staff Offices. The proposed AFR references AFR 80-32, QRC-ECM. ATIC participated in revision of AFR 80-32 which resulted in the inclusion of QRC-Intelligence (QRCI). (UNCLASSIFIED)

CUSTOMER SURVEY PROGRAM:

ATIC instituted a continuous type survey of ATIC product customers for their reaction to the scope, treatment, adequacy, etc. of Center Studies, Technical Reports, Handbooks and other forms of releases. Many valuable suggestions have been received for guidance in preparation of more effective products. The customer replies have been made available to the producers and have resulted in planning for appropriate additions and changes in future products. (UNCLASSIFIED)

PERSONNEL:

From 1 January 1959 through 30 June 1959, there was a total of 81 new civilians placed on the payroll of the Center. During the same period there were 39 separations, leaving a net gain of 42 for the six-month period. ATIC attained a peak strength of 597 civilians assigned 1 May 1959. As of 30 June 1959, the authorized civilian strength remained at 642, with ⁶¹⁷25 vacancies to be filled in order to bring ATIC up to authorized strength. The turnover rate for the period was slightly less than two percent, but exceeded the previous reporting period by approximately double in number.

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The turnover rate of two percent favorably compares with the average of industry and government at large as published by the Bureau of Labor Statistics. (UNCLASSIFIED)

A total of 33 summer-time only employees were brought onto the payroll in order to overcome peak workloads in a variety of areas throughout ATIC. This represents the largest number of this type of employee in the history of ATIC, and raised the actual assigned strength to 625 as of 30 June 1959. (UNCLASSIFIED)

A training requirements survey was conducted throughout ATIC during the reporting period and the first ATIC requirements for off-reservation University level training were submitted to HQ USAF. Upon receipt of approval, contracts will be negotiated with at least six universities which will conduct the training during fiscal year 1960. (UNCLASSIFIED)

During the period, three individuals were selected for nomination of appointment to Public Law 313 positions in ATIC. Two additional nominations will be made as soon as the selection process has been completed. As of 30 June, approval of the nominations had not yet been received from HQ USAF. (UNCLASSIFIED)

The ATIC Merit Promotion Program was officially placed into effect on 4 March 1959. An inspection of the Plan was made by the Sixth US Civil Service Region and, in general, was determined a satisfactory and acceptable one. (UNCLASSIFIED)

Colonel Huntington K. Gilbert, 3412A, retired 30 April 1959, per paragraph 2, Special Order C-255, DAF, 27 April 1959. (UNCLASSIFIED)

Colonel Cledous M. Mangum, A0293149, retired 30 June 1959, per paragraph 9, Special Order C-387, DAF, 26 June 1959. (UNCLASSIFIED)

No major staff assignments were effected during this period. (UNCLASSIFIED)

ORGANIZATION:

The chief organizational change to occur within the period was a complete reorganization of the Deputy for Acquisition. On 18 June 1959, this deputy became

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the Deputy for Collection with Division and Branch structure as follows:¹

DEPUTY FOR COLLECTION

Requirements Division

Requirements Branch

Guidance Branch

Collection Evaluation Branch

Operations Division

Operations Planning Branch

Field Operations Branch

Special Activities Branch

ATILO Activities Branch

Technical Division

Advanced Techniques Branch

Equipment Branch

Equipment Support Branch

Collection Training Branch

(UNCLASSIFIED)

This reorganization was accomplished to reduce span of supervisory control to a more manageable entity necessitated by expanding collection programs and space exploitation; to regroup functions more homogeneously and provide for smoother workflow; and especially to meld collection planning with collection operations. Prior to this major reorganization and in anticipation of it, the ATILO Activities Branch was established with primary function of serving as focal point for coordinating operational problems involving the USAFE and PACAF Air Technical Intelligence Liaison Offices.² (UNCLASSIFIED)

Minor changes in component designations occurred within Materiel and Flight Services and in Administrative Services. In Materiel and Flight Services,

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designation was changed from "Material" to Materiel", the Material Facilities Branch became the Services Branch, and the Property and Accounting Branch was redesignated Supply Branch.³ In Administrative Services, the Distribution and Services Branch became the Dissemination and Services Branch.⁴ (UNCLASSIFIED)

As forecast in the 1 July - 31 December 1958 History, the ATILO PACAF Office in Hawaii was consolidated with the similar office in Japan, 1 February 1959.⁵ (UNCLASSIFIED)

MANPOWER:

Other than confirmation of conversion of eight Master Sergeant allotments to three E-9's and five E-8's, no changes occurred in number of ATIC manpower authorizations during the period.⁶ (UNCLASSIFIED)

At the end of the period, manpower authorized was 271 officers, 158 airmen, 642 civilians, total 1071. (UNCLASSIFIED)

Although no major changes in manpower distribution within the ATIC was made during the period, much planning for future manpower needs and distribution was accomplished and several requests for increased manpower were forwarded through the Assistant Chief of Staff/Intelligence to the Secretary of the Air Staff.⁷ (UNCLASSIFIED)

ADMINISTRATIVE SERVICES:

During the reporting period, Air Force directives emphasized the necessity for maintaining accountable records which show routing, location, and disposition of classified documents. The accountable record must be retained until two years after the related document has been destroyed, lost, declassified, or transferred. An investigation was made to determine the adequacy of systems in effect in the Center to account for classified material released to ATIC Contractors. (UNCLASSIFIED)

Such material must be returned to ATIC upon completion of the contract, unless the contractor is given written authority to destroy or retain the documents. The manner in which project managers are maintaining accountable records does not provide

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assurance that all classified material is properly accounted for upon termination of ATIC contracts. This office will endeavor to establish a system which will rectify this situation during the next reporting period. (UNCLASSIFIED)

AIR INTELLIGENCE SERVICES:

ATIC continued during this period to provide a full intelligence service to the Air Materiel Command. This service included weekly and ad hoc briefings to the Headquarters staff; and Daily Intelligence Summaries (DINTSUM's), Weekly Intelligence Summaries (WINTSUM's), special briefings and estimates for Hq AMC components. (UNCLASSIFIED)

In June, ATIC undertook the production of a film to create an understanding and appreciation of the Center's mission, objectives, and functions which is essential for establishing vital relationships between ATIC and outside groups for whom no security clearance may be available. The film is designed for showing to civilian and military audiences: visiting cadets, visitors from industry, new employees of ATIC, AF Reserve personnel, foreign nationals, and other visitors. This film will supplement the current briefings and insure consistency in presentation of information to all groups. The Air Photographic and Charting Service has started the actual production (UNCLASSIFIED)

MATERIAL AND FLIGHT SERVICES:

In April 1959 a program for better utilizing ATIC assigned aircraft was initiated. This program for scheduled flights of ATIC aircraft was correlated with requests for Administrative Flights (ATIC Mission Flights) in an effort to use our TDY monies more advantageously. (UNCLASSIFIED)

The aircraft assigned to ATIC flew 1,051 hours with seat passenger hours 152,284. (UNCLASSIFIED)

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The FY-1960 Military Construction Program which provides for additions to Building 828 and Building 259 was defended before the Military Appropriations Committee. The preliminary engineering has been accomplished by the A. M. Kinney Inc.
(UNCLASSIFIED)

A project to construct 207,000 square feet of analysis^{Play 809} laboratory space was submitted in the FY-1961 Construction Program. If this project is approved and constructed, it will provide for our requirements through FY-1964 or FY-1965.
(UNCLASSIFIED)

The Materiel Planning Group⁸ eliminated many problems in the FY-1959 materiel program and has prepared plans and estimates for FY-1960 and FY-1961 which should eliminate brush fire materiel actions. (UNCLASSIFIED)

-
- 1.. GO Nr 6, 25 Jun 59, 1125th USAF FAG (HEDCOM USAF)
 2. GO Nr 1, 13 Mar 59, 1125th USAF FAG (HEDCOM USAF)
 3. GO Nr 3, 26 May 59, 1125th USAF FAG (HEDCOM USAF)
 4. GO Nr 5, 15 Jun 59, 1125th USAF FAG (HEDCOM USAF)
 5. Special Order A-213, Para 1, fr Headquarters PACAF
 6. PAV 59/2/40, 12 Jan 59, Confirming Memo dtd 10/24/58
 7. AFCIN-4X4 thru FY-1965. AFCIN-4X4 ltr thru ACS/I to SAS, 7 May 59,
subj: (U) Request for Additional Manpower Authorizations.
 8. ATIC History, 1 July 58 - 31 Dec 58, p. 11.

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SECTION II

ATIC ACTIVITIES

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CHAPTER 3

COLLECTION PLANNING

TECHNICAL RESOURCES:

ATIC continued to work with WADC on the completion of the airborne infrared surveillance system under development by ARDC to meet air technical intelligence requirements. The main problem has been timely funding of the project and definitizing a contract for all items required. Aircraft and government furnished equipment availability caused some slippage in the program. (~~SECRET~~)

The first prototype of an infrared scanning camera was completed under an ATIC contract. This camera is now undergoing testing and evaluation at the contractor's plant. (~~CONFIDENTIAL~~)

Close cooperation with the Chief of Naval Operations, the Contractor and the Naval Research Laboratories, resulted in the collection equipment under the Joint Navy Air Force program, being readied for operational use in two months. ATIC assumed operational control of the equipment. (~~SECRET~~)

Results of the tests against missiles fired from the Atlantic Missile Range indicated little feasibility for the operational use of the current star scintillation technique. Further research is needed to improve present equipment. (~~CONFIDENTIAL~~)

A major objective not yet implemented is to provide a more complete system for acquisition of technical data from foreign missile and rocket launchings, utilizing electromagnetic wave propagation to and from peripheral locations and at remote sites over global distances. Activity during this period consisted of further investigation both of spectral radiations emitted in the target

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near-zone, to determine what significant information may be obtainable, and of the results of recent propagation studies by leading U.S. groups in this field.

