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AEROSPACE TECHNICAL INTELLIGENCE CENTER

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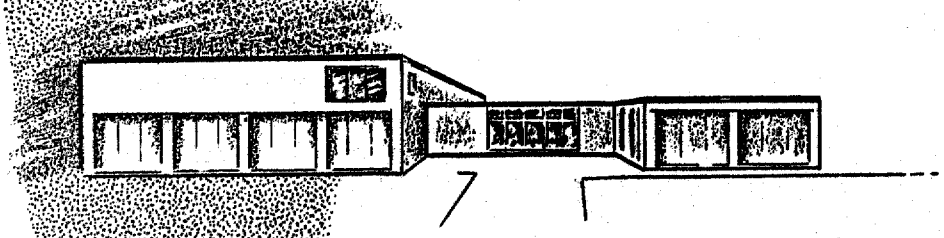

WRIGHT-PATTERSON AIR FORCE BASE, OHIO

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HISTORY OF

AEROSPACE TECHNICAL INTELLIGENCE CENTER

(AFCIN-4)

Wright-Patterson Air Force Base
Ohio

1 July 1959 - 31 December 1959

Prepared By

Air Intelligence Office

AEROSPACE TECHNICAL INTELLIGENCE CENTER

31 January 1960

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AEROSPACE TECHNICAL INTELLIGENCE CENTER – AFCIN-4

CHART NR I

Commander
Deputy Commander
Chief of Staff

Scientific Advisor

Administrative Services	Air Intelligence	Personnel & Manpower

Materiel & Flight Services	Comptroller	Production Control

Deputy For Collection	Deputy For Documentation	Deputy For ELINT
DIVISIONS	DIVISIONS	DIVISIONS
Requirements Operations Technical	Technical Information STEP Control	Evaluation Analysis Projects

Deputy For Engineering Support	Deputy For Science & Components	Deputy For Air Weapon System
DIVISIONS	DIVISIONS	DIVISIONS
Engineering Analysis Graphics Photo Exploitation Machine Computation	Electronics Weapons & Industry Air Sciences Propulsion	Estimates Aircraft Missiles & Space Supplemental Research

Hq Squadron Section	Det. Nr I (SMITIG)	Det. Nr 2 (Western)

Det. Nr 3 (European)	Det. Nr 4 (Pacific)

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SECTION I

ATIC ORGANIZATION AND MANAGEMENT

CHAPTER 1

GENERAL

NAMING OF ATIC:

On 31 July 1959, ATIC submitted a proposal to the Assistant Chief of Staff, Intelligence, to change the name of the Center from Air Technical Intelligence Center to Aerospace Technical Intelligence Center. This action was taken in line with General White's adopted policy that insofar as the Air Force is concerned, air and space form an indivisible and strategic continuum, and that the Air Force must insure general comprehension and acceptance of this as a fact. The Center proposal was approved and the name changed to Aerospace Technical Intelligence Center, effective 21 September 1959.[1] (UNCLASSIFIED)

SCIENTIFIC ADVISORY GROUP:

On 19 November 1959 the Scientific Advisory Group was established within the Scientific Advisor's Office.[2] The newly established Scientific Advisory Group (SAG) will furnish scientific and technical consultant services to technical producing elements of ATIC, evaluate contractor studies and ATIC projects, develop aerospace technical intelligence courses of action and their related activities for the foreseeable future, and serve on AF scientific and technical boards and committees. (UNCLASSIFIED)

PROGRAM REVIEW:

The Center made a comprehensive review of the total ATIC Program during November 1959 to assure compatibility of ATIC effort with the five areas of primary interest to the ACS/I: space and missiles, electronics, propulsion (including ANP), Soviet aircraft and air defense. This review was unique in its breadth and scope; and it introduced new operational concepts based upon recent policy decisions of the ACS/I. A succession of surveys was made to align all major efforts with these concepts; specifically reviewed were all tasks, products, specific requests for information (SRI's), priority requests for information (PRI's or PAIR's), and requirements levied on the Scientific and Technical Exploitation Program (STEP). Other special-purpose surveys were conducted coincident with or subsequent to this review to serve different requirements such as budget, manpower, etc.

A number of tasks and products were regrouped or consolidated, and those of non-mission or low priority eliminated where possible. In numbers of items, but not according to magnitude of effort, a net reduction of 25% was achieved.

Where ATI requirements could be satisfied by other agencies having appropriate mission responsibilities, action was taken to levy these requirements through official channels. For example, negotiations were initiated to have the CIA undertake

for ATIC a series of studies on basic or fundamental research in the USSR. The requirements for R&D in support of intelligence were levied on ARDC. The Unidentified Flying Objects (UFO) Program was determined to represent a non-intelligence activity on the basis of recent operational experience; and it was recommended that this activity, conducted by ATIC since 1947, should be transferred to some other agency having primary mission responsibilities and existing capabilities for scientific and technical investigations.

Also, guidance was given on the extent to which aerospace technical intelligence should be carried out in areas of lesser priority such as studies dealing with friendly foreign nations. (UNCLASSIFIED)

EXCHANGE OF CONTRACTOR PAPERS WITH CIA:

Interchange and liaison, which has always been accomplished with CIA, was stepped up during this period. Discussions between representatives of ATIC Production Control and CIA Production Staff resulted in an agreement to exchange specified contractor solutions to stated tasks upon special request. (CONFIDENTIAL)

ATIC CUSTOMER SURVEYS:

During the reporting period, results of ATIC customer surveys were used in ATIC quality-control-products development, and as data to defend ATIC programs in budget hearings. These data were used also in review of products schedules, in establishment

of priorities and in recommendations for allocations of manpower and other resources. Additions and deletions were made to products lists and distribution lists as a result of our market survey findings. (UNCLASSIFIED)

ATIC-ARDC INTERCHANGES:

A series of monthly meetings was inauguarated by Major General Charles B. Dougher, Commander, ATIC, and Brigadier General John E. Dougherty, DCS/Intelligence, ARDC, to advance the role of intelligence in R&D.

Two major propposals were made in these meetings by ATIC and approved by Brigadier General John E. Dougherty, DCS/Intelligence, ARDC. The first proposal was that ATIC provide intelligence annexes for all Systems Requirements and weapon-system proposals. This is now being done, the first two SR's have been received from RADC for the addition of intelligence annexes. In this way, ATIC inputs to weapon-systems development will be at the beginning and can be tailored for each requirement or proposal. This procedure may preclude instances of discontinuance or re-direction of weapon developments due to intelligence inputs received only after great quantities of money have been spent. The second proposal is that ATIC and ARDC set up technical working teams in R&D support of intelligence and in intelligence support of R&D. Two teams were proposed in the first-named area, one for actions during

the current period to two years in the future, and one for three to fifteen years in the future. A third team is proposed for problems and actions in Intelligence Support of R&D. (UNCLASSIFIED)

AFIC-ATIC WORKING RELATIONS:

The Center has continued to investigate the AFIC functional relationship to those of ATIC in the interest of insuring harmonious mutual support between the two Centers and minimizing the amount of duplications in operations. AFIC functional statements have been studied and interpreted for guidance of ATIC production elements and discussions and correspondence have been exchanged with AFIC to resolve areas where real or implied duplication exists. (UNCLASSIFIED)

VISITORS TO ATIC:

Visitors from the UK during this period included a representative of the Ministry of Defense and the Chief Intelligence Officer, Hq RAF Germany, who were briefed on areas of specific interest. Other Commonwealth visitors included two members of the RAAF who were interested in the exchange of information between ATIC and DAFI; and seven Canadians, members of the Defense Research Board and Directorate of Air Intelligence, for briefings on missiles and aircraft and informal discussions with their counterparts in ATIC. ~~(CONFIDENTIAL)~~

Two members of the House Appropriations Committee visited ATIC on 21 September to investigate utilization of services of

experts and consultants. A Department of Defense budget team visited ATIC on that same date to discuss FY 59 and FY 60 programs and FY 61 projects. (UNCLASSIFIED)

Maj Gen Howell Estes, Asst DCS/Operations, Hq USAF, and Maj Gen Watson, Deputy ACS/Intelligence, visited ATIC on 29 July for orientation briefings on specific ATIC projects. The first week in August, Messrs. M. E. Davies and L. Rosenzweig of AFCIN heard pertinent briefings by all deputies of ATIC to assist them in developing a methodology for comparing strategic weapon-systems development progress.

The Assistant Chief of Staff, Intelligence, Maj Gen James H. Walsh, spent 23 October at ATIC for discussion of problem areas including research and development, collection, contract studies, the Scientific and Technical Exploitation Program (STEP), space track and data reduction. (CONFIDENTIAL)

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1. GO Nr 55, 17 Sep 59, HEDCOM USAF
2. GO Nr 18, 16 Dec 59, 1125th USAF FAG (HEDCOM USAF)

CHAPTER 2

MANAGEMENT CONTROL AND SERVICES

PLANS AND PROGRAMS:

The ACS/I and ATIC conducted reviews and drastically changed the ATIC FY 60 and FY 61 programmed effort. Changes resulted in a reduction of external assistance programs for intelligence hardware and contractor produced studies, as well as in-house projects associated with low priority intelligence areas. (SECRET)

Representatives of the Bureau of the Budget and Office of the Secretary of Defense, after briefings on original ATIC program requirements for FY 60 and FY 61, had concluded that the Center depended too much on contractors for intelligence studies, duplicated the efforts of other agencies, such as CIA, NSA, and the RD community; spent a great deal of money for hardware development without concrete results, used expensive and exotic means to collect intelligence that was available from other sources, and delved too deeply into many subject areas thus increasing the over-all cost of the intelligence product. Many of these criticisms were eliminated as a result of ATIC's detailed program review and realignment. (CONFIDENTIAL)

BUDGET AND ACCOUNTING:

When the ATILO functions of Hq PACAF and Hq USAFE became ATIC detachments, direct funding support of these offices in the M&O areas was instituted. (UNCLASSIFIED)

ATIC designed and implemented a new fiscal accounting system based upon the Offensive, Defensive, Support, and Acquisition functions of the Center. This accounting system provides an automatic cross-reference by system, organizational component, or task for all actual and programmed FY 60 obligations in the P-489 and P-850 areas. (UNCLASSIFIED)

