

# AIR POWER

## History

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This issue concludes our year-long commemoration of the United States Air Force's entry into the missiles and space field. That event began fifty years ago, when General Bernard A. Schriever opened the Western Development Division in Inglewood, California, and embarked on a revolutionary technology program that built the Atlas, Titan, Thor, and Minuteman long-range ballistic missiles. These ICBMs and IRBMs not only stood on strategic alert during the Cold War, they also served as space launchers for the military and NASA.

General Schriever promoted "technology push"—the notion that change was inevitable—and its corollary that we had better master it or suffer the consequences. Now, fifty years later, it is the historian's task to record and analyze how well we have adapted to change. Our authors have accepted that challenge; they welcome your reactions to how well they fared. Please weigh in, write "Letters to the Editor."

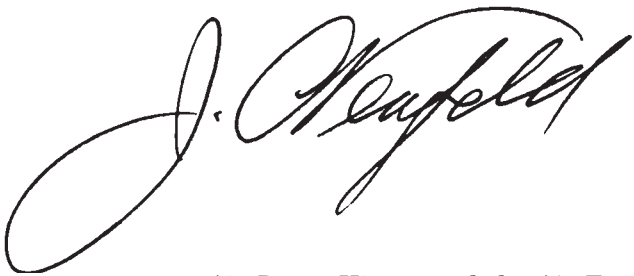
In the lead article, Don Baucom examines Germany's introduction of ballistic missiles in World War II and traces the history of our effort to build defenses to counter these weapons. Dwight D. Eisenhower, as general and President was a central figure throughout the period. Next, David Arnold, through his study of the career of Lt. Gen. Forrest McCartney, demonstrates how the Air Force evolved space professionals. In the third article, Dwayne Day discloses how NASA's administrator James Webb used intelligence data to influence the race to the Moon. Finally, Sean Atkins examines a 1960s issue—the deployment of cruise missiles to the United Kingdom—to seek lessons relevant to contemporary issues concerning military alliances.

On a lighter note, Rob Bardua introduces the recent addition the National Museum of the United States Air Force (formerly the Air Force Museum). His subject is *Vittles*—the dog who flew during the Berlin Airlift.

Congratulations to Scott Willey, our book review editor, for providing seventeen reviews, possibly a record number. Also, the diversity of topics suggests that all readers should find an appealing review.

The departments section contains the familiar titles, including Bob Dorr's "History Mystery," George Cully's guide to "Upcoming" events, a list of reunions, letters to the editor, news, and a report by the Air Force Historical Foundation's president, Lt. Gen. Michael Nelson. Among other topics, General Nelson outlines the Foundation's new strategic plan and solicits reactions from the membership. (Please see page 71.)

With great sorrow, we note the passing of Brig. Gen. Brian S. Gunderson (See page 72). The very popular "Gundy" was involved with Air Force history for several decades following his service in World War II. He led the Air Force's official history program, was president of the Foundation, wrote and reviewed articles for the journal, and served as publisher for *Air Power History*. He will be missed.



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# Eisenhower and Ballistic Missile Defense The Formative Years, 1944-1961



Donald R. Baucom

(Overleaf) Display of Discoverer XIII capsule at the White House; first recovery of an object from space, August 1960.

*Behind all these other changes in the middle years of the 1950s loomed the changes of science, remaking the world and bringing new problems. More and more, the jet aircraft, the nuclear power plant, the hydrogen bomb, the ballistic missile were coming into the consciousness of all of us.*

Dwight D. Eisenhower, 1963.<sup>1</sup>

## Introduction

Although the United States started an anti-ballistic missile (ABM) program shortly after World War II, it was conducted with minimal funding and with a low priority for the first decade. As a result, developments were still in the conceptual phase in 1953, when Dwight D. Eisenhower became the thirty-fourth President of the United States. However, by the time Eisenhower left office eight years later, the U.S. was pursuing a major ABM program and had established a firm conceptual foundation for future ballistic missile defense (BMD) developments.

America's postwar ABM program was a direct response to the German rocket program of World War II, which produced the world's first long-range ballistic missile, the V-2.<sup>2</sup> While used only during the final months of the war, the V-2 and its air-breathing cousin the V-1 made a strong impression on Allied leaders, including Eisenhower.

