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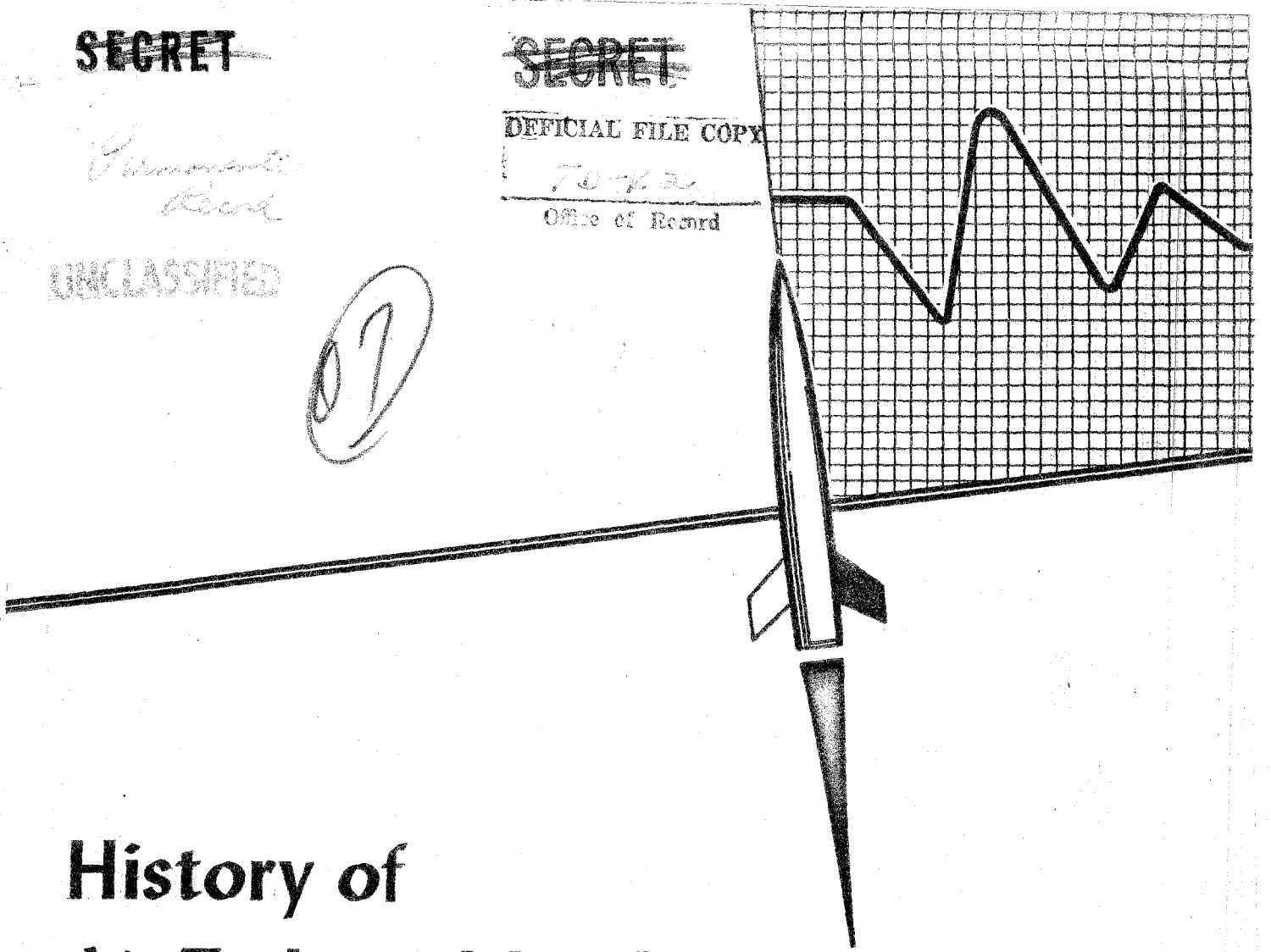

# History of Air Technical Intelligence Center

(AFOIN-4)

## WRIGHT PATTERSON AIR FORCE BASE, OHIO

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1 JULY 1956 - 31 DECEMBER 1956

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# HISTORY OF

# AIR TECHNICAL INTELLIGENCE CENTER

# (AFOIN-4)

# Wright-Patterson Air Force Base

# Ohio

1 July 1956 - 31 December 1956

Prepared by

Air Intelligence Office

AIR TECHNICAL INTELLIGENCE CENTER

31 January 1957

Copy No. _____
T57-2390

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FOREWORD

TO THE HISTORY OF

THE AIR TECHNICAL INTELLIGENCE CENTER
(AFOIN-4)

For the Period

1 July 1956 - 31 December 1956

This edition of the History of the Air Technical Intelligence Center reflects an emphasis on program development and production management.

Management personnel at all levels exerted efforts to improve approaches to the production of air technical intelligence. The most promising approach proved to be the use of contractual assistance wherever practicable. ATIC specialists concerned themselves more and more with developing a nucleus of external resources available through research institutes, scientific consultants, and the aircraft industry to assist in covering those facets of scientific and technical studies which were beyond the capability of personnel assigned to ATIC. The scope of contractual assistance included research of documents and data demanding a large number of sub-professional manhours, study of specific problems requiring extensive study-in-depth by professional staff personnel, and comprehensive studies utilizing limited consultative services of scientific personnel.

Programmed activities of the Center are presented in separate chapters. Production activities reflect the degree to which requirements for intelligence implicit to the mission of ATIC were met. Footnotes, if any, are listed at the end of each chapter.

# SECTION I

## ATIC ORGANIZATION AND MANAGEMENT

# CHAPTER 1

## COMMAND ACTIVITIES

SIGNIFICANT TRIPS: At the close of the last report period, the Commander was in Germany for the purpose of debriefing General Twining and his group upon their return from a visit to the USSR.[1] During September 1956, the Commander visited military organizations in London, Wiesbaden, Athens, Izmir, Istanbul, and Ankara; and attended the Flying Display and Exhibit of the Society of British Aircraft Constructors at Farnborough, England.[2] In London General Watson conferred with the RAF counterpart of the USAF Director of Intelligence, the RAF Director of Scientific Intelligence, the Director of the Joint Intelligence Bureau, the US Air Attache, the Chief of the USAF Liaison Team, and the Chief of the ATIL Office there. In Wiesbaden General Watson discussed the requirements, operational procedures, and personnel matters of concern to the intelligence effort with the DCS/Intelligence, USAFE; and he discussed ATIL problems, ATIC programs, and ATIL contributions to these programs with ATIL officers from offices in Wiesbaden, Berlin, and Munich. Other conferences were held with US Air Attaches in Bonn, Athens, and Ankara, ATILO's at Air Force installations in Turkey, and the Air Force Member of the Joint Military Mission for Aid to Turkey. In Paris, General Watson conferred with the ACS/Intelligence, SHAPE. [redacted]

SIGNIFICANT BRIEFINGS:

Briefings on ATIC mission, programs, operations, products, and organization were given to visitors including the Special Assistant for Intelligence to the Secretary of the Air Force, the DCS/Operations,

USAF; the SAC Director of Intelligence and staff, the Deputy Director of Intelligence for Estimates, USAF; the Director of Scientific Intelligence in the Ministry of Defense (JIB) and the Director of Intelligence, RAF, London, England; the Commander and staff of CONAD, and representatives of the USAFSS, and newly assigned AFOIN officers. (UNCLASSIFIED)

Special briefings on the role of ELINT and on guided missile activities of ATIC were given before the World-Wide ELINT Conference and the National Security Agency respectively in Washington. (CONFIDENTIAL)

ATIC participated in numerous formal and informal conferences and discussions on common interest areas, related intelligence efforts, intelligence requirements, and mutual problems with groups representing CIA, CONAD, SAC, ARDC, TAC, AMC, NACA personnel, and industry. ([redacted])

EXTERNAL RELATIONSHIPS:

ATIC representation on ad hoc working groups of the Intelligence Advisory Committee (IAC) was arranged by the Scientific Estimates Committee (SEC) and ATIC. This arrangement concerns an exchange program involving US and USSR scientists in the fields of computers, theoretical physics, high-energy fuels, and cermets. ([redacted])

ATIC made other arrangements with the SEC, the National Board of Estimates (NBE), and the Joint Intelligence Group (JIG) for attendance by writers of ATIC or other D/I elements at meetings of these organizations to assure that the significance of the items which they have contributed is not weakened or omitted from consolidated estimates. The purpose was to improve utilization by these organizations of D/I contributions to these National or DOD estimates. ([redacted])

ATIC made arrangements for presentation of the 1958 ATIC program to the assembled SAB membership during their spring meeting. This is the first presentation of an ATIC program to the SAB and fulfills the basic plan of SAB/SAG relationship which prescribes the exchange of intelligence information on a need-to-know basis for scientific counsel from the highest AF level and on the broadest scale. (CONFIDENTIAL)

The Scientific Advisory Group (SAG) broadened its scope within the last six months by realignment of its membership into an advisory group, a specialist group, and some panel groups which are either permanent or ad hoc in character. The Chairman of the SAG assigned responsibility for identifying and outlining special problems to the advisory group; the study, recommendations or solution of these problems to the specialist group; and responsibility for implementation of required procedures for problem solution to appropriate panel groups. (CONFIDENTIAL)

