

# A History of NASIC

## Chapter Two

### Air Technical Intelligence Center and the Soviet Threat

After World War II, the mission of technical intelligence changed. No longer were there mountains of advanced equipment to exploit, tons of documentation to decipher, and dozens of former enemy scientists ready and willing to help advance American industry. A Cold War loomed and the foe was very concerned about security and keeping the details of its latest equipment hidden from the Western world. In this fertile environment for change, a new discipline grew from the technical intelligence missions of World War II. The real roots of today's National Air and Space Intelligence Center (NASIC) lie in the years between 1947 and 1961.

#### Air Materiel Command's Intelligence Department

T-2 Intelligence became the Intelligence Department of Air Materiel Command on 10 October 1947. This was the beginning of a subtle change in the mission of technical intelligence. By 1949, the importance of the technical assessment began to loom in the stark realization that a Cold War with the Soviet Union was beginning and the future technical, scientific and industrial capabilities of the Soviets had to be estimated. Given the secretive society the United States faced, analysts had to be able to assess from afar, because the equipment itself would be much harder to acquire than that of the Axis powers. The danger to US national security was great, given the Soviets' first successful nuclear test on 29 August 1949 and the full factory production in that same year of the TU-4/BULL, a copy of the B-29 which was capable of delivering a nuclear weapon against the United States. The foundation of today's technical intelligence capabilities came into existence to protect the nation from a technological Pearl Harbor or even utter destruction at the hands of the Soviets.

The job requirements of this new discipline of scientific and technical intelligence called for a reassignment of personnel from the task of analyzing captured information to the significantly more complex job of "formulating reasonable estimates of future trends in foreign research, development, and industrial activity and of the consequent

effects of these trends upon the USAF (United States Air Force) and the national security."<sup>1</sup> The Intelligence Department began relying heavily on the aircraft industry and educational institutions to assist through nonprofit contracts in the detailed assessment of foreign aeronautical and scientific advances. This also helped the USAF and its contractors to better understand strategic vulnerabilities of the US military.

To better streamline the technical intelligence effort, the Central Air Documents Office (CADO) left the organization and became an independent unit on 1 June 1949. This was the beginning of the unit that is today the Defense Technical Information Center (DTIC). It continues to publish the *Technical Data Digest* and provide vital technical information, including published scientific and technical articles dealing with aeronautics, and articles written by US government researchers. After the separation from the Intelligence Department, CADO ceased to do translations. However, in previous efforts it provided 731 foreign documents and many more abstracts to the department's body of knowledge.<sup>2</sup>



*Chief of the Intelligence Department, Colonel Howard M. McCoy is shown with his staff. McCoy was the chief when T-2 Intelligence became the Air Materiel Command Intelligence Department in October 1947. He stayed until July 1949, when Colonel Watson came back to Wright-Patterson.*

While working directly for Air Materiel Command, the Intelligence Department conducted the basic missions of safeguarding military information and keeping the command informed about the military situations overseas. However, its most critical mission was developing intelligence estimates of foreign technical potential. This, of course, served the command, yet it also served the nation as the department utilized all forms of available information to determine characteristics and performance capabilities of Soviet aircraft and other equipment. That “other equipment” included early Soviet ballistic missiles. This field led to one of the greatest overall contributions in the long history of the unit: providing the nation with a better understanding of these terrifying weapons of mass destruction.

Late in 1949, the department published an “Intelligence Estimate of Current Russian Guided Missile Situation,” the first of its type and the forerunner of many thousands of similar reports to come. In April 1950, the Intelligence Department met with some of the nation’s leading guided missile experts. At that time, department officials informed these industry leaders of its assignment as the “analyzer and evaluator of all foreign guided ballistic missiles information in order to determine the guided missiles

potential of foreign nations.”<sup>3</sup> In this meeting, the department made clear its desire to work closely with industry, glean assistance and advice from the nation’s top scientists. Ironically, some of the best minds were brought here under the German scientist program that the department still ran. The result of this and other exchanges was the Intelligence Department creating a Ballistic Missile Office in October 1950.

Air technical intelligence was already influencing not only the Air Materiel Command and the Air Force, but also all of the Defense Department. In August 1949, the Intelligence Department hosted a symposium on foreign air technical intelligence. Attendees included other major commands and, more significantly, representatives of the Army, Navy, and the Central Intelligence Agency. This small department had information everyone was interested in because the Air Force led the way in technical intelligence. Indeed, the Air Materiel Command history from 1 January-30 June 1950 stated, “The Intelligence Department was the sole producer of air technical intelligence in the United States during the period under review.” This was a major mission, because the nation was on the verge of entering another war. Although gaining considerable attention in the military intelligence circles, the organization still had to



*Building 263 was ATIC headquarters during the 1950's.*

struggle to obtain the proper personnel to carry out this national responsibility.<sup>4</sup>

With the increasing reliance on technical data to create technical estimates, the job requirements for intelligence personnel began to change. With a general lack of opportunity to study foreign equipment, engineers had to go beyond basic knowledge of their trade to interpret the technical data they collected, then make associations between bits of evidence, and ultimately derive an accurate intelligence estimate. From the beginning, this was a difficult challenge for engineers to overcome. In October 1949, the department initiated a study aimed at defining exactly what air technical intelligence personnel did. When it concluded 8 months later, the civil service approved a new set of positions called “air technical intelligence specialist.” Through this effort, the intelligence leaders and the personnel leaders laid the foundation of today’s scientific and technical intelligence career field. Unfortunately, this meant the abolishment of all the existing positions and an audit to ensure people met the new standards. The requirements of the new positions were too rigid for some of the personnel who had served with the unit since World War II, and they had to separate from the department.<sup>5</sup>

In the early days of technical intelligence, there were relatively few means of intelligence collection. Cameras and listening devices provided some good information, and there were open-source intelligence possibilities, yet the United States depended greatly on good officers and enlisted personnel to collect information in the field. The Intelligence Department utilized Air Technical Liaison Officers (ATLOs) to collect technical intelligence information worldwide. The department trained these officers and prepared them for field assignments, where they collected data and provided technical expertise to theater commanders. When the officer career training program for the ATLOs was temporarily abolished in 1950, the department turned to creating reserve units throughout the country. These units included specialized personnel who served as investigators, analysts, and interrogators. The people came from the existing reserve, from universities, and from industry. Those coming in from the civilian realm received a reserve commission and a mobilization assignment to the Intelligence Department. By June 1950, there were five air technical intelligence reserve units, located at Wright-Patterson AFB, Washington, New York, Cleveland, and Los Angeles.<sup>6</sup>

All ATLOs had to be college graduates in a specialized technical field and had to have at least 4 years of practical experience in their area of expertise. Even though these officers were qualified, field experience indicated that the Intelligence Department could not always rely on foreign scientists to open up and give critical information to these officers. Indications were that they would, in fact talk to

other scientists. As a result, the department recruited 10 leading American scientists to travel to Europe in June 1950 and spend 90 days contacting and conferring with their counterparts. They briefed their impressive results to a joint service intelligence symposium on 21 October 1950.<sup>7</sup>

Late in 1949, the Intelligence Department made a historically important decision. It would no longer produce bulk intelligence about all other countries. According to USAF leaders, the United States only had one real enemy, and that was the Union of Soviet Socialist Republics. Therefore, all of the Intelligence Department’s resources from there on would be solely focused on the collection and evaluation of Soviet equipment and technology. This set the stage for the next 42 years of technical intelligence effort as the Intelligence Department, the Air Technical Intelligence Center (ATIC), and the Foreign Technology Division (FTD) all accepted the challenge of assessing Soviet scientific and technical capabilities. One little known fact about this period is that Headquarters, USAF even assigned the department responsibility for the production of all technical intelligence on Soviet anti-aircraft equipment on 8 June 1950. The Air Force technical intelligence star was rising.<sup>8</sup>

## **The Korean War and the Air Technical Intelligence Center**

The outbreak of the Korean War on 25 June 1950 forced the Intelligence Department into reevaluating its collection priorities and processes. A hot war tended to change the requirements of the Cold War, at least for the time being. With the approval of Headquarters, USAF, the air technical intelligence teams that deployed to overseas locations came under the direction of the theater air commanders. This meant that the department trained the individuals and supported their collection efforts, yet the operation of these teams came under the air commander in that particular area of responsibility. Although under other commanders, these teams provided much valuable information and equipment to the Intelligence Department and the Air Technical Intelligence Center over the next few years.