STATISTICAL SERVICES

The Center designated a committee to formulate plans for a Management Data Center. The result of committee work is intended to replace or improve the presentations included in the present monthly Statistical Summary. Action was taken to increase the quantity and improve the quality of statistical information being maintained, which will provide a rapid capability for producing statistics revelant to many managerial areas of the Center's operation. (UNCL)

Report audits during this period placed the accent on several miscellaneous-type reports. Typical of these is the Programming Data Report, submitted to Hq Wright-Patterson AFB, and which outlines the support required by ATIC from the Base. The improved effectiveness of reports control

resulted in a reduction in workload on the part of Major ATIC activities. These controls were maintained over approximately 650 recurring report submissions, 89% of which met established due dates. (UNCLASSIFIED)

MANAGEMENT ANALYSIS:

ATIC continued to perform spot analysis primarily for measuring program efficiency and the effectiveness of contractual support. The basis of work measurement involves relatively simple input-output forms of measurement in accord with the assigned functional statement. (UNCLASSIFIED)

ATIC prepared a study on the use of Experts and Consultants which could have a significant bearing on the quality of future ATIC evaluations where the application of new scientific break-throughs would considerably alter foreign capabilities during the next ten years. This study was prepared as requested by the Surveys and Investigation Staff, House Appropriations Committee, and was used as the basis for committee hearings at ATIC in October, 1959. The result of the findings is to be used as a basis for amending Public Law 600. (UNCLASSIFIED)

CONTRACT REQUIREMENTS

The special procurement section within the Aeronautical Systems Center of AMC, which was constituted within the last year to serve as an external assistance outlet for intelligence

contracts, has been successful in its primary mission of placing our contracts with commercial firms on an expedited basis. This section, named the Intelligence Support Section, successfully negotiated ninety-two contracts during FY 59 for both services and hardware. This is exclusive of other procurement actions performed as a result of seventy-two additional Purchase Requests for contract amendments and requirement cancellations. (UNCLASSIFIED)

Representatives of this Center (ATIC) and the Aeronautical Systems Center (AMC) agreed that requests for procurement action would precede by 100 days the requested date for contract, since experience proves that the majority of contract placements of an intelligence nature require an extended period of negotiation prior to the preparation of a contract. (UNCLASSIFIED)

ATIC prepared Advance Information copies of all FY 60 procurements, authorizing the buyer to proceed with procurement actions to the point of but not including award. This preliminary procurement information allowed not only for expedited preparation of Requests for Proposals and negotiations, but also for sufficient time to re-study this Center's requirements prior to actual contract placement. (UNCLASSIFIED)

AIR INTELLIGENCE SERVICES:

ATIC continued its full intelligence service to the Air Material Command. This service included special briefings and estimates, periodic and ad hoc briefings, and Daily Intelligence Summaries (DINTSUM's) for the Headquarters Staff; and Weekly Intelligence Summaries (WINTSUM's) for AMC field components. (UNCLASSIFIED)

The distribution of the ATIC BULLETIN was increased by 40 copies. (UNCLASSIFIED)

The Air Photographic and Charting Service completed the answer print of the ATIC film[1] which was started during the first half of 1959. (UNCLASSIFIED)

ADMINISTRATIVE SERVICES:

Increased centralization of ATIC distribution activities made it possible to attain greater uniformity in procedures for the release of ATIC finished intelligence documents to outside agencies. (UNCLASSIFIED)

ATIC conducted a campaign for review of files which resulted in the destruction of 350 cubic feet of non-essential paperwork. (UNCLASSIFIED)

CIVILIAN PERSONNEL:

During the last six months of 1959, there were 95 new civilians hired for the Center; and 89 separated, including 33 summer-time only employees, making a net gain of six (6).

As of 31 December 1959 the assigned civilian strength was 631, leaving a total of eight (8) civilian vacancies to be filled. Excluding the 33 summer-time only separations, the turn-over rate in ATIC continued to be slightly less than the normal turn-over rate of 2.5% for government at large and considerably under the average turn-over rate of 4% for industry. However, the Bureau of Labor Statistics reports that the higher turn-over rate in industry during the six month period may have been largely due to the steel strike and its by-products. (UNCLASSIFIED)

The first ATIC-University contract was let to Wittenberg College for off-reservation training. Five other contracts with universities and/or colleges were pending as of 31 December 1959. (UNCLASSIFIED)

ATIC completed plans for conducting its first in-house course in Management I. Heretofore this course was made available to ATIC on a space-available basis by both Headquarters AMC and Headquarters WADD. Since space was seldom available, it was only possible to provide the Management I course to three ATIC employees over a period of almost three years. Current plans assure that all supervisors will have completed the Management I course by 31 December 1961. (UNCLASSIFIED)

In September ATIC received approval and in-hired its first three Public Law 313 type individuals, in addition to the Scientific Advisor to the Commander. These individuals were Dr. Albin N. Benson, Dr. Paul J. Ovrebo and Mr. Edgar O. Berdahl. As of 31 December 1959, two PL 313 authorizations remain to be filled. (UNCLASSIFIED)

The true test of the ATIC Merit Promotion Plan came during this period and it now appears that the plan is workable. Having used the "weighted factor" principle in implementing the Merit Promotion Plan seems to have been proper in view of the fact that HQ AMC has now disbanded the "hurdle" comcept in favor of the "weighted factor" concept. Further, it would appear at this point that the entire Federal Service may eventually go into a master standard plan designed for the entire service based upon the principle of "weighted factors". (UNCLASSIFIED)

MILITARY PERSONNEL:

In conjunction with Air Force policy to implement NCO Quality Control, ATIC published a supplement to the basic directive (AFR 39-40) that applies to all airmen assigned. (UNCLASSIFIED)

Colonel Clair E. Ewing, 3792A, was assigned Commander, Detachment #1, ATIC, Kelly AFB, Texas effective 1 July 1959 per G.O. 7, 7 July 1959. (UNCLASSIFIED)

Colonel Robert J. Gibbons, 3978A, was assigned Chief, Production Control Office, effective 27 July 1959 per G.O. 8, 29 July 1959. (UNCLASSIFIED)

Colonel Philip G. Evans, 6081A, was assigned Deputy for Science and Components effective 17 September 1959, per G.O. 15, 17 September 1959. (UNCLASSIFIED)

ORGANIZATION:

The most significant change to occur during the period was change in designation of the Air Technical Intelligence Center to the Aerospace Technical Intelligence Center. This change was effective 21 September 1959 and was the result of national decision to assign to the Air Force major responsibility for Space. (UNCLASSIFIED)

On 24 September the Office of the Executive was officially abolished and Administrative Services raised to full staff level thereby.[2] (UNCLASSIFIED)

In keeping with change in intelligence emphasis to missiles and space, the Guided Missiles Division of the Deputy for Air Weapon Systems was redesignated "Missiles and Space Division", October 13, 1959. At the same time the Information Analysis Branch was added to this division's internal structure.[3] (UNCLASSIFIED)

On 19 November 1959 the Scientific Advisory Group was established as a subordinate of the Office of the Scientific

Advisor.[4] (UNCLASSIFIED)

The Collection Operations Activities, formerly designated as ATILO USAFE and ATILO PACAF were officially established as Detachment #3 European and Detachment #4 Pacific, respectively.[5] (UNCLASSIFIED)

A revision of the ATIC Organization and Functions Manual, ATICM 20-1, was published December 1959. (UNCLASSIFIED)

MANPOWER

Civilian authorizations were reduced from 642 to 639 with the release of three allotments to Deputy Chief of Staff, Intelligence, 23 July 1959. At the same time the ATIC received one Lieutenant authorization in exchange for one Warrant Officer allotment.[6] (UNCLASSIFIED)

At the end of the period, manpower authorized was 271 Officers, 158 Airmen, 639 Civilians, Total 1068. (UNCLASSIFIED)

MATERIAL AND FLIGHT SERVICES:

During the period of 1 July to 31 December 1959, the FY-60 MCP made great progress. In August the authorizations and appropriation bills for the FY-60 program became law. Final plans and specifications were completed by the A. M. Kenney Co. Construction directives were issued and the Corps of Engineers, Ohio River Region were appointed construction agents. The program was advertised for bids and the Maxon & Co. were announced as successful bidders for the

addition to Building 828. The addition to Building 828 has been programmed for October 1960 (1st floor) and March 1961 (complete building). The addition to Building 259 has been programmed for completion in March 1961. (UNCLASSIFIED)

The FY-61 MCP was presented to Hq. USAF for consideration. The items submitted by ATIC called for 207,000 square feet in a three floor structure directly to the west of Building 828. At various points in time the building has been included and excluded from the Air Force Program, and at the close of 1959 was still under study. Hq. USAF reduced the scope of the project to 140,000 square feet apparently because of Department of Defense and Congressional direction that no replacement construction would be included in the FY-61 Program. In the case of this particular project, 66,000 square feet of space to replace Building 263 had been included in the original project. (UNCLASSIFIED)

At the close of 1959, the value of property in the special supply account (AFK 4204) was $1,821,514.00, while the dollar value of UAL equipment was $897,176.00, making a total value of $2,718,691.00 for the property being used by ATIC and WPAFB. (UNCLASSIFIED)

During this period a major effort to dispose of excesses in AFK 4204 resulted in the disposal of over 24,000 pounds of material valued at in excess of $133,000.00. (UNCLASSIFIED)

The aircraft assigned to the Center flew a total of 1,069:20 hours during the past 6 months with a passenger load of 4,860 seat passenger hours. The allocated flying hours for the period amounted to 1,085. (UNCLASSIFIED)

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1. ATIC History, 1 Jan - 30 June 1959, page 12
2. General Order #16, 24 Sep 59, 1125th USAF FAG (HEDCOM USAF)
3. General Order #17, 13 Oct 59, 1125th USAF FAG (HEDCOM USAF)
4. General Order #18, 16 Dec 59, 1125th USAF FAG (HEDCOM USAF)
5. General Order #58, 8 Oct 59, HEDCOM USAF
6. PAV 60/1/16, 23 July 1959