The SAG undertook the compilation of a roster of capabilities in the scientific, engineering, and technology fields related to the ATIC mission. From this roster, authorities competent to represent the Center at scientific meetings can be identified. SAG made plans to monitor and justify ATIC personnel attendance at symposia and learned society meetings and other gatherings at home or abroad, and continued to monitor the attendance of SAG members at Scientific Advisory Board (SAB) panel or committee meetings such as Defense Against Ballistic Missile (DABM) Nuclear Weapons, etc. (CONFIDENTIAL)

The Scientific Advisory Group of ATIC continued to be concerned with special projects involving the acquisition of reports from oversea sources. (CONFIDENTIAL)

1. Ltr Order #01147, 1125th USAF F/A Gp, 22 Jun 56 (AFOIN-4X2a)

2. Ltr Order #01589, 1125th USAF F/A Gp, 24 Aug as amended by #011609, 1125th USAF F/A Gp, 29 Aug 56 (AFOIN-4X2a)

# CHAPTER 2

## MANAGEMENT AND CONTROL

### PLANS AND PROGRAMS:

During November 1956, ATIC completed a Preparedness Plan for Limited War. The purpose was to prescribe actions necessary to fulfill the responsibilities of the Air Technical Intelligence Center under conditions of a localized war involving the United States. The plan included sections on general guidance, assumptions, tasks, and command. Tasks included plans, policy, programs, operational responsiveness, air intelligence support; ATI production support to operating commands and world-wide collection support, ATIC exploitation of foreign materiel, and ATIC resources. [redacted]

[redacted]

ATIC developed a center-wide Program-Project-Task structure, and made plans to use the structure as the foundation for ATIC's programming. The Center's effort will be prepared in thirteen areas. (UNCLASSIFIED)

Project White Stork (Battelle Memorial Institute) continued operations under the Fy-57 contract as scheduled. The utilization of the Technical Intelligence Processing System (TIPS) by ATIC contractors and consultants increased tremendously. It overtaxed the capability of the project to provide efficient service at all times. Steps were taken to obtain more space and personnel so that adequate service could be provided. An associated problem concerned the reproduction and release of large volumes of classified data from Project White Stork to contractors.

[redacted]

Late in 1956, ATIC requested a proposal from Battelle Memorial

Institute for a foreign air information center. The proposal outlined a program for the systematic and rapid exploitation of Soviet scientific and technical literature of air technical intelligence interest. This program, designated United States Foreign Information Center (USFIC), envisioned the use of White Stork as the focal point of an all-encompassing system for screening, abstracting, evaluating, and disseminating all available Soviet scientific and technical literature. The program, as presented, included abstraction and identification of material potentially worthy of exploitation, determining the degree of exploitation required, and monitoring the exploitation program. Battelle proposed the Air Information Division of the Library of Congress (AID/LC) as a logical agency to accomplish the critical identification and abstraction portion of the program, and the scientific and technical resources of ATIC to accomplish the evaluation phase. The management aspects, time factors involved, and alternatives available to ATIC for implementation of the program were under study at the close of this report period. (CONFIDENTIAL)

PROBLEM AREA:

Arrangements for external assistance which was intended to supplement the in-house manpower capability resolved some problems, yet created others. ATIC specialists spent considerable time during this period in pre-contract discussions with budget review and procurement personnel, in monitoring the work by contractors, and in reviewing products which in many instances required integration of new intelligence data. Providing contractors with all the documents necessary for their study of basic science and technology areas placed additional demands upon ATIC manpower. The location and transmission of a large volume of

material to each of the various ATIC contractors created a backlog of work within ATIC. (CONFIDENTIAL)

An example of the problem arose during this report period when several contracts were let to determine Soviet capability to develop turbojet, ramjet, and rocket propulsion systems. These contracts called for the contractors to analyze and evaluate available literature and intelligence reports in all related development areas. It was apparent they would have to spend an appreciable amount of time searching ATIC TIPS files at White Stork to identify applicable reports. Where necessary, the contractors ordered literature and reports. To reduce the amount of time away from their facilities, contractors screened the TIPS files and requested copies of all the extract cards. One contractor has requested some 5,700 individual extract cards and some 500 intelligence reports; it is anticipated that he will request some 100 books, monographs, and articles. (CONFIDENTIAL)

FINANCIAL AND CONTRACT MANAGEMENT:

ATIC developed and first published during this report period a valuable tool for internal management and use in budget justification. The "Dollar for Dollar" Quarterly Report represented the first attempt of ATIC to correlate the Project Initiation Form (PIF) or plan and the actual expenditures against any given project as work progresses. Costs were developed for planning purposes only. Estimated costs, although not all-inclusive, covered military and civilian labor costed at accepted rates; and travel, external assistance, material, supplies, equipment, and rentals costed as obligated. The information is useful for internal management and in support of individual requests for external assistance.

The report included data on the current status of each ATIC purchase request and of each active contract. (CONFIDENTIAL)

Funds in one additional project were received to provide ATIC with various equipments required in performance of its mission. (CONFIDENTIAL)

MANPOWER MANAGEMENT:

The total requested manpower increase covering requirements through FY 1958 received favorable consideration at Hq USAF level during this period.[1] The 38 civilian spaces which were authorized represented 30% of ATIC's 1956 programmed requirements, or 9.5% of the total requirements programmed through 1958. ATIC integrated ten additional civilian authorizations available through exchanges and conversion of airman spaces. Of necessity, a considerable amount of distribution and redistribution of spaces took place within ATIC. Requirements imposed by current priority workloads and talent available controlled ATIC's utilization of manpower. Every effort was made to maintain the proper perspective between current and long-range manpower needs. (UNCLASSIFIED)

PERSONNEL MANAGEMENT:

Development of the Civilian Personnel Office received major effort during this period.[2] Staffing was not completed until the latter part of the calendar year and some of the desired civilian personnel programs were not fully implemented and streamlined. The recruitment and career-development programs received priority effort. Key positions throughout ATIC were staffed with talent obtained from industry and elsewhere in the Government service. The Colonel authorizations granted to ATIC were staffed to the extent that AF resources permitted; three of the ten colonel spaces remained vacant at the close of this report period.[3] (UNCLASSIFIED)

Three changes were made in personnel assigned to key positions within ATIC during the last half of 1956.[4] Lt Colonel William V. McGarity replaced Major Alec H. Lester as Chief, Personnel and Management Office.[5] Colonel Cledous M. Mangum was assigned as Deputy for ELINT, replacing Lt Colonel Ralph S. Jordan, who was assigned to the ATILO in Germany.[6] Colonel Huntington K. Gilbert replaced Colonel Gordon C. Hoffman as Deputy for Science and Components.[7] Colonel Paul E. Villars was assigned as Deputy for Air Weapon Systems.[8] He replaced Colonel William C. Farrior who had been Acting Deputy.

ORGANIZATIONAL MANAGEMENT:

No major changes in organization of ATIC were made during this period. One division and two branch designations were changed upon integration of the division's function related to documents processing with documentation programs, and functional realignment within the Documentation Division as a result of the recommendations of the Documentation Committee in April 1956. (UNCLASSIFIED)

The Documentation Division required new and different operational procedures to implement committee recommendations. The Documents Branch assumed responsibilities for processing documents for technical review, preserving pertinent intelligence content for future retrieval, and providing administrative guidance and support to the ATIC Reading Panel. The Foreign Documents Branch continued to exploit foreign-language documents and provide translation and interpreter services to AF and DOD agencies as requested. Functions of the Library Branch were expanded to include reference, order, research, and other library-type services. (UNCLASSIFIED)

Although the Reading Panel has not radically altered basic document processing functions, mandatory functional realignment necessitated the need for additional personnel. As an interim measure, a complement of eight civilians and four airmen were detailed from other components. Inadequate personnel authorizations prevented establishment of a reference-research service and the separate cataloging of domestic documents as originally recommended by the committee. (UNCLASSIFIED)

ADMINISTRATIVE SERVICES:

The ATIC Communications Network for the transmission and receipt of classified messages expanded to include additional organizations. Hq ARDC, RADC, and Eglin AFB became operational in September 1956. Negotiations were under way at the close of 1956 for additional on-line cryptographic operations between ATIC and Detachment #2, Western Office, Pasadena, and other intelligence organizations in Washington, D. C. (UNCLASSIFIED)

New TOP SECRET control procedures were initiated in July 1956. Centralized control was maintained by the Adjutant, and staff TOP SECRET Control Officers named for ATIC directorates and staff offices. (UNCLASSIFIED)

Dissemination functions of the Adjutant expanded to include direct distribution of ATIC reports and studies to the RAF, RCAF, RAAF, and the international elements of SHAPE and SACLANT. (UNCLASSIFIED)

Messenger service was extended to two more locations during the latter part of 1956; and arrangements were made for performance of this service for all of ATIC by January 1957. The assignment of a security vehicle to the Center was requested for use in providing this service

to the various buildings within two separate areas of Wright-Patterson AFB. (UNCLASSIFIED)

RECORDS MANAGEMENT: Records management activities were extended to include 39 offices of record and suboffices of record, including the ATIC Western Office. (UNCLASSIFIED)

AIR INTELLIGENCE SERVICES:

The critical situation created by seizure of the Suez Canal in August 1956 gave rise to a request by AMC for a daily briefing by ATIC for the Commander, Hq AMC, and his staff. Daily briefings continued for several weeks, then reverted to a weekly schedule. (UNCLASSIFIED)