~~(SECRET)~~

The Phase I experimental model has demonstrated a capability to separate easily a complex signal as much as 25 to 30 db below a single-frequency interfering signal. Preliminary tests have indicated good results may be expected in separating two or more complex signals, but additional engineering development and testing are necessary to overcome the problems of precise and rapid alignment adjustments. The tests have also shown the need for further reduction in flutter and wow in recording, to the order of 0.1% or less, for optimum utilization of the separation technique. ~~(SECRET)~~

The Texas Instruments timing reference units were placed in preliminary testing for operational-suitability checkout with the 144206 equipment system. To support this application, a small multiple-channel recorder was produced to record elapsed time between readout of the TI reference unit and the occurrence of events requiring absolute timing accuracy of the order of 0.01 second. The recorder moves the tape at 3/16 ips for a total of 555 minutes (9 hours and 10 minutes). A 360 cps tone is recorded for reference on two tracks, and is interrupted on one track by timing marks to show the time of events. ~~(SECRET)~~

Acoustic Analysis Equipment delivered to ATIC provided an in-house capability for the first time. The analysis of operational tapes will be an in-house function in the near future. Emphasis has been placed on the recording of static missile firings and aircraft engine test stands in the extension of acoustic technology.

~~(SECRET)~~

ATIC examined for necessary modifications experimental models of a

~~SECRET~~

specially-configured short-time recorder before release for field use. These units are designed for acquisition, in normally inaccessible environments, of significant data. (~~SECRET~~)

The design of the optics for the fly weight 100" F11 portable long range oblique photographic (LOROP) system currently in fabrication was reviewed. Minor changes in secondary mirror mounting and sighting optics are required. Contractural action to accelerate delivery of this item by three months was initiated in order that flight tests could be accomplished prior to the deadline for firming up FY 1960 procurement data for prototypes, and prior to inclement weather. (~~SECRET~~)

Procurement was initiated on a new concept in data recording cameras using newly available art in intralens shutters and compact pneumatic drive systems using standard CO² cartridges to eliminate cumbersome battery packs, electric motors and attendant maintenance and logistic problems. The new equipment will be approximately 1/3 the weight and size of the original equipment, will be capable of obtaining velocity information against moving targets through timed sequence operation, and will eliminate motion distortion characteristics of the former focal plane shutter design. The camera will have the normal external appearance of commercial equipment. (~~SECRET~~)

Initial results were reviewed of work on two prototype devices for the collection of name plate data by compact discreet techniques. Both devices employ new techniques whose feasibility was confirmed by operation of breadboard devices during this reporting period. (~~SECRET~~)

ATIC initiated action to obtain a service test quantity of a 70 mm pentaprism sequence reflex camera to replace the obsolescent, chronically malfunctioning K-20 cameras in present use with more compact versatile modern equipment which

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will also double as a ground camera offering many advantages over 35 mm ground equipment now in use. A British 70 mm reconnaissance camera on loan from WADC is being adapted to a 40 inch f/8 telephoto lens in an in-house effort to determine whether ground-to-air coverage of aircraft can be improved in quality by reduction or elimination of dynamic disturbances felt to be generated by equipment in present use. If sufficient gain in comparative image quality results in side-by-side operation of this equipment with the old, a prospect exists for material size and weight reduction of fly-by equipment and the elimination of the need for the additional operator now needed for the holding focus of the longer focal length equipment at current ranges. (~~SECRET~~)

An R&D model of the airborne combustion products collection system was flown against the Atlantic Missile Range to determine system requirements. ARDC and the Air Weather Service made meteorological studies as a basis for determining the operational feasibility. (~~SECRET~~)

The Center continued efforts to acquire a capability for the collection of Air Technical intelligence information on foreign nuclear-propelled vehicles. RADC was advised of the requirement for a personalized gamma detection device. After a review of studies in this area, on 14 January 1959, RADC advised Hq ARDC regarding the feasibility of the task stating estimated time and cost. (~~SECRET~~)

HUMAN RESOURCES:

Foreign contracts for the production of scientific studies on the Soviet state-of-the-art in fields of ATI interest was further expanded. The program was also extended to several new geographical areas and study-subject areas were gradually broadened and pointed toward the long range objectives. (UNCLASSIFIED)

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The exploitation of scientific and technical organizations continued at both international and domestic conferences. The selection of individual scientists with special opportunities for making desired foreign contacts was expanded. Under these exploitations, a variety of subjects of ATI interest were covered and new contacts established. ~~(SECRET)~~

Delegation exchanges continued in a variety of fields. Approximately 35 scientific and technical areas of ATI interest have been furnished the USIB Exchange Committee for exploitation of ATI requirements. ~~(SECRET)~~

The ATIC Tri-services Reserve Program has made slow but steady advancement. A Reserve seminar was held at ATIC to resolve the various organizational, management, and special technical problems related to further implementation of the project.
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CHAPTER 4

COLLECTION OPERATIONS

REQUIREMENTS:

On 31 May 1959 there were 322 active SRIs. During the reporting period 225 SRIs were initiated and 172 cancelled. (UNCLASSIFIED)

Items of foreign hardware received by ATIC during the reporting period included a Russian made Radio Sonde and Soviet photo-flare bomb fragments. ~~(SECRET)~~

EXPLOITATION:

Exploitation of foreign fairs, expositions and meetings for ATI information continued during this period with the issuance of 36 SRIs to overseas collection officers. Thirty-three of these SRIs covered trade fairs which are mainly of interest to Weapons and Industry Division. ~~(CONFIDENTIAL)~~

In December 1958 the function of the Returnee Exploitation Group was absorbed into the Defector Reception Center (DRC) at Frankfurt in January 1959. All scientific and technical sources are now being processed by the Scientific Exploitation Section of DRC. The regular exploitation of the last REG source was completed. ~~(SECRET)~~

During the six months period nineteen new DRC sources of possible ATI interest became available for exploitation. Five of these sources were considered to be of special interest to ATIC. ~~(SECRET)~~

During the period requirements were developed and served on ATI Detachment USAFE for use in exploiting twelve selected sources which became available to DRC. These requirements covered various fields of ATI interest. ~~(SECRET)~~

During the reporting period, ATIC received forty reports which contained information of high value, mainly on Soviet missile guidance and Soviet and East

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German aircraft and propulsion. ~~(SECRET)~~

EVALUATION:

From 1 January through 31 May 1959, 638 Air Force reports and 216 evaluations of CIA reports were processed. ~~(SECRET)~~

The production of evaluations as compared to the previous reporting period, more than doubled. ~~(CONFIDENTIAL)~~

FIELD OPERATIONS:

Collection activities in the various project areas of Field Operations continued to progress satisfactorily. In view of additional collection opportunities, new projects were created to provide for servicing ATIC requirements. Collection activities engaged in were as follows:

1. Direct contact with and penetration of Soviet government, economic, scientific and technical organizations increased substantially both in scope and frequency. These collection activities include twenty-five or more separate collection tasks, each of which provides opportunities for additional tasks to be created and exploited. ~~(SECRET)~~

2. The off-shore controlled European collection net continued to be productive and reports received increased in quantity and quality. The reports reflected a continued emphasis on primary targets indicating responsiveness to ATIC requirements. ~~(SECRET)~~

3. Tasks in three countries were active in the area of utilizing indigenous scientists in allied and friendly countries, which are strategically located in relation to the USSR, for Soviet state-of-the-art studies. ~~(SECRET)~~

4. Procurement of foreign technical equipment of intelligence interest was accomplished satisfactorily. A refinement of the facilities devoted to

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this method of acquisition was completed during the reporting period, and it is anticipated that there will be a continuous flow of desirable equipment through this means. Procurement of this hardware is accomplished through the use of established trading operations and many items of intelligence interest have been obtained for evaluation and analysis. (~~SECRET~~)

GUIDANCE:

ATIC prepared a Collection Brief supporting priority ECM collection requirements entitled "Recognition of Countermeasures-Type Interference on Video Displays." It is designed to aid radar operators to recognize various types of interference on a radar scope and to report and describe these interferences in a manner most useful to the intelligence analyst. A Secret and a Confidential version was made. It should be particularly noted that the Department of the Navy requested and received 500 copies of the Confidential version for dissemination to all ships having an air defense capability. In addition, the Confidential version was sanitized to permit release to selected ROKF, JASDF, CHINAT and British personnel in the PACAF area. (~~CONFIDENTIAL~~)

The field dissemination of ICGM-Research Facilities during the month of May culminated the Center's effort to develop a series of basic intelligence collection guidance documents that provides in layman's language a general indoctrination of the scientific and engineering fields of ATI interest. A total of twelve manuals were developed in the ATI series. (UNCLASSIFIED)

ICGL #2 (POL Sampling) was revised and updated. Such action was necessary to reaffirm interest in the program to include new requirements covering solid gasoline, solid jet fuel, encapsulated fuels, etc., as well as to make current, administrative procedures in the program. (~~CONFIDENTIAL~~)

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ATIC guide for travellers into sensitive areas has expanded through development of two unclassified guides, Antenna Systems and Guided Missiles.

~~(CONFIDENTIAL)~~

PHOTOGRAPHIC TRAINING AND OPERATIONAL EQUIPMENT:

Considerable effort was expended during this period to improve the over-all Aerial Reconnaissance Intelligence Collection program for ATIC. This effort resulted in establishing an IBM machine card listing of all ATIC targets that can be fully or partially satisfied by AERIAL Reconnaissance. This IBM listing was designed for and integrated into the USAF Aerial Reconnaissance requirement IBM program. ~~(SECRET)~~

Within this period a procedure was established with both USAFE and PACAF whereby all Immediate Photographic Interpretation Reports and Mission Review Photographic Interpretation Reports are delivered directly to ATIC. ~~(SECRET)~~

During this period special photographic training was provided to 21 Air Attache and ATILO officers, 17 Air Attache and ATILO Airmen and one civilian. The photo courses varied in length from three to eight weeks with each course specially tailored to fit the needs of the individuals concerned.