SECTION II

ATIC ACTIVITIES

CHAPTER 3

COLLECTION

GENERAL POLICY:

ATIC's collection effort received major redirection, all aspects of which were not accomplished. The ACS/I determined that air-technical-intelligence collection will focus on specified priority objective material and, insofar as possible, will avoid secondary and tertiary material. ATIC's participation in clandestine operations was restricted to a very small number of specifically approved projects. Resources of other collection agencies will be used in clandestine matters. These directives occasioned a major realignment of projects and tasks and some redeployment of personnel. (SECRET)

There also occurred a basic change in the philosophy governing the development and procurement of new and improved collection aids and techniques. Heretofore, as new collection aids and techniques were identified, their procurement was undertaken directly by ATIC's Deputy for Collection. Under the revised policy, maximum reliance will be placed upon the USAF R&D community and other sources engaged in collection hardware development. Direct procurement by ATIC will be used only as a last resort or for minor "quick fix" items that do

not justify initiating formal R&D action. The Deputy for Collection retained the function of identifying new and improved collection aids and techniques which can be developed within the state of the existing US technology, performing this service for the ACS/I collection interest as a whole and, when such areas of improvement have been identified, acting as the initiating or sponsoring agency for the procurement requirement. (SECRET)

REQUIREMENTS:

In line with the sharpened policy for collection requirements, ATIC reviewed and refined the outstanding Specific Requirements for Information (SRI's), and eliminated a substantial number which were considered to be in fringe or marginal areas. SRI's now outstanding were screened to avoid duplication with information previously collected and made applicable solely to the sharpened objectives. (CONFIDENTIAL)

Results from SRI's during the period of this report were good with some outstanding accomplishments having been recorded. One SRI in connection with probable surface-to-air missile sites in East Germany received quick reaction in the form of ground and aerial photographic coverage from which came reports of major significance to ATIC analysts. SRI's for information on advanced types of Soviet aircraft were very largely fulfilled due to successful exploitation of transient aircraft in Europe and the US. (SECRET)

Exploitation of scientific and technical meetings continued to be an important source of information on Soviet trends and capabilities. Less emphasis was placed on exploitation of trade fairs and, except in cases of a lucrative collection potential, SRI's were not issued but exploitation was left to Theater initiative. (SECRET)

Exploitation of Spanish repatriates developed into a major source of high priority information, including missile, aircraft, propulsion and electronic activities. ATIC prepared special SRI's and special guidance material to support this project in substantial quantity; as well as other guidance material to serve as a major support item for users in the field. (SECRET)

Collection evaluation was implemented to provide a management tool for the assessment of the contribution of air-technical-intelligence collection to the fulfillment of the ATIC mission. (CONFIDENTIAL)

COLLECTION OPERATIONS:

Prior to the direction which terminated ATIC's general participation in clandestine activities, substantial results were received from this type of collection. Significant items of Soviet materiel having military application were obtained through a project using Import-Export facilities, and significant personal observations and photographs from inaccessible

areas of the USSR and Soviet Bloc were received under other clandestine projects. Since these projects are now phasing out, further returns from these sources will be nominal, but it is hoped that the effort will be picked up in substantial part by other collection agencies so that the benefits will be retained for ATIC. (SECRET)

A Tri-Service reserve project became active in this period. This is a project to permit scientifically and technically qualified Army, Navy and Air Force reserve personnel to earn reserve credits by working on projects which immediately support ATIC production. This project was fully coordinated with, and is receiving excellent support from, the CIA, Army and Navy. Throughout the period, ATIC actively sponsored and supported various collection efforts to maintain surveillance on space vehicles already in orbit. (CONFIDENTIAL)

In the course of exploitation of transient Soviet aircraft and other collection targets of opportunity, ATIC conducted seven exercises with significant results. In addition to providing much needed data on aircraft, these exercises also provided concrete data on fuel and oxidizer capacity configuration, weight, structural and internal components of the last stage of a Soviet space vehicle. (SECRET)

ATIC's ATILO activities group acted as the focal point for operational management of the ATILO program, including

advice to the Commander on the current status of every active project in the ATILO Detachment files; and conducted follow-up to insure that ATILO detachments received necessary specialized equipment to support their collection activities. An Operational Control Board will be available to the Commander in the very near future. (CONFIDENTIAL)

TECHNICAL RESOURCES:

Much effort was spent in realigning technical activities to conform to the new philosophy. A substantial number of projects was transferred to ARDC which has assumed the responsibility for project completion in fulfillment of ATIC requirements. Plans were made for transfer of some other projects involving personalized clandestine equipment to CIA for completion. Under the redirected effort, it still is necessary for ATIC to provide technical support and guidance to the active development agency in order to be sure that the end product will satisfy the ATIC requirements. (SECRET)

A bench test conducted by the contractor on 15 December 1959, in connection with an Airborne Infra-Red search and track system, aimed at collection of guided missile technical information. The test was eminently satisfactory and indicated that the system capability will fully meet the ATIC requirement. Airborne test of the equipment is expected to take place in March. In the meantime, ATIC is taking up with Headquarters USAF

the question of establishing an operational capability in order to be ready to deploy this equipment as soon as the development program has been considered successful. (SECRET)

A major photographic reconnaissance project was discontinued. Preliminary flight test of equipment indicated that the capability would add materially to over-all collection capacity and would supply high resolution, large scale photography from high altitudes. In view of the fact that no operational vehicle had been designated by Headquarters USAF, it was determined not to continue further tests or development at this time. (SECRET)

Another program in which fine technical results were achieved, but which was cancelled for either financial or operational considerations, was a long-range oblique aerial camera. In this case, a 100-inch focal length capability was achieved with a major breakthrough in the reduction of cost, weight, complexity, meintenance and installation problems with the equipment being such that it could be assembled or disassembled in flight, stored in normal cargo containers, and made available for use in any cargo or transport aircraft without major modification to the aircraft. (CONFIDENTIAL)

Equipment for use in the field was tested, deployed, and maintained in accordance with applicable instructions. ATIC continued the training of Air Attache and ATILO personnel and,

for the first time, gave instructions in fields other than photography. Personnel were also indoctrinated in the use of tape recorders. (CONFIDENTIAL)

CHAPTER 4

DOCUMENTATION

SCIENTIFIC AND TECHNICAL EXPLOITATION PROGRAM (STEP):

Management responsibility for the Air Force program for exploitation of foreign open source scientific and technical publications, journals and books, was delegated to ATIC in October 1959 by General Walsh. This responsibility was further delegated to the Deputy for Documentation by General Dougher. (UNCLASSIFIED)

The STEP Working Group was officially established by appropriate documents[1], its responsibilities defined, membership designated, and working relationships clarified. Heretofore, this group, the main STEP planning body, had existed on an informal basis and operated "without portfolio." Group membership consists of appointed members, associate members or consultants. Consideration is given to the relationship of the program with specific governmental agencies and Air Force contractors. (UNCLASSIFIED)

The STEP Working Group critically reviewed the publications initially selected for STEP exploitation with the result that 131 journals were deleted from the list. This action

further resulted in a slight decrease in STEP abstract production; 34,579 abstracts were produced as compared to 37,358 during the preceeding six months. A total of 226 journals (SOV, SAT and CHI/COM, inclusive) are assigned to the selected list of journals for abstracting. In addition, ATIC received 1,003 monographs which were produced by the Air Intelligence Division, Library of Congress, under contract to the Directorate/Collection with whom ATIC previously shared program-management responsibility. (UNCLASSIFIED)

Late in the year, ATIC inaugurated a "model" system for evaluating the scientific and technical worth of STEP products, particularly as relates to use of this material in aerospace technical intelligence production. This model system currently relates only to the rocket propulsion subject area, but will be used as a guide in developing an evaluation system applicable to all scientific and technical fields of interest to the Center. (CONFIDENTIAL)

TRANSLATION PROGRAM:

Information made available through an ATIC translation, which had been previously accomplished, resulted in the cancellation of a contract which saved WADD, the Army and Navy, $1,500,000. (CONFIDENTIAL)

The FY 58 contract with O. W. Leibiger Research Laboratories, Inc., neared completion. Under this contract

approximately 5,500,000 words will have been translated at an estimated cost of $175,000. The FY 59 contract with Language Service Bureau, Inc., was approximately 75% completed. Estimates are that approximately 5,000,000 words will have been translated at a cost of $110,000. The FY 60 contract was split between the two contractors, and shipments to them started in November 1959. (UNCLASSIFIED)

During FY 59 approximately 2,500,000 Russian words were forwarded to the Control I group of Project Gold Eagle, and 456,000 words to its Control II activity. The Control II activity, with a capability to furnish unedited copy only, completed all assigned documents; the Control I activity, organized to furnish finished copy, was not able to prepare rough draft copies of all documents received for translation. Under FY 60, translation support to ATIC analysis continues. Control II activity will give orals and supply rough drafts of short urgent translations; and Control I will provide finished copy of longer documents. (UNCLASSIFIED)

An overseas facility, with a capability for turning out 200 typed pages of translated material per month, was used in the ATIC translation program on a limited basis, pending assessment of the material produced. (UNCLASSIFIED)

The total English words produced by inhouse resources was approximately 1,160,000 words. The total foreign pages

translated comprised 2,825; manhours expended totalled 4,900. (UNCLASSIFIED)

The release of ATIC translations to the public through the US Department of Commerce proceeded according to plan. Since the inception of this program, ATIC has released a total of 359 documents, or 103,847 pages. (UNCLASSIFIED)

AUTOMATIC TRANSLATION:

Monitoring activities in the field of machine translation and machine searching continued. Short-range projects with modest goals conducted by other agencies, were particularly watched. Long-range projects, such as a German-to-English undertaking at MIT, were followed indirectly to evaluate the progress rate and to gain any new insights that may prove valuable for developing short-range projects. Parallel developments in the USSR and the Chinese Peoples' Republic were followed through technical reports and press releases. ATIC also studied the elaborate and current data received from the National Science Foundation. (CONFIDENTIAL)

LEXICOGRAPHY:

ATIC has shipped Russian-English technical terms to the AID on a monthly basis since June 1959. The terms are incorporated by AID and printed in a cumulative glossary. A private publishing firm proposed a plan for the compilation of a comprehensive computer-based Russian-English Dictionary.