As a result of the critical situation in Europe, AMC made a formal request for distribution of a daily intelligence summary by ATIC to AMA's and AFD's in the Zone of Interior. The requested summary of intelligence on the world situation continued to be sent daily for the remainder of this report period to the designated field activities and to each Hq Staff Director of AMC. (UNCLASSIFIED)

Briefings prepared for the AMC Council were placed on a regular schedule for delivery before the staff of ATIC; and intelligence daily summaries were put on regular distribution to ATIC directors. (UNCLASSIFIED)

SECURITY CONTROL: ATIC placed primary emphasis on the re-evaluation of existing security controls and requirements for future action during this period. Two security surveys were made; one of ATIC external security requirements by the Hq USAF Air Provost Marshal Staff, and a technical survey for subversively concealed listening devices by an OSI team of experts. (UNCLASSIFIED)

1. ATIC History, 1 Jan 56 to 30 Jun 56, page 47
2. ATIC History, 1 Jan 56 to 30 Jun 56, page 48
3. Ibid.
4. ATIC History, 1 Jan 56 to 30 Jun 56, page 5
5. 1125th USAF FAG (HEDCOM USAF), GO #16, 16 July 1956
6. PERAM No. 29, 22 August 1956, paragraph 1
7. 1125th USAF FAG (HEDCOM USAF), GO #15, 10 July 1956
8. 1125th USAF FAG (HEDCOM USAF), GO #19, 28 Aug 56

SECTION II

ATIC ACTIVITIES

# CHAPTER 3

## COLLECTION PLANNING

### HUMAN RESOURCES:

ATIC participated in the human resources program which has as its objective keeping informed on the status of foreign scientific and technical achievements through a Delegation Exchange Program. Under this program, contracts are arranged on an exchange basis with persons who have performed researches in the physical sciences, technology, military science and related fields. (CONFIDENTIAL)

An ATIC representative served on a USAF Ad Hoc Committee which made recommendations to the IAC that the United States enter into an agreement with the USSR for exchange of individuals and delegations possessing specialized knowledge in these research areas. The IAC accepted the recommendations, concluded an exchange agreement through the State Department, and subsequently set up a Standing Committee for delegation exchanges on which the D/I, USAF has regular membership. (CONFIDENTIAL)

The Air Technical Intelligence Center set up a special project for the exploitation of intelligence opportunities through the United States National Committee (USNC), established by the National Academy of Sciences in connection with the International Geophysical Year (IGY). This provided continuous liaison between ATIC and the USNC. This project was established in recognition of the relationship between the disciplines and areas of activity involved in the IGY and fields of investigation at ATIC, notably communications and meteorology. (CONFIDENTIAL)

ATIC formulated requirements for scientist exchanges with the USSR during the official IGY. A proposal exists between the US and the USSR

to fly jointly a northern route from Nome, Alaska, to Murmansk, USSR, for arctic observations. A US meteorologist and a Soviet meteorologist are appointed members of the USSR and US Antarctic observation groups respectively. (CONFIDENTIAL)

TECHNICAL RESOURCES:

During this report period, the technical resources activities supported ATIC's acquisition program by devising hardware to meet specific needs. (SECRET)

In the area of acoustics, work continued in the development of technology whereby aircraft and guided missiles (rocket) propulsion-unit characteristics are identified by fine line analysis of sound recordings. Additional elements of information extended the scope of activity and significant intelligence resulted from operational reporting of Soviet aircraft. (SECRET)

ATIC obtained a significant body of data pertinent to monitoring the 100-160-KCS radio frequencies spectrum applicable to long-range navigation; and, upon completion of an expendable prototype for receiving the 10-500-KCS spectrum, took steps to procure production models. (SECRET)

Other equipments which ATIC obtained to use in fulfilling world-wide acquisition requirements included sub-miniature voice and data recorders and specialized photographic equipment -- long-focal-length lenses and stereo-photogrammetric and ranging equipment. (SECRET)

ATIC used lead sulphide infrared detectors for detecting, tracking, and recording radiation from heat generating sources such as conventional propulsion devices and airborne nuclear power plants. Work was performed

on fabrication of devices for detection of infrared radiation with scanning cameras and ranging equipment to obtain information on aircraft. (SECRET)

An Acquisition Control Room provided an information center for technical personnel working on specific projects within the acquisition areas. This facility provided guidance to personnel through situation maps designed for visual presentation of human and technical resources and collection operations, and by means of charts of projects under the acquisition program, budgetary allocations, and project status. (SECRET)

# CHAPTER 4

## COLLECTION OPERATIONS

REQUIREMENTS:

Requirements activity continued at a rapid pace with the initiation of 174 Specific Requests for Information (SRI's) during the last half of 1956. These primarily concerned exploitation of foreign fairs, expositions and meetings for the collection of air technical intelligence information, and IGY interest areas. ATIC received many significant items as a result of SRI's; notably, the Soviet motion picture, "Wings of the Motherland," which provided detailed close-up views of Soviet aircraft heretofore unobtainable; and technical orders on the CRATE aircraft. (SECRET)

Other requirements of importance concerned Soviet Tactical Guided Missiles, Aircraft Landing Gear, Material Sample Collection, Communications Data, Surface-to-Air Guided Missile Launching Installations around Moscow, and BEAR aircraft. (SECRET)

EXPLOITATION:

In addition to SRI's served on overseas collection agencies, ATIC placed requirements on domestic sources. Personal debriefings by ATIC specialists increased collection through this medium and resulted in very valuable intelligence information. (SECRET)

The Returnee Exploitation Group (REG) acquired seven new sources during this reporting period. The interrogation of two of these served specific ATIC requirements. ATI specialists in electronics and guided missiles provided technical assistance in their interrogation. (SECRET)

During the last six months of 1956, ATIC accelerated preparations for exploitation of the IGY as its operations expanded. (SECRET)

ACQUISITION:

Data acquired by photographic coverage of Soviet Air Shows made possible the production of intelligence of primary significance to the Aircraft Markings Program. Significant improvements in operational capability included increased film size, increased speed in taking exposures, and the addition of three systems which were programmed for procurement early in 1957. Through use of specialized equipment, exposures were made of aircraft from which infrared radiation information was obtained. (SECRET)

Operation of the project for acquisition of foreign aeronautical and related equipment continued. The scope was restricted to foreign equipment of interest to ATI specialists, from which estimates could be written reflecting the current capability of Soviet industry. The need for a higher collection capability for equipment remained, as did the need for intelligence information concerning pre-production plans and design of Soviet equipment. (SECRET)

ATIC obtained significant intelligence information in the fields of fuels, metallurgy, and computers through sponsorship of scientists to attend meetings and visit key European scientists. Reports were received of current European scientific and technical research and development programs. Surveys were made of Soviet scientific and technical publications reflecting trends within the USSR. To achieve a high degree of selectivity and avoid the general coverage of foreign publications monitored by other members of the intelligence community, ATIC covered only those subjects relating to ATIC priority requirements. (SECRET)

GUIDANCE: ATIC's participation in the Intelligence Collection Guidance Manuals Program continued on schedule. Accomplishments in the

field of general guidance requirements included preparation of an Intelligence Collection Guidance Letter (ICGL) on Air Weapons Serviceability and Reliability, and a plan to provide guidance by the use of motion pictures concerning intelligence-collection devices. (SECRET)

CAPABILITIES:

During the past year, ATIC gave support to a test program for the collection of acoustic recordings of Soviet aircraft. The results indicated that high priority intelligence can be obtained in this manner and acoustic-collection capabilities were established in FEAF. (SECRET)

ATIC developed and put into operation plans for an in-house photographic capability which enabled ATIC to complete two "crash" projects in their entirety without external assistance. Production during this period increased 400% in printing and 100% in production of negatives. (CONFIDENTIAL)

ATIC REQUIREMENTS:

ATIC requirements on Soviet and Sino-Soviet Bloc countries were integrated into the Joint Intelligence Bureau (JIB) system. In support of the JIB US-UK travel program, ATIC participated in programming JIB travel-brief revisions. (CONFIDENTIAL)

Work on the Technical Requirements Geographic Index continued to provide an index of priority ATI requirements and to help in preparing Technical Trip Briefs and priority target lists. (CONFIDENTIAL)

TRAINING: Three regular training courses were conducted during this period. In addition, a group of Air Attaché personnel were briefed, a special group of officers and airmen received photographic training, and representatives of the Weston Electrical Company were given a special training session in connection with a film-testing contract. ATIC

produced a complete syllabus for photographic training for distribution to students and other interested personnel. (CONFIDENTIAL)

# CHAPTER 5

## DOCUMENTATION

### INFORMATION PROCESSING:

In September 1956, ATIC implemented the recommendations of the Documentation Committee and established a Reading Panel. Under this concept, ATIC engineering specialists review intelligence information peculiar to their respective fields of interest on a daily basis. They indicate abstracts or extracts to be typed for their files, code intelligence information, prepare evaluations, and indicate discards. No documents are routed unless specialists indicate they are needed. (UNCLASSIFIED)

The Reading Panel went into operation in September 1956. A large percent of documents were then in circulation to technical components of ATIC. This meant recall of 4000 documents for reprocessing through the Reading Panel. It was possible to completely eliminate this backlog within two months, to decrease appreciably the time lag between document receipt and delivery to interested analysts, and to reduce document accounting time within ATIC 98%. (CONFIDENTIAL)