## Eisenhower and the Dawn of the Missile Age, 1944-1945

As Supreme Allied Commander, Europe, General Dwight Eisenhower witnessed the dawn of the missile age and was duly impressed by the destructiveness of the V-2 rocket. Indeed, while overseeing the preparations for Overlord, Eisenhower received "alarming intelligence reports concerning the progress of the Germans in developing new long-range weapons of great destructive capacity." He considered these warnings serious enough to give them as one reason for launching Overlord at the earliest possible moment.<sup>3</sup>

Eisenhower's sense of urgency was not misplaced. About a week after D-Day, German V-1 "buzz bombs" began falling on London. Three months after D-Day, the Germans ushered in the ballistic missile age when they began launching V-2 rockets against key Allied targets, especially London and the port city of Antwerp, Belgium.<sup>4</sup>

V-weapon attacks against England had "a very noticeable effect upon morale," according to Eisenhower. The successful lodgment of Allied armies on the continent in June 1944 had given the

British "a great sense of relief." However, "their hopes were dashed" when the missile attacks started. Moreover, Eisenhower pointed out, it was not just civilian morale that was affected. "Soldiers at the front began again to worry about friends and loved ones at home, and many American soldiers asked me in worried tones whether I could give them any news about particular towns where they had previously been stationed in southern England."<sup>5</sup>

Eisenhower understood the operational characteristics of Germany's "V" weapons. The V-2, he noted, "was a rocket, shot into the air to a great height, which fell at such high speed that the first warning of its coming was the explosion. During flight it could not be heard, seen, or intercepted." Because of its velocity, the V-2 tended to penetrate whatever it hit before exploding. If it struck in the open and penetrated the ground, the missile's explosive forces were channeled upward, causing little damage to surrounding structures. However, if it hit a building within a cramped urban area, the V-2 detonated inside the building so that its explosive forces were coupled to the structures around it. In this case, Eisenhower wrote, "the destruction was almost complete."<sup>6</sup>

Between September 8, 1944, and March 27, 1945, the Germans aimed 1,359 V-2s against London; 1,190 of these attempted launches were successful. The V-2s which struck England destroyed or damaged thousands of homes and buildings. They also killed 2,724 civilians and seriously injured another 6,467 civilians. On the average, according to Sir Winston Churchill, England's wartime prime minister, each V-2 killed twice as many people as did a V-1. The main reason for this disparity was the fact that the sound of the approaching V-1 warned people to take cover; there was no such warning in the case of the hypersonic V-2.<sup>7</sup>

While these losses were small compared to overall wartime casualties, the impact of the V-2 on morale was serious enough to justify a search for countermeasures. This search spawned the world's first missile defense architecture, which included the same basic components that still make up today's architectures: weapons, sensors, and a command and control system.

The London missile defense system called for the city to be laid off in a grid and surrounded by anti-aircraft artillery (AAA). Radar would pick up the V-2s once they reached an altitude of 5,000 feet. Radar data would then be used to calculate the missile's trajectory and determine which square in the grid it would hit. At the right

V-WEAPON  
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AGAINST  
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DESTROYED  
OR DAMAGED  
THOUSANDS  
OF HOMES  
AND  
BUILDINGS

*Donald R. Baucom is a 1962 graduate of the U.S. Air Force Academy. He earned his Ph.D. in the History of Science from the University of Oklahoma in 1976. Dr. Baucom's federal service includes twenty-eight years as an officer in the Air Force and thirteen years in the civil service. Between 1987 and 2003, he was the historian for DoD's missile defense program. His book, Origins of SDI: 1944-1983, won the 1994 Leopold Prize of the Organization of American Historians.*

ANTWERP WAS THE SCENE OF THE SINGLE WORST V-2 ATTACK—ON DECEMBER 16, 1944

BY END OF MARCH 1945 WHEN THE V-WEAPON ATTACKS STOPPED, 3,752 CIVILIANS HAD BEEN KILLED AND 6,072 SERIOUSLY INJURED

moment, the AAA guns would fire a barrage of shells timed to go off at the optimum altitude over the proper square. In theory, the V-2 would have to fly through this barrage and be destroyed. To be sure that the barrier of shell fragments was in place to meet the approaching V-2, the guns would have to be fired while the missile was still thirty miles away. Before advocates of the missile defense concept could secure permission to test their ideas, Allied ground forces had overrun the last launching sites within range of London, ending the V-2 attacks.<sup>8</sup>