The war meant an almost immediate increase in requirements for the Intelligence Department. One of these was to effectively identify and detail the enemy aircraft the United States would be facing in the Korean War. The Far East Air Force benefited from a series of air technical brochures that described the performance and characteristics of all the types of enemy aircraft that US forces might initially face in combat. This type of response was only possible because the department kept its assessments “up-to-the-minute” and took the initiative to get this information out to the pilots as quickly as possible.<sup>9</sup>





*This Soviet-built IL-10 came to Dayton during the Korean War for testing.*

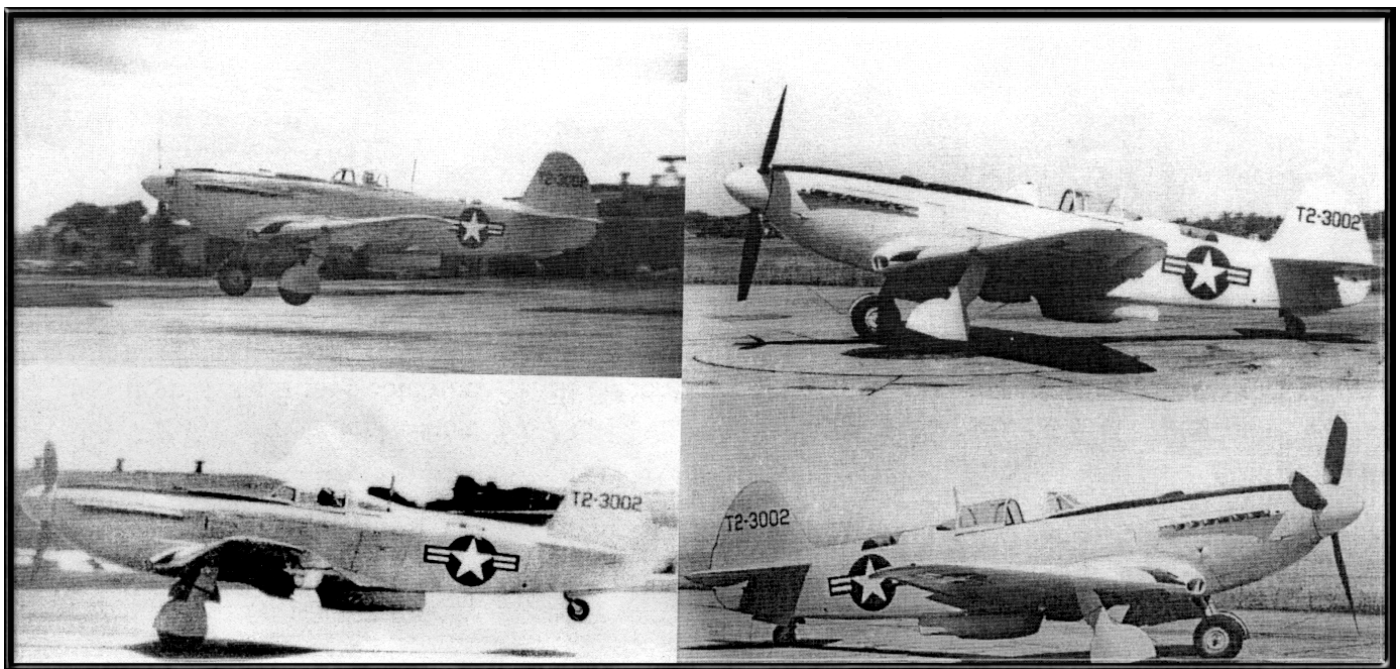
At the start of the Korean War, there were no ATLOs serving in the combat zone. After the United Nations breakout from the Pusan perimeter, the personnel of the Air Technical Liaison Office at Far East Air Force headquarters closed the office in Japan and headed to Korea to begin the job of collecting air intelligence on the enemy. Ultimately, they ended up at Kimpo airfield on 17 September 1950, just 2 days after the Inchon landings. It was here on an airfield quickly abandoned by the North Korean forces that their wildest dreams came true.<sup>10</sup>

As the Communist forces retreated from the area, they left behind an impressive treasure trove of aircraft and air-related materiel, such as instruments, weapons, ordnance, and engines. The most valuable of these were two complete North Korean IL-10/Stormovik aircraft and a Yak-9P fighter. These represented some of the best aircraft in the enemy inventory at that particular time in the war, and the ATLOs realized they had to get these assets back to the United States for exploitation. Given that their small team was not on

anyone's priority list, even to the point of not having any vehicles available to them, they did an amazing job in acquiring these aircraft for air technical intelligence.<sup>11</sup>

First, the ATLOs managed to get a Russian truck from a Marine unit and transfer the aircraft, one at a time, from Kimpo to the port at Inchon, where the United Nations forces had struck the North Koreans hard and fast just a few weeks before. Trucking their large assets down the road was the first challenge; then they had to work out an "unofficial and unauthorized means" to get the Navy to put the planes on a ship bound for Japan. From there, Air Materiel Command could get them home to America. After a sea voyage, these three aircraft and the associated air materiel finally made it to San Francisco, where they began the long journey to Ohio. There, the Intelligence Department awaited the opportunity to perform flight tests on them, just like Technical Data Laboratory did during World War II. Altogether, the ATLOs' take of foreign equipment weighed more than 90 tons.<sup>12</sup>

As stated earlier, the Intelligence Department depended on universities and industry to assist in the study of foreign air equipment. When the North Korean aircraft arrived in San Francisco, they were sent on to Cornell Aeronautical Laboratory, Inc. in Buffalo, New York for initial processing. The Yak-9P arrived in Buffalo on 26 December 1950, and the IL-10 aircraft made it on 24 January 1951. Cornell provided expertise in creating drawings and taking photographs of the planes' structures, plus it determined the weight, balance, data plate information, and markings data for each. This contracted effort provided the Air Force with quick, accurate technical information on which to base further testing.<sup>13</sup>



*These photos show the North Korean Yak-9 flight-tested by ATIC.*

This data derived from the aircraft while at Cornell all went directly to the Intelligence Department; however, the process of unmasking the capabilities of the Stormovik was already well on its way, even as the effort began in Buffalo. In fact, information from the ATLOs in Korea had already reached the department and the first product from their initial exploitation was published by February 1951, shortly after the aircraft arrived in the United States. Intelligence Department Study No. 102-AC-50/41-34, "Analysis of the Soviet IL-10 Ground-Attack Airplane," gave an impressive technical description of the aircraft, its characteristics and capabilities, plus vulnerability data. This study came out before the aircraft even flew here in the United States, thanks to the indepth analysis of the Intelligence Department-trained ATLOs in the field.<sup>14</sup>

In Buffalo, Cornell personnel completely assembled two of the aircraft, fully restoring them to flight condition and painting them in USAF markings. The Yak-9P had three shakedown flights by Cornell's chief test pilot before it was finally ferried to Wright-Patterson AFB on 4 September 1951. The one IL-10 that was returned to flight status first flew on a 4 May 1951 checkout flight; after another flight, it was ferried to Wright-Patterson on 8 May 1951. The Air Force shipped the remaining IL-10 to Dayton, where it remained stored in building 89 until needed.<sup>15</sup>

The Yak-9P flight test program consisted of 16 flights between 21 September 1951 and 12 December 1951. Air Force pilots accumulated 23 hours, 55 minutes of flying time in the Yak fighter, which now carried the tail number T2-3002 (even though "T2" was a holdover from the days of flight-testing World War II enemy aircraft). The IL-10 flight test program occurred earlier with 11 flights taking place between 20 June and 15 August 1951. The pilot, Captain R.L. Stephens put 13 hours, 55 minutes on the Stormovik with the tail number T2-3000. Although these propeller-driven aircraft were not as valuable as a complete Soviet jet would have been, they still provided insight into how much Soviet aircraft production had improved since World War II.<sup>16</sup>

As these events took place, the Air Force made a major decision about the importance of technical intelligence and the fate of the Intelligence Department. In mid-1950, Air Materiel Command questioned whether the Intelligence Department should remain in that command or move to the Research and Development Command (redesignated Air Research and Development Command on 16 September 1950). Because the research and development aspects of Air Materiel Command had become their own major command in February 1950, the question remained: was intelligence more research and development or logistical?