The ease with which requests for inclosures to documents may be made in the Reading Panel, and the promptness with which they are obtained, resulted in a considerable increase in number of requests for documents. Practices established in the Reading Panel practically eliminated circulation responsibilities by limiting them to control of documents sent out to various offices for retention. (UNCLASSIFIED)

Existing retrieval codes proved inadequate for the Center and a new

system was installed on a trial basis which served technical intelligence needs. The new system, known as Dynamic Retrieval Information, is a word code which lists country, action, subject, and designation; for example, USSR - Design of - Helicopter - Hare. (CONFIDENTIAL)

A pilot experiment in the coding phase of mechanized documentation began during this period. It consists of taking extracts which contain the dynamic retrieval information as indicated by ATIC specialists, transferring it to punched cards, and correlating results. Through this simulated future mechanized retrieval, ATIC is gaining insight into future retrieval effectiveness. (CONFIDENTIAL)

Considerable savings in money and personnel were realized through the utilization of a Photo Expediter. Locator cards which were formerly typed can now be reproduced in 8 seconds, and locator information kept available on a current basis. (UNCLASSIFIED)

The problem of satisfying requests for raw intelligence remained of primary concern during this period. This problem was enlarged tremendously with the increased use of contractual assistance, and was further complicated by the increase in quantities of items requested. In some cases reproduction was the only answer. Many expedients were employed, including microfilming, to overcome the facility and personnel insufficiencies. (CONFIDENTIAL)

FOREIGN LANGUAGE EXPLOITATION:

A sole-source translation contract was awarded to the O. W. Liebiger Research Laboratories, Incorporated. Reproduction services for the ATIC Russian-English Glossary of Aeronautical and Miscellaneous Technical Terms were placed under contract by AMC in late 1956. (UNCLASSIFIED)

An abstracting program to support USAF requirements was implemented during this period, under which ATIC contributes to USAF recipients 15 Soviet scientific and technical periodical titles on a table of contents basis and six on a selective basis. The Air Information Division (AID), Library of Congress, contributes 12 titles on a table-of-contents basis. This new abstracting program replaced the now non-existent NSCID-16 abstracting program. (CONFIDENTIAL)

# CHAPTER 6

## MATERIAL SERVICES

FOREIGN EQUIPMENT: A limited testing laboratory was established at ATIC for examination and preliminary evaluation of foreign aeronautical hardware. Where possible, foreign-made test equipment originally received for evaluation was used to equip the laboratory. This facility has saved funds by supplementing the existing system of evaluation by commercial contractors. (UNCLASSIFIED)

SUPPLY: Supply activities increased over corresponding periods of the three preceding years:

| 1 JUL - 31 DEC 56 | ITEM TRANSACTIONS | | INCREASE | PER CENT INCREASE |
|---|---|---|---|---|
| FY 57 over 56 | 8365 | 6900 | 1465 | 21.2 |
| FY 57 over 55 | 8365 | 4800 | 3565 | 74.3 |
| FY 57 over 54 | 8365 | 3650 | 4715 | 129.2 |

(UNCLASSIFIED)

TRANSPORTATION AND STOCK TRACING: The volume of services in this area included 1,665 transportation requests with a total of 22,238 miles travelled. (UNCLASSIFIED)

PHYSICAL PLANT MAINTENANCE AND REPAIR:

Construction and maintenance work within the Center continued on an overtime basis. Plans and programs for expansion, new facilities, and construction changes of the new ATIC building were developed. The highlight for ATIC personnel was the official ground breaking for the new building on 18 July 1956. Date of occupancy was forecast for February 1958. (UNCLASSIFIED)

New vault construction and vault modifications were completed, and 90% of the air conditioning work completed for Building 263. Modifications to Building 219, which was assigned to ATIC in June 1956, were approved and the Base proceeded with contracting for engineering design. (UNCLASSIFIED)

Other services in this area included:

Completion of an area of 15,250 square feet of partitioning construction.

Completion of 100 work orders by ATIC laborers.

Completion of 58 work orders by Base Installations.

Repair of office machines - 283.

Phone relocations - 92 requests, 146 phones involved.

Teletalk relocations - 4.

Maintenance and services requests to Base Installations - 210.

(UNCLASSIFIED)

FLIGHT ACTIVITIES:

The two assigned aircraft remained the primary means of furnishing air transportation for ATIC personnel. The C-47 flew 21 special missions, transported 246 passengers and 17,420 pounds of cargo, while flying 413:15 hours. The C-54 transported 562 passengers and 41,345 pounds of cargo while flying 272:10 hours. (UNCLASSIFIED)

Cockpit familiarization flights in the YAK-18 continued. Thirty ATIC pilots received this training. A total of 52 flights were made for a total of 42 hours flown. (UNCLASSIFIED)

# CHAPTER 7

## ELECTRONICS INTELLIGENCE (ELINT)

SYSTEMS EVALUATION:

Consultant services provided by ATIC during this period included service to SAC on matters pertaining to procurement, uses, and modifications of ground based data-reduction equipment; to WADC on matters involving signal environments and data processing techniques for planning the ERB-47H engineering flight tests, and to APGC on operational tests for the RB-66C. (CONFIDENTIAL)

Studies submitted by a contractor were evaluated for their applicability to the ELINT program.[1] These included such items as application of digital computers to ELINT problems, proposed automatic film reading and data processing equipment, operations analyses of ferret activities, parameter categories of signals, audio and video recorder specifications, and techniques for manual analysis of film data. (CONFIDENTIAL)

ANALYSIS:

The processing of intercept signals for detecting and analyzing new types of signals continued. Exclusive of special intercepts, this totaled 15,600 intercepts from SAC ferret missions, 48,000 USAFSS intercepts, and 24,000 Army and Navy unidentified electronic radiations. (SECRET)

A new system for processing new and unusual signals was introduced. This system operated on a signal-to-signal basis which is preferable to the previous system on a signal group basis. The data secured in this manner was consolidated into a readily accessible "Current Interest File" using the IBM card filing system. This provided an efficient method of

sorting intercepts into groups of similar signals, as well as permitting performance of integrated data and analysis. Data and analysis results on groups of unusual or unidentified signals was made available to collecting agencies through a new periodical, the "ATIC Signal Review". It was planned to publish this document semi-monthly and to devote each issue to a particular category of signals. (SECRET)

Four ELINT reports (classified SECRET) were published during the last half of 1956: "(Secret) ELINT Indications of Soviet AI Radar",[2] "(Uncl) 1956 Summary of ELINT Developments",[3] "(Uncl) ELINT Progress Report No. 8",[4] (Uncl) ELINT Progress Report No. 9".[5] Two other reports were in process: "(Uncl) ELINT Progress Report No. 10", "(Uncl) Evaluation of the QRC-26". (SECRET)

CAPABILITY IMPROVEMENT:

ATIC procured various equipments for use in collection effort, and initiated a study on new laboratory ferret configuration that will provide information on available commercial equipment which could be used in the data-collection function. ELINT responsibilities of ATIC for breaking out the telemetry intercepts into analog traces and for various phases of the sonics program established requirements for additional equipments. Plans were made for acquiring decommutation equipment and sonics data-reduction equipment. The sonics analysis equipment as developed by Melpar is sufficiently advanced for use by ATIC as a sonics data-reduction facility.[6] (SECRET)

Results of RADC-ATIC effort to increase the usability of the Ground-Installed Reconnaissance Data Handling System (GIRDHS) reduction were the AN/GLA-7 which combines the GIRDHS sorting and plotting capability

with a general-purpose computer. This permits an extension of the original GIRDHS capability to include handling of inputs from systems other than the RB-58 reconnaissance system, control of programming other than the planned program in the GIRDHS, and the eventual inclusion of an analysis capability. ([redacted])

TRAINING:

During the last half of 1956, training in ELINT data handling and techniques was given to 11 persons representing CIA and USAFSS. ([redacted])

Considerable assistance was provided by ATIC in the establishment of the National Technical Processing Center (NTPC) which will handle the DOD effort in the ELINT field. (UNCLASSIFIED)

1. AF33(600)-31664, Glenn L. Martin Co.
2. TIR-DE-56-7
3. TIR-DE-56-8
4. TIR-DE-56-9
5. TIR-DE-56-10
6. AF33(600)-21214, MELPAR Incorporated

# CHAPTER 8

## ENGINEERING SUPPORT

ENGINEERING ANALYSIS:

ATIC produced weight estimates on the following aircraft: CAMP, BLOWLAMP, FISHBED A and B, FITTER, FACEPLATE, and FISHPOT. After scale factors and engine weights were agreed upon, final estimates were completed and more refined estimates produced from extensive curve plotting. (SECRET)

Conferences on Russian aircraft among representatives of ATIC, the RAF, and the DDI (Tech) resulted in a joint estimate on current aircraft of interest based on special analytical calculations performed during the conference. (SECRET)

In order to prove the sensitivity of photographs, an analysis showed a group weight statement of the B-58 was within two percent of complete accuracy. ATIC continued to develop new methods in weight and volume estimation, and maintained weight files on friendly foreign and domestic aircraft to insure that plots of weight parameters reflect the latest design philosophy. (SECRET)

Range determination on aircraft whose infra-red radiation was being measured presented several problems. Photo-interpretation, photogrammetric, and infra-red problems were analyzed in part by using the high speed digital computer. (SECRET)

COMPUTERS:

The determination of performance of new Soviet aircraft appearing in air shows during 1956 was accomplished by machine application to the problems. (CONFIDENTIAL)

ATIC also undertook the analysis of present job accounting procedures on an experimental basis and developed a system of statistical procedures to account for manhours per project as well as skill or talent per project. (UNCLASSIFIED)

PHOTO-ANALYSIS:

Two pieces of equipment received during this period provided ATIC with the first truly controlled photography. These were the WILD C-12 Stereometric Camera and the WILD A-4 Autograph and the Zeiss Stereotop. The A-4 will extract dimensional information with increased accuracy from a much smaller number of photographs, the A-4 Autograph can serve as a comparator, ten times as good as that of glass scales now used; the Stereotop will interpret and measure near vertical aerial photos. (CONFIDENTIAL)

Other equipment received by ATIC, which contributed to considerable savings in time and effort, included a Friden Calculator with an automatic square-root facility, and a Monroe Calculator. (UNCLASSIFIED)

Photometric analysis and resultant drawings were completed on CAMP, FISHBED A and B, FISHPOT, BLOWLAMP, FLASHLIGHT C and B, FITTER, FACEPLATE, CAMEL, and FARMER. From available photography, ATIC completed a new drawing of the seaplane MADGE. (SECRET)

PUBLICATIONS: Automatic typing and justifying equipment acquired during this period is expected to result in improved appearance of ATIC publications. (UNCLASSIFIED)

REPRODUCTION:

A capability of absorbing the new documentation handling system was developed by ATIC; and a schedule established whereby the documents can be microfilmed, developed, and mounted on aperture cards within 48 hours.

This was done by the modification of the Triplex Camera, Model RF1 (on indefinite loan from RADC), plus the extensive cross-training program now in effect. (UNCLASSIFIED)

The ultimate goal is to have each person capable of operating a variety of machines thereby assuring a continuous flow of work regardless of personnel shortages, sick leaves, vacations, etc. At the same time, the individual's knowledge and scope within the duplicating field will be broadened. (UNCLASSIFIED)

Additional attachments have been procured and installed on the Model 1250 Multilith machines to provide a facility for duplicating document extract cards which is cheaper and faster than the ozalid process previously used. This sytem will eliminate the back-log, reduce the cost of manhours and materials, and provide more machine time for production. (UNCLASSIFIED)

# CHAPTER 9

# PROPULSION

## PROPULSION SYSTEMS:

ATIC sought the assistance of the propulsion industry in conducting studies within critical areas and in developing new techniques for systems analysis. One of the major contracts with industry concerned Soviet capability to develop a supersonic ramjet engine.[1] Under another contract, industry undertook to provide ATIC with an increased capability to estimate Soviet turbojet engine altitude performance by developing methods for obtaining engine-component performance data and relating these data to perform the required cycle analysis and obtain the 100% ram-recovery performance data.[2] ~~(SECRET)~~

Work started during the last quarter of 1956 on analyses of the engines in the CAMEL, BISON, and BADGER aircraft. Based upon intelligence information obtained during flights of CAMEL into London, the objective was to determine the basic configurations and operational performance of the CAMEL power plants and to estimate the performance of an improved engine of this type for application to the BISON and BADGER. ~~(SECRET)~~

Soviet aircraft displayed in the 1956 air shows inspired similar analyses to estimate the configuration and performance of engines for BLOWLAMP, FISHPOT, FITTER, FISHBED A and B, and FACEPLATE. ~~(CONFIDENTIAL)~~

The analyses of intelligence information on Soviet turboprop engines which were designed and developed at Zavod II in Kiubyshev enabled ATIC to present significant conclusions regarding these engines and components, and to compare them with US models.[3] These analyses of basic engine

performance data traced the general pattern of engine development followed by the Germans at Zavod II, and revealed the development of Soviet engine prototypes, which could be measured against the accomplishments of US engine manufacturers. (SECRET)

The successful negotiation of a contract provided the impetus needed for the rocket-propulsion program.[4] Under this contract, the contractor seeks to determine propellant combinations and give rocket-engine performance data, as well as design information, from mathematical and photographic analysis of rocket exhaust patterns. The development of this method of analysis will provide ATIC with a valuable working tool. (SECRET)

A contract for rocket engine sounds analysis[5] terminated with publication of a Sonic Radiation Characteristics Handbook. (SECRET)

Nuclear propulsion was the subject of a study made by a consultant under contract to ATIC on the relative status of Western European nations in nuclear-technology developments, particularly nuclear instrumentation.[6] (CONFIDENTIAL)

Under the ATIC program for assessment of Soviet capabilities in aircraft nuclear propulsion, a WADC contractor initiated a study of the Soviet capability to develop an aircraft nuclear-propulsion system.[7] (SECRET)

As a result of a contract,[8] ATIC produced comparative performance characteristics of both liquid and air-cooled Soviet reciprocating aircraft engines and US engines of similar design.[9] These data concerned engines in the range of 500 to 2,000 BHP, and resulted in part from testing of latest production Soviet engines representing the state-of-the-art of the industry as of 1948-1951. (CONFIDENTIAL)

ATIC produced revised estimates for the ASH-82 engine and a handbook on aircraft engines of friendly foreign nations, which were discussed with DDI Tech personnel. A published survey report provided the basis for a comparison of the propulsion systems of friendly foreign countries with those of the USSR and the US.[10] (SECRET)

FUELS AND LUBRICANTS:

Future plans included a series of projects to devise a reliable means of identifying guided missile propellants which would provide data necessary to determine the performance and range of a weapon. ATIC started work on one of these projects to investigate the possibility of identifying rocket propellant systems from the analysis of gases and cooling water contaminants collected at points remote from the launching and testing site. The contract was not negotiated by the close of the year. (SECRET)

Three contracts were let with private industry in the study of areas of technical intelligence. One of these was for a study of hydrogen research in the USSR,[11] particularly through a search of Soviet scientific literature to determine significant developments in fundamental research design of equipment for liquefaction and storage of hydrogen, and in Soviet utilization and handling of liquid hydrogen. Another was for a study of fundamental and applied combustion and gas-dynamics research in the USSR to assist in determining the Soviet capability to develop high-speed and high-altitude propulsion systems.[12] The third contract was for a study of Soviet capability in synthetic lubricants for turbojet engines.[13] (SECRET)

A study conducted for ATIC under Project WHITE STORK on Soviet-Bloc solid propellants research and development was completed and made available

for distribution through the Joint Technical Intelligence Subcommittee. (SECRET)

Accomplishments under the exploitation program for the Air Force and the Intelligence Community, in the scientist-exchange program area, resulted in the attendance of three outstanding Soviet combustion scientists at the Sixth Combustion Symposium at Yale University in August 1956 and plans for reciprocal visits by US combustion experts to the USSR during 1957. (SECRET)

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1. AF33(600)-33448, Marquardt Aircraft Company
2. AF33(600)-33711, Allison Division, General Motors Corporation
3. TIR-PR-56-5, dtd 31 Oct 56
4. AF33(600)-33497, Aerojet General Corporation of Azusa, California
5. AF33(600)-15660, Haller-Raymond-Brown Incorporated
6. AF33(600)-33192, Dr. Albert Van Rennes
7. PR-187414, Aircraft Nuclear Propulsion Division of General Electric Corp.
8. AF33(600)-31235, Lycoming Division, AVCO Manufacturing Corporation
9. TIR-PR-56-3 dtd 29 Jun 56
10. TIR-PR-56-4 dtd 23 Jul 56
11. AF33(600)-33396, Arthur D. Little Incorporated
12. AF33(600)-33600, Combustion Explosives Incorporated
13. AF33(600)-33795, Dow Chemical Company

# CHAPTER 10

## ELECTRONICS

GENERAL: Work continued in the effort to finalize the program for contractual assistance in the analysis of Soviet Bloc electronics equipment capabilities. This program, termed WHITE CASTLE, was planned to supplement the limited internal capability of ATIC in the electronics fields of specialization. The work proposal is concerned with determining the performance characteristics, functional capabilities, and effectiveness of Soviet Bloc airborne and ground electronics equipment, and the state-of-the-art of the Soviet Bloc in various specialized areas. (SECRET)

MISSILE-GUIDANCE SYSTEMS:

During the last half of 1956, ATIC concentrated attention on a piece of radar equipment with estimated electronic missile-guidance applications. This equipment, designated YO YO, is a device located at sites in the Moscow ground-to-air missile-launch complex area. Evidence that the YO YO is a radar device was not conclusive; however, its association with the complex, its geometry, and the fact that no other objects observed in these areas have been identified as radar, gave credence to the assumption that it is a radar device. (SECRET)

A requirement for contractual assistance[1] was established to analyze and evaluate the intelligence information on YO YO, to estimate the operational capabilities of the device, and to prepare drawings and specifications. ATIC made a preliminary study of YO YO and summarized findings,[2] followed by a special supplemental report on an item of equipment designated as YO YO SAM.[3] (SECRET)

ATIC undertook three projects related to this program to determine performance characteristics and functional capabilities for surface-to-surface, surface-to-air, and air-to-surface missile-guidance equipment. Each study will also seek to determine the Soviet state-of-the-art and research and development trends in electronic equipment for each of these categories. (SECRET)