ATIC, however, considered the plan was not feasible because it underestimated the volume of words required, and indicated an unrealistic application of such a dictionary in the field of machine translation. (CONFIDENTIAL)

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1. STEP Policy and Management Memo, Nr 25-1, 14 December 1959

CHAPTER 5

ELINT

GENERAL:

ATIC participated in meetings of the Technical ELINT Panel, a group composed of representatives of the three services, NSA, and CIA, which has the responsibility for exchanging information and recommending action in connection with problems related to the technical means of collecting and processing electronic intercept data. (SECRET)

In December, ATIC representatives attended two related conferences concerned with arrangements for collecting and processing ELINT and related types of intercept data. The purpose of these conferences was to provide the Joint Chiefs of Staff with the viewpoints of the joint and specified commands, and the individual services, as to recommended solutions for policy and procedural problems confronting the ELINT community. Based on the conclusions and recommendations, the several commands will provide the JC/S with their requirements for carrying on signal interception and processing activities. (SECRET)

ELINT REQUIREMENTS AND EVALUATION:

ELINT engineers worked on approximately fifty Special Requests for Information. One request was satisfied, and seven were cancelled

as being of no further interest. Much electromagnetic radiation data was collected on many of the others. (SECRET)

Engineers continued their efforts to establish effective data requirements in the radar, ECM, navaid missile, and satellite areas to assist collectors and operational commands in meeting ELINT requirements. A new effort was initiated in the area of electric propulsion systems. (SECRET)

ATIC engineers worked with ARDC engineers on the development of thermoplastic recorders, frequency diversity radar receivers, and interferometer techniques; and with AFBMD on various sub-systems of Weapon System 117L. (SECRET)

ATIC engineers prepared Qualitative Operational Requirements for a universal time source for the US Air Force and for a ground-based space-surveillance system. (SECRET)

RADIATION RESEARCH:

The more notable results of signal data exploitation included the following:

1. Statistical analysis confirms alternating pulse intervals in SCAN THREE signal. The purpose of such alternating intervals is not known at this time.

2. 154 mc signals linked to SPOON REST radar at Surface-to-Air missile site are believed to be from equipment utilized as acquisition radar for the complex.

3. New four-channel, low-data-rate telemeters were noted. Analysis of recordings show this is a pulse-position modulated telemetry system.

4. Analysis of special high-speed oscilloscope photography of Type C telemetry provided a new insight into the pulse-train structure of this signal.

5. Signals acquired during the 13 July 1959 flight of a Soviet TU-114 (CLEAT) from New York to Moscow indicates that the navigation radar is similar to that of the TU-104 (CAMEL).

6. Additional signals associated with the Soviet vertical rocket firing of 2 July 1959 were reported. This is an increase of 4 channels of Radio Frequency over that previously noted.

7. Two MUSH ROOM type of signals have definitely been correlated with the Soviet aircraft MADGE.

8. Rapid scan S-Band signals (EUAZ) were confirmed as emissions from FRUIT SET, the multiple-antenna electronic complex seen at Soviet Surface-to-Air missile sites.

9. A complete informational listing was completed of Soviet missile telemetry modulation formats. This list is unofficial but is the format used in publications of ATIC. There is no standardized USAF format published otherwise.

10. Detailed analysis has provided the beamwidth and scan details of Soviet transport aircraft radars.

11. A number of MUSH ROOM type signals have been definitely correlated with Soviet HOUND (Mi-4) helicopters.

12. A study of the staggered pulse-interval effect in SCAN THREE signals indicated that this may be a blind speed multiplication feature. Blind speeds are critical radial velocities which result in zero response in an MTI system.

13. A summary was prepared on the characteristics of TU-104 (CAMEL) navigation radar data which summarizes the emission characteristics of this radar.

14. An intercept of signals at 670 mc of a possible new Soviet IFF system includes both interrogator and transponder emissions. Analysis of this signal provided new insight to the pulse structure of the emitters. (SECRET)

Signal Summary Sheets were initiated during this period. This sheet lists all known characteristics for a specific signal and is distributed for the information of an use by other elements within ATIC, USAFE, PACAF, SAC and NSA. (CONFIDENTIAL)

CAPABILITY IMPROVEMENT:

ATIC engineers continued their assistance to ARDC and AMC in the planning of cyclic modifications of existing aircraft. (UNCLASSIFIED)

These engineers made more extensive use of QRC procedures in obtaining techniques to assist with intercept and data-processing problems. Approximately ten items are in some stage of funding or production. (CONFIDENTIAL)

A local contractor began equipping two mobile vans for SAC's use in processing intercepted data. These vans are scheduled for deployment around 1 July 1960. (CONFIDENTIAL)

Engineers are investigating fast-print strip-film techniques including a device allowing nearly immediate processing of motion picture film, the processing being carried on during the actual time that the film is being exposed. (UNCLASSIFIED)

ATIC procured the components to be used by a contractor in the fabrication of updated data analysis consoles for ELINT use. These have been designated officially as AN/GSQ-41, Data Analysis Central. The first item was delivered in December. (UNCLASSIFIED)

The contract for the manuscript of the ELINT Processors' Manual is continuing satisfactorily. It appears the manuscript will be in the Government Pringing Office for 4th Qtr 1960 printing as scheduled. Two PENs (Processing Equipment Notes) were published: Nr 5 on Spectrum Analysis was distributed in September; Nr 6 on miscellaneous subjects was distributed during November. USAFE and SAC have increased their distribution lists for this publication. (UNCLASSIFIED)

ATIC continued to provide engineering and materiel support to the theaters and operational commands. (CONFIDENTIAL)

TRAINING:

During this period nine completed the ELINT Indoctrination Course; ten completed the ELINT Analyst Course; and six completed

the Special Analyst Team Course. In addition, eighteen special briefings were given to USAFE, AUC, ARDC, ATC, CIA, AFCIN and SAC personnel; AF contractors; and personnel from NATO countries.

(S[redacted])

CHAPTER 6

ENGINEERING SUPPORT

ENGINEERING ANALYSIS:

Under the methods development program, work was carried out: (1) to revise the stress method of establishing wing section properties and to program this method for the IBM 7090 computer, and (2) to develop a method of estimating weight and section properties of aircraft fuselages and to program for solution by a digital computer. Another problem under study was a method of determining the center of gravity location of an aircraft by the use of a fourth-order equation which allows discreet solutions without resorting to the trial and error approach currently in use. (UNCLASSIFIED)

One outcome of the last US-UK Conference was the agreement on basic data for all current Soviet aircraft. In adjusting current ATIC aircraft performance estimates to reflect the changes in new basic data, changes in configuration, propulsion plant, or gross weight were made on many of the current fighter and bomber aircraft. (UNCLASSIFIED)

An extensive study was made on all the ramifications of aircraft performance to investigate the feasibility of expanding the present aircraft performance problem as

programmed for a digital computer. In addition to the present output data, the new program will: (1) furnish data for any specified altitude and gross weight condition, (2) calculate maximum nautical miles per pound of fuel and the velocity at which this occurs, and (3) calculate range factors for drag and reheat engines, as well as range for specific weight increments. (UNCLASSIFIED)

GRAPHICS:

In November of 1959, ATIC introduced an additional method of preparing briefing aids. Resultant products are three-dimensional mobile and static mock-ups for purposes of analysis, and, when photographed, for inclusion in intelligence publications. The first mock-up produced was of a Soviet rocket launching installation. (SECRET)

The Joint Congressional Committee on Printing granted approval for procurement of a Model 1C Xerox Copyflo machine. This machine meets the need for rapid reproduction of paper copies from microfilm in direct support of ATIC project STEP and for other microfilm reproduction requirements. (UNCLASSIFIED)

A system for rapid retrieval of vu-graphs was established through use of a Simplafind mechanical filing machine. This system will be used in direct support of the ATIC briefing program. (UNCLASSIFIED)

MACHINE COMPUTATION:

ATIC concluded arrangements for rental of an IBM 7090, system beginning the 2nd Qtr, FY-61, to improve the machine-computation capability. It will replace the two small digital computers presently in use. The IBM 7090 is an extremely fast machine which can accomplish much more computational work in one shift than is possible to accomplish on two shifts for the Burroughs 205 and one shift on the Readix. Training of programming specialists on the IBM 7090 system began on 1 November 1959. (UNCLASSIFIED)

PHOTO EXPLOITATION:

During this period it became increasingly apparent that the impending Weapon System 117L products would have considerable impact on the Center; particularly on the photo exploitation group, if current photo-handling and data-reduction methods were used. Consequently, ATIC undertook the development of a data-reduction system that will satisfy current demands and, when completely implemented, accommodate Weapon System 117L products along with all other photo imputs in a systematic manner. (UNCLASSIFIED)

One of the most significant single photo analysis accomplishments was the layout and description of the SAM Site at Glau, East Germany, where missile launchers and supporting equipment were all well photographed. As

a result, a thorough interpretation and analysis was possible. (SECRET)

Another significant exercise was participation in projects that resulted in controlled stereo-photography of three Soviet aircraft. (SECRET)

Equipment to acquire, view, or measure photo data included (1) a new data-reduction unit, (2) a device for projection enlarging, (3) a stereo-viewer, (4) a comparator for direct reading of coordinate measurements with an accuracy of plus or minus .01 mm, and (5) a device for establishing precise orientation of photo axis, and recording of photo detail on glass for interpretation purposes. (UNCLASSIFIED)

ATIC acquired the following new items of photo equipment: a printing device for making diapositives of varying scales; a precision rectifier, a precision enlarger, a color camera, and 11 photo-processing sinks. (UNCLASSIFIED)

CHAPTER 7

AIR WEAPONS AND EQUIPMENT

AIRCRAFT ARMAMENT AND FIRE CONTROL SYSTEMS

The Soviet aircraft armament philosophy continued to adhere to all around bomber-defense configurations abandoned by the Western Powers more than a decade ago with the introduction of jet powered aircraft. (SECRET)