The Air Force provided the definitive answer in 1951: it was neither. Rather than allot these important intelligence

responsibilities to either of these major commands, Headquarters, USAF chose to create a new Center to carry out the mission of scientific and technical intelligence for the Air Force and the nation. The official reason stated in the Air Technical Intelligence Center's 1 January-20 June 1952 annual history is, "Since the Intelligence Department, AMC, was providing air technical intelligence to other components of the United States Air Force as well as AMC and the Air Research and Development Command, it was deemed advisable to lace the former Intelligence Department, AMC, directly under the Directorate of Intelligence, Headquarters, USAF, that it might better serve the United States Air Force." There is no doubt that Air Force intelligence leadership saw the need to retain this unique capability under their area of direct influence.<sup>17</sup>

On 21 May 1951, the USAF established the Air Technical Intelligence Center (ATIC) as a field activity of the Assistant Chief of Staff for Intelligence. The unit was also given a numbered designation as the 1125th Field Activities Group. The Center served as the technical intelligence element (AFOIN-4) of the Air Staff's Directorate of Intelligence. Manning for the new unit was initially 411 people. This represented the first time that the scientific and technical intelligence mission of the USAF had its own established unit. All the previous branches, sections, laboratories, and departments were simply a part of another established unit. The perfect leader was already in place to make this unit a success.<sup>18</sup>

As Chief of the Intelligence Department since July 1949, Colonel Harold E. Watson played a vital role in the intelligence transition from AMC department to USAF center. According to a 1991 oral history interview with General Watson, General Charles P. Cabell, Chief of Air Force Intelligence sent Watson to Wright-Patterson because he "had a job for Watson to do." The ATLO program was one of Watson's priorities at ATIC and General Cabell saw he got all the support he needed to get officers with a technology background out in the field to collect proper technical intelligence. Another of his initial goals was "establishing its proper organization, defining the mission, and beginning the work of watching the Russians." In this effort, he took responsibility for hand-picking many of the people who worked for him. Watson personally wrote the job descriptions of the newly created positions described earlier in the chapter. He convinced the civil service classifiers to grade the positions higher than usual because these specialists were working with incomplete information in their efforts to assess the Soviets. Basically, he created the foundations of today's technical intelligence career field. Watson's legacy today at NASIC extends far beyond foreign materiel exploitation.<sup>19</sup>



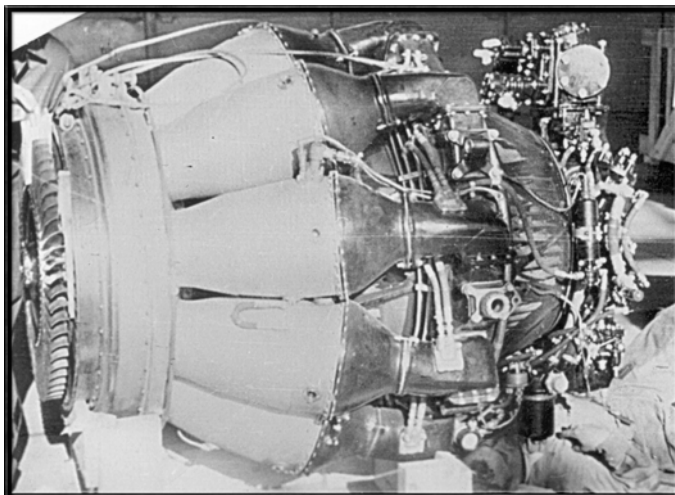
Interestingly, Watson's attention to detail in the civil service realm resulted in ATIC having some of the highest graded civilian jobs on base. He fought for highly qualified people, going as far as recruiting directly from the aviation industry when North American closed its aircraft production plant in Columbus, Ohio. He also changed the Center's Civil Service Commission office from the one in Dayton to the office in Cincinnati. In Watson's view, this allowed ATIC to avoid the "Wright Field riff-raff" that he worked so hard to rid from his unit. By this he meant the "deadwood" workers who were ineffective and not qualified to do the kinds of things he envisioned for ATIC would be sent back to Materiel Command. The secret to Watson's success was that he worked "face-to-face" with the head of the Civil Service Commission in Washington, and he "had a convincing, needed product." He turned ATIC into a technical intelligence center to be reckoned with.<sup>20</sup>

Watson stayed at the Intelligence Department and ATIC from 1949 until 1951. Some changes happened while he was away. The ATIC commander initially answered to the Assistant for Production on the Directorate of Intelligence, USAF. On 21 April 1952, that reporting chain changed as Colonel Frank L. Dunn began reporting directly to the Director of Intelligence, Major General John A. Samford. Watson returned as commander of ATIC on 15 September 1954, from an assignment with headquarters, Allied Forces Southern Europe. He was a brigadier general and had even more clout than before. The unit even received its own aircraft, C-47D 43-48856.<sup>21</sup>

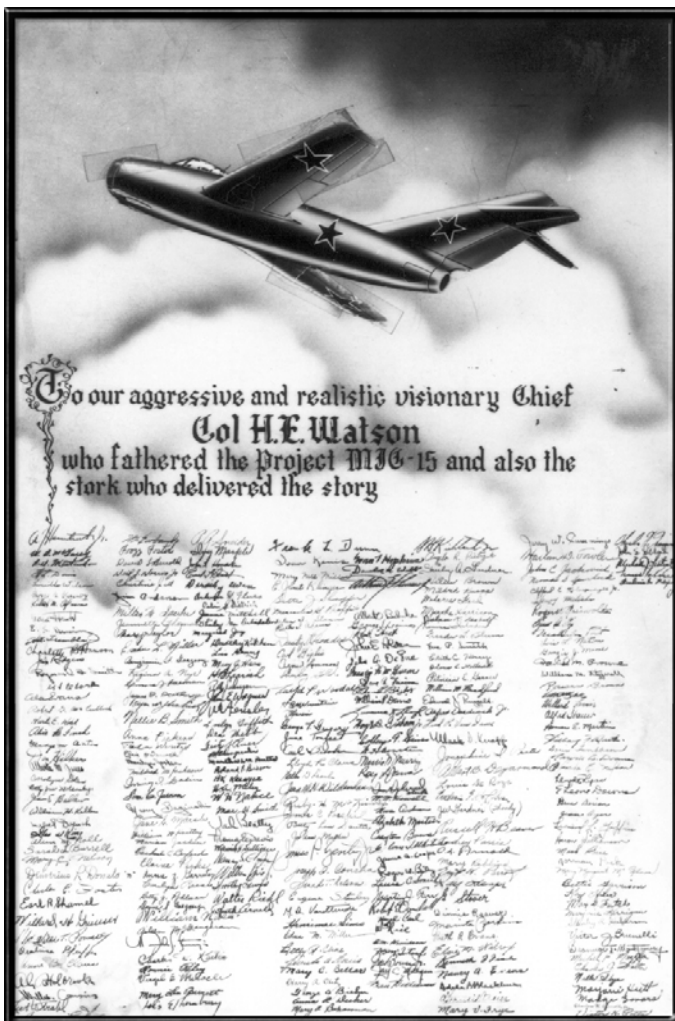
### Studying Crashed MiG-15 Aircraft

The Korean War gave ATIC a unique opportunity to actually acquire examples of advanced enemy equipment, as well as the older Ilyushin and Yak aircraft. Some of the equipment in the dreaded MiG-15/FAGOT was originally of Western origin. In the late 1940's, the British sold the Russians examples of their state-of-the-art "Nene" aircraft engine. According to General Watson, the original order was for 20 engines, yet the deal ended up being for 5 after he complained loudly to Air Force leaders about it. The Soviets still put the centrifugal flow engine design to good use, coupling with a dynamic swept-wing airframe to create the impressive little MiG-15. As the personnel at Intelligence Department and later at ATIC worked feverishly to estimate the jet's performance characteristics, the technical intelligence analysts in Dayton received a wonderful surprise from the Korean front.<sup>22</sup>

A man by the name of Don Nichols proved to be invaluable in assisting Air Force technical intelligence in the acquisition of some very valuable junk in 1951. The Master Sergeant with a sixth grade education and a love for Korea, its people, and language established a technical