The final Allied drive that resulted in the occupation of the last V-2 launch sites had depended to a great extent on supplies entering the continent through the port of Antwerp. According to General Eisenhower, Antwerp became a *sine qua non* for the final all-out battle to overthrow Hitler's Third Reich. Churchill expressed similar views: "Without the vast harbour of this city no advance across the lower Rhine and into the northern plains of Germany was possible."<sup>9</sup>

Not surprisingly, then, once the Allies gained control of Antwerp, the Germans launched a major V-weapons campaign against the port. Indeed, Allied records show that more V-2s (1,712) struck the Antwerp area than hit London and its surroundings (1,190). In addition to the V-2s, the Germans hit Antwerp and the area around the city with 4,248 V-1s. More than 150 V-2s and a similar number of V-1s hit Antwerp's dock area. Because of these attacks, the port's handling capacity was reduced by as much as a third, due in part to the fact that stevedores were routinely forced to abandon their work and seek shelter. Furthermore, because of the dangers posed by the V-weapons, the Allies placed severe restrictions on the shipment of ammunition through Antwerp. As a result, "most of the ammunition for the theater had to be transported the 500 miles from Cherbourg or 275 miles from Le Havre." Finally, Antwerp was the scene of the single worst V-2 attack—on December 16, 1944, a lone missile struck a crowded theater killing 567 and seriously injuring another 291. By end of March 1945 when the V-weapon attacks stopped, 3,752 civilians had been killed and 6,072 seriously injured.<sup>10</sup>

The Antwerp experience may explain Eisenhower's sobering assessment of how the V-2 might have changed the course of the war had it been developed earlier. In his memoir, *Crusade in Europe*, the general wrote:

*It seemed likely that, if the German had succeeded in perfecting and using these new weapons six months earlier than he did, our invasion of Europe would have proved exceedingly difficult, perhaps impossible. I feel sure that if he had succeeded in using these weapons over a six-month period, and particularly if he had made the Portsmouth-Southampton area one of his principal targets, Overlord might have been written off.*<sup>11</sup>

## Beginnings of the U.S. Missile Defense Program, 1946-1948

Eisenhower's experience with the V-2 and other World War II weapons impressed upon him the vital role science and technology had come to play in national security. However, these experiences did not make of him an uncritical supporter of new weapon systems. In 1946, while serving as Army Chief of Staff, Eisenhower visited Fort Bliss, Texas, where some of the earliest work on missile defense was taking place. During a briefing on this work, Eisenhower expressed skepticism about the idea of intercepting a missile with another missile. This, he said, was tantamount to hitting a bullet with a bullet, a feat that was too difficult to accomplish.<sup>12</sup>

Eisenhower's skepticism was not shared by other American officials who reviewed Germany's rocket program after the war. These officials were impressed by the challenges the new weapon posed for defenses. Given the potential of the long-range rocket, especially if it should be combined with an atomic warhead, these investigators believed the U.S. had little choice other than to pursue the development of ballistic missile defenses.<sup>13</sup>

Perhaps the most disturbing discovery made by these officials was that the Germans had plans for an ICBM that might have been used against New York City had the war continued long enough. Report number 237-45 of the United States Naval Technical Mission stated:

*There is little of humorous nature in the statement so often heard that the Germans intended to bombard New York from launching sites in Europe, as two missiles, the A-9 and A-10 [which would have been combined into a two-stage missile] were under development for use against the U.S. in the early months of 1946. This contemplated use was scientifically possible and undoubtedly would have been realized had time permitted.*<sup>14</sup>

Concern with the future threat of missiles was a major theme in a post-war study completed by the War Department's Equipment Board, which was chaired by General Joseph W. Stilwell, legendary commander of American forces in the China-Burma-India Theater. Completed in January 1946, the Stilwell Report concluded that "guided missiles, winged or non-winged, traveling at extreme altitudes and at velocities in excess of supersonic speed, are inevitable." Among these new weapons would be missiles with "intercontinental ranges of over 3,000 miles and pay load sufficient to carry [an] atomic explosive."<sup>15</sup>

The lethality of such weapons revolutionized the requirements for effective defenses. In the past, the major goal of air defense was to simply make air attacks so costly that an enemy air force could not sustain the effort long enough to produce decisive results. "In future wars," the report noted, "no single airplane or bomb-carrying missile should be permitted to penetrate the defenses of a vital area

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THE  
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THREAT