RADAR SYSTEMS: ATIC started a program in August 1956 to utilize the services of White Stork in the preparation of radar coverage diagrams. The work involved calculation of radar ranges for each of a group of radar equipments against selected US and foreign aircraft from a number of different aspects and at a variety of blip-scan ratios, requiring preparation of coverage diagrams for each case. This material serves the operational commands, primarily SAC, and assists in the preparation and maintenance of the Handbook of Soviet and Satellite Radar Equipments. (SECRET)

NAVIGATION SYSTEMS:

Soviet utilization of low and very-low frequency (VLF) for navigation purposes was the subject of a study begun by ATIC during the last half of 1956. One area of significance is a study of the Soviet MOON navigation system, based largely on intelligence derived from project WILD WAVES. This is a world-wide effort to monitor and analyze the portion of the radio-frequency spectrum between 10 and 500 kilocycles. Other electronics support to the WILD WAVES program included general guidance, formulation of requirements, and analysis of data. (SECRET)

ATIC evaluated the Soviet marker-beacon receiver Type MRP-48P[4] and completed a study of the future air navigational capabilities of the USSR

and satellite countries.[5] Work was completed on a Handbook of Soviet and Satellite Navigational Electronic Equipment, the last in a series of three basic electronics handbooks with wide application throughout the Intelligence and Research and Development agencies.[6] (CONFIDENTIAL)

The analysis of a Soviet automatic radio compass, Type ARK-5, began during this period.[7] The analysis will include the investigation of new techniques, methods, and materials used by the Soviets. This analysis and evaluation was undertaken to determine the probable cost of producing the device and its specific operational characteristics to aid in establishing a basis for more accurate appraisal of Soviet electronics design and manufacturing capabilities. (CONFIDENTIAL)

COMMUNICATIONS SYSTEMS:

Arrangements for examination and test of physical items of equipment by an ATIC contractor generated a great amount of activity during the latter part of 1956 in the communications area. Equipments included the Soviet RSB-F radio set, the East-German-manufactured point-to-point communications equipments designated 931-A (UHF) and URG-951-A (VHF), a Communist Chinese radio receiver, and a Soviet-manufactured telephone multiplexer designated V-3. These analyses were planned for contractual performance to study the operational characteristics of the equipment and the manufacturing techniques used for comparison with similar US equipment.[8] The purpose was to provide important inputs to future estimates of Soviet trends in development and application. (CONFIDENTIAL)

Two major intelligence products resulted from studies in the area of electronics communications during this period. ATIC produced considerable detailed technical information on a Soviet-produced item of

telephone (multiplexing) equipment, the TF-941, evidencing its future use in Soviet ground communications networks which form an important part of air-warning systems and of air-defense systems.[9] ATIC studied the types of air-communications-equipment systems being utilized by the Soviets and determined the effectiveness of these systems as they exist now and as they are expected to exist in the future.[10] (SECRET)

ATIC negotiated a contract for production of important studies on the technical aspects of ground-to-ground, ground-to-air, air-to-ground, and air-to-air communications[11] associated with the defensive, strategic, and tactical air operations of the Soviet Air Force. (SECRET)

COMPONENTS AND SPECIAL DEVICES:

Interest in Soviet ECM capabilities continued at a high level during 1956. Formal and informal briefings of WADC personnel and contractors were almost a weekly occurrence. ATIC received several requirements for infrared radiation characteristics of Soviet aircraft and information on Soviet infrared capabilities. Although available new information was limited principally to open literature, ATIC made plans for review of Soviet capabilities in these areas in view of some significant developments. (SECRET)

During this report period, ATIC released one in a series of six studies of electronics, summarizing existing intelligence information on Soviet electronics components.[12] This report concerned passive components such as tubes, transistors, radomes, and antennas; and included several notable conclusions, particularly regarding similarity of Soviet and US types in miniaturization, reliability, printed circuits, ferro-magnetic material research, transistors, magnetron and klystron development, radomes and antennas. (SECRET)

ATIC secured contractual assistance to determine the capability of the Soviet Bloc to conduct electronic warfare against US air weapon systems.[13] The scope of the study will include present and future estimates of Soviet capability to employ active electronic countermeasures (radar and communications jamming), confusion reflectors, and reconnaissance in various types of air warfare -- including strategic, tactical, and air defense. (SECRET)

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1. AF33(600)-31112, General Electric Company
2. TIS-EL-56-1 dtd 25 Sep 56
3. Un-numbered Report T56-27340
4. TIR-EL-56-3
5. TIS-EL-56-6
6. TIH-EL-3
7. AF33(600)-31843, Farnsworth Electronics Corp.
8. Ibid.
9. TIR-EL-56-2 dtd 3 Aug 56
10. TIS-EL-56-2 dtd 31 Oct 56
11. AF33(600)-33689, Radio Corporation of America
12. TIS-EL-56-3 dtd 7 Dec 56
13. AF33(600)-32612, Sylvania Electronic Products Incorporated

# CHAPTER 11

# ARMAMENT

## ARMAMENT SYSTEMS:

A limited study of Soviet bomber defensive armament systems, completed under contract, provided ATIC with indications of possible Soviet development trends.[1] A more comprehensive study of bomber defensive armament systems was placed under contract,[2] and contract negotiations begun for a study of Soviet fighter armament systems.[3] ATIC engaged contractual assistance for vulnerability and lethality studies of foreign aircraft and weapons also during this report period.[4] ~~(CONFIDENTIAL)~~

ATIC representatives gave major briefings before Deputy Chief of Staff Materiel on the armament system in the Soviet all-weather interceptor FLASHLIGHT, and at the Eighth Technical Advisory Group Conference (Air Force Armament Center) on the latest Soviet aircraft armament systems and missile capabilities. (UNCLASSIFIED)

## ANTIAIRCRAFT ARTILLERY:

The Air Technical Intelligence Center has pursued rather vigorously since August 1955, a project for analysis of Soviet antiaircraft weapons. A contract with American Machine and Foundry Co., Alexandria, Va.,[5] was negotiated for $41,000 in FY-56 and extended for $38,000 in FY-57. As a result of this effort, approximately 250 antiaircraft fire unit analyzers (M-2 type) were completed and distributed directly to using agencies -- SAC, TAC, FEAF, and USAFE in November 1956. (~~CONFIDENTIAL~~)

The fire unit analyzer is in essence a tool to be used by operational commands in mission planning for analysis of known Soviet antiaircraft gun

defenses in order to determine the best approach to and exit from targets, thereby maximizing the expectancy of success in attack and return over hostile territory. (CONFIDENTIAL)

The first two tasks of the contract extension with American Machine and Foundry were completed. These involved the development of a mechanical method of determining the effectiveness of the surface-to-air weapon defenses against strategic bombers. The first task, completed in October 1956, was a feasibility study. The results indicated that the mathematical model for effectiveness incorporating a terrain analysis for low-level attacks could be coded on a high speed digital computer. The second task, completed in November, produced a basic flow diagram for programming on an IBM 704 electronic computer. The project was revised in October 1956 and the scope of work was increased by the addition of a third task. This task consists of performing a representative SAC problem on a selected target, evaluating the results and demonstrating the operation of the model to SAC. (CONFIDENTIAL)

The universal automatic analyzer to be developed under the above program is much broader in scope than the Fire Unit Analyzer. It will be able to deal with Soviet conventional guns, high-velocity guns, hyper-automatic weapons, unguided rockets, and surface-to-air guided missiles. Whereas the fire unit analyzer uses a graphical technique for solution, the universal analyzer will utilize an electronic computer to handle in a much shorter time the more complex problems associated with these weapons. (CONFIDENTIAL)

An ATIC representative attended the 7th Annual Technical Intelligence Conference (Army) and visited DDI Tech in London to work with British intelligence authorities on Soviet Bloc antiaircraft capabilities and aircraft armament components and systems respectively. (CONFIDENTIAL)

SPECIAL WEAPONS:

ATIC representatives briefed the JTIS BW-CW Working Group on East German chemical and biological warfare technology, and AMC Special Weapons personnel on the comparison of US and Soviet nuclear-weapon development. (SECRET)

In response to a special request, ATIC prepared estimates of Soviet nuclear weapons and their delivery by currently significant Soviet bombers. Characteristics of these weapons included weight, yield, and dimensions with significance in loading and stowage. The study covered the transport of Soviet nuclear weapons by cargo and helicopter aircraft as well as by bombers. (SECRET)

ATIC made significant additions pertaining to defensive equipment such as gas masks in the revision of Chapter 12, "Chemical Warfare" of the "Performance and Characteristics Handbook, Foreign Aircraft Armament." (UNCLASSIFIED)

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1. AF33(600)-24502, Crosley Division, AVCO Manufacturing Corp., Call Ltr No. 6
2. AF33(600)-33106, Aircraft Armaments Incorporated
3. AF33(600)-24502, Crosley Division, AVCO Manufacturing Corp., Call Ltr No. 7
4. AF33(600)-31900, Institute for Cooperative Research, Johns Hopkins University
5. AF33(600)-33898, American Machine and Foundry Company

# CHAPTER 12

## EQUIPMENT

INSTRUMENTATION AND CONTROL: One of the three major products of ATIC in the equipment area was a study presenting the Soviet organization for research and development in air-weapons instrumentation.[1] The study covered the areas of governmental control, facilities, personalities, and educational institutions related to this field. (~~CONFIDENTIAL~~)

EQUIPMENT SYSTEMS:

ATIC accomplished a survey of a major area of technology and reported survey results on the status of Soviet research and development in the field of aircraft electrical equipment.[2] The summarized data regarding associated facilities and technical personalities provided reference material for further study in the area. (~~CONFIDENTIAL~~)

Soviet aerial refueling capabilities was the subject for investigation and study as one means of range extension.[3] These capabilities were applied to new Soviet aircraft -- BADGER, BISON, BEAR, FAGOT, FRESCO, FLASHLIGHT, and FARMER. (~~CONFIDENTIAL~~)

New work undertaken by ATIC with contractual assistance included determination of performance characteristics and status of Soviet self-contained (non-radiating) navigation and guidance equipment;[4] determination of the minimum standards for runways to support the principal Soviet aircraft, and evaluation of Soviet runway requirements with reference to landing-gear weight and volume.[5] (~~CONFIDENTIAL~~)

Soviet capabilities in aerial photographic reconnaissance was the subject of a briefing by ATIC before the ARDC Industrial Symposium on

Aerial Reconnaissance. A briefing on the human factors aspect of equipment and systems, presented at the Human Factors Technical Symposium, indicated the apparent status and present trend in Soviet aeromedical research. (CONFIDENTIAL)

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1. TIS-WI-56-5 dtd 12 Jul 56
2. TIS-WI-56-3 dtd 28 Jun 56
3. TIS-WI-56-4 dtd 21 Aug 56
4. AF33(600)-33894, Minneapolis-Honeywell Regulator Company
5. AF33(600)-26266, Bendix Corporation

# CHAPTER 13

## MATERIALS

METALLURGY:

To determine the status of Soviet reactor metallurgy, ATIC, Battelle Memorial Institute, and US metallurgical scientists under contractual arrangements with ATIC, combined their efforts and evaluated 14 technical papers presented by Soviet scientists to the International Conference on the Peaceful Uses of Atomic Energy held at Geneva. The report of this evaluation was one of two major formal presentations by ATIC in the field of metallurgy.[1] ([redacted])

In addition to this study, ATIC produced a handbook on Soviet alloy compositions and applications.[2] This is essentially a manual of Soviet alloy designations and the corresponding composition ranges. Its purpose was to provide a medium for identification of Soviet metals and alloys and to help itemize patterns of materials applications in Soviet aircraft. ([redacted])

ATIC redefined the use of White Stork in selected metallurgical subjects, and established agreement on subject areas in which estimates will be prepared on future Soviet state-of-the-art. ([redacted])

Metallurgical developments by the Soviets which were confirmed included their advanced state in continuous casting of steel, use of isotopes in studying molten metals, and vacuum melting of high temperature alloys on a production scale; production of titanium on a priority program and the development of ductile chromium-base alloys for high temperature usage. Factors influencing these developments were the

acute shortage of molybdenum in the USSR, the unique and comprehensive educational program in metallurgy, as well as extensive use of women metallographers for research. (CONFIDENTIAL)

All of these developments proved highly important since the utilization of these processes not only conserves critical alloying elements, facilitates machining and fabrication, but enhances the value of metals for high-temperature applications such as turbine buckets, nozzle guide vanes, etc. All these developments were identified as exerting a significant bearing on the Soviet air-weapon capability in their use of resources. The vacuum treatment for steels (not vacuum melting) which the Soviets now employ on a production basis enables Soviet metallurgists to make steels relatively free from hair-line cracks, a major problem in the US today, and enhances fatigue resistance in structural members of air weapons. (CONFIDENTIAL)

NON-METALLIC MATERIALS:

ATIC conducted tests of some small rubber and plastic foreign aircraft materials and distributed results of examinations.[3] An addendum[4] to the basic ATIC study entitled "Status of the Fields of Ceramics and Cermets in Selected Soviet Bloc Nations", brought this study up to date.[5] (CONFIDENTIAL)

Two projects were introduced for utilization of the contractor in studying Soviet capability in airframe materials and ICBM materials.[6] They will estimate Soviet capability in airframe materials and seek to establish the materials requirements and research associated with the use of airframe materials in advanced air weapons. (CONFIDENTIAL)

ATIC discovered the development of a Soviet synthetic process for producing rubber identical to natural rubber (developed by the US in 1955). The manufacture of aircraft tires from this rubber will improve the landing performance of Soviet aircraft. (CONFIDENTIAL)

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1. TIR-WI-56-3, dtd 26 Jun 56
2. TIH-WI-1 dtd 25 Sep 56
3. TIR-WI-56-4 dtd 2 Aug 56
4. TIS-WI-56-7 dtd 2 Oct 56
5. 102-AE-54/9-34
6. AF-33(600)-31597, Convair

# CHAPTER 14

## INDUSTRIAL TECHNOLOGIES

AIRFRAME PRODUCIBILITY:

A study of factors affecting Soviet supersonic fighter production resulted in completion of a comprehensive Phase I report by the contractor including analysis of the effects of alternative designs for Mach 2 and 3 fighters upon performance and producibility. The information developed provided the basis for a briefing at the Joint Anglo-American Aircraft Production Conference held in Washington. Phase II and Phase III of the study conducted by ATIC and the contractor produced significant information which was used as a basis for intelligence-collection activities and future estimates of Soviet capability. (CONFIDENTIAL)

A study of factors affecting Soviet supersonic bomber production met with problems of securing contractual assistance. (CONFIDENTIAL)

A manufacturing analysis of the Soviet jet transport aircraft CAMEL indicated that the Soviets were able to make considerable savings in production time and cost through the use of large portions of the design of the medium jet bomber, BADGER.[1] The Soviets were in this way capable of producing an advanced-design jet transport at costs that may be as much as 30% lower than would be required for an all-new transport design. This analysis was also presented to the Joint Anglo-American Production Conference. (SECRET)

ATIC started manufacturing analyses of FISHBED, FACEPLATE, and BLOWLAMP during this period. (CONFIDENTIAL)

GUIDED MISSILE PRODUCIBILITY: A study of the producibility of the

Soviet ICBM progressed according to schedule and preliminary information available helped in the formulation of special collection requirements.[2] (CONFIDENTIAL)

PROPULSION-SYSTEMS PRODUCIBILITY: Phase I study of rocket-propulsion-systems producibility, conducted under contract, provided one of the most complete studies of rocket-engine production characteristics and facilities available. The contractor continued with the Phase II portion of the study. (CONFIDENTIAL)

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1. TIS-WI-56-6 dtd 31 Dec 56
2. AF33(600)-31597, CONVAIR

# CHAPTER 15

## AIR SCIENCES

GEOPHYSICS:

ATIC, through utilization of WHITE STORK contract, initiated a study to determine Soviet bloc capabilities in selected areas of seismology and acoustics as they apply to air weapons and air operations, and as they support the Integrated Airborne Passive Search and Tracking Intelligence System. (SECRET)

ATIC's program for equipment development created a need for a related study of the Soviet capability in acoustics which was undertaken under contract.[1] The project involved a study of Soviet acoustic scientific literature and available intelligence information. (SECRET)

ASTRONOMICAL SCIENCES: A survey of Western European astronomical capabilities continued during this report period. (CONFIDENTIAL)

PHYSICS: A study of Soviet application of heat transfer to air-weapons development approached completion during this period. (CONFIDENTIAL)

AERIAL PHENOMENA: The appearance of a large number of books and motion pictures on the subject of "flying saucers" and the sudden increase of self-styled "flying-saucer investigation and research organizations" had noticeable effect on the number of UFO reports received during this period. ATIC received 425 UFO reports, the largest number since the peak UFO year of 1952. Controversial motion picture films and publications were reviewed and analytical reports made where possible in anticipation of wide-scale public queries. ATIC prepared a training course on UFO's for ATI officers; and special instructions, charts, and guidance material for UFO investigators and GOC observers. (CONFIDENTIAL)

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1. AF33(600)-34084, Melpar Incorporated

# CHAPTER 16

## AIR WARFARE AND WEAPON SYSTEMS

INTEGRATED PRODUCTS: Work proceeded on revisions to AIE-11, "The Threat of Military Surprise from Soviet Technological Superiority", and to the study "Estimated Characteristics of Soviet Air Weapons". (CONFIDENTIAL)

AIR WARFARE SYSTEMS:

Support to the ARDC Weapon System Project Offices and their contractors continued during this report period. The number of briefings and studies prepared by ATIC increased considerably. This support aimed directly toward meeting the requirements of WSPO's for planning new US weapon systems to meet the enemy environment which was estimated for the time period when the US weapon system became operational. A major study area concerned the technical capabilities of Soviet air-defense weapons.[1] (CONFIDENTIAL)

ATIC support included intelligence on Soviet air defense related to specific systems development; e.g., Strategic Bombing System 110 A (Chemical powered) and 125 A (nuclear powered), Tactical Bombing System 302 A, Penetration System 125 A (anti-radar missile, decoys), Bomber-Defense Missile Systems 126 A and 126 B, and Weapon System 121 A (CROSSBOW). Included also was information on Soviet tactical air related to Fighter-Bomber System 300 A development; and technical intelligence related to strategic reconnaissance developments, Advanced Reconnaissance System 117 L development, the GAR-X (SW FALCON), the B-52, B-58, Surface-to-Air Missile System Requirement 136, and the WADC contracted study on penetration of Soviet defense.[2] (CONFIDENTIAL)