*VK-1 engine from a defected Polish MiG-15. ATIC officers only had a short time to understand exactly how the engine worked, what it was made of, and how it was manufactured, before it had to be returned.*



*A citation presented to Colonel Watson from his team that did the analysis of the crashed MiG-15 parts obtained from Korea. The citation also mentions the contributions of "the stork, who delivered the story," which refers to the Battelle personnel who contributed greatly to this effort.*

intelligence collection network that recovered remnants of two MiG-15 fighters early in the war. His unit became the 6004th Air Intelligence Service Squadron (AISS) in 1951. On 17 April 1951, Nichols and his team of South Koreans located a MiG-15 crash site about 100 miles behind enemy lines. Flying in a YH-19 helicopter, call sign Windmill 14, Nichols landed, photographed the wreckage, documented technical information, and acquired a good number of vital pieces. Because of the mangled condition of the wreckage, he used hand grenades to acquire some engine parts. He noted the numbers “699” were painted in red on the wings and tail of the aircraft. The wreckage showed indications of an ejection by the pilot because there was no canopy or ejection seat. There were no visible national markings or anything written in a language other than Russian. The aircraft had a VK-1 engine, making it a MiG-15bis. As the pieces were flown out, the YH-19 was damaged by ground fire on the way to Cho-Do Island, where the wreckage was put on an SA-16A Albatross amphibian aircraft. It flew to the air base known as K-16, where the wreckage was put on a C-47 bound for Wright-Patterson. Detailed examination seemed to indicate the aircraft serial number was 0615399.

Once again, Watson included the civilian sector to enhance ATIC’s capabilities. After ATIC analysts obtained the engine parts and the tail section of the crashed MiG-15 from the Korean theater, Watson invited 14 major aircraft companies to view the MiG-15, to offer technical assessments, and to become more familiar with the Russian aircraft. ATIC provided the Far East Air Force (FEAF) with the performance characteristics of the Russian aircraft in theater and charts depicting the combat radius of the MiG-15. This support allowed FEAF to more effectively develop engagement tactics for its F-86 fighters.<sup>23</sup>

Another MiG-15 recovery took place on 20 and 21 July 1951. The wrecked jet aircraft was recovered by Nichols and his team working with the *HMS Cardigan Bay* and US Landing Ship *LSU 960* (modified with special crane) in shallow water of the coastal mud flats Southwest of Hanchon on the Korean West coast (northwest of Pyongyang). After the wreckage of this MiG-15 was recovered, it was delivered to US 5th Air Force at Inchon on 22 July 1951. The shattered remains of the jet were brought to Wright-Patterson for analysis by ATIC. The engine serial number was 50345116. This time, the team recovered the whole RD-45 engine, the first 9 feet of fuselage, both wings with gear, and the vertical and horizontal tails. Little in the cockpit was left to recover. It turned out that the aircraft was built in 1948 at the Zavod 1 factory. Perhaps the most shocking part was the first jet had a VK-1 engine, while this second example had an RD-45 with 1,000 pounds less thrust. Apparently, both types were fighting side by side.

Obtaining wreckage of a crashed MiG-15 was not the only way to glean technical information from the Soviet’s best fighter. There were two defections in 1953 that enabled ATIC personnel to study complete and flyable versions of the aircraft. Although these proved very helpful, the sad truth about defections is that international law required the jets to go home. Because of this, the feeding frenzy over MiG-15 data could not last long, and the ATIC teams had to move quickly in their efforts. On 5 March 1953, Polish Air Force Sub-Lieutenant Francizek Jarecki defected into Bornholm, Denmark in MiG-15bis number 346. Major Dan Gareri led the technical intelligence team from Germany to Copenhagen to take the aircraft apart and examine it very closely in the time they had. Their 24/7 efforts produced the first detailed comprehensive engineering and technical report on the MiG-15 fighter. They tested the subsystems and the armament package, but did no engine or flight tests. They did not have to wait long for another chance to “disassemble” another MiG-15 for shipment back to Poland.<sup>24</sup>

Jarecki’s defection inspired another pilot to follow in his footsteps. On 20 May 1953, Polish MiG-15bis number 415 defected into Bornholm, flown by Sub-Lieutenant Zdzislaw Jazwinski. Once again, technical intelligence personnel examined the aircraft closely. Although both Polish MiG aircraft proved to be of immeasurable worth, ATIC still did not have what it really wanted: a MiG-15 to keep.<sup>25</sup>

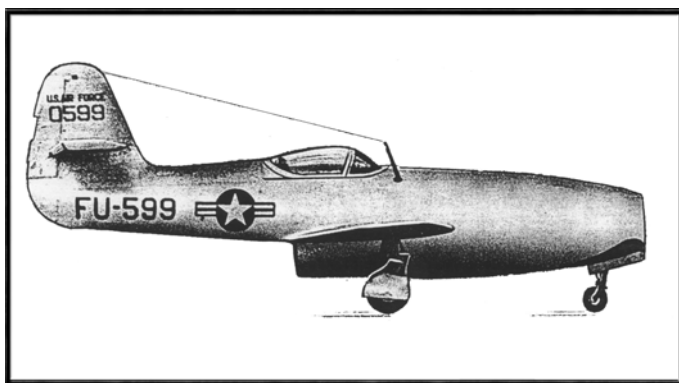
ATIC solidified its importance by the quality of the analysis it performed on the MiG fighters and their associated equipment during these war years. By the end of the Korean War, ATIC manpower had increased to 634 personnel, a 50-percent increase since its activation in 1951. In September 1953, just months after the war ended in July 1953, a North Korean defector named No Kum Sok delivered a MiG-15 to Kimpo Air Base near Seoul. Because the North Koreans did not acknowledge the defection, the aircraft stayed in the West. This time, a team of analysts from Wright-Patterson headed overseas to examine a complete aircraft, not just wreckage, and the most important detail was that the aircraft belonged to ATIC. The ATIC team monitored the MiG-15 flight test program at Kadena Air Force Base, Okinawa, which included 11 flights by Captain Tom Collins, Major Charles E. “Chuck” Yeager from the Air Force Flight Test Center at Edwards AFB, and Brigadier General Albert Boyd. From these tests and the continued tests later at Wright-Patterson and other locations, the ATIC team learned much.

The MiG-15 arrived at Wright-Patterson shortly after midnight on 8 January 1954, and was unloaded off the C-124 within an hour and a half. After the MiG was tested at Wright-Patterson and other military bases, the ATIC team

members happily assessed that their original early war estimates for the aircraft's performance and characteristics were actually 98-percent correct. This little jet, which now sits in the National Museum of the United States Air Force, validated many of ATIC's methodologies at a time when Soviet equipment was very hard to obtain and the technical assessment methods proved critical to defending the nation.<sup>26</sup>

## Yak Exploitations

ATIC received a complete, flyable Russian-built Yak-23 fighter in October 1953. Thanks to the cooperation of a Soviet satellite nation, the USAF had the opportunity to borrow the aircraft, fly it back to the United States on a C-124 transport bound for Wright-Patterson, and flight-test it before taking the jet back where it came from. A complete flight test program took place in November 1953, with Captain Tom Collins (fresh from flying the MiG-15) serving as test pilot. Known as Project Alpha (a popular term, NOT an official code word), the testing and analysis included a full ground exploitation that resulted in a technical report, a flight test program, and even a film about the project.<sup>27</sup> The report concluded that the Yak-23 was a lightweight fighter which had been given in quantities to Soviet satellite nations and that it carried a minimum amount of equipment on board. ATIC noted that the outstanding features of the aircraft were its takeoff, climb, and acceleration capabilities, while major drawbacks were the lack of cockpit pressurization, a 0.8-Mach number restriction, and poor directional stability above 325 knots. In short, it was not a very good aircraft in most flight profiles.<sup>28</sup>



*The Yak-23 flew out of Wright-Patterson in a classified project during 1954. This is a drawing of the Yak in US Air Force colors from the ATIC Yak-23 study.*

The workmanship of the aircraft varied from excellent to poor and unacceptable by US standards. The ATIC team studied every part of the airframe, weaponry, and instrumentation. Of particular interest was the jet propulsion system. The RD-500 engine on the Yak was an impressive

copy of the Rolls-Royce Derwent V engine. Although it powered the aircraft to excellent acceleration performance, it also heated the cockpit to over 110 degrees. Overall, the maintenance required for the aircraft was minimal, yet its performance in general was considered far less impressive than the MiG-15 operated by ATIC at the time.<sup>29</sup>