CONCERN  
ABOUT A  
"BOMBER  
GAP" ... WAS  
CREATED IN  
PART BY  
SOVIET  
MANIPULA-  
TION

because of the possibility that it might be carrying an atomic bomb." While no such defense was then possible, the report said, it was "imperative" to improve defenses "until the ultimate obtainable [effectiveness] is reached."<sup>16</sup>

To meet that part of the new threat posed by "V-2 type missiles traveling at very high altitudes at speeds greatly in excess of the sonic," the United States had to develop "a guided missile of the greatest attainable speed." This interceptor "should have a range of at least 100,000 yards and possess the greatest accuracy of control and maneuverability commensurate with the speed of the missile." This missile must also offer "a high probability of destroying any aerial target that comes within its operating range."<sup>17</sup>

The recommendations of the Stilwell Board and other studies helped spawn a number of conceptual missile defense programs. The earliest of these were two programs started by the Army Air Forces (AAF) in March 1946 using funds that General Arnold had set aside for the pursuit of promising technical developments. One of these was Project Wizard, which was to lay the foundation for developing an interceptor that could destroy a missile traveling at speeds of up to 4,000 miles per hour at altitudes between 60,000 and 500,000 feet.<sup>18</sup>

The second AAF missile defense program was known as Thumper. This program was to explore the interception of a number of different types of high-speed aerial vehicles, including ballistic missiles. Unlike Wizard, Thumper specified several flight tests using the Army's two-stage Bumper missile, which used a variant of the German V-2 rocket for its first stage and a WAC Corporal as its second. Like Wizard, Thumper specifications called for destroying targets traveling at 4,000 mph at altitudes as high as 500,000 feet.<sup>19</sup>

None of these early BMD programs moved much beyond the conceptual stage of development before the second half of the 1950s; and one of them, Thumper, was cancelled in 1948.<sup>20</sup> The relative low interest in missile defense before 1955 stems from the fact that America's leaders viewed nuclear-armed Soviet bombers, not ballistic missiles, as the principal strategic threat.

### **Emergence of the ICBM Threat, 1949 to 1955**

From World War II until late August 1949, the United States enjoyed a nuclear monopoly. This, American analysts believed, gave the United States a decisive edge against the Soviet Union, an edge that was reflected in a U.S. strategy emphasizing the deterrent power of nuclear-armed bombers. This strategy also happened to be the least expensive defense option in the post-war world and therefore was in consonance with President Harry Truman's policy of squeezing the armed forces to help pay for the Marshall Plan and economic assistance for West Germany and Japan. Strengthening these and other American allies all along the periphery of the Soviet Union was central

to Truman's strategy of containment.<sup>21</sup>

Of course, America's nuclear monopoly could not last forever. And once it ended, the United States and Soviet Union could be expected to move to the next level of their nuclear competition. The Soviets detonated their first atomic bomb on August 29, 1949. Five months later, President Truman decided that the U.S. should develop the hydrogen bomb. This was about three months after Joseph Stalin had given a similar order in the Soviet Union.<sup>22</sup> These decisions would later prove crucial to both the American and Soviet ballistic missile programs, since small, powerful thermonuclear warheads were crucial to the development of the ICBM.<sup>23</sup>

But in 1950 the first operational ICBMs were still a decade away, and the threat American analysts most feared was a surprise attack by nuclear-armed Soviet bombers. On February 10, 1950, the CIA issued its latest assessment of Soviet capabilities. While acknowledging the absence of hard data, the agency predicted that the Soviets would have a stockpile of 100 Nagasaki-size bombs by 1953 with this number rising to 200 by 1955. Additionally, the CIA believed that the Soviets would have enough Tu-4 bombers to get these weapons to U.S. targets and noted that the delivery of 200 atomic bombs against key targets could defeat the United States. However, the Soviets were unlikely to be able to launch a major surprise attack before the 1956-1957 timeframe.<sup>24</sup>

As late as 1955, the national security establishment was still more concerned about manned Soviet bombers than long-range Soviet missiles. At least part of the reason for this fixation was concern about a "bomber gap" that was created in part by Soviet manipulation of the sightings of its latest aircraft.<sup>25</sup>

The existence of this gap was questioned as early as June 1956. By early 1960 President Eisenhower was able to say that the "bomber gap" had evaporated. However, by this time it was being replaced by equally disturbing charges of a "missile gap."<sup>26</sup> Indeed, as early as 1954, events had begun to push ballistic missiles toward the center of national security concerns.