Studies of air weapons research and development in non-Soviet Bloc countries proceeded satisfactorily, but because of higher priority work assigned to Project White Stork very little was accomplished on studies of Soviet capabilities in aerodynamics and aircraft structural design.[3] (CONFIDENTIAL)

ATIC presented a preliminary analysis to TAC personnel of the capability of the Soviet Bloc air defense weapon system against low-level, high-speed penetrations as estimated for 1956-1960. A requirement was placed on the contractor for a detailed analysis of certain findings in the preliminary study.[4] (CONFIDENTIAL)

Work proceeded satisfactorily and on schedule on the technical significance of Soviet strategic bomber capability, a study under contract.[5] Very little work was accomplished on the study of Soviet capability to develop and launch a military earth satellite because of lack of personnel. (SECRET)

A study was initiated to determine Soviet capabilities to develop a defense against the ICBM and to evaluate its effectiveness. An Ad Hoc Committee was established to monitor and advise during the study. The requirement for consultant services was established and the request initiated for external assistance provided by the University of Michigan. (CONFIDENTIAL)

A contract for consultant services was approved for a study of West European capabilities in fluid dynamics; the contractor was to devote a major protion of his time to analysis of Soviet theoretical dynamics and aerodynamic design philosophy.[6] (CONFIDENTIAL)

AIRCRAFT WEAPON SYSTEMS:

Studies of the nine new Soviet aircraft shown on the Tushino Air

Display of 1956 were undertaken during this period. These included studies of the Soviet twin-turboprop transport CAMP, the day fighters FISHBED A and B, the delta-wing aircraft FISHPOT; the swept-wing version of FISHBED A, designated FACEPLATE; the swept-wing version of FISHPOT, designated FITTER; the improved all-weather fighter variant of FLASHLIGHT A, the FLASHLIGHT C; and a variant of the FLASHLIGHT series (possible reconnaissance or attack aircraft), the FLASHLIGHT B; and the Soviet twin-jet swept-wing light bomber, BLOWLAMP. The study of BLOWLAMP was completed. (CONFIDENTIAL)

It was necessary to reschedule eight studies in process because of the greater emphasis on fulfillment of requests from major air commands and the revision of the Estimated Future Soviet Aircraft Weapon Systems during the period 1957 to 1967. These included studies of the estimated development of Soviet fighter and bomber aircraft, temperature effects of performance of USSR aircraft, revised studies of FLASHLIGHT and FARMER, and analyses of CAMEL, CRATE, and HORSE. (CONFIDENTIAL)

The study of the YAK-18 Flight Test was completed but not released because of requirements of higher priority items placed upon clerical help. (UNCLASSIFIED)

The maintenance of handbooks of foreign aircraft, other than Soviet, is a continuous project. A Characteristics and Performance Handbook of Foreign Aircraft was released at the close of the year.[7] (UNCLASSIFIED)

At the close of this period, a contract was in process of negotiation by ATIC with Boeing Aircraft Company for a study of Soviet Air-to-Air Refueling Capabilities, based upon evidence of Soviet activity in this area. This obligated ATIC to furnish to the contractor finished

intelligence estimates regarding the componental hardware and its capabilities, and performance data on the aircraft involved. The contract entails a study of the various possible Soviet bomber-tanker combinations and the selection of the most logical combinations the Soviets would use, and provision of pertinent engineering data which using agencies will need to plan any "buddy" or "rendezvous" type missions involving these aircraft. (CONFIDENTIAL)

A re-evaluation of the original study on FRESCO was undertaken, based on new intelligence information which has become available since the original analysis. (UNCLASSIFIED)

ATIC obtained contractual assistance for a study of the Soviet capability to develop a supersonic manned medium bomber weapon system.[8] Work began on Phase I which requires the acquisition of an understanding of the Soviet state-of-the-art capability in technical areas pertinent to the contract. Phase II will require the design of the weapon system associated with knowledge previously acquired in Phase I. ATIC established a working group for assignment to this project which included an aerodynamicist, a design engineer, systems engineer, and a propulsion engineer. (CONFIDENTIAL)

GUIDED MISSILE WEAPON SYSTEMS:

A study of the Moscow Surface-to-Air Guided Missile Defense System,[9] and a TOP SECRET Supplement to the study, were completed during this period.[10] Supplement No. 1, published as a Technical Report, covered the effects of interrupted YO-YO type radar intelligence on the performance of a semi-active homing surface-to-air missile.[11] Supplement No. 2 was placed under contract and as new intelligence information improves in quantity and quality, continued analysis effort will be given to studies of this missile system

and its effectiveness.[12] (SECRET)

Problems were created by higher priority work and receipt of additional information affecting content of studies which delayed production in study areas of Soviet surface-to-air missile guidance and control capabilities, surface-to-surface guided missiles, and air-to-surface guided-missile capabilities. (UNCLASSIFIED)

A study of an air-to-ship missile-guidance system was published during this period and a new study on the subject was initiated.[13] (UNCLASSIFIED)

A new project undertaken by WHITE STORK had as its objective the production of realistic surveys from significant intelligence reports and related collateral information regarding the facilities involved in research, development and flight testing of guided missile weapon systems. (CONFIDENTIAL)

The Collection Requirements Board reestablished the Ad Hoc Committee in October 1956 and assigned to the committee the task of producing an Intelligence Requirement Guide for an ICBM Weapon System. The Glenn L. Martin Company undertook preparation of material for the Guide on a no-cost basis. (CONFIDENTIAL)

ATIC made plans for consolidation of defensive missile studies into a single study to be revised semi-annually. Each study and revision will include the surface-to-air and air-to-air missiles. (CONFIDENTIAL)

Other new projects planned by ATIC during this period included studies of a probable guidance system employed in Soviet ballistic missiles and of guided missile instrumentation data. (CONFIDENTIAL)

NATIONAL AND JOINT COMMAND AND AIR STAFF SUPPORT:

During this report period, ATIC forwarded contributions for the National Intelligence Estimates Program and the National Intelligence Survey Program

to the Deputy Director for Estimates, USAF. Contributions to NIE's included estimates on probable developments in Japan and estimates regarding Communist China. ATIC support to NIS's included 13 contributions concerning nine countries. (CONFIDENTIAL)

ATIC participation in the Air Force program for the production of air capability studies included responsibility for the chapter of Air Intelligence Studies entitled "Air Material in the Advanced Stages of Development." During this report period, ATIC contributed to AIS's on France, Spain, Finland, Switzerland, and Yugoslavia. (CONFIDENTIAL)

Other ATIC support included contributions to Air Defense and Tactical Force Air Intelligence Studies, and preparation of the Joint US-UK Conference Report. (UNCLASSIFIED)

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1. TIS-ES-56-3 dtd 24 Jul 56
2. TIS-AC-56-1 dtd 11 Dec 56
3. TIS-ES-56-2 dtd 9 Jul 56
4. AF33(600)-32973 Armour Research Foundation
5. AF33(600)-33229 Lockheed Aircraft Corporation
6. AF33(600)-33820 Massachusetts Institute of Technology
7. TIH-AC-1 dtd 21 Dec 56
8. AF33(600)-31864 Convair
9. TIS-GM-56-1 dtd 8 Nov 56
10. TIS-GM-56-1A dtd 31 Dec 56
11. TIR-GM-56-1 dtd 10 Sep 56
12. AF33(600)-30230 Convair
13. TIS-GM-56-2 dtd 28 Sep 56

# GLOSSARY

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| AFAC | Air Force Armament Center |
| AFD | Air Force Depot |
| AI | Airborne Intercept |
| AMA | Air Materiel Area |
| AMC | Air Materiel Command |
| APGC | Air Proving Ground Command |
| ARDC | Air Research and Development Command |
| ATILO | Air Technical Intelligence Liaison Officer |
| BHP | Base Horsepower |
| CIA | Central Intelligence Agency |
| CONAD | Continental Air Defense Command |
| DDI (Tech) | Deputy Director of Intelligence, Technical (Great Britain) |
| ECM | Electronic Countermeasures |
| ELINT | Electronics Intelligence |
| FEAF | Far East Air Forces |
| FY | Fiscal Year |
| GOC | Ground Observer Corps |
| IAC | Intelligence Advisory Committee |
| ICBM | Intercontinental Ballistic Missile |
| ICGL | Intelligence Collection Guidance Letter |
| ICGM | Intelligence Collection Guidance Manual |
| IGY | International Geophysical Year |
| JIB | Joint Intelligence Bureau |
| JTIS | Joint Technical Intelligence Subcommittee |

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|---|---|
| NACA | National Advisory Committee for Aeronautics |
| NTPC | National Technical Processing Center |
| OSI | Office of Special Investigations |
| RADC | Rome Air Development Center |
| RAF | Royal Air Force |
| REG | Returnee Exploitation Group |
| SAB | Scientific Advisory Board (AF) |
| SAC | Strategic Air Command |
| SAF | Soviet Air Force |
| SAG | Scientific Advisory Group (ATIC) |
| SAM | Surface-to-air Missile |
| SEC | Scientific Estimates Committee |
| TAC | Tactical Air Command |
| TIPS | Technical Intelligence Processing System |
| UFO | Unidentified Flying Objects |
| UHF | Ultra-high frequency |
| USAFSS | USAF Security Service |
| USFIC | US Foreign Air Information Center |
| USNC | US National Committee |
| VHF | Very-high frequency |
| VLF | Very-low frequency |
| WADC | Wright Air Development Center |

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(Jul-Dec 1956)