Another excellent opportunity to study a Russian aircraft came to ATIC in 1955. On 17 August 1955, a Yak-18 came to the Center from South Korean authorities. Once again, thanks to a North Korean defector, it became possible to study an enemy aircraft. USAF officials turned the aircraft over to Wright Air Development Center for flight-testing, with ATIC providing all the logistical support and technical analysis for the project.<sup>30</sup>

No Kum Sok, the defector who flew the MiG-15 out in 1953, got to know the defectors who brought the Yak-18 out of the North in June 1955. In a 1996 interview, he related that, "Captain Lee Un-Yong flew the Yak-18 and 2Lt Lee Eun-Seong rode in the back of the trainer." He told how both friends became colonels in the Republic of Korea Air Force. Sadly, Captain Lee had a hard time handling his new found wealth and fame. After a lot of drinking, he died of liver failure in 1974. However, Lt Lee had a much happier ending as a result of his defection, succeeding in business and ultimately becoming a millionaire.<sup>31</sup>

ATIC and the Wright-Patterson Flight Test Division operated the defector's aircraft from October 1955 to June 1957. It wore US Army markings and carried the designator T-10G. Tail number 47-715 accumulated 110 flight hours until the familiarization program on the Yak-18 ended on 26 June 1957. The Yak was grounded because of failure of the fabric to pass the tests prescribed by T.O. 1-1-25. The Air Force Museum got it, repainted it in North Korean markings, and then sent it to the National Air and Space Museum (NASM), in Washington DC, on 8 June 1960. At the time of this writing, the unrestored Yak-18 is in the Garber Restoration Facility. According to NASM, the Yak participated in a 16-17 June 1953 "Bedcheck Charlie" attack on Inchon that destroyed a 5-million-gallon gasoline dump.<sup>32</sup>

## Contracting for Help: Project Stork

In 1951, the Air Materiel Command's Intelligence Department, and later the Air Technical Intelligence Center, began utilizing a unique method for supplementing the unit's production capabilities: the contractor. Seeking a "gold mine" in Russian technology to boost his unit's capabilities, Colonel Watson looked to Battelle Corporation, later Battelle Memorial Laboratories, to provide technological and scientific information to ATIC by utilizing Battelle's Russian linguists and documents, as well as the Russian documents located at Ohio State University. Battelle was conveniently located in Columbus, Ohio, just up the road



from ATIC. According to Watson, he got \$20 million from the Secretary of the Air Force, Harold Talbot to create this revolutionary contract to acquire scientific and technical data on the Russians by utilizing civilian expertise.<sup>33</sup>

In contracting with Battelle, Watson hoped to “provide a source of scientific research, study, and analysis of the technical capabilities of a foreign government to wage offensive air warfare and to defend itself against air attacks.” Given the many thousands of products that Project Stork provided in the many years to come, Watson indeed found his “gold mine” of technical help. The process was simple. The engineers of the Technical Analysis Division prepared specific subprojects dealing with foreign air materiel, technical characters, performance, manufacturing techniques, and the types of materiel countries employed in their construction. Battelle then committed its personnel and resources to the request. They would fully answer the requirement, partially answer it, or inform ATIC it could not be done.<sup>34</sup>

By 1953, almost two-thirds of ATIC’s total commitment of procurement funds went to one single contract: Project Stork. Battelle invested a large amount of money in training its personnel to meet the rigorous technical and linguistic requirements ATIC imposed on them. There were, however, classification issues that occurred throughout the program. In May 1953, a study on the status of the nuclear energy program in the Soviet Union had to be revised to restrict Battelle’s contribution. Usually, the Project Stork people received summaries of the intelligence documentation that could not be released to them in total and they would work from the knowledge they had available. Otherwise, ATIC and Battelle had to deal with situations where the contractor could not participate in some phases of a project. It remained a constant issue throughout the program, which continued for over 40 years and bore the names White Stork and Have Stork in later years.<sup>35</sup>

## Readix: Entering the World of Computers

Beginning in 1955, ATIC analysts began using early computers for aircraft analysis. In the detailed analysis of the MiG-19/FARMER fighter aircraft seen at the 1955 Moscow May Day Show, the calculations of thrust, rate of climb, and other parameters used in performance analysis “were computed on UNIVAC.” This computer did not reside at ATIC, yet Air Materiel Command had a UNIVAC I (serial number 10) here at Wright-Patterson. Air Technical Intelligence Center received its first computer in August 1955, when contractors delivered a Readix digital computer to the ATIC headquarters in building 263.<sup>36</sup>

The computer required a tremendous effort on the part of the ATIC personnel who worked with it. They had to develop the necessary computing routines, as well as learn



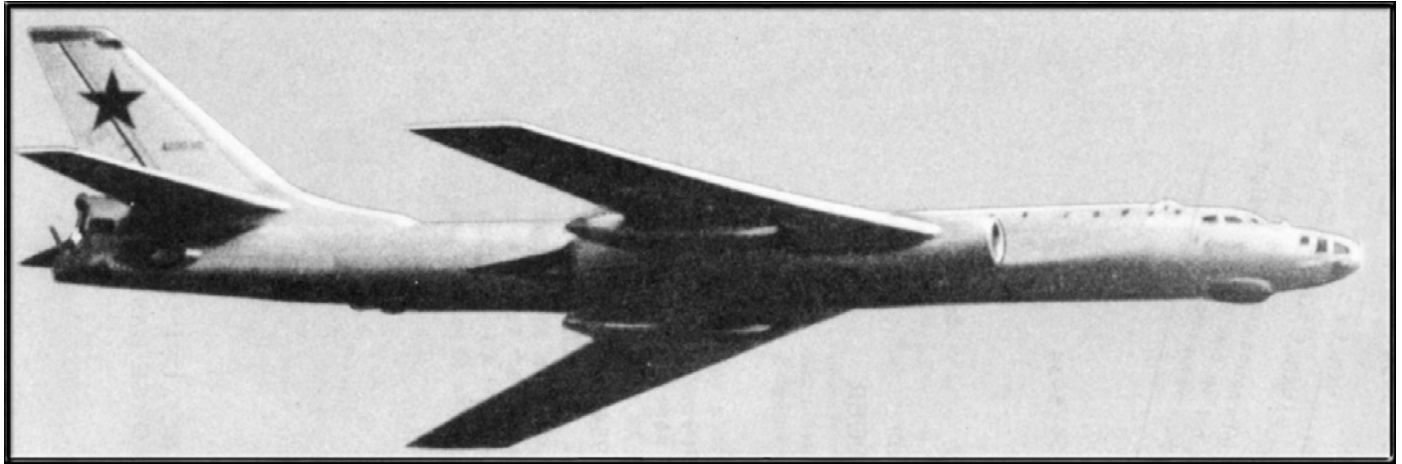
*The Readix computer was initially installed in building 263 and later moved to 828. This early computer helped reduce mountains of data and pioneered the use of computers in technical intelligence.*

the mechanical operation and design of their new resource. For the first few months, the Readix was nothing but trouble. Late in September 1955, the drum was ruined and the power lines gave everyone fits. Finally, with a resurfaced drum and design changes in its logic, the Readix was ready to work for a living. By November, the new computer was well on its way to satisfactory operations and the technical intelligence community had a resource that would prove invaluable over the years to come.<sup>37</sup>

In May 1957, the center employed its Readix computer in performing a portion of the computations for a contracted study entitled, “The Vulnerability of Bison, Badger and Bear to Current and Future US Interceptor Weapons.” Reducing vast amounts of data for technical assessments was not the only computer mission at ATIC. The unit purchased a Datatron computer in 1959 to be used as more of a business computer for personnel issues, timecards, and such. It went directly into building 828. The computer people had already moved the Readix over there from building 263 after the new building’s dedication in 1958. The initial computer space was upstairs next to what is now the NASIC Operational Analysis Center (NOAC). In the upcoming years, the Readix and its successors were used to perform many thousands of computations that contributed greatly to the missions of ATIC and its successor, FTD.<sup>38</sup>

## The Bomber Gap

The Soviets gave the world a peek at their latest equipment by performing fly-bys in association with the annual May Day celebration and the Tushino Air Show. This was an excellent chance for foreign intelligence collectors to glean information, and it was an even better opportunity for the Soviets to say to the world, “Don’t mess with us.” In 1954, ATIC representatives were not able to