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CHAPTER 5

DOCUMENTATION

DOCUMENT PROCESSING:

During the first half of 1959, ATIC directed Document Processing efforts primarily toward the more timely receipt, processing and dissemination of all intelligence and intelligence information received in ATIC. The two principal areas of concern were:

1. The time delays involved from the date a report is written to the date it is received in ATIC.

2. The time delays involved from the date a report is received in ATIC until the information is in the hands of an ATIC analyst. (UNCLASSIFIED)

To expedite the transmittal of documents from the Collector to ATIC, a project was initiated under which intelligence reports, pertinent to the ATIC mission and requirements, are airmailed or handcarried directly to ATIC once a week from the Office of the Chief, ATILO, USAF. Since these reports by-pass Hq USAF, ATIC is now realizing a savings of several days which would normally be required for transmittal through administrative channels. (~~CONFIDENTIAL~~)

All intelligence information received under this project is processed on a priority basis and disseminated to ATIC analysts for formal evaluations. At first, there was over 50% duplication of reports received; however, certain aspects of document selection were refined to the point where there is no longer any duplication. (UNCLASSIFIED)

To enhance the processing operation and insure the timely dissemination of intelligence information after it has been received in ATIC, new processing procedures were established whereby ATIC analysts may review reports prior to their transmittal to Project White Stork. Under the new procedures, raw intelligence reports of a

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priority nature are screened to Branch level and placed in the library reading room area for review by analysts. These reports are available for review for a maximum of three days, after which they are forwarded to PWS for normal processing. (~~CONFIDENTIAL~~)

AIR TECHNICAL INTELLIGENCE LIBRARY:

The Technical Library, during the first half of 1959, took steps toward becoming a complete Information Center by assuming the responsibility for the entire set of microcard negatives and maintaining a complete set of TIPS cards for all documents which have been extracted in their entirety. In addition, a complete card catalog system was established. (UNCLASSIFIED)

ATIC extended coverage of foreign and domestic literature by the acquisition of specialized bibliographical publications such as subject and form indexes, bibliographies and guides. These served as a means of evaluating the holdings of the Library which in turn enabled the Library to acquire publications which were not included in the Library files. Further, the acquisition of publications for the Library was stabilized by levying requirements on distribution agencies in such a manner that files of desired series or subjects are complete and distribution to the ATIC Library is made on a continuing basis. (UNCLASSIFIED)

To insure that the Library is dynamic and responsive to customer requirements, the Library still has to work toward the further consolidation of the Library files and incorporation of the STEP abstracts into the Library holdings. (UNCLASSIFIED)

SCIENTIFIC AND TECHNICAL EXPLOITATION PROGRAM (STEP) MANAGEMENT:

The STEP Control Center operational environment increased in certain areas beyond the expectations for this period in the realization of contractual resources support plus diligent AF personnel efforts reflecting over-all progression in accomplishing the program mission. During this period, 37,358 abstracts were processed from 184 Russian journals under SOV/STEP, and 455 abstracts from 10

Satellite journals (ChiCom) as the SAT/STEP became operational. Of the 34 ChiCom journals selected for the program, 30 are available in Taipei, Taiwan, for abstracting and translating. In addition, 1,456 monographic abstracts were processed. (UNCLASSIFIED)

SOV/STEP is operational with 184 journals selected for processing.
(UNCLASSIFIED)

SAT/STEP just became operational during this period with 102 journals selected for processing. (UNCLASSIFIED)

FREE/STEP has not entered the pilot stage as yet, however Project Gold Eagle, Project White Stork, and Air Force Office of Scientific Research are reviewing literature for recommendation of what nations' literature, subjects, authors, and articles should be exploited. (UNCLASSIFIED)

IN-HOUSE TRANSLATION:

Total words translated by in-house resources during the reporting period comprised approximately 953,000 Russian, 300,000 German, 70,000 French and 60,000 other languages, for a combined total of 1,383,000. (UNCLASSIFIED)

IN-HOUSE ACTIVITIES IN THE FIELD OF AUTOMATIC TRANSLATION:

ATIC follows on a continuous basis all the current developments in the field of Machine Translation (MT) and related areas such as auto-abstracting, indexing, data processing, etc. Monitoring activities cover directly or indirectly six American and two European MT research projects in addition to the Soviet efforts in this field. The scope of these activities increased substantially during the period covered by this report due to highly intensified efforts of the US MT project groups, reflected in the amount of MT trial runs, briefings and conferences, as well as in the abundance of pertinent literature which requires

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a careful analysis. In addition to these monitoring activities, conducted in close collaboration with RADC and PWS, ATIC runs a small-scale experiment in MT, based on "Harvard Automatic Dictionary," wherein the input device (short Russian texts in electronics, mathematics, and cybernetics) are prepared in-house on a Unityper and then sent to Harvard Computation Laboratory for processing on Univac 1 in exchange for our editorial comments. (~~CONFIDENTIAL~~)

LEXICOGRAPHIC PROJECTS:

ATIC continued work on brief interim glossary on automation and rocketry terms. Agreements were reached designating the recipient of technical terms from contractors engaged in translating and abstracting, as well as from overseas ATI stations dealing with Russian and other foreign literature. A multilingual (French, German, Italian, Spanish, Swedish, Polish, English) glossary of about 1,000 technical terms approached completion. (UNCLASSIFIED)

FY59 TRANSLATION CONTRACT:

This contract, awarded to the Language Service Bureau of Washington, D. C., is approximately one third complete. Contractor estimates 90% of all work on hand will be complete by 30 September 1959. In order to preclude the FY59 Contractor from having a large amount of work still to be completed after 30 September 1959, no shipment of documents to the contractor for translation was made after 10 April 1959. The estimated amount to be translated will encompass approximately 4,000,000 words. (UNCLASSIFIED)

RUSSIAN PERIODICAL TRANSLATION:

Translation of "Herald of the Air Fleet" by Syracuse University under the FY59 contract remained of excellent quality. All 1958 issues have been translated. Work on Issue 1, for 1959, is well under way and several articles from Issues 2 and 4 have

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been translated. Procurement action is presently being taken for the award of a "sole source" contract for FY60. (UNCLASSIFIED)

ATIC TRANSLATIONS RELEASED THROUGH U. S. DEPARTMENT OF COMMERCE:

Early in 1959 final arrangements were completed whereby copies of unclassified translations were forwarded to the Office of Technical Services, U. S. Department of Commerce, for publication and sale. To date, 62 completed translations have been listed for sale in the Department's publication "Technical Translations," and the masters for 27 more have been requested. (UNCLASSIFIED)

ATIC TRANSLATION SUPPORT OF ARDC COMPONENTS:

During the first six months of 1959, ATIC translation support of ARDC components increased as follows:

1. Processed requests for translation of 976 foreign pages.
2. Completed and forwarded, in answer to specific requests, translations of 1,145 foreign pages.
3. Forwarded on automatic distribution, translations of 10,274 foreign pages.

(UNCLASSIFIED)

Page 27 of 63 pages
Copy 4 of 12 copies
T59-18392

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CHAPTER 6

ELECTRONIC INTELLIGENCE
(ELINT)

GENERAL:

ATIC was represented at the Canada-UK-US Electronics Intelligence Conference at Ottawa, Canada, from 12 to 23 Jan 59, as well as at the pre-CANUKUS ELINT discussions held by representatives of the three countries in Washington, D. C., on 8 and 9 Jan. Among significant ELINT disclosures at these sessions were new facts concerning Soviet S-band jamming; ballistic missile, sputnik, and lunik telemetry; 12-15-kc pulsed signals; bomber tail-defense emissions; coding of 660-mc identification-friend-or-foe (IFF) signals; X-band, fast-scanning artillery-range radar; ground beacon replies of distance measuring equipment (DME). (~~SECRET~~)

Members of the IG Survey Team visited ATIC during the week 2-6 Feb and discussed matters relevant to the adequacy of R & D support of USAF intelligence operations. Their purpose was to conduct a follow-up survey of the reactions of ARDC and ATIC to the findings resulting from the teams initial survey made in Jan 58. It is hoped that this series of surveys will assist in the establishment of a more effective and productive working relationship between R & D and intelligence activities by streamlining procedures, reducing time cycles, and resolving security problems. (~~SECRET~~)

Air Force intelligence personnel met at the Center in March to exchange views on specific questions concerning the Airborne ELINT Collection Program for the 1962 and 1965 period. The primary areas of concern were:

- a. Whether the inventory of ELINT vehicles could be reduced to one type, the KC-135 being designated.
- b. Whether all routine airborne ELINT processing could be centralized in one place, Hq SAC being indicated as a possibility.

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As a result of the discussion, it was agreed that the aircraft type inventory for ELINT could probably be reduced to two types, most of the requirements being met with the KC-135 or equivalent, with a small number of an as yet unidentified specialized type. It was also determined that it appeared unlikely that all airborne ELINT processing could be centralized to the degree suggested because of theater requirements and operational feedback problems. (~~SECRET~~)

Another meeting was held to discuss sonics data-reduction methods and equipments involved in the US and UK Programs. The principal speaker was Mr R. A. Eades of SRDE - UK. It was felt that the UK and US sonics efforts are comparable in scope and capability, the weakest link in either program being the poor quality of the data collected. (~~SECRET~~)

On 1 April 1959, personnel of ATIC presented an interim plan to Hq ARDC, AFMTC, CRC and other AF intelligence personnel for collection of ELINT data on earth satellite vehicles and space vehicles launched by the USSR. This plan covers the following particulars:

- a. A statement of the problem in acquiring, tracking, and collecting ELINT data from space probes as well as earth satellite vehicles.
- b. The locations of existing sites, their capabilities and deficiencies, and the stipulation of equipment required to make a site capable of collecting ELINT data between 20 mc and 500 mc.
- c. Recommended antenna configurations for accurate acquisition and tracking.
- d. The alerting problem, the type of tape recorders to be used, the data to be collected, a history of collected data, and an operators' log format. (~~SECRET~~)

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On 18 May representatives of ATIC, ARDC, WADC, RADC and AMC attended a meeting sponsored by the Directorate of Systems Management, ARDC, for the purpose of establishing an Ad Hoc working group to study current and future problems in the electronic system interference areas associated with weapon system development. Dr. A. L. Hiebert of RAND Corporation discussed some of his recent conclusions pertaining to the problem area. Briefly, the objectives of this Ad Hoc group will be to determine the extent of present interference problems in weapons system development, establish techniques to correct these problems, and, ultimately, to insure that future weapons systems are electronically compatible. This compatibility implies a close control over system design, frequency allocation, system integration and deployment, etc., such control being based on a thorough knowledge of the over-all electromagnetic environment in which the system must function. ATIC, while not participating in this Ad Hoc group by providing active members, will provide such assistance as possible through the use of the ELINT Signal Environment Simulation Study now nearing completion under contract. In addition, it is expected that the results of the Ad Hoc group effort will benefit ATIC by providing useful technical inputs to the ATIC computer program.