Like the U.S. ballistic missile program, that of the Soviet Union emerged from the German program of World War II. The first stage of the Soviet program actually took place on German soil, as Soviet rocket experts like Sergei P. Korolev, who had been named the chief designer for all Soviet long-range missiles, went to Germany where they worked with German scientists and technicians to assemble eighteen V-2s. In October 1946, these rockets, along with about 150 German rocket experts, were shipped to the Soviet Union. Here, the Germans continued to work in the Soviet long-range rocket program, while the Soviets test-fired their V-2s at Kapustin Yar, launching the first one on October 18, 1947.<sup>27</sup>

Even before leaving Germany, the Soviets had begun work on the R-1, a Soviet copy of the V-2. From the R-1, which was first tested in September





Gen. Eisenhower addresses the troops.

**NEAR THE  
END OF  
MARCH 1954,  
PRESIDENT  
EISENHOWER  
MET WITH A  
SELECT  
GROUP OF  
SCIENTISTS  
TO DISCUSS  
THE  
PROBLEM OF  
A POSSIBLE  
SURPRISE  
ATTACK  
AGAINST THE  
UNITED  
STATES**

1948, the Soviets moved forward steadily, incrementally in developing their own missiles until they reached the R-5, a missile that was to be capable of hurling a one-ton warhead for a distance of 1,200 kilometers. It was successfully tested in the spring of 1953.<sup>28</sup>

Encouraged by Soviet dictator Joseph Stalin, who expressed interest in an ICBM as early as 1947, Korolev and his Soviet colleagues had begun laying the groundwork for a Soviet ICBM while still developing the shorter range missiles. By early 1953, they had settled on a design that would have two stages—a central core that would fire throughout the missile's boost phase and four strap-on rockets that would fire until their fuel was exhausted and then be jettisoned. The missile was to weigh 190 tons, develop 270 tons of thrust at liftoff, and throw a 3-ton warhead seven to eight thousand kilometers. On February 13, 1953, less than a month before his death, Stalin approved the development of an ICBM blueprint that would be based on previous research work.<sup>29</sup>

In October 1953, after learning from Soviet physicist Andrei Sakharov of the probable dimensions of a thermonuclear warhead, Soviet leaders ordered Korolev to increase the size of the ICBM's warhead; it was now to weigh five to six tons. Work on the required changes to the rocket's design began in November 1953, by which time the missile had been designated R-7. The redesign was completed in February 1954 and officially approved on November 20, 1954.<sup>30</sup>

Meanwhile, in the United States, long-range ballistic missiles were moving into the limelight of national security. Near the end of March 1954, President Eisenhower met with a select group of scientists to discuss the problem of a possible surprise attack against the United States. After presenting some of the latest intelligence information on new Soviet bombers, the President asked for advice on the situation. This meeting spawned the Technological Capabilities Panel (TCP). Headed by James R. Killian, Jr., president of the Massachusetts Institute of Technology, the TCP was expected to evaluate how America's technological capabilities might be used to cope with crucial

security issues and report its findings to the President in February of the following year.<sup>31</sup>

While the TCP was completing its work, the National Security Council (NSC) was considering NSC 5440, a proposed revision of America's basic national security policy. Reflecting the growing concerns about the Soviet ICBM program as it was understood at the end of 1954, this document included the following statement:

*The Soviet guided missile program, over the next few years, will bring increasingly longer-range missiles into production. Assuming an intensive effort, the USSR may develop roughly by 1963 (1960 at the earliest) operational intercontinental ballistic missiles. The U.S. program for missiles of this type should approximate this timetable, provided that intensive effort continues. There is no known defense against such missiles at this time.*<sup>32</sup>

This ominous statement about the Soviet ICBM threat survived the NSC's review and appeared in NSC 5501, which Eisenhower approved on January 7, 1955. Among its important provisions was a softening of the truculent massive retaliation doctrine that had been a hallmark of America's national strategy since the early days of Eisenhower's presidency. The new policy recognized the need to accept a long-time standoff once the Soviets achieved nuclear parity.<sup>33</sup>

On February 15, 1955, a little over a month after the promulgation of NSC 5501, the TCP submitted its findings. Known as the Killian Report, it noted the dangers posed should the Soviets be the first to achieve an operational ICBM force and recommended assigning the highest possible national priority to America's ICBM program with the goal of achieving a full-scale test of an ICBM by 1958. The report also recommended the development of an intermediate range ballistic missile (IRBM) that could be both land- and sea-based. Moreover, since bombers would continue to be needed after ICBMs became operational, the panel supported the development of a nuclear-powered bomber.<sup>34</sup>

Where defensive measures were concerned, the Killian Report called for the rapid completion of the Distant Early Warning line to provide the earliest possible warning of an approaching attack. It also called for a strong, balanced R&D program on the interception and destruction of ballistic missiles.<sup>35</sup>

The Killian Report indicates that by the beginning of 1955, the level of interest in ballistic missile defense was starting to rise as the implications of the Soviet missile program seeped into the consciousness of America's national security leadership. It was not long before this awareness reached down into the defense establishment where weapons programs are generated.