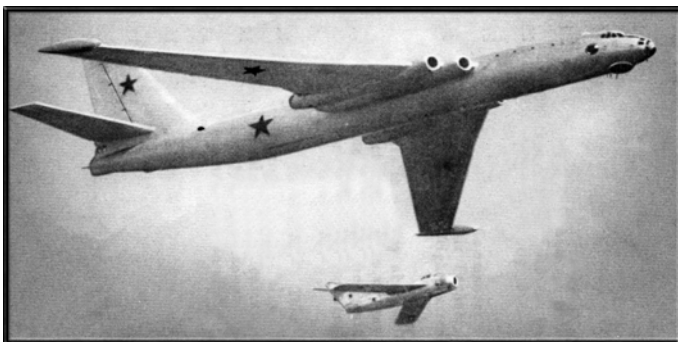
*The medium-range BADGER was also seen at the 1954 Soviet May Day Air Show.*

make it to the famous fly-bys that took place in the prior rehearsals and in the actual May Day celebration. The coverage ATIC obtained was marginal for that historic opportunity and for the photographic collection later that summer at the 1954 Tushino Air Show. However, the technical analysis of the extremely threatening bombers observed in those events was already underway. On 27 May 1954, ATIC initially published the assessment of the “Type-37” heavy bomber jet aircraft which was tentatively assigned the code name BISON. It was originally observed at Ramenskoye Airfield in 1953. The initial study on the “Type-39” medium bomber was completed as well on that date for the other observed aircraft tentatively called the BADGER. By the end of 1954, ATIC was already coordinating these studies with USAF Directorate of Intelligence, the Atomic Energy Commission, and the Department of State. If the Soviets had jet bombers capable of delivering nuclear weapons, then that threatened the peace of the world.<sup>39</sup>

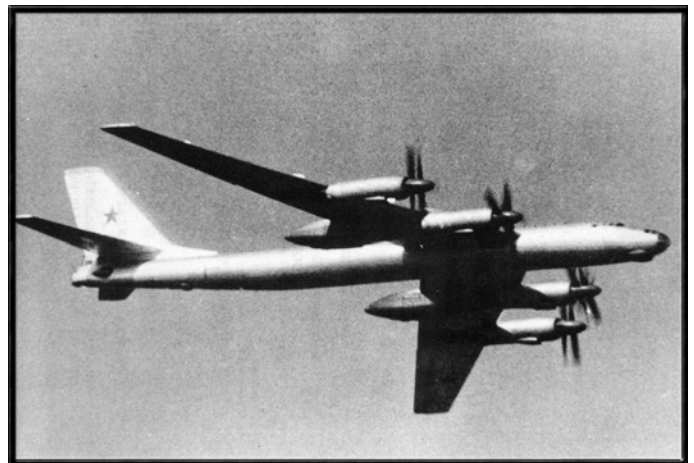
The 1955 air shows and rehearsals made the intelligence community even more interested in this new Soviet threat. In an attempt to mask the true strength of their bomber fleet, the Soviet military leaders allowed the US air attaché in Moscow to view the fly-by rehearsals for the May Day show,

which interestingly, was cancelled because of bad weather. The attaché reported two waves of M-4/BISON bombers, totaling 28 aircraft. Unbeknownst to the American, the second wave of 18 Soviet aircraft included the 10 BISON from the first group. That first group of 10 aircraft simply had circled and joined the 8 aircraft in the second flight. Based on this ruse, US estimates of Soviet bomber aircraft production increased dramatically, creating a projected “bomber gap.” In defense of ATIC’s initial analysis of this event, the January-June 1955 ATIC history clearly stated, “The appearance of the BISON in numbers (possibly 19 aircraft participating) in the 1955 air show rehearsal has necessitated a revision of the service availability estimate to 20 aircraft delivered to units in mid-[19]55.”<sup>40</sup> At least ATIC did not initially believe there were 28 BISON aircraft already in the inventory.

The initial reports, “Analysis of BISON” and “Analysis of BADGER,” were published in final form in 1955. ATIC assessed that, “The BISON, a swept-wing, four-engine, heavy jet bomber has a gross weight of 365,000 pounds



*One of the first photos of the M-4/BISON bomber in 1954. This type aircraft went on to fuel the bomber gap, perhaps its greatest contribution to history.*



*The Tu-95/BEAR bomber. The most impressive Soviet bomber ever developed was first seen in flight on 21 April 1955 over Moscow.*

and an estimated wing span of 170 feet.”<sup>41</sup> In reality, they were not far off, given the poor quality of the photos they worked from. The aircraft actually had a 165-foot wingspan, and the takeoff weight was nearly right on at 365,745 pounds. The analysis of BADGER called it a medium bomber with “an operational takeoff weight of 150,000 pounds and a wing span of 116 feet.”<sup>42</sup> In actuality, the aircraft had an operational weight of 165,350 pounds and a 108-foot wingspan. Still, given the quick glances captured by the photographer, the analysis was pretty close. The other extremely important aircraft observed in 1955 was the massive BEAR bomber, a swept-wing bomber powered by 4 turboprop engines with counterrotating propellers. Of the three bombers seen, this was to be the most important threat to the United States over the next 35 years.<sup>43</sup>

As Soviet technology advanced, ATIC analysis became increasingly important to national security issues. These bombers, first seen publicly in 1954 and 1955, provided strong evidence that the Russian development in long-range bomber aircraft was very comparable to the American B-52. ATIC analysts estimated that the aircraft would not be delivered to operational units until 1957. U-2 flights over Russia in June 1956 gathered better data on bomber production. Resultant analysis brought lowered estimates on aircraft production. Although national estimates of bomber production fell, the Soviet military seemed to turn its efforts toward the development of intercontinental ballistic missiles. The “bomber gap” was replaced by a “missile gap.”<sup>44</sup>

## Ballistic Missiles

The possibility of the Soviets launching a nuclear strike against the continental United States was one of the most frightening aspects of the Cold War. Bombers were a known entity at that time. They could definitely carry out the mission. Intercontinental ballistic missiles (ICBMs) were an emerging threat as ATIC developed its missile analysis capabilities during the mid-to-late 1950’s. On 1 April 1955, ATIC’s Detachment 1 was organized and assigned to the 1125th Field Activities Group. It was based at Kelly Air Force Base so it could work in close coordination with the USAF Security Service; however, its main job was to collect and analyze technical information on Soviet guided missiles. The next few years in ATIC history served to justify the efforts.<sup>45</sup>

As with the “bomber gap,” the “missile gap” was partially a result of Soviet artifice. Premier Nikita Krushchev and other Soviet leaders fabricated a series of space triumphs to create the illusion of missile superiority. Krushchev talked about missiles coming off production lines “like sausages,” though the inventory of long-range missiles remained low. During the first half of 1956, analytic work

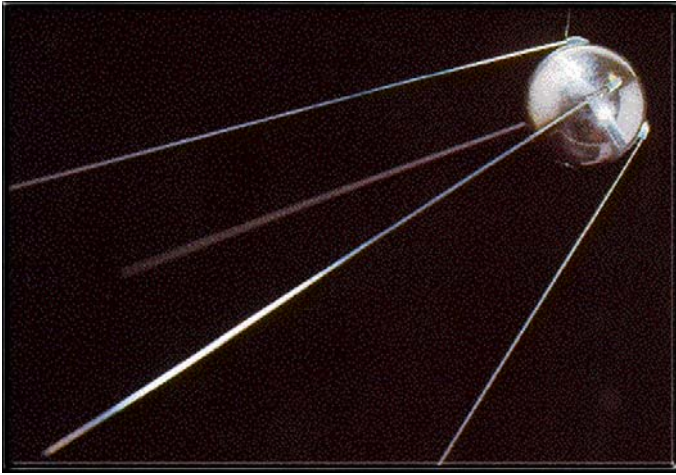
on ICBMs began receiving priority attention. Under contract with ATIC, the Convair Astronautics Division of General Dynamics prepared a study called, “ICBM Manufacturing Analysis Related to Soviet Capabilities.” This work allowed center analysts to determine ICBM production lead times, showed the possible acceleration of the production schedule by the Soviets, and pointed toward operational availability dates.<sup>46</sup>