(CONT)

ELINT REQUIREMENTS AND EVALUATION:

By the use of contractual assistance, ATIC completed a study of the signal environment in which ELINT collection operations must be conducted for immediate, future and long range estimates. The first volume describes the computer techniques developed to study the subject environment; the second contains specific intelligence support and is subject to restricted distribution. (SECRET)

ATIC expended considerable effort in establishing data requirements in the areas of missiles, RADINT, navigational aids, ECM, and satellite and space vehicles. The compilation of these requirements serves as a guide to collectors, assists in the

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design of equipment, and influences the activities in the R & D community. ATIC personnel followed closely the ARDC activity in the development of thermoplastic as a recording technique for wide-band signals. Present indications are that this will be placed on contract soon. ATIC engineers reviewed specifications on various systems to ascertain their capability to fulfill ELINT requirements. (~~SECRET~~)

A WADC aircraft carrying a rapid frequency-shifting radar rendezvoused with an RB-47 in June. For approximately 2 hours, the WADC radar was put through a complete series of operating modes to give SAC crews an opportunity to recognize this type of exotic radar, to determine the capability of their equipment, and to provide ATIC analysts with tapes for possible future comparison of these signals with similar Soviet signals. (~~SECRET~~)

ATIC representatives attended the first meetings of the 466L System Phasing Group in May. Organizations represented included the 466L ESSPO, Alaskan Air Command, ATIC, AFCIN-1, AFDRQ, AFOAC, RADC, ROAMA, GEEIA, ATC, 438L ESSPO, and the 480L ESSPO. Discussion of the system-manager contractor work statement and the forthcoming briefings of the system-manager contractor were specifically excluded from the discussions by the ESSPO. Items discussed included:

- a. Preparation of AFD 100-2 and AFR 5-47 documentation requirements and their time scheduling.
- b. The lack of sufficient funds in many areas, including training, logistic support, and overseas construction.
- c. The lack of training equipment and the problem created by having to train both in the Z. I. and Europe.

One working group under the Phasing Group was formed to investigate logistic and installation planning problem areas. This sub-group will be composed of USAFSS, RADC, ROAMA, GEEIA, and ESSPO personnel. (UNCLASSIFIED)

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ELINT RADIATION RESEARCH:

During this period 1580 documents were received and 150,000 intercepts were processed. (~~CONFIDENTIAL~~)

ATIC inaugurated a new policy of forwarding a consolidated weekly request to the respective theaters for signal data. This has reduced the number of communications and has not impaired the quality or timeliness of the replies. Analysts completed a list of radar location data in support of a data transmission project. From this a map showing the location of net stations was prepared. (UNCLASSIFIED)

Missiles. One hundred ten missile-associated signals and one hundred sixty-eight rolls of magnetic tape recordings were processed during the past six months. During January analog records were made of a highly significant non-USAF intercept of Soviet lunar telemetry. In February two articles were published on a group of 48- and 144-mc signals identified in Soviet open literature as involved in geophysical rocket experiments. During March a comprehensive summary article of ELINT data on the KOMET Missile guidance radar was prepared. The Missile Team was assigned the subject of Ballistic Missile Early Warning during March and initial familiarization with the problem and screening of the current data were begun. Increased emphasis was placed on intercept site redirection. (~~SECRET~~)

Airborne. Analyses of airborne-intercept signals confirmed previous reports of pulse and scan synchronism between the L-band signal and the S-band signal of the associated AC&W radar, confirmed the belief that another system had a mode-change capability of from two to eleven levels of scan, and made possible calculations from ELINT/RADINT data. (~~SECRET~~)

Ground Electronics. Analysis was performed on 820-850-mc intercepts possibly associated with the new Soviet FLAT FACE acquisition radar. These signals were intercepted in both the European and Pacific areas. (~~SECRET~~)

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CHAPTER 8

PROPULSION

GAS TURBINE PROPULSION SYSTEMS:

ATIC's most significant accomplishment in the propulsion area during this reporting period was the completion of the initial annually scheduled study, "Soviet Air Breathing Gas Turbine Power Plants for Aircraft." This publication assembles into a single entity the estimated characteristics and performance of gas turbine power plants for all Soviet aircraft. (~~CONFIDENTIAL~~)

ATIC awarded a contract to General Electric Co. for study of control systems for Soviet jet engines. The contractor's study is to cover general design philosophy as well as control systems for specific engine applications.

(~~CONFIDENTIAL~~)

Considerable manhours were expended in this period to develop engine performance data and installation corrections for friendly foreign aircraft for use in certain war gaming currently being conducted. (~~SECRET~~)

ROCKET PROPULSION SYSTEMS:

Additional contractual agreements were consummated with the Rocketdyne Division of North American Aviation, Inc. and the Reaction Motors Division of Thiokol Chemical Corporation. With the new contractual arrangements ATIC can rely upon assistance as required from any one of the major US industrial rocket research, development, and production manufacturing agencies. (UNCLASSIFIED)

ATIC ASSISTANCE TO INTELLIGENCE COMMUNITY AND OTHER GOVERNMENTAL AGENCIES:

ATIC provided rocket propulsion briefing material with accompanying vu-graphs to the Air University, Maxwell Air Force Base, as requested for use in major University briefings. This briefing consisted of illustrations of actual Soviet

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rocket hardware, related hardware estimates, production capabilities, and estimates of future rocket capabilities to 1970. (~~CONFIDENTIAL~~)

Assistance was provided to ARDC in the form of graphic illustrations of Soviet accomplishments and future potentialities in the field of rocketry. On the basis of these contributions, WADC was requested to provide similar US accomplishment graphic illustrations. (~~CONFIDENTIAL~~)

Guidance was provided to overseas collection activities by actual interrogation and standardized specific interrogation guides. Joint conferences were also held between DDI/Tech. and Branch representatives on information derived from this project. These discussions were of major benefit to both Governments. (~~CONFIDENTIAL~~)

A complete rocket propulsion briefing was provided to the engineering personnel of AFMDC, Holloman Air Force Base. (UNCLASSIFIED)

The Center provided contributions and technical assistance for the recently established Joint Intelligence Telemetry Seminar and presented a complete rocket propulsion briefing to the group. (~~SECRET~~)

MAJOR PRODUCTS:

The Center compiled extensive intelligence information in the area of Soviet ICBM and satellite rocket power plants, and completed a study entitled "Soviet Rocket Power Plants for Long Range Missiles and Space Vehicles" were completed. The study presented over-all component and power plant characteristics and performance of known and estimated Soviet rocket power plant packages. This study represents an integration of the historical intelligence from 1946 to the present and should be an ideal tool for the Intelligence Community and US Government Development Agencies. (~~CONFIDENTIAL~~)

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Data Analysis: The Nav aids Data Analysis Team engaged in the study of a new group of signals in the 12- and 15-mc bands possibly associated with a new Soviet long-range submarine navigation system development. ATIC analyzed quantities of data intercepted from the Soviet lunar probe launching. Analysis of sonics data progressed slowly because of the small quantity and poor quality of data received. More refined intercept equipment was ordered for use during late 1959. (~~SECRET~~)

Reports. Twelve issues of the ATIC ELINT Reporter were published during this period. Articles outlined results of analysis in the various data areas and outlined problem areas for the information of field collection and processing activities. (~~SECRET~~)

ANALYSIS TECHNIQUES:

A 13 January meeting of all service representatives was convened in Washington to resolve any remaining obstacles in the way of progress on a Joint Service Directory of ECM Equipment. The agenda included format, contact points for data collection from each service, quality of photos to be used, AF contribution to the funds required, and number of copies required by each service. (UNCLASSIFIED)

ATIC personnel continued to request official status and nomenclature for certain items of data processing equipment specially designed to ATIC specifications for ELINT purposes. Although this is a slow process, when status has been granted the theaters can requisition the items through normal channels of supply. One such item, for instance, is the Data Reduction Console which has been assigned the official nomenclature "Data Analysis Central, AN/GSQ-41." (UNCLASSIFIED)

A local contractor was procured in May to complete the equipage of the mobile ELINT data processing vans. Minor problems such as internal power supply, etc. were resolved. Upon completion of a few minor modifications these vans are ready for the customer, in this case Hq SAC. (UNCLASSIFIED)

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ATIC personnel completed the specifications and initiated procurement action for a slide-rule type device which will be capable of integrating the known emitter parameters in such a manner as to identify the emitter type. The model was developed by Mr. Mills in the USAFE theater and has proved quite useful in ELINT processing activities. (~~CONFIDENTIAL~~)

Satisfactory progress has been made through the use of external assistance in compiling and writing the manuscript for the ELINT Processors' Manual, designed as a working tool for all ELINT processing activities. Concurrently the ELINT Collectors' Manual is in process of revision. These are scheduled for publication as Air Force Manuals in the 200 series in Dec 1959. (~~CONFIDENTIAL~~)

ATIC continued to provide helpful hints to ELINT processing activities via PENS, timely notes on equipment operation and maintenance. (UNCLASSIFIED)

INTERCEPT TECHNIQUES-CAPABILITY:

Work on the cyclic modification of three types of aircraft began during this period. Plans permit analog audio recording of pulse-width and amplitude information from normal radar-type pulses, and installation of new components to extend the collection capability. (~~SECRET~~)

ATIC personnel requested the RADC QRC facility to provide prototype equipment and engineering services to collect additional information on the MOON navigation system signals. All required data except phase coherence had been completed. RADC is fabricating the QRC-104(T) to handle this problem and ATIC engineers have completed plans for theater operations. (~~SECRET~~)

ELINT FIELD OPERATIONS:

Detailed plans for the ELINT Test Facility were completed. Equipment will be tested prior to its deployment to the theater. Likewise, the operator will be trained here in the use of the equipment before he departs for the theater. (UNCLASSIFIED)

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During this period ATIC personnel designed, procured equipment, and directed its installation into a complete mobile ELINT collection facility which represents the optimum intercept capability available within the electronics state-of-the art.