Intercepts of BADGER and BISON bombers by US gun-armed fighter aircraft in the Far East provided confirmation of the Soviet's belief in the effectiveness of their bomber defensive armament. The gun-armed bombers maneuvered, when countering USAF pursuit curve intercept, so as to bring the maximum turret firepower to bear and, in one instance, tracked our interceptor aircraft with one of the three available turrets. (SECRET)

Estimates of Soviet bomber armament systems were presented in four publications: (1) "Defensive Fire Coverage Diagrams of Soviet Bomber and Transport Aircraft," (2) "Defensive Armament System of BADGER," (3) "Defensive Armament System of BEAR", and (4) "Theoretical Effectiveness of Soviet Bomber Sub-Systems". (SECRET)

FIGHTERS:

A major change in the Soviet fighter-armament philosophy was revealed during this period. Intelligence collection

ascertained that an armament change transpired in one particular Soviet aircraft, FARMER B, wherein the normal gun complement was removed and four external wing pylons installed. Since the guns were removed, it could only be assumed that these pylons were designed to carry AAM's as their sole firepower, although, to date, no stores were observed attached to these pylons. Hence, it is probable that the Soviets are now modernizing their fighter aircraft with an armament more effective in present day combat environment than guns. (SECRET)

Estimates of Soviet fighter-armament systems were presented in three publications: (1) "Soviet Intercepter Armament Systems", (2) "Analysis of Soviet Tow Target Glider", and (3) "Analysis of Soviet Tow Target Glider". (SECRET)

SOVIET AIR-TO-AIR GUIDED MISSILE CAPABILITIES

The Center collected and analyzed fragmentary information about components of a Soviet beam rider air-to-air guided missile. The most probable over-all missile design and performance were established from this information, which covered about 50% of the missile itself. Information in the form of descriptions and sketches covering the missile guidance and control sub-systems was supported by the acquisition of a hardware item, a cylinder and piston assembly, utilized in the integrating rate gyro and

accelerometer. Evaluation indicated the component to be an authentic part of the missile at that development stage; hence, confidence in the previously reported intelligence information was materially increased, since the data was acquired from separate sources. (SECRET)

The Soviets were credited with the capability to design and produce an air-to-air guided missile for their fighter interceptor aircraft, and, in fact, ATIC became aware of advanced research and design programs in all basic operating principles such as beam rider, semi-active homing, and infrared homing. Actual operational utilization was not detected. (SECRET)

Estimates of Soviet air-to-air missile capabilities were presented in the following publications: (1) "Soviet Air-to-Air Guided Missile Capabilities", and (2) "Analysis of Air Damping Piston Assembly for Soviet Air-to-Air Guided Missile". (SECRET)

VULNERABILITY:

Vulnerability investigations of current Soviet bomber aircraft were completed and detailed results presented in the following publications: (1) "Vulnerability of BADGER to Various Air-to-Air Weapons", (2) "Vulnerability of BISON to Various Air-to-Air Weapons", (3) "Vulnerability of BEAR to Various Air-to-Air Weapons", and (4) "Vulnerability Data -

Soviet Aircraft". (SECRET)

NUCLEAR WEAPONS:

During the past six months, a mathematical method was developed for estimating the number of weapon types in the Soviet nuclear weapon stockpile. The number of weapon types in stockpile (diversification) is a direct indicator of the Soviets' capability to accomplish various types of nuclear weapons and, therefore, is extremely desirable information which heretofore was highly speculative. (SECRET)

This mathematical analysis is based upon several assumptions. First, nuclear weapon tests are a necessary adjunct to an effective weapons development program. Consequently, the number of weapon tests, as well as the rate of testing, correlates with the rate at which new weapons are developed and produced for stockpile. Second, the rate of weapon testing by the US and the rate of weapon testing by the USSR bear a similar, though not identical, relationship to the respective weapon development and stockpile rate. (SECRET)

A mathematical expression describing the history of progress can be written for the US test program, the US development program, and the USSR test program. The derivation of the unknown quantity, history of the development program in the USSR, is accomplished by comparing the rates

of US and USSR testing and assuming a correlation to exist between rate of testing and rate of development. These relationships as determined graphically from plots of total number of tests versus year and total number of weapon types versus year, take the form

$$\text{Log } N = \frac{Y - b}{C}$$

where N equals total number of weapon tests or types, Y equals year, b equals abscissa value (year) when N equals 1, C equals a constant proportional to the slope of Log N. (SECRET)

Solution of these relationships resulted in the following estimates of weapon types in the Soviet nuclear weapon stockpile:

1959 = 13 types

1960 = 16 types (SECRET)

This method is considered valid only through 1960, due to the present moratorium on nuclear tests and also the probability that development rates will level off as major improvements become more difficult to achieve. (SECRET)

A detailed development of this method was presented in an ATIC Study dated 9 December 1959. In addition, a study estimating the design details of these weapons and their aircraft and missile compatibility was in process of publication late in 1959. (SECRET)

BW-CW WEAPONS:

Accomplishments in biological and chemical warfare technical intelligence included a major examination of the Soviet capability for conducting offensive operations in this specialized warfare. The assessment of Soviet capability for the air delivery of BW-CW weapons encompassed both aircraft and missile delivery systems. (SECRET)

Results of the international conference on biological and chemical warfare held at Pugwash, Nova Scotia in August stimulated a closer look at Soviet BW-CW by the intelligence communities. ATIC went on record with the other agencies in supporting the belief that the Soviets have a comprehensive offensive biological warfare program. Heretofore, this position was not formally held by the Air Force. (SECRET)

ANTIAIRCRAFT ARTILLERY CAPABILITIES:

A comprehensive evaluation of the capabilities of two Soviet antiaircraft weapon systems was completed during the past six months. These systems included the Soviet 57-mm and 100-mm antiaircraft weapon complex. The results of the investigation led to the conclusions that the engagement kill probability of either weapon system extended from zero to nearly 1.0 within the altitude range of 500 feet to 3,000 feet when engaging the B-47 and the F-100A aircraft at speeds of 420 knots and 525 knots, respectively. The 500-ft altitude

increments between 500 ft and 3,000 ft were added to the study. (SECRET)

EQUIPMENT:

Evidence of Soviet progress toward placing a man into orbit and safely returning him continued to appear during the closing months of the 1950's. This triumph, and the final triumph of human interplanetary exploration, appears definitely to be in the Soviet plan, no matter whether or not they are to be first in this achievement. (SECRET)

The obstacles to be overcome in orbiting a man are those associated with maintaining the life processes in the space environment and the safe recovery from orbital velocities. Some time ago, in their second earth satellite, the Soviets demonstrated a capability to maintain mammal life in space approximately five days. Going to the next problem, that of recovery, it was recently learned that they had during the past year successfully recovered two dogs and a rabbit in free-fall from an altitude of 120 miles. These evidences all point toward a present Soviet capability to recover a man from space in free-fall and a probable capability to recover a man from orbit. (SECRET)

Although the Soviets are undoubtedly presently capable of supporting human life in space, to do this for a period of time in excess of 30 days would require very substantial

weights of breathing oxygen, water, and food, unless certain materials are recycled. A closed ecology, in which all materials are recycled indefinitely would be the ultimate in this regard, and Soviet work toward this objective was confirmed during late 1959. ATIC received information indicating that the Soviets had succeeded, in the laboratory, in recycling breathing oxygen for one man for a period of seven days, using living algae to produce oxygen from the exhaled carbon dioxide. (SECRET)

Outstanding successes by the Soviets in the fields of photographic reconnaissance and energy conversion appeared in their Lunar reconnaissance vehicle, launched in October 1959. This vehicle succeeded in photographing the back side of the moon from a distance of 40,000 miles and subsequently transmitting these photographs to receiving stations in the USSR. (S[redacted])

Electrical power used on this vehicle was provided by a solar powered generating system which generated electricity directly from the solar radiations, without the use of any moving parts. This represented the largest system of this type yet used and indicated a Soviet capability to provide power for a wide variety of space exploratory vehicles, which can be used to explore out to and including the area of Venus and Mars. ([redacted])

In the area of ground support equipment for Soviet guided missiles, the reporting period marked the continued accumulation of evidence pointing toward the adoption of a mobile philosophy by the Soviets in the deployment of their missiles. The Soviet transportation system being highly rail dependent, would infer that support for Soviet missile deployment will be highly dependent upon their rail system and that the Soviets will therefore attempt to make each launching facility as self-sufficient as possible. (SECRET)

CHAPTER 8

PROPULSION

AIR-BREATHING ENGINES:

Propulsion specialists from DDI (Tech) of the Royal Air Force and DAI of the Royal Canadian Air Force met with ATIC propulsion specialists in the Sixth Annual Conference to discuss air technical intelligence concerned with Soviet aircraft. Agreements were reached on the basic thermodynamic cycles and sizes of turbojet and turboprop engines in all current Soviet aircraft. Of special significance is the fact that the power plant for FITTER aircraft was resolved, a subject upon which no agreements had been reached for the last three calendar years. (SECRET)

Considerable effort was expended in synthesizing estimates on turbomachinery and thermodynamic cycles for Soviet aircraft nuclear propulsion systems. Initially, the efforts were directed to prognosticating systems in support of the 1962 and 1965 ATIC nuclear bomber estimates. Finally, however, studies were made on hypothetical nuclear propulsion systems which are estimated within the Soviet capability for five, two-year periods between the years 1960 and 1970. (SECRET)

The contractor's evaluation and report on the Soviet AV-50 propeller was completed within this period. This item was the sole article of physical hardware which was exploited

within the six-months span. The endeavor was considered significant as it provided another calibration point in affixing Soviet state-of-the-art in propeller development as a function of time. (S[redacted])

ATIC produced two publications which were particularly significant in view of current estimates and indications of Soviet employment of ramjet engines. These end products provided other members of the intelligence community, as well as major air commands, with the results of a study on a subject for which the Soviets had displayed no hardware. ([redacted])

The efforts of the past three or four years in achieving an in-house capability to design and more accurately predict the performance of Soviet turbojet engines at all modes of flight conditions through employment of computer exercising neared completion by the end of 1959. Programming was well advanced for the IBM-7090 computer. ([redacted])