ATIC analysis contributed to the National Intelligence Estimates (NIE) on missiles, and the center also supported other Air Force Assistant Chief of Staff for Intelligence (ACS/I) elements. Information from the center’s “Semiannual Offensive Missile Study” and products relating to Soviet science and technology capabilities and trends found its way into the national estimates. The May 1958 NIE predicted a massive Soviet missile buildup, with as many as 1,000 missiles being operational by the end of 1961. The American inventory could not keep pace; hence, there would be a “missile gap.” As further evidence was gathered, analysts recognized that the Soviets were experiencing technical difficulties with their ICBM program, and the production estimates began to fall. As a result, by January 1960, national leaders concluded that the missile gap was not a serious threat to American security. The Soviet SS-6 went on alert in January 1960, yet with only about 10 missiles available, and those had many requirements before they could launch. While the Soviet missile program seemed to be advancing slowly, there was another challenge emerging. In 1959, ATIC began studying Chinese trends in offensive missiles and space vehicles.<sup>47</sup>

## The Race for Space: ATIC and Sputnik

With an established cadre of experienced engineers and scientists totally focused on every aspect of Soviet technological development, ATIC was poised to be one of the Defense Department’s best sources of information on the birth of the Russian space program. As the Russians achieved an ICBM capability in 1957, it became obvious that a Soviet satellite and space program would not be far behind. It was not far behind at all. With the first successful test launch of the R-7 (SS-6/SAPWOOD) in August 1957, and the second successful test in September, the stage was set for the history-making flight. ATIC analysts began formally studying the Soviet capability to launch an Earth satellite in March 1956. After analysts concluded that such an achievement was imminent, ATIC published an important study early in 1957 entitled, “Soviet Capability to Develop and Launch a Military Earth Satellite.” ATIC assessed that the Soviets’ ability to put a satellite into orbit would be “largely determined by the results of their IGY (International Geophysical Year) Satellite Program.”<sup>48</sup>





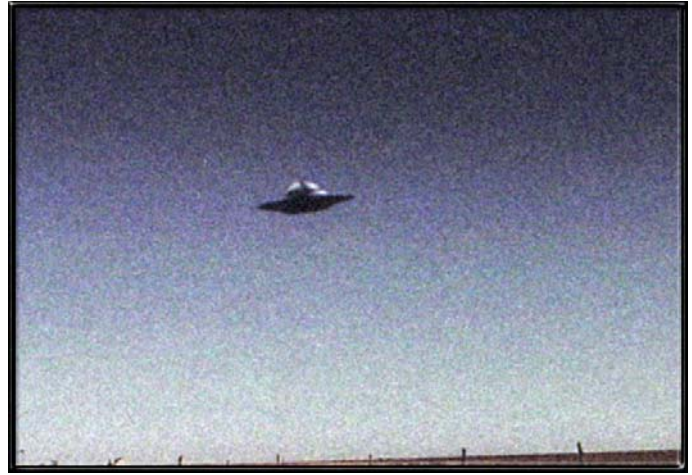
*The October 1957 launch of Sputnik was no surprise to ATIC analysts. The possibility of a Soviet Earth satellite was known since the previous year.*

This analysis proved accurate, and in the spring of 1957, the preparation for a launch was detected. Two successful launches of the R-7 ICBM in August and September signaled the booster might be ready. On 4 October, the Russians successfully launched the first Earth-orbiting satellite, Sputnik I. This truly put ATIC into the space business, as the center concentrated its efforts on space during the whole latter half of 1957. The ATIC history for that period states, “ATIC participated in Air Research and Development Command’s (ARDC’s) coordinated effort in the observation of Soviet Earth satellites with the express purpose of obtaining orbital and scientific information and provided technical and acquisitional assistance as required.”<sup>49</sup> ATIC did not share in the operational aspects of the program, but instead monitored for possible technical intelligence exploitation.

On 1 November 1957, ATIC published a special edition of the ATIC Bulletin, which contained all of the previously printed materials on Soviet work in space. The ATIC history states, “The purpose was to allow a comparison of isolated statements on this subject, most of them from Soviet sources, made over a period of years prior to the launching of Sputnik and including officially released information made public by the Soviets after the launchings.” This unique product showed the statements made by the Soviets as early as 1955 proved to be valid. ATIC took this to indicate a “freedom from security classification on scientific developments.”<sup>50</sup>

### **Project Blue Book**

The 1950’s also saw a continuing interest in unidentified flying objects (UFOs). In March 1952, ATIC established an Aerial Phenomena Group to study the reported sightings, and a new name was assigned to the program: Project Blue Book. Probably the most highly publicized events during



*In March 1952, ATIC established an Aerial Phenomena Group to study reported UFO sightings. The program was named Project Blue Book.*

the ATIC years involved a series of sightings in Washington, DC, in 1952. On 29 July, Major General John Samford, the Air Force ACS/I held a press conference to explain the phenomena. Captain Roy James, a radar expert at ATIC, was brought to Washington to discuss the radar “sightings.” Captain James was also a featured guest on the national radio talk show, “Face the Nation.”<sup>51</sup>

Because of increased US sightings (1,700) in 1952 and a marked increase in foreign sightings, the Air Force decided to hold a coordination conference between ATIC Blue Book personnel and officials from the 4602nd Air Intelligence Service Squadron in Colorado Springs. From this conference, Air Force Regulation 200-2, “Unidentified Flying Objects Reporting,” was placed into full operation on 12 August 1954. In May 1955, ATIC published “Project Blue Book Special Report #14.” To help diffuse criticism that the Air Force was “hiding” UFO findings from the public, the Secretary of the Air Force made “Special Report #14” part of the public domain and allowed the Department of Commerce to sell copies to the public.<sup>52</sup>

### **Early Sensor Development and Analysis**

During the last half of 1957, especially following the Sputnik launches in October, the demand for ATIC products and services outstripped the center’s ability to respond. In technical intelligence areas, center personnel identified a new family of telemetry signals which could be used to study Soviet ballistic missiles, and gas dynamics analysis conducted from photographs of rocket exhaust patterns helped determine rocket performance data. These helped ATIC analysts do what the mission required in the Cold War: accurately analyze the Soviets from a distance, so the United States could predict what was coming.<sup>53</sup>

One of the critical systems developed during the 1950’s and early 1960’s was an over-the-horizon radar to better

monitor Russian missile launches. Mr. Elmond Decker was given free reign to do the technical research to engineer the system, and he personally briefed Air Force Chief of Staff, General Curtis E. LeMay, on the capabilities of the proposed new system. The FPS-17 provided critical information to ATIC analysts on the capabilities and performance of Soviet missiles and space boosters.<sup>54</sup>

Besides the breakthroughs in sensor data collection, ATIC also contributed greatly in the development of automated and technical systems. In partnership with American industry, ATIC spurred the development of automated performance analysis techniques and pioneered the machine translation of foreign language documents within the Department of Defense. ATIC engineers and scientists also broke new pathways in the development of sensor, photographic, and reconnaissance systems. The center even had its own aircraft (a C-47 and a C-54), which were used for transporting materiel to Wright-Patterson AFB and testing new data collection and photographic systems, as well as for official travel.<sup>55</sup>

### ATIC Facilities

As the number of personnel assigned to ATIC increased, there was a growing need to construct a building to house the unit. The Center's personnel occupied buildings 263,

219, 275, 259, 867, and 278. Brigadier General Watson lobbied the Air Staff for the construction of a new headquarters building. On 18 July 1956, ATIC held a groundbreaking ceremony for a 100,000-square-foot complex, building 828. In addition to office spaces, the building was specifically designed to house the center's Readix computer.<sup>56</sup>

### Aerospace Technical Intelligence Center

In 1959, the Air Force renamed ATIC, recognizing the importance of the space-related mission. The "Air" Technical Intelligence Center became the "Aerospace" Technical Intelligence Center on 21 September 1959. The Center's ability to take on Soviet technology and accurately assess it gave the ATIC reputation a boost. The Air Force did not want to lose that in a Department of Defense reorganization.