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ATIC continued its support of special activities, and furnished improved data processing equipment to TAC, SAC and the theater EIPC's, in addition to the in-house ELINT facility. Contractor engineers were deployed to assist on specific problems, and contractor technicians to maintain this specialized equipment. ~~(CONFIDENTIAL)~~

PROBLEM AREAS:

There has existed for several years a series of Soviet radars that operate on several frequencies simultaneously. This has presented a serious problem to the operator of a manually tuned receiver to confirm the existence of and the correlation between these different frequencies. This problem has recently been increased many-fold by the advent of Soviet random frequency shifting and hopping radars. It is now impossible for the operator of a manually tuned receiver to resolve, correlate, or confirm the existence of the various frequencies. This inability of crystal-video receivers to resolve frequency has indicated a requirement for a receiver with the capability of resolving frequency while looking at all frequencies simultaneously. This problem was presented to RADC through Hq ARDC and accepted by them as a QRC task. Our proposal was for a complete "channelized receiver" with a basic simultaneous frequency coverage of 1,000 to 12,000 mc with converters. Proposers' conference was held in May. Due to insufficiency of QRC funds, RADC plans to build only one of the four bands, none of the three converters, and no scanning card punches. The proposals which are not available for ATIC review, are being evaluated by ARDC. It appears necessary for ATIC to plan for procurement of the balance or approximately four-fifths of the system. ~~(SECRET)~~

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TRAINING:

Training activities increased during this period. Thirty people received the one week's ELINT Indoctrination Course. Thirteen people completed the four months' ELINT Analysts and Laboratory Technicians Course. Four individuals completed the Special Analyst Team Course. (UNCLASSIFIED)

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CHAPTER 7

ENGINEERING SUPPORT

ENGINEERING ANALYSIS:

The Center devoted considerable effort during the first half of 1959 to the provision of special aircraft performance on Soviet current and future estimated aircraft, as well as friendly foreign aircraft, in support of war-game projects. (UNCLASSIFIED)

Additional aircraft performance problems were programmed for the computer. One programmed problem determines the effect of high lift coefficients on induced aircraft drag; another determines the turn-radius capability of an aircraft as a function of mach number. (UNCLASSIFIED)

ATTC developed a detailed analytically based stress-analysis method of estimating the structural weight of a wing; and related methods of estimating several critical structural parameters, i.e., wing structural box thickness and chord lengths, and tip deflection. (UNCLASSIFIED)

GRAPHICS:

The quality and readability of ATTC publications received appropriate attention through (1) modification of Justowriter equipment to provide more space between lines, (2) revision of typing layout to decrease the reduction ratio and increase the size of the printed type, (3) substitution of Mylar typing ribbon for paper carbon ribbon to provide a more clean-cut type on the reproducible copy, and (4) establishment of a new format for headings and subheadings. (UNCLASSIFIED)

New techniques for the production of top quality Vu-graphs were introduced in which Bourges paper and Diazo-type material in pastel shades are used.

(UNCLASSIFIED)

UNCLASSIFIED

A request for authorization to procure a Haloid Xerox Copyflo machine was forwarded to the Joint Congressional Committee on Printing. This equipment will provide the Center with an inexpensive and rapid means of producing paper copies directly from microfilm, as required mainly for support of the SOV-STEP and collection programs. (UNCLASSIFIED)

MACHINE COMPUTATION:

Since January 1959, ATIC's computer requirements have drastically increased. The new computer is in operation 24 hours a day, five and a half days a week, and runs 440 hours a month on the average. (UNCLASSIFIED)

The usual engineering computations represented the bulk of the computing requirements during this period; but two new information-processing files, the 1958 ELINT SUMMARY FILE and OPEN SOURCE FACILITY FILE, began to consume considerable production time. The processes involve searching the files for associations rather than computations. (UNCLASSIFIED)

Planning for a new ultra-high-speed central-data processor began in March 1959. The new installation will provide ATIC with a computer capable of handling large information storage and retrieval problems, weapons simulation studies, reduction of data from special collection devices and engineering computations. (UNCLASSIFIED)

PHOTO EXPLOITATION:

ATIC's most significant work in this area concerned the new Soviet Vertical Take-Off and Landing Transport that was discovered at Lyubertsy Airfield. (SECRET)

ATIC representatives attended the 25th Annual Meeting of the American Society of Photogrammetry held in Washington, D. C., to observe the newest aids and techniques to better accomplish assigned tasks. (UNCLASSIFIED)

UNCLASSIFIED

Five new items of photo-analysis and photo-research support equipment were received and put in operation, including a closed-circuit TV system. Devices for more complete Center-wide dissemination of photography were introduced, including two telephone-answering devices with five-minute tape capabilities to disseminate information on photos received on a daily basis. (UNCLASSIFIED)

Other major items of equipment received in the Photo Lab included a dia-positive printer, a projection printer, and a photographic processing machine. (UNCLASSIFIED).

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NUCLEAR REACTORS:

Intensive activity was underway during this period to assess Soviet capability to develop nuclear propulsion reactors for conventional aircraft and guided-missile power plants with contractual assistance from the ANP Department of General Electric, Marquardt, and Rocketdyne Division of North American Aviation, Inc. Plans were formulated to investigate intermediate and fast neutron reactors, thermonuclear technologies, and radioisotope units, beginning FY 60, primarily for electric propulsion and secondary power systems.

(~~CONFIDENTIAL~~)

ENERGY CONVERSION SYSTEMS:

Contractual assistance from Convair was utilized to determine Soviet activity in nuclear and solar energy conversion systems utilizing both conventional heat transfer and thermoelectric conversion techniques. (~~CONFIDENTIAL~~)

ELECTRIC PROPULSION:

Armour Research Foundation, Illinois Institute of Technology, assisted ATIC in establishing Soviet activities in this field to provide further depth to ATIC studies. (~~CONFIDENTIAL~~)

FUELS AND PROPELLANTS:

ATIC continued to investigate the fundamental and applied combustion research conducted by the Soviets which would be applicable to various propulsion systems. Procurement action was initiated for a FY-60 continuation of this effort. (~~SECRET~~)

A study is now being completed by the General Electric Company on Soviet activities and interests in advanced energy sources for air and space weapons. The study concludes that known activities are confined to supporting the basic science fields. There are suggestions that the Soviets are interested in ion and plasma jet propulsion. Until more significant developments are detected, this field will be surveyed on an in-house basis. (~~SECRET~~)

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A feasibility study on the chemical technology of nuclear fuels recently concluded that specific indicators of Soviet activities were too vague to warrant an intensive study at this time, and concluded that ATIC should maintain surveillance on an in-house basis, with consultative assistance if required.

~~(SECRET)~~

PETROLEUM FUELS:

Research and development pertaining to Soviet petroleum products was followed by various analysis programs and studies in specific problem areas. The analysis programs indicate that the Soviets are maintaining their capability to produce satisfactory products and are constantly meeting their specification requirements. Detailed analysis programs have recently been initiated to provide additional information indicating performance capabilities and characteristics of special samples. ~~(SECRET)~~

The Center completed studies on the thermal stability of jet fuel and the effect of radiation on fuels, fluids and lubricants; and prepared a thermal stability study, which established Soviet concern with the problems attendant to stability of jet fuels and hinted at possible solutions to these problems. Very little information on Soviet activities related to radiation effects was available; therefore, this study will be used as a working paper and will receive only limited distribution. Both of these studies demonstrated the need for more intensive work and outside contracts. ~~(SECRET)~~

Interest in solidified gasoline or encapsulated fuels continued. A sample of this material was obtained and analyzed. Analysis proved that the gasoline is not completely encapsulated but is contained in a porous type structure. It represents a state-of-the-art achieved in this country seven or eight years ago. However, it is believed that the Soviet state-of-the-art is much further advanced than is indicated by this sample. ~~(SECRET)~~

~~SECRET~~

ROCKET PROPELLANTS:

A study conducted by PWS, with the objective of providing intelligence on liquid propellants used or contemplated for use in the Soviet missile program, is nearing completion. Continuation of this study is planned at PWS for FY-60 in order to keep estimates current and to incorporate new information into the study. (~~SECRET~~)

Individual studies on boron, fluorine, ozone, and hydrogen research in the USSR as applied to high energy propellants are being conducted. Olin Mathieson Chemical Corporation completed its study of Soviet boron chemistry literature. The study uncovered continued Soviet work in this field, but it is not apparent that the work is in support of a high energy fuels program. A fluorine study and supplement were published during this report period. These demonstrated a Soviet interest in liquid fluorine as an oxidant but little evidence was found to indicate that they are as far advanced as the West in the attainment of a liquid fluorine engine. The ozone investigation is nearing completion and will soon be ready for publication as a preliminary report. There is no direct evidence of a Soviet liquid ozone propellant development program although many Russian publications indicate their interest and awareness of this material as a potential propellant. A contract was awarded to the Beech Aircraft Corporation to study the Soviet technological achievements in the field of hydrogen research, with particular interest on the use of hydrogen in an aircraft or rocket engine.