ROCKET PROPULSION

ATIC furnished estimates to the intelligence community of Soviet capabilities in the field of rocket propulsion applicable to the areas of offensive and defensive missiles and space vehicles. The propulsion estimates and related data were disseminated in the following ATIC publications: Defensive Surface-to-Air Guided Missile Capabilities, Soviet

Offensive Guided Missile Capabilities, Soviet Astronautics, Soviet Rocket Power Plants for Long Range Missiles and Space Vehicles, Soviet Rocket Power Plants for Aircraft and Short Range Missiles, Soviet Capability to Develop ICBM and Satellite Rocket Power Plants, Contributions to NIE's, NIS's, and FWAIS's. (S[redacted])

The Soviet rocket power plant capabilities provided in these publications permitted ATIC to estimate Soviet missile and space vehicle characteristics and predict future trends. (S[redacted])

Critical evaluation of the rocket propulsion information provided by Soviet repatriated Spanish personnel continued. The matching of some isolated facts with those obtained earlier from German rocket-power-plant technicians indicated that there is valid information to be gained from this program. Information concerning the Soviet nominal 150,000-pound-thrust rocket engine development lends credence to an earlier prediction of Soviet need for an engine in this thrust category. (S[redacted])

Under the Scientific and Technical Exploitation Program, US industrial rocket propulsion specialists screened and evaluated for ATIC the Soviet open literature potentially applicable to rocket-propulsion and aerospace-vehicles. (S[redacted])

Guidance was provided responsible US collection agencies to improve the information collection effort in the field of rocketry. Joint activities between technical specialists of CIA and ATIC have improved the intelligence "take." (S[redacted])

ELECTRIC PROPULSION AND NUCLEAR REACTORS

In the Nuclear Reactor area, ATIC developed and implemented a performance-analysis procedure, through contractor assistance, which enables more thorough analysis of design-performance characteristics. This group also provided timely support for the establishment of estimated Soviet nuclear-propelled aircraft and guided missiles, and major support for the NIE on Space. Chairmanship of the working group responsible for contributions on nuclear reactors for propulsion to the NIE on Atomic Energy was delegated to ATIC for the next report period. (S[redacted])

Analysis conducted to date indicates that the Soviets are actively engaged in research and development programs on electric propulsion systems for space applications. This group supported the ATIC effort to establish Soviet capabilities in space, and make a major contribution to the recent NIE on Space. (S[redacted])

FUELS AND PROPELLANTS

A marked change evolved in the nature of operations in the area of fuels and propellants. External technical

assistance in this area was supplanted by a developed in-house capability. (SECRET)

The contractual assistance used during the past several years was based upon two necessities: (1) the need for more astute scientific talent to review the accumulation of information in order to detect more meaningful indications of Soviet activities and intentions which were not readily exploitable by ATIC specialists, and (2) to seek new means and approaches to develop information in those areas where intelligence was weak or non-existent. (SECRET)

This technical assistance, through the studies which it produced, established a more firm foundation in fuels and propellants intelligence for preparing estimates and evaluating new information. The close working relationships between industry's senior scientists and ATIC's specialists on intelligence problems, and self-education by the ATIC specialists, enabled the development of a competent in-house capability. This coupling of achievements (a firmer intelligence foundation and an in-house capability) lessened the need for continued contractual assistance. Only in a relatively few areas did the need for external assistance continue; for example, laboratory analyses on samples of foreign fuels, and industry-wide consultation by a coordinating research council. (SECRET)

ATIC's revised program required that basic science inputs be procured from other intelligence activities. This posed a difficulty since so much of the intelligence produced by ATIC is predicated upon the thorough comprehension of Soviet basic sciences. An example of this dependency was reflected in the synthetic lubricants study recently published. Original efforts were directed to the applied field (synthetic lubricants) and the lack of findings justified the cancellation of further efforts. However, when attention was directed to the allied basic field (silicon chemistry) the results strongly indicated that a Soviet synthetic lubricants program had existed for several years. Only by close scrutiny of this Soviet basic science area was this significant conclusion possible. (S[redacted])

A computer program for both solid and liquid propellant calculations was implemented by a "dollar-a-year" contractor. ATIC's fuels and propellants group will adapt this program to the Center's new 7090 computer. (S[redacted])

With the shift in emphasis from jet and conventional aircraft to guided missiles, ATIC limited its coverage of petroleum products to jet fuels in order to direct more attention to rocket propellants, high-energy fuels, and high-temperature lubricants. (S[redacted])

CHAPTER 9

ELECTRONICS

PRELIMINARY INFORMATION ON ELECTRONIC SYSTEMS (PINES):

During this period the PINES messages were established to accomplish rapid distribution of significant information in the area of Soviet Bloc electronic systems to principal users of electronics intelligence. In addition, ATIC started a new series of publications called Executive Reports to provide an effective, easy-reading resume of technical intelligence which already exists as ATIC publications. (SECRET)

RADAR

ATIC spent considerable time and effort in analyzing new Soviet radar systems. It was of interest at this point, because an unprecedented number of new Soviet radar systems were introduced into the field in 1959. The Center reduced effort in Radar Echo Area Measurements by limiting work to specific prime Soviet vehicles only. (SECRET)

ATIC received the SAC Criteria for Radar Capability, which outlines SAC's requirements. This document specifies particular interest areas and will greatly enhance all effort

in support of SAC. The Center completed a brief but comprehensive study concerning Range Instrumentation Ships associated with the Soviet missile effort. This is the beginning of a subject which will no doubt increase in importance in the immediate future. (S[redacted])

MISSILE GUIDANCE

In the ballistic missile field, ATIC made an analysis of possible Soviet ICBM guidance methods and calculated their theoretical accuracies. Miss-coefficients used in calculating these accuracies were derived, assuming a near-minimum energy trajectory. (S[redacted])

The Center concluded that a zero baseline system utilizing monopulse tracking techniques and doppler velocity measurement could achieve a CEP of about 1.0 NM of ICBM ranges. This type of system has the advantage of centralized location but is rather complex. It requires careful adjustment, difficult alignment, and extensive checkout and maintenance procedures. (S[redacted])

ATIC analyzed another method which utilized much less complex equipment. This is a multiple radar system utilizing long baselines. A possible system used for analysis purposes has three relatively unsophisticated radars located at the vertices of an equilateral triangle. If 50 to 60 NM baselines are used, it was determined that a CEP of slightly less than

1.0 NM of 5500 NM could be obtained utilizing Soviet radar with range accuracy of 30 ft. and velocity accuracy of 0.2 ft/sec. (S[redacted])

Since inertial guidance offers the advantage of invulnerability to electronic jamming, it provides a maximum salvo capability and is favorable for operation from hardened sites. ATIC performed a CEP analysis of this method. Using component accuracies now estimated for the Soviets, a guidance accuracy of about 3.0 NM was calculated for a range of 5500 NM. ([redacted])

There were indications of Soviet application of inertial components to guidance and, therefore, ATIC examined the use of a combined radar and inertial system. This is a system in which the better features of radar guidance and inertial guidance are combined in a hybrid system allowing the use of much more simple components than when either system is used alone. Examination of this system indicated that it was possible to obtain a CEP of about 2.0 NM utilizing comparatively simple "WHIFF" or "FIRE CAN" type of radar with baseline and unsophisticated inertial components. ([redacted])

Based on these analyses, ATIC estimated that the Soviets could now be using a radar-inertial system, but that the ECM vulnerable link would be eliminated by an all-inertial system during 1960-63. However, radar guidance systems

produced prior to this time period were estimated to remain in the Soviet inventory. ([redacted])

The discovery of a new Soviet surface-to-air missile system triggered off an all out effort to determine its characteristics and capabilities. ([redacted])

The first indication of the deployment of this new SAM system was obtained when photography, taken in June 1959, revealed a site at Glau, East Germany. Since that time intelligence revealed that this new SAM system was extensively deployed throughout the USSR. A concentrated effort was made to determine the exact guidance scheme employed by this system. The result of this effort allowed ATIC to estimate the most likely system used, its guidance accuracy, and vulnerability to countermeasures. ([redacted])

In conjunction with this SAM investigation, ATIC supported several conferences with regard to SAC war planning and ARDC countermeasures development. ([redacted])

Several articles were written by the Soviets on a process known as "adjoint second order perturbation". This theory may be applied to missile guidance problems, allowing much simpler mechanization of the guidance equipment. ([redacted])

COMMUNICATIONS

During the latter half of 1959, five technical intelligence reports and one technical working paper were published. These

reports were the result of six external contractor assistance contracts. The publication "(U) An Assessment of USSR Capability in the Field of Radiowave Scatter Propagation" is rather significant in that this is the first comprehensive study, to our knowledge, relative to the Soviet's capability in scatter propagation published in this country. Another report titled "(U) Soviet Capability in Telemetry as Applied to Air Weapons" is the first system and technique study concerned with Soviet telemetry published in the United States. (S[redacted])

Also during this period, examination of new Soviet air transport aircraft revealed the introduction of a new complement of airborne communication equipment. The radical deviation from Western practices previously adopted by the Soviets indicated a new era in Soviet technology. Their technical advances began to require a finer degree of technical analysis, due to greater design complexities. Many new features were noted. Only the best proved techniques developed by the West were being adopted. (S[redacted])

An increasing emphasis on wire and cable communications became very evident during this period. The efforts extended toward this phase of communications was more prominent than ever. The expansion of this communication media, with its high capacity and versatility for conversion to other media

of communication and reconversion back to wire or cable, demanded more exacting analysis. (SE[redacted])

The publication of many Russian publications on wave-guide communication using millimetric waves to realize exceptionally wide bandwidths for communication services was noted. This type of communication transmission has been under study since 1934 in the US, but many complex problems remain to be solved, and it will probably not be commercially acceptable for many years. This is another complex technical area that the Soviets began entering during this period. (SE[redacted])

Future estimates contained in TIS-EL-56-2 "Soviet Air Communications" published three years ago were confirmed during this period by analyzing the equipment on recent IL-18, TU-104, and TU-114 aircraft. Specifically: (S[redacted])

1. "Prior to 1960 eight to twelve channel equipment will be utilized" (VHF Command). (S[redacted])