General Bernard A. Schriever, Air Research and Development Command/Air Force Systems Command (ARDC/AFSC) commander from April 1959 through August 1966, noted that the United States was engaged in "technological conflict" with the Soviet Union. To win that conflict, scientific and technical intelligence had to be integrated with system development. AFSC discontinued ATIC effective 1 July 1961, establishing the Foreign Technology Division (FTD) at the same time. In addition to intelligence applications, AFSC expected the investigation of foreign technology to provide a yardstick against which American research and development could be measured. Analysis of foreign technology would also allow a crossfertilization of ideas. The stage was set for FTD to make a name for itself.<sup>57</sup>



General Watson at groundbreaking in 1956 for new ATIC headquarters, building 828



Newly completed ATIC headquarters (building 828) in 1958

## Endnotes

- <sup>1</sup> Vorce, Ruth E., *History of the Air Materiel Command, 1 Jan-30 Jan 1949*, May 1951, p. 134.
- <sup>2</sup> Vorce, Ruth E., *History of the Air Materiel Command, 1 Jan-30 Jan 1949*, May 1951, pp. 135-136.
- <sup>3</sup> Frederick A. Alling, Ethel DeHaven, Max Rosenberg, S.A. Zimmerman, *History of the Air Materiel Command, 1 Jan-30 Jun 1950*, October 1950, p. 333.
- <sup>4</sup> Frederick A. Alling, *History of the Air Materiel Command, 1 Jul-31 Dec 1949*, May 1950; Frederick A. Alling, Ethel DeHaven, Max Rosenberg, S.A. Zimmerman, *History of the Air Materiel Command, 1 Jan-30 Jun 1950*, October 1950, p.326.
- <sup>5</sup> Frederick A. Alling, Ethel DeHaven, Max Rosenberg, S.A. Zimmerman, *History of the Air Materiel Command, 1 Jul-31 Dec 1950*, May 1951.
- <sup>6</sup> Frederick A. Alling, Ethel DeHaven, Max Rosenberg, S.A. Zimmerman, *History of the Air Materiel Command, 1 Jan-30 Jun 1950*, October 1950, pp. 329-330.
- <sup>7</sup> Frederick A. Alling, Ethel DeHaven, Max Rosenberg, S.A. Zimmerman, *History of the Air Materiel Command, 1 Jul-31 Dec 1950*, May 1951.
- <sup>8</sup> Frederick A. Alling, Ethel DeHaven, Max Rosenberg, S.A. Zimmerman, *History of the Air Materiel Command, 1 Jan-30 Jun 1950*, October 1950.
- <sup>9</sup> Frederick A. Alling, Ethel DeHaven, Max Rosenberg, S.A. Zimmerman, *History of the Air Materiel Command, 1 Jul-31 Dec 1950*, May 1951, p.161.
- <sup>10</sup> AU Project No. AU-411-62-ASI, "Guerrilla Warfare and Airpower in Korea, 1950-1953," Appendix No. 4, by Concepts Division, January 1964.
- <sup>11</sup> Ibid.
- <sup>12</sup> Ibid; Frederick A. Alling, Ethel DeHaven, Helen Brents Joiner, Clifford A. Morrison, *History of the Air Materiel Command, 1 Jan-30 Jun 1951*, November 1951.
- <sup>13</sup> *History of Air Technical Intelligence Center, 1 January–30 June 1952*, 7 August 1952.
- <sup>14</sup> Intelligence Department Study No. 102-AC-50/41-34, "Analysis of the Soviet IL-10 Ground-Attack Airplane," February 1951.
- <sup>15</sup> Ibid.
- <sup>16</sup> Ibid.
- <sup>17</sup> Pennington, Jr., Oliver C., *History of Air Technical Intelligence Center, 1 January 1952–30 June 1952*, 7 August 1952, p. 1.
- <sup>18</sup> Frederick A. Alling, Ethel DeHaven, Helen Brents Joiner, Clifford A. Morrison, *History of the Air Materiel Command, 1 Jan-30 Jun 1951*, November 1951.
- <sup>19</sup> Interview, Maj.Gen. Harold E. Watson with Dr. John Brownlee, 26 September 1991.
- <sup>20</sup> Ibid.
- <sup>21</sup> *History of Air Technical Intelligence Center 1 July 1954-31 December 1954*, Air Intelligence Branch, 31 January 1955.
- <sup>22</sup> Interview, Maj.Gen. Harold E. Watson with Dr. John Brownlee, 26 September 1991.
- <sup>23</sup> Ashcroft, Bruce, "Brief History of Scientific and Technical Intelligence," NAIC, 1995.
- <sup>24</sup> Interview, Colonel Dan J. Gareri with Mr. Robert Young, NASIC Historian, 12 January 2006.
- <sup>25</sup> Ibid.
- <sup>26</sup> *History of Air Technical Intelligence Center 1 January 1954-30 June 1954*, Policy and Management Office, 31 July 1954.
- <sup>27</sup> Ibid.
- <sup>28</sup> ATIC Report, "Soviet Yak-23 Aircraft," 4 April 1955, p. vi.
- <sup>29</sup> Ibid, p.53-55; Film, "Evaluation of the Yak-23," ATIC, 1955.
- <sup>30</sup> *History of Air Technical Intelligence Center 1 July 1955-31 December 1955*, Air Intelligence Office, 31 January 1956, p.24.
- <sup>31</sup> Interview, Mr. Kenneth Rowe with Mr. Robert L. Young, NAIC Historian, October 1996.
- <sup>32</sup> *History of Air Technical Intelligence Center 1 January 1957-30 June 1957*, Air Intelligence Office, 31 July 1957; <http://www.nasm.si.edu.htm>.
- <sup>33</sup> Ibid.
- <sup>34</sup> Pennington, Jr., Oliver C., *History of Air Technical Intelligence Center 1 January 1952-30 June 1952*, 7 August 1952, p. 51.
- <sup>35</sup> *History of Air Technical Intelligence Center, 1 January 1953-30 June 1953*, Air Intelligence Office, 30 July 1953.
- <sup>36</sup> *History of Air Technical Intelligence Center, 1 July 1955-31 December 1955*, Air Intelligence Office, 31 January 1956, pp.29-30.
- <sup>37</sup> Ibid.



---

<sup>38</sup> *History of Air Technical Intelligence Center, 1 January 1957-30 June 1957*, Air Intelligence Office, 31 July 1957, p.41.

<sup>39</sup> *History of Air Technical Intelligence Center, 1 January 1954-30 June 1954*, Policy and Management Office, 31 July 1954, p. 61; *History of Air Technical Intelligence Center 1 July 1954-31 December 1954*, Air Intelligence Branch, 31 January 1955, p.89.

<sup>40</sup> Ashcroft, Bruce, "Brief History of Scientific and Technical Intelligence," NAIC, 1995; *History of Air Technical Intelligence Center, 1 Jan 1955-30 Jun 1955*, Air Intelligence Office, 31 July 1955, p.34.

<sup>41</sup> *History of Air Technical Intelligence Center 1 Jan 1955-30 Jun 1955*, Air Intelligence Office, 31 July 1955, p.34.

<sup>42</sup> Ibid.

<sup>43</sup> Ibid.

<sup>44</sup> Ashcroft, Bruce, "Brief History of Scientific and Technical Intelligence," NAIC, 1995.

<sup>45</sup> *History of Air Technical Intelligence Center 1 Jan 1955-30 Jun 1955*, Air Intelligence Office, 31 July 1955, p.2.

<sup>46</sup> Ashcroft, Bruce, "Brief History of Scientific and Technical Intelligence," NAIC, 1995.

<sup>47</sup> Ibid.

<sup>48</sup> *History of Air Technical Intelligence Center 1 January 1957-30 June 1957*, Air Intelligence Office, 31 July 1957, p.50.

<sup>49</sup> *History of Air Technical Intelligence Center 1 July 1957-31 December 1957*, Air Intelligence Office, 31 January 1958, p. 3.

<sup>50</sup> Ibid. pp 9-10.

<sup>51</sup> Ashcroft, Bruce, "Brief History of Scientific and Technical Intelligence," NAIC, 1995.

<sup>52</sup> *History of Air Technical Intelligence Center 1 July 1954-31 December 1954*, Air Intelligence Branch, 31 January 1955.

<sup>53</sup> Ashcroft, Bruce, "Brief History of Scientific and Technical Intelligence," NAIC, 1995.

<sup>54</sup> Ibid.

<sup>55</sup> Ibid.

<sup>56</sup> Ibid.

<sup>57</sup> Ibid.