(~~SECRET~~)

The lack of information on solid propellant research within the Soviet Bloc required a study on the Soviet capability to develop solid propellants. Existing intelligence indicates no advancement beyond the double-base propellants and composite propellants using ammonium nitrate as an oxidant. This study will soon be completed by PWS. (~~SECRET~~)

~~SECRET~~

~~SECRET~~

In addition to these studies on the USSR and Satellite capabilities, analysis of the solid and liquid propellant programs in the UK and France were conducted. The UK report was completed for processing as a working paper. A compilation of the information from intelligence reports and scientific and technical literature is now being made on the French report. (~~SECRET~~)

SYNTHETIC LUBRICANTS:

Previous efforts have demonstrated the existence of a synthetic lubricant industry in the USSR. It is necessary, however, to determine the identification, composition and characteristics of the substances being produced as well as to identify improved lubricants and techniques to be used in more advanced weapons of the future. An attempt to obtain this information is being made with the assistance of an outside contractor. (~~SECRET~~)

~~SECRET~~

CHAPTER 9

ELECTRONICS

GUIDANCE AND NAVIGATION:

During the period of this historical report, ATIC received a 1958 version of the Soviet Neptune radar and started a complete exploitation of the equipment and spare parts. This is the first modern Soviet radar ever actually acquired by the West and available for detailed study. (~~SECRET~~)

This was a period of considerable activity in this area. Contractors completed three major study contracts, and ATIC published three basic studies and one technical report, and negotiated three new study contracts. (UNCLASSIFIED)

Specifically, external contracts with Bendix Aviation, Radio Division for a long range navigation study, Cook Research Laboratories for a short range navigation study, and Bendix Systems Division for the electronics aspects of Soviet missile guidance were completed in the early part of the year. These provided source material for three ATIC studies: "Soviet Offensive Missile Guidance Subsystems," "Soviet Defensive Missile Guidance Subsystems," and "Soviet Navigation Capabilities (Long and Short Range)." Consultants from Stanford Research Institute provided assistance in producing a technical report, "An Evaluation of the KRUG DF and TAI FUN DME Systems." (~~SECRET~~)

Contract negotiations were completed with Radiation, Inc. for a one year study of Soviet offensive missile guidance. Also awarded was a contract to Bendix Systems Division for a study of defensive missile guidance. In the navigation area one contract for a long and short range navigation study was awarded Stanford Research Institute. (UNCLASSIFIED)

~~SECRET~~

RADAR:

The Center published studies of Soviet ground and airborne radar, and issued revisions of two handbooks on Soviet and Satellite radar equipment and on electronic equipment radiation data, during the first half of 1959. Radiation Incorporated, under contract with ATIC, produced 14 reports in the area of radar echo. ATIC's in-house effort included seven major estimates and analyses; eight contributions to other agencies and contractors in the area of ground and airborne radar and Soviet frequency range; and other contributions to War Games (Hg USAF). (~~SECRET~~)

COMMUNICATIONS:

Early in January 1959, ATIC published three technical reports:

1. "Evaluation of the East German Decimeter Equipment RVG-904."
2. "Analysis of East German URG 951A VHF Communications Equipment."
3. "Analysis of a Soviet V-3 Multiplexing Equipment."

All these were based on evaluations of communications equipment, completed by the Farnsworth Electronics Company, a Division of IT&T. (UNCLASSIFIED)

During the first half of 1959, considerable effort was exerted on expediting ATIC technical reports and studies which were based on the following external assistance efforts:

1. The RCA basic study to determine Soviet Bloc communication-system capability and equipment specifications in support of air offensive and defensive operations, resulted in a comprehensive analysis of present Soviet air communications and an estimate of future trends in the Soviet communications field.

(~~SECRET~~)

2. The Stanford Research Institute's evaluation of Soviet capability in the field of scatter propagation as applied to air weapons development indicated new evidence of increasing interest in the field of forward scatter communications as

~~SECRET~~

well as in the use of back scatter techniques. In addition, the study implied that a close surveillance of new information should be continued, since evidence points toward Soviet application of scatter techniques in the near future.

~~(SECRET)~~

3. The Radiation Inc. study of Soviet capabilities in the field of telemetry revealed use by the Soviets of some interesting system-design trends in the field of telemetry. One of these trends is the apparent attempt by the Soviets to standardize on AM as a carrier with mostly PPM for information channels. Of considerable interest to this program are the Soviet satellites and their associated telemetry. ~~(SECRET)~~

4. The Cook Research study on Soviet communication modulation techniques is a significant contribution to ATIC's over-all appraisal of Soviet trends in communications. ~~(CONFIDENTIAL)~~

5. The Convair report on the Soviet capability in electronics for nuclear powered aircraft presented an NPA aircraft configuration that the Soviets are likely to use, which is a basis for their analysis of the electronics problem resulting from this nuclear environment. This report served as a basis for an ATIC collection guide. ~~(SECRET)~~

6. The Farnsworth report on the technical analysis of the East German DSE 8/1-K Decimeter communications system and TFC 1-4 carrier telephone multiplexing equipment presented an evaluation of the technical characteristics, manufacturing techniques and production cost of the aforementioned equipment. ~~(CONFIDENTIAL)~~

In addition to the above products which were based on inputs resulting from external assistance contracts, in-house effort resulted in the completion of the second revision of the Handbook of Soviet and Satellite Communications Equipment

~~CONFIDENTIAL~~

which lists the principal technical characteristics of Soviet and Satellite communications equipment believed to be currently in use or under development.

~~(CONFIDENTIAL)~~

ECM AND SUPPORT:

ATIC produced four basic studies in the fields of ECM, infrared, passive components, and electronic computers. An informal working paper on the electronics associated with Soviet earth satellites was presented at the IXth Canadian - UK - US Electronics Meeting at Ottawa Canada. One working paper on certain Soviet Electronic facilities was also produced, consolidating the TIPS information on these facilities. ~~(CONFIDENTIAL)~~

ATIC provided intelligence support to AMC's ECM Management Group at their regular bi-monthly meetings. The implied threat of another West Berlin blockade occasioned considerable effort in support of ARDC, RADC, WADC, AFCRC, and USAFE with respect to specific intelligence on Soviet ECM capabilities in the Berlin area. ~~(SECRET)~~

ELECTRONIC SYSTEMS:

In this reporting period, a contract covering the electronic configurations of known Soviet Bloc aircraft was completed and the final report issued as an ATIC Working Paper. An in-house study covering Soviet Bloc defensive electronics and a study of possible uses of Soviet KRUG Systems were completed; and an engineering evaluation of KRUG and KRUG/TAIFUN prepared. ATIC awarded a contract, for assistance in the Soviet Bloc defensive electronic area, continued contractual negotiations for assistance in the area of Soviet Bloc space electronic systems, and evaluated proposals for contractual assistance on a study of Soviet Bloc strategic electronic systems. ~~(SECRET)~~

~~SECRET~~

CHAPTER 10

ARMAMENT

BW - CW WEAPONS:

ATIC initiated a new study which will explore Soviet biological warfare development in the light of recent progress in microbial genetics. Within the past five years, tremendous strides have been made in both classic genetics and the applied aspects of bacterial mutations and transduction in micro-organisms. It appears "tailor-made" pathogenic micro-organisms are rapidly becoming a reality. It is of interest here to determine the effects of these developments on biological warfare weapon systems development. (~~SECRET~~)

An external assistance contract with the American Machine and Foundry Co. was utilized to study the Soviet Chemical and Biological Weapons suitable for delivery. The contractor began work on the project in February and has already completed a review of statistical methods in use to evaluate biological systems pertinent to weapons considerations. As a result of this survey, the contractor has indicated that new mathematical models and electronic computer methods may be applied to this study. It is anticipated that new parameters for estimating the effectiveness of biological and chemical weapons will evolve. The Army Chemical Corps has enthusiastically volunteered to assist the American Machine and Foundry Co. in the experimentation and development of new systems of analysis for these weapons. This task will include both Soviet aircraft and missile weapon systems delivering biological and chemical agents. (~~SECRET~~)

AIR-TO-AIR MISSILES:

Evaluation of Soviet capabilities in semi-active radar guided AAM continued at Bendix System Division. Basically, the study has an intelligence back-up of a system requirement. The resulting evaluation is a most probable missile design

~~SECRET~~

using indications of capability in design of semi-active homing systems. Launch trajectories, guidance accuracies, production capabilities, ground support analysis, and firing zone envelopes have been determined. (~~SECRET~~)

Aerojet General Avionics Division completed the evaluation of Soviet capabilities in infrared guided air-to-air missiles. The evaluation was made considering Soviet fighter optical sighting pursuit course capabilities and the compatible missile-system performance requirements. The high altitude environmental conditions were considered in this phase. (~~SECRET~~)

The Center negotiated with Sperry Gyroscope Co. for an extension of work to cover evaluation of intelligence on a canard configuration of the ShM beam-rider air-to-air missile. Missile configuration was established, the control system simulated, and the launch domain computed. (~~CONFIDENTIAL~~)

"Soviet Air-to-Air Guided Missile Capabilities" was approved for publication. This report contains the estimated performance, characteristics, and capabilities of the Soviets in the air-to-air missile field based on intelligence available up to May 1959. (~~CONFIDENTIAL~~)

AIRCRAFT ARMAMENT AND FIRE CONTROL SYSTEMS:

During this reporting period, three bomber studies were produced: "Defensive Fire Coverage Diagrams of Soviet Bomber and Turreted Transport Aircraft," "Defensive Armament System of BADGER," and "Defensive Armament System of BEAR." A detailed mathematical analysis of Soviet bomber defensive systems effectiveness was derived through theoretical duels between current USAF fighters and the BEAR, BISON and BADGER. This back-up information to the Soviet bomber defensive armament studies, because of its technical nature, was published as an ATIC Working Paper. (~~UNCLASSIFIED~~)

~~SECRET~~

~~SECRET~~

In the field of fighter aircraft, two studies were released: "Analysis of Soviet Tow Target" and "Soviet Interceptor Armament System." A third study, "Soviet Fighter Fire Control Systems Summary Estimates," was undertaken to combine into one book all the current estimates of the Soviet inventory of interceptors and to include the various modes of fighter tactics. (UNCLASSIFIED)

VULNERABILITY:

The vulnerability investigations of Soviet bomber aircraft continued during the reporting period. The study "Vulnerability of BADGER to Various US Air-to-Air Weapons" was distributed in January 1959. The supplemental contract for new work became active in the same month. The investigation of BACKFIN'S vulnerability is well underway. A program was also initiated to present the lethal envelopes of bomber aircraft to various nuclear weapon yields. (UNCLASSIFIED)

The contract with Ballistic Research Laboratory, Aberdeen Proving Ground, Md., was extended for continuation of the vulnerability firing program currently underway. (UNCLASSIFIED)

ATIC began negotiations for a preliminary study on US space vehicles' vulnerability as related to estimated Soviet space weapon lethality. This pilot study seeks to define the logical Soviet space weapons as related to target characteristics. (UNCLASSIFIED)

AIR ORDNANCE AND WARHEADS:

A study of Soviet munitions, warheads and fuzes for air-to-air and surface-to-air applications was conducted by Aerojet General Corporation. Warhead design parameters have been coded for an electronic computer method of obtaining a series of warhead design formulation tables. A similar approach has been taken toward preparation of weapon effectiveness tables against potential US target aircraft.