These aircraft have appeared with a new 6-channel VHF command set in place of the 4-channel RSIU-3M. Some of these installations have carried dual sets to provide 12 preset channels. The sixth channel may be manually reset. (S[redacted])

2. "Subsequent to 1960 frequency synthesis techniques are expected to allow as many as 25 channels of command communications available to the pilot." (S[redacted])

The TU-114 aircraft has a new 20-channel VHF set employing frequency synthesis with provision for setting the frequencies (500 plus) manually by three simple knurled wheels and one additional control. This is claimed to be such a simple procedure that the preset channel provision is seldom used in these transport aircraft. The Czechoslovakian VVF-25K 26-channel airborne VHF transceiver which appeared during 1959 in TU-104s further supports this estimate. ([redacted])

COMPUTERS

A thorough investigation of Soviet computer capabilities was concluded and published in study form during the period. It revealed that the Soviets have adequate capability to develop airborne and missile-borne digital computers and are probably emphasizing such work in their air-defense and missile programs. They have concentrated on methods of formulating problems, and their theoretical work on logical circuitry appears outstanding. Progress in these areas will result in substantial advancements in technology, even though Soviet component development has not progressed remarkably and Soviet fabrication techniques are well below Western standards. ([redacted])

ELECTRONIC COUNTERMEASURES

The ECM collection program, which was given impetus as a result of the "1959 Berlin Crisis" during the preceding

period, began to produce results. The first USAF intercept of a Soviet radar jammer was received. The signal characteristics confirmed ATIC estimates. Continuation of the Soviet ECM build-up was evident in the mounting number of ECM exercises, sightings of long-range aircraft equipped for ECM functions, and sightings of more and different types of ground-based ECM gear. (SECRET)

ELECTRONIC COMPONENTS

The Soviet Exposition in New York occasioned a flurry of activity in the field of electronics components, but no unexpected developments. The Soviets showed some interest in moderate "miniaturization", but even in their space program it was obviously only of secondary interest. (CONFIDENTIAL)

CHAPTER 10

AIR SCIENCES AND TECHNOLOGIES

BIOSCIENCES:

ATIC began a critical survey of the Soviet work and capabilities in the field of biosciences in September to determine areas of priority necessary to the development of a sound biosciences program for ATIC. Emphasis was placed on Soviet "Man-in-Space" efforts. (C[redacted])

SPECIFIC PRODUCTS:

During this period the Air Sciences Division prepared ten intelligence papers reflecting estimates on the following areas of Soviet and foreign science: meteor research (as applied to guided missiles and air operations), information theory, thermoelectricity, (solid state physics), electromagnetic wave propagation, geophysical measurements from Sputnik III, capabilities in geomagnetism, aerial meteorological and reconnaissance capabilities, transistor materials, and lattice interactions, and radiation chemistry.

In accordance with specific requests National Intelligence Estimates (NIE) were prepared on Communist China, Switzerland, Denmark, and the USSR with respect to individual capability to instrument future space vehicles. ([redacted])

The ATIC Study "Soviet Competence in Airglow and Auroral Research" was accepted by the US Department of Commerce for publication and distribution to the US Science community and the general public. (S[redacted])

The ATIC Study, "Soviet Capabilities in Nonlinear Mechanics and Applications," was sanitized for distribution to a larger segment of the US Scientific community, since very little is available on this subject in the US. (S[redacted])

The following "Technical Briefs were prepared: Soviet Research in Weather Predication, Soviet Aerial Weather Reconnaissance, New Italian Space Research Center, Soviet Plans for Space Travel, Soviet Biophysiological Animal Experimentation, Improved Gravity Capability of Soviets Revealed, Polish Organization of Chemistry, Chinese Communist Cloud Physic, Research by New Weather Radar, Interview with Soviet Guide on Rocket and Satellite Exhibition, Soviet Capabilities in Radiation Chemistry, Soviet Cloud and Fog Dispersal in the Arctic, and Versatility and Capability of Soviet Scientist N. N. Bogoliubov. (S[redacted])

SPECIAL LECTURES:

A programmed series of science lectures were presented to ATIC staff and other personnel during this period to promote a greater appreciation and understanding of the role of foreign basic science efforts in the field of intelligence. (UNCLASSIFIED)

During this period the following were presented:

Col. (DR.) Clair E. Ewing - "Geodetic Science in the Missile and Space Age"

Prof. Keeve M. Siegal - "Upper Atmosphere Ionization by Shock Waves and Missile Exhaust Flames"

Dr. Rudolf Penndorf - "Arctic Ionosphere and its Effect on Communication" (UNCLASSIFIED)

UFO:

As part of a plan to increase the over-all capabilities of the UFO program in the many varied fields under the scope of its responsibilities, ranging from rocketry to psychology, a UFO panel of specialists was established to convene monthly and study or analyze special UFO incidents and problems. The panel consisted of members qualified in the areas of Astronomy, Mathematics, Psychology, Religion, Physics, and Public Relations. (~~CONFIDENTIAL~~)

Proposals were made to transfer the UFO program to other USAF elements or agencies of the intelligence community with view to improving its "reaction capability." (~~CONFIDENTIAL~~)

AIR AND SPACE SCIENCES:

ATIC devoted the major part of this period primarily to implementing a plan developed earlier for a larger, more productive and dynamic Air Sciences program. Attempts were made to acheive this objective through survey and realignment of tasks and contractual

assistance, additional manpower, and a firm production schedule of end products designed to directly support ATIC Aerospace-Weapon-System programs or fulfill standing requirements of the intelligence community. (CONFIDENTIAL)

The development of this program was not realized, because of the inability to augment the manpower of the division, the directed reduction or curtailment of certain external contracts, and the command decision near the end of this reporting period to deactivate the division and transfer or reassign its assets to other elements of ATIC. (CONFIDENTIAL)

PROGRAMMING:

Programming was centered primarily on four general objective areas: (1) procurement of new, or realignment of, existing contracts for providing external assistance to the limited manpower of this division, (2) firm production schedules for studies, reports, working papers and other end products providing intelligence evaluations and estimates in Soviet basic science areas of Air Force interest, (3) closer monitorship of Project White Stork assistance given this division's project efforts, and (4) increased support to the Deputy of Air Weapons Systems and other elements of ATIC. (CONFIDENTIAL)

ATIC's purchase requests for new contracts included Georgia Institute of Technology (Atmospheric Optics), University of Maryland and M.I.T. (Aeronautical and Astronautical Sciences),

University of Chicago (Advanced Theoretical Chemistry), M.I.T. (Elasticity and Plasticity) and University of California and Princeton University (Magnetohydrodynamics and Plasma Physics). (CONFIDENTIAL)

AIR WEAPONS MATERIALS:

Through exhaustive coverage and analyses ATIC produced definitive and conclusive estimates on the Soviet research and development and technological capability in the various aero-materials fields unique and/or applicable to aero-space systems. (CONFIDENTIAL)

A total of 11 working papers and technical reports, 9 contributions, 25 technical briefs, and one briefing to NASA covering all the major aspects of the metallurgical and polymer (rubber and plastics) fields were produced in seven subject areas. (CONFIDENTIAL)

One of these concerned the availability of Soviet ANP materials in the 1962-70 time period. It was shown that by 1962 the Soviets would not likely attain an allowable operating temperature of more than 2100-2150°F in any fuel element material for a direct air cycle and that a material able to withstand a temperature of 2500°F in these components would not likely be developed until 1968-70. (An allowable operating temperature of 2300-2500°F in the fuel element material necessary for a high subsonic performance in a direct air cycle is required under

the present state of the art in design, shielding, cladding, etc. A breakthrough, for example, in shielding materials permitting reduction of weight could reduce these temperature requirements appreciably.) Nuclear-resistant plastics would probably be available to the Soviets about 1965, but the elastomers (rubbers) for nuclear application without a breakthrough would not become available before 1970. (SECRET)

Present Soviet re-entry protective systems for ICBM nose cones lack the sophistication of their US counterparts. The probable use of steel protected with a refractory coating, while permitting high velocity impact of Soviet ICBM's, imposes weight penalties that the Soviets have accepted to produce an operational weapon without delay. Soviet future developments will result in lighter re-entry heat protective systems. (SECRET)

The Soviets do not presently have the materials required for an aerodynamic nuclear ramjet missile. (SECRET)

The Soviets lag behind the US by 3 to 5 years in high strength-to-weight ratic metals for aero-space systems. (SECRET)

The Soviet research activities in light metals indicates extensive use of aluminum and magnesium for the next several years--which means Soviet use of aircraft of less than 2.5 Mach. (SECRET)

The Soviets have the metals for aircraft of greater than 2.5 Mach speed but not precipitation hardening stainless steels.