~~(SECRET)~~

~~CONFIDENTIAL~~

Ballistic Research Laboratory, Aberdeen Proving Ground, completed the determination of Soviet 23mm and 37mm ammunition exterior ballistic coefficients.

(~~CONFIDENTIAL~~)

Photographic information which showed that a modification had been made on the 37mm Soviet type N-37 automatic aircraft gun was analyzed. Under services of Armour Research Foundation, the modification was duplicated, a firing test program accomplished, and an ATIC report was published, "Evaluation of Modified Soviet N-37 Gun," covering the investigation. (~~CONFIDENTIAL~~)

ATIC secured contractual assistance from Johns Hopkins University in evolving a mathematical model for evaluating missile kill probabilities against US operational aircraft. As a part of the contract, kill probabilities for the Guidline Missile against the B-52 will be evaluated. The mathematical model derived under this contract will have application to other missiles and aircraft evaluations. (~~SECRET~~)

NUCLEAR WEAPONS:

An ATIC study of Soviet nuclear weapons for air delivery incorporated information provided by the contractor, and procurement action was initiated in March for contractual assistance in a comprehensive survey of intelligence on information covering sciences and technologies associated with the non-nuclear components of weapons. (UNCLASSIFIED)

AA CAPABILITIES:

The Center extended its contract which is concerned with characteristics, performance, and engagement capabilities of the Soviet towed and self-propelled versions of the 57mm AA weapon with its various alternative fire control directors and radars. This was necessary in order that experimental data derived from Army field tests could be incorporated in the overall investigation. The scope of the contract was increased to include an evaluation of the Soviet 100-mm AA gun complex. (~~CONFIDENTIAL~~)

~~SECRET~~

CHAPTER 11

MAINTENANCE AND EQUIPMENT

AIR WEAPONS EQUIPMENT:

Significant events during the first half of 1959 in the equipment area included the securing of several contracts with aircraft-equipment companies, the publication of two technical reports, extensive analysis of Soviet parachute-recovery systems for high altitude research vehicles, and extensive contributions to activities in the astronautics area. (~~CONFIDENTIAL~~)

ATIC continued its emphasis on the study of Soviet use of a solar-energy converter in a space vehicle,^{1/} and of equipment and installations for Soviet nuclear-powered aircraft. A working paper on the latter subject was completed during this period, and an Intelligence Collection Brief was initiated to back up the one previously published.^{2/} (~~CONFIDENTIAL~~)

The Center awarded a contract to Perkin-Elmer Company of Norwalk, Connecticut, for the examination and interpretation of information on Soviet optical reconnaissance systems;^{3/} and to Convair of San Diego for a study of Soviet aircraft maintenance and reliability.^{4/} Other contractual arrangements included extension of existing contracts with American Machine and Foundry Company to cover ICBM missiles and with Convair to go beyond the work in the human-factors area in which they are now engaged.^{5/} (~~CONFIDENTIAL~~)^{6/}

GUIDANCE AND NAVIGATION:

Among the contracts for external assistance, one involves a thorough analysis and re-examination of information for evidence of an intent or capability of the Soviets to effectively use self-contained inertial guidance for their ICBM. A contractor report resulting from this assistance was incorporated into an ATIC study, "Soviet Inertial Guidance." (~~SECRET~~)

~~CONFIDENTIAL~~

Another ATIC contract, with American Bosch Arma Corporation, involves Soviet capabilities and progress toward providing inertial and celestial navigation and stabilization of astronautic vehicles. ^{7/} (~~SECRET~~)

Assistance was secured from Bell Aircraft Corporation in the investigation of the Soviet position and future capabilities to use new and advanced types of inertial references. ^{8/} (~~CONFIDENTIAL~~)

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1. ATIC History, 1 July 1958 - 31 December 1958, p. 48
 2. Ibid.
 3. Ibid.
 4. ATIC History, 1 July 1958 - 31 December 1958, p. 47
 5. ATIC History, 1 July 1958 - 31 December 1958, p. 48
 6. ATIC History, 1 July 1958 - 31 December 1958, p. 47
 7. ATIC History, 1 July 1958 - 31 December 1958, p. 46
 8. ATIC History, 1 July 1958 - 31 December 1958, p. 47

~~SECRET~~

CHAPTER 12

INDUSTRIAL ENGINEERING AND MATERIALS

PRODUCIBILITY:

During the first six months of 1959, ATIC continued to emphasize the development of in-house capability in the area of industrial engineering; and the conduct of broad programs in the several key-product areas. (UNCLASSIFIED)

The Center completed manufacturing studies in aircraft producibility, specifically, studies on the BLOWLAMP and BACKFIN bombers and FACEPLATE and FISHBED (A and B) fighter aircraft; and made contributions to weapon-system studies of the FRESCO and FLASHLIGHT fighters, the BOUNDER bomber, and other space vehicles. By 30 June 1959, the producibility study of a family of supersonic bombers, based upon Boeing reports, was in the final stage of preparation.

~~(SECRET)~~

ATIC initiated two new contracts to support the establishment of a broader base of knowledge from which to develop estimates of propulsion and air/space weapon systems. In this category were included open- and closed-cycle turbojet types of nuclear powerplants for aircraft and liquid rocket powerplants for guided missiles. Contractual support was obtained for a future estimate of Soviet capability in the field of advanced aircraft gas-turbine engines; turbojets, turboprops, and turboprops. Based upon recent reports of Soviet manufacturing technology as applied to ballistic-missile powerplants, a significant contribution was made to the ATIC semi-annual appraisal of Soviet offensive guided missile capabilities. ~~(SECRET)~~

As in other weapon-component areas, a broader base of knowledge was established in the field of guided missiles airframe producibility. In March, a contract was awarded to Bell Aircraft to study factors affecting Soviet production

~~SECRET~~

of air-to-surface guided missiles. ATIC completed a production study of Soviet ICBM's, based upon contractual work by the Martin Company; and Minneapolis-Honeywell concluded an evaluation of Soviet inertial guidance manufacturing capability. The Bell Aircraft study is scheduled for completion in time to provide inputs to an over-all ATIC estimate of Soviet air-to-surface guided missile weapon systems. (~~CONFIDENTIAL~~)

Primary emphasis in the fields of basic and precision-industry manufacturing technology was given to the completion of a study of welding technology in the Soviet bloc nations, and to the establishment of a contract to assess Soviet capability in the basic metal-working processes as related to air-weapon production. Already, intelligence analyses have disclosed basic processes (super-high pressure, electrical discharge forming, and electro-slag welding) in which the Soviets have pioneered and enjoy a substantial lead. Monitorship of Soviet electron-tube production technology was brought to a close with the contractor's final report in June. (~~SECRET~~)

Preparatory to the initiation of a full-fledged manufacturing analysis of Soviet air-weapon electronic equipment, a three-month surveillance program was conducted to determine how the Center could best expend effort in this critical area of air-weapon production. (~~SECRET~~)

ATIC re-established the Soviet management and control program with emphasis on the decision-making process as it affects the availability of air/space weapons. This study has become increasingly significant to the intelligence community since it is apparent that fewer numbers of more complex weapons will comprise the threat to the United States. (~~CONFIDENTIAL~~)

Another undertaking during this period was a broad appraisal of the industrial capability of Communist China. (~~CONFIDENTIAL~~)

~~SECRET~~

~~SECRET~~

AIR-WEAPON MATERIALS:

Major ATIC studies in the materials area during this period covered Soviet research on surface-active media, and the status of the USSR and Satellites in radiation-resistant polymeric materials as related to air weapons. The Center prepared technical reports on the status of melting technology in the USSR, activities of the All-Union Institute for aviation materials, and Soviet aircraft-engine turbine blades; and in addition, working papers on the status of nuclear metallurgy and aircraft materials in the USSR. (~~SECRET~~)

Major briefings dealt with the subjects of Soviet structural materials development and implications and Soviet state-of-the-art in materials. (~~SECRET~~)

In connection with the SOV/STEP Program, a polymers panel of the world's leading polymer scientists was established to serve ATIC. Establishment of a panel on metals will be contingent upon the results obtained from the polymers panel. (~~CONFIDENTIAL~~)

Aid was extended to ATIC to implement collection and evaluation of Soviet data on Cesium and Rubidium, with evaluations to be furnished by Oakridge National Laboratories at no cost to ATIC. (~~SECRET~~)

The Center continued work on reports and studies covering specific research efforts of the Soviets in air-weapon materials. Examples include research in martensite transformation, intermetallic compounds, creep of metals, and powder metallurgy; and research and technology in polymers. Soviet materials included conventional and nuclear propulsion materials, ICBM materials; and aircraft materials such as low-alloy and stainless steels, and polymers, for supersonic and hypersonic airframes. (~~SECRET~~)

~~CONFIDENTIAL~~

CHAPTER 13

AIR SCIENCES

GENERAL:

In consideration of the future role of Air Sciences in the ATIC mission, the first half of 1959 was devoted to implementation of the reorganizational policies and modified objectives formulated during the last half of 1958.^{1/} Work continued on streamlining operations and programs to accelerate production schedules.