The latter is by choice and not from the lack of capability. The plastics for such aircraft will not, however, be available until 1965 while the elastomers (rubbers) without a breakthrough will not become available until 1968-70. (SECRET)

The Soviet rate of effort and quality of research in high temperature metals could well result in the loss of US superiority by 1970. The USSR's increased rate of research effort in heat- and radiation-resistant polymers, a serious limiting factor, is unique to aero-space systems. The Soviets' intent with respect to these systems is clearly reflected by their objectives set forth in the present seven-year plan. Here the Soviets aspire to increase polymer research by eight-fold and all chemical production by five-fold. Their intentions in advanced aero-space systems are further evidenced by the fact that materials research pertinent to such systems is being conducted by VIAM (All Union Scientific Research Institute for Aviation Materials). (SECRET)

INDUSTRIAL ENGINEERING:

In reviewing the area of Industrial Engineering during the latter half of 1959, several general observations of intelligence significance were apparent: (1) re-orientation of over-all effort pointed at more direct and timely support of the ATIC Weapon Systems Deputy (2) the revelation of the Soviet advances in production technology which may be applicable to aero-space

weapon manufacture, (3) emphasis on continuing exploitation of Soviet transport aircraft to secure positive indications of the state-of-the-art in production technology, and (4) the initiation of an intensive investigation of NIAT, the Soviet Scientific Research Institute of Technology and Organization of Production in the Aviation Industry. (SECRET)

ATIC channeled increased effort into contributions to over-all weapon-systems estimates. These contributions took several forms: producibility evaluations of specific, current Soviet aircraft and space vehicles, comprehensive manufacturing capability analyses of representative Soviet air-to-surface, ICBM, and surface-to-air missiles (used as direct input to Weapon Systems studies), and producibility appraisals of future Soviet aero-space weapons (manned aircraft, missiles, and space vehicles). Indicative of the shift in emphasis to higher priority areas is the fact that in the last half of 1959, 50 per cent of the formal contributions submitted dealt with guided missiles and space vehicles, as compared with 30 per cent during the same period last year. (SECRET)

The Center revised its program to establish the annual publication of "position papers" in the various aero-space weapon product areas. Scheduled for release so as to provide input to major estimates of weapon systems and components, they are

designed to provide across-the-board evaluations of Soviet capability and intent in appropriate fields of production technology. (SECRET)

Of high value was the recent revelation of Soviet advances in manufacturing process technology, much of which appears to be applicable to the production of yet unseen aero-space weapons. The discovery of unique processes such as underwater lightning, electro slag and friction welding, the development of ultra-high pressures to deform and create new materials; and extrusion of wide, integrally stiffened structural panels; has lead to the conclusion that future Soviet aero-space weapons may exhibit a new, advanced level of production technology. (SECRET)

The revelation of this advanced manufacturing process work has not only caused the intelligence community to reconsider prevalent estimates which credited the Soviets with "World War II manufacturing methods"; it has excited sufficient interest among several US airframe and powerplant manufacturers to prompt the initiation of similar manufacturing development programs in this country. (SECRET)

ATIC continued exploitation of available Soviet aircraft from a manufacturing standpoint. In the last few months of this period the TU-114, IL-18, and AN-10 aircraft were examined. Though these are transport types, much was gained from their exploitation since they were probably indicative of the Soviet

level of industrial technology at a given time, especially since many components are common to military aircraft; they provided concrete bench marks by which ATIC can check out estimates, and they will lend greater credibility to ATIC's future estimates in the eyes of the intelligence community and its using agencies. (~~SECRET~~)

In initiating an intensive study of the activities of NIAT, the central Soviet institute for manufacturing research in the USSR, ATIC adapted the basic approach used so successfully in the material areas to the area of industrial engineering. This approach involved a methodical correlation of personalities, facilities, and technical subjects of concern, with respect to time. In this way the attempt was made to establish trends in production technology, latest levels of technology in the various manufacturing areas, and future direction and intent, possibly to the degree which will enable firmer and more accurate predictions of the nature, the effectiveness, and availability of future aero-space weapons. (~~SECRET~~)

CHAPTER II

AIR WARFARE AND WEAPON SYSTEMS

RESEARCH AND DEVELOPMENT SUPPORT:

ATIC continued to support the ARDC Weapon System Project Offices and their contractors during this period. Numerous briefings were given, formal and informal, studies prepared, pointing directly to their requirements in order that new US weapons will be planned to meet the enemy environment that is estimated for the time period when the US weapons become operational. ATIC participated in the ARDC evaluation of contractors' studies on the Strategic Orbital System Study, Boost Glide Weapon System Study, and Boost-Glide Weapon-System Application Study. ~~(CONFIDENTIAL)~~

A briefing was prepared on Soviet Research and Development capabilities for presentation to the Force Estimates Board and to the Air Council. This briefing was presented by the ATIC Commander to the Force Estimates Board in December. ~~(CONFIDENTIAL~~)

ATIC completed two revisions to the Estimated Characteristics of Soviet Air Weapons and changed the format to a loose leaf publication pending Production Board approval at the close of reporting period. (UNCLASSIFIED)

The Soviet R&D Philosophy Study was completed in December. This study provides a better understanding of the overall research and development framework within which Soviet air weapon programs are carried out. In addition, a Study of the development and utilization of scientific and technical manpower in specific areas of environment was completed by the Associates for International Associates, Inc. Results of both analyses will be used as basis for the formulation of long term estimates and evaluation of the threat of technological superiority. (~~SECRET~~)

MATHEMATICAL SIMULATION METHODOLOGY:

Five probability models were delivered to ATIC in October and are being translated from the Applied Physics Laboratory (APL) Computer Program to the ATIC Computer Program. The sixth and final intercept model was completed and check-out runs are being made on the APL computer. (UNCLASSIFIED)

AIR-DEFENSE SYSTEMS:

B-58B Survey Team visited ATIC first part of July. Purpose of visit was to sum-up the B-58 defensive configuration required to survive in the past 1964 Soviet air defense environment. Team had previously visited SAC, NORAD, HQ USAF, RAND, the Systems Development Corporation, and John Hopkins University for information bearing on this problem.

A briefing was presented on the electronic environment beyond 1962 of the Soviet air defense system and the major threat to the B-58B. (CONFIDENTIAL)

Study distributed in December presented available data and evaluations pertinent to the estimated technical characteristics and potential effectiveness of the Soviet Bloc Air Defense system for the period 1959-1965. (SECRET)

ATIC obtained the services of Northrop Aircraft to determine requirement for and parametric performance characteristics of the preferred air-defense weapon systems the Soviets may develop to counter the Soviet projection of the Western threat during the period 1960-1975. (SECRET)

AIR-OFFENSE SYSTEMS:

ATIC directed work toward determining the effect of Soviet doctrine on weapon system effectiveness. External assistance continued with Lockheed Aircraft to outline the sensitivity of factors affecting weapon system effectiveness. (CONFIDENTIAL)

In support for Other Elements of ACS/I, ATIC completed Contributions to National Intelligence Estimates on Capabilities and Trends of Soviet Science and Technology, Communist China, Soviet Capabilities for Strategic Attack Through Mid 1964, Soviet Requirements for Air Defense Weapon Systems, and Sino-Soviet Requirements for Offensive Missiles and Space Vehicles. (SECRET)

Also completed and forwarded to the Directorate of Warning and Threat Assessments were 14 contributions to Free World Air Intelligence Studies and 11 contributions to National Intelligence Studies. ([redacted])

PUBLICATIONS:

Initial distribution was made in November of the Characteristics and Performance Handbook - Estimated Future Soviet Aircraft, including revisions pertaining to BEAR and MADGE. Revisions to the Guided Missile Handbook covered 23 missiles.

Representatives from the Office of Scientific Intelligence, CIA, visited ATIC for the purpose of discussing problems concerning NIE and NIS production. A new format was established for Sec 72 (Air, Ground and Naval Weapons) of the NIS in the USSR. ([redacted])

AIRCRAFT WEAPON SYSTEMS:

ATIC directed major effort toward the Nuclear Powered Aircraft Program. In July, a reappraisal of the ATIC estimate of the 1965 Soviet Nuclear Bomber was made; and services of Lockheed Aircraft were obtained to determine the most feasible nuclear powered manned-bomber weapon systems which the Soviets can be expected to develop during the next 10 years. ([redacted])

A joint three-service meeting was held at ATIC to formulate preliminary agreements on the program and require-

ments relative to the exploitation and evaluation of support aircraft. In attendance were representatives from Army Transportation Intelligence. Army ACSI, Army Continental Command, Army Aviation Board, and Navy Bureau of Aeronautics. (CONFIDENTIAL)

The escort crew for the COOT/IL-18 flight, from Halifax to Mexico City and return to Gander, 18-28 Nov 1959, were debriefed at ATIC on 3 December. This was the first crew that had obtained good photography of the crew compartment interior. (SECRET)

On 17 December, the Soviet four-engine turboprop AN-10A/CAT took off from Moscow for its flight to Andrews AFB via Sconefield, East Germany, Prestwick, Keflavick, Gander, and Boston International Airport. Upon inspection by representatives of the Aircraft Division, it was determined that the AN-10A/CAT is a 100 passenger variant, while the AN-10 is limited to 84 passengers. The aircraft which made the flight had most of the seats removed in the passenger cabin to provide space for the cargo of trees. (SECRET)

During September the 1959 Joint US-UK Canada Aircraft Conference was held at ATIC. Significant milestones achieved and agreements were reached. (UNCLASSIFIED)

MISSILES AND SPACE:

The Anti-ICBM, Space Review, Navy Missile and Second Generation ICBM Phase Teams were established. (SECRET)

Analysis and evaluation of intelligence information on the Soviet ICBM and Space Programs continued throughout the reporting period. (SECRET)

Work continued on the new surface-to-air missile system recently observed at Glau, Germany, as well as the results of the most recent effectiveness analysis of this system. ACS/I, Army personnel, SAC, The Air University, and Industry, were constantly briefed by ATIC personnel as additional information and evaluation results became available. (SECRET)

Supplements were completed on the Soviet surface-to-air guided missile capabilities study and the Soviet Astronautics Postulated Soviet Space Program 1959-1967. ATIC completed a special ICBM Study and a Technical Working Paper on nuclear warhead capabilities. (SECRET)

GLOSSARY

AFBMD	Air Force Ballistic Missile Division
AID	Air Intelligence Division (Library of Congress)
AMC	Air Materiel Command
ANP	Aircraft Nuclear Propulsion
ARDC	Air Research and Development Command
ATC	Air Training Command
AUC	Air University Command
CIA	Central Intelligence Agency
DAFI	Department of the Air Force/Intelligence (Australia)
DAI	Directorate of Air Intelligence (Canada)
DDI/Tech	Deputy Director of Intelligence/Technical (Great Britain)
ECM	Electronic Countermeasures
FWAIS	Free World Air Intelligence Study
FY	Fiscal Year
MCP	Military Construction Program
NASA	National Aeronautics and Space Administration
NSA	National Security Agency
PENS	Processing Equipment Notes
PRI	Priority Request for Information
PWS	Project White Stork
QRC	Quick Reaction Capability
RAAF	Royal Australian Air Force

RAF	Royal Air Force (Great Britain)
RADC	Rome Air Development Center
SAB	Scientific Advisory Board (AF)
SAC	Strategic Air Command
SAG	Scientific Advisory Group (ATIC)
SRI	Specific Request for Information
STEP	Scientific and Technical Exploitation Program
UFO	Unidentified Flying Object
VHF	Very High Frequency
WADD	Wright Air Development Division

X