(UNCLASSIFIED)

Consistent with the increased air-science requirements, both from within the USAF and from outside agencies, ATIC conducted a program with renewed emphasis on working relationships between project managers and agencies which have mutual interests or related programs, to curtail duplication of effort. (UNCLASSIFIED)

ATIC and CIA/OSI representatives met in Washington in May to finalize the phasing out of the ATIC seismology program.^{2/} By agreement, ATIC will continue to make seismology a matter of interest and will obtain the answers to specific questions in this area from CIA. (~~CONFIDENTIAL~~)

In June, a proposal was under consideration for making the 1006th AISS primarily responsible for UFO investigation in order to improve the Air Force's "reaction capability" in this area and the over-all UFO program. (UNCLASSIFIED)

The monthly presentations of "Science Lectures" on subjects of prime interest to ATIC staffs and analysts continued.^{3/} The presentations during this period were:

1. "Magnetohydrodynamics and Applications," by Mr. B. L. Griffing of the Air Technical Intelligence Center.
2. "Machine Handling of Satellite Data," by Dr. Paul Herget, University of Cincinnati.

~~CONFIDENTIAL~~

3. "From Gas Dynamics to Cosmic Physics," by Dr. P. J. Theodorides, University of Maryland.

4. "Impact of the UFO Program on Scientific Research," by Dr. J. Allen Hynek, Smithsonian Astrophysical Observatory.

5. "Physics of the Upper Atmosphere," by Dr. Joseph W. Chamberlain, University of Chicago.

(UNCLASSIFIED)

GENERAL SCIENCES:

Princeton Laboratories of the Radio Corporation of America completed the ATIC contract in the area of solid-state physics. Dr. Jenny and his group outlined methods and approaches for the use of foreign research literature on the performance of this contract. (UNCLASSIFIED)

ATIC representatives attended two major conferences on wave-propagation during this period. Scientific and technical problems relating to communication from and through the Arctic regions were discussed at a classified conference held in March by the Central Radio Corporation Laboratory, National Bureau of Standards, Boulder, Colorado. At a meeting of the Union Radio Scientifique International held in Washington, a highlight was the discussion of electron density as a function of altitude far out into space. This was of value to ATIC in the evaluation of Soviet efforts and capabilities in these areas, particularly density measurements from space satellites of the USSR. (UNCLASSIFIED)

The Center held a symposium on upper-air research and wave propagation in June for indoctrination of conferees on some of its priority requirements, particularly those pertaining to Electronics, Air Weapon Systems, ELINT and Acquisition. (~~CONFIDENTIAL~~)

ATIC requested the Air Intelligence Division of the Library of Congress (AID) to assist in preparing a study on "Plasma Physics" similar to the work prepared

~~CONFIDENTIAL~~

a study on "Plasma Physics" similar to the work prepared by them on "Soviet Efforts in Ball Lightning."^{4/} The AID provided a bibliography on Plasma Physics, and PWS consultants have furnished assistance in obtaining research data and other information. (~~CONFIDENTIAL~~)

Other products of the General Sciences Group included a working paper, "Survey of Soviet Acoustics."^{5/} This paper covered the extent of Soviet application of acoustic science to air warfare systems; and a compilation of science research efforts in Red China, including a survey of significant scientific research institutes, programs and personnel. (~~CONFIDENTIAL~~)

GEOPHYSICAL SCIENCES:

During this period, ATIC promoted a number of programs and projects in those geophysical-science areas having potential application to breakthroughs, weapons systems and space technologies. Among some of the most significant products were two extensive works, "Soviet Competence in Airglow and Auroral Research," which analyzed the capabilities of Soviet and European Satellites in these areas of science; and "A Review of Soviet Airglow and Auroral Literature," which was prepared in unclassified form and submitted to the Department of Commerce for wide distribution throughout the United States. (~~CONFIDENTIAL~~)

Other accomplishments by the Geophysical Sciences Group included the estimate of the Soviet "Venus Probe," which provided an analysis of the instrumentation-payload; and a study, "Soviet Meteorological and Geophysical Aerial Reconnaissance Capability." (~~CONFIDENTIAL~~)

Two papers of significance were a study, "Geophysical Measurements with Sputniks," prepared by Dr. Penndorf of AVCO Corporation; and a working paper, "The Status of Cartography in the USSR," prepared by Dr. Millstein of AID.

~~(CONFIDENTIAL)~~

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Other subjects for studies in this area of interest were "Soviet State of the Art in Geomagnetism," "Soviet Research in Earth Currents," "Soviet Knowledge of Van Allen Radiation Belts," and "Soviet Work on Electronic Optical Converters."

~~(CONFIDENTIAL)~~

Special projects continued with external assistance by AVCO Corporation and Battelle Memorial Institute (PWS) in ionospherics and cloud physics, Soviet geodesy and gravimetry, and Soviet Bloc competency in atmospheric sciences.

~~(CONFIDENTIAL)~~

ATIC representatives attended the Interagency Meteorological Conference in May to hear discussions of the US state-of-the-art in silent-area forecasting; and the SAB Nuclear Panel Meeting at the University of California Radiation Laboratories for discussions on various kill techniques, including blast, thermal, neutron flux, and X-ray radiation. ~~(CONFIDENTIAL)~~

MATHEMATICAL SCIENCES:

As part of a program to keep the intelligence community informed of the great strides being made by the USSR in the field of higher mathematics, astronomy and fluid mechanics as they apply to air weapon systems and space operations, ATIC gave specific emphasis during this period to the applications of radio astronomy, magnetohydrodynamics, and cosmic gas dynamics as the Soviets were giving inordinate attention to these areas. ~~(CONFIDENTIAL)~~

The Mathematical Sciences Group published three studies: "Soviet Capabilities in Nonlinear Mechanics and Applications," "A Review of Soviet Celestial Mechanics Literature," and "Soviet Research in Celestial Mechanics as Applied to Guided Missiles and Air Operations." Three others were prepared for publication: "Soviet Meteor Research as Applied to Guided Missiles and Air Operations," "Soviet Research on Information Theory and Applications," and "Soviet Research in Cosmic Gas Dynamics."

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

An ATIC contractor completed an evaluation of the outstanding book on fluid mechanics by the Soviet scientist L. I. Sedov. A new contract was placed for a survey of Soviet mathematical work in the fields of servomechanisms and computing devices. (~~CONFIDENTIAL~~)

ATIC representatives participated in a number of conferences and meetings. At the April meeting of the American Astronomical Society in Rochester, New York, the ATIC representative presented a paper on "The Solution of the General Equation and Some Extensions." The Monge equation is a particular type of a nonlinear differential equation -- an area in which the Soviets are giving enormous attention because of its wide military applications. (~~CONFIDENTIAL~~)

AERIAL PHENOMENA:

During this period the Aerial Phenomena Group engaged in an effort to improve the reporting and investigation of UFO cases. The group also made plans to bring project "Blue Book," Special Report #14, up-to-date. A UFO Advisory Panel was set up to improve methods of analysis and operation. The panel consists of members qualified in astronomy and mathematics, psychology, religion, physics, and public relations; and who represent ARDC, WADC, and W-PAFB.

Four case histories and a summary of statistics for the period from 1 January 1955 to 31 December 1958 were provided for use by Mr. Ruppelt in bringing up-to-date his book, "The Report on Unidentified Flying Objects." (UNCLASSIFIED)

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1. ATIC History, 1 Jul 58 - 31 Dec 58, p. 52
 2. Ibid.
 3. Ibid.
 4. TIS-SC-58-3
 5. TWP-SC-58-1

~~CONFIDENTIAL~~

UNCLASSIFIED

GLOSSARY

AFDRQ	Air Force Director of Requirements
AFMDC AF BMD	^{Ballistic Division} Air Force Missile Development Center
AFMTC	Air Force Missile Test Center
ANP	
AFSSO	Air Force Special Security Office
✓ AID	Air Intelligence Division, Library of Congress
AISS	Air Intelligence Service Squadron
✓ ARDC	Air Research and Development Command
✓ ATC	Air Training Command
✓ CIA	^{AUC} Central Intelligence Agency
COCOM	Coordinating Committee of the Atlantic Alliance
✓ DAI	^{Directorate of Air Intelligence (Canada)}
CRC	Cambridge Research Center
✓ DAFI	^{Department of the Air Force (Australia)}
✓ DDI/Tech	Deputy Director of Intelligence/Technical (Great Britain)
DRC	Defector Reception Center
ECM	Electronic Countermeasures
EIPC	European Intermediate Processing Center
ESSPO	Electronic Sub-System Project Office
✓ FWAIS	^{Free World Air Intelligence Study}
✓ FY	Fiscal Year
GEELIA	General Electronic Engineering Installation Agency
IPIR	Immediate Photographic Interpretation Reports
IT&T	International Telephone and Telegraph Company
LOROP	Long Range Oblique Photography
MCP	^{Military Construction Program}
MRPIR	Mission Review Photographic Interpretation Reports
NASA	
NBS	National Bureau of Standards
✓ NSA	^{PACAF} National Security Agency
✓ PENS	Processing Equipment Notes
✓ PRI	^{Air Forces, Pacific} Priority Request for Information
✓ PWS	Project White Stork, Battelle Memorial Institute
✓ RAP	^{Royal Air Force}
✓ QRC	Quick Reaction Capability
✓ RAAF	^{Royal Australian Air Force}

UNCLASSIFIED

✓ RADC	Rome Air Development Center
ROAMA	Rome Air Materiel Area
✓ SAB	Scientific Advisory Board (AF)
✓ SAC	<i>Strategic Air Command</i>
✓ SAG	Scientific Advisory Group (ATIC)
✓ SR	<i>System Requirement</i>
SRDE	Scientific Research and Development Establishment
✓ SRI	<i>Specific Request for Information</i>
✓ STEP	Scientific and Technical Exploitation Program
✓ TIPS	Technical Intelligence Processing System
URSI	Union Radio Scientifique Internationale
✓ USAFE	United States Air Force, Europe
USAFSS	United States Air Force Security Service
✓ UFO	<i>Unidentified Flying Object</i>
USIB	United States Intelligence Board
✓ VHF	<i>Very High Frequency</i>
✓ WADC	Wright Air Development Center
WADD	<i>Division</i>

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