In March 1955, the Army asked Bell Laboratories to conduct an eighteen month study of an advanced interceptor system that could deal with the highly capable air-breathing threats of the 1960 to 1970 timeframe. In light of the growing interest in BMD, Bell suggested expanding the

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study to include ballistic missile targets, thereby turning the new interceptor concept into a step toward effective missile defenses. The Army agreed and in June 1955 directed Bell Laboratories to make ballistic missile defense the study's central focus.<sup>36</sup>

At the start of the Nike-II study, as the Bell project came to be known, a number of American leaders agreed with Eisenhower's 1946 assessment that missile defense was not technically feasible. The Bell study went far toward dispelling this view by completing 50,000 computer-simulated interceptor-ICBM engagements which indicated that a "bullet" could indeed hit another "bullet."<sup>37</sup>

By the time the Nike-II study was completed, Eisenhower had won re-election in a landslide victory over Adlai Stephenson. During his second administration, the ballistic missile would emerge from the world of intelligence estimates and become an operational reality, further increasing the interest in ballistic missile defense. As a result, BMD achieved a position of increasing importance so that the latter part of Eisenhower's second term would be marked by Army efforts to secure a decision to deploy the Nike-Zeus (hereafter Zeus) system that emerged from the Bell Laboratories study.

#### Laying the Foundation: The Second Eisenhower Administration, 1956-1961

The final version of the Nike-II study was briefed to the Army staff in October 1956. It proposed a system that would consist of a forward acquisition radar to secure early information on the track of incoming missiles, a local acquisition radar to control the ABM battle, an interceptor missile that carried a 400-pound nuclear warhead and was capable of 10-g maneuvering at 100,000 feet, and a communications system to tie all components together. Also included in the final study was a six-year development plan that would extend from initial development to the demonstration of system performance against a simulated ICBM warhead.<sup>38</sup>

In February 1957, the Army selected Western Electric/Bell Laboratories to serve as prime contractor for Zeus. For the first year, the contract called for an R&D effort valued at about \$12 million.<sup>39</sup>

Two months after the contract for Zeus was let, the Eisenhower administration established the Security Resources Panel to investigate the relative merits of active and passive defenses against ballistic missile attacks. Because the panel was chaired by H. Rowan Gaither, chairman of the board of Ford Motor Corporation, its report came to be known as the Gaither Report.<sup>40</sup>

Before the panel could complete its work, the Soviet Union shook the West by successfully testing the world's first ICBM, the R-7 (SS-6 NATO), on August 26, 1957. Just six weeks later, on October 4, the Soviets launched Sputnik, the world's first artificial satellite, driving home the point first made in the August 21, R-7 test: the Soviet Union had developed a rocket with sufficient range and

payload to strike America with a nuclear weapon. A measure of the impact that Sputnik had upon the American public is a comment that appeared in *Life* magazine, which stated that the Soviets had "burst upon the world as the infinitely sinister front runners in the sophisticated and perilous science of space."<sup>41</sup>

Eisenhower remained calm and took measured steps to deal with the Sputnik crisis. One of the earliest indications of the changes he would make came in his first meeting with Neil McElroy, who had been sworn in as secretary of defense shortly after the launch of Sputnik. In their October 11, meeting, Eisenhower and McElroy decided to apply a single-manager concept to missile defense and other long term projects that cut across service boundaries. Service missile programs that were already well along in the development cycle were excluded from this initiative.<sup>42</sup>

The idea of a single manager for advanced projects squared nicely with views expressed in the Gaither Report, which was submitted to Eisenhower on November 7, 1957. This report questioned DOD's management of new weapon systems that cut across "traditional Service lines" and recommended concentrating R&D responsibilities for major weapons systems in "manageable organizational units."<sup>43</sup>

The Gaither panel also made several other points about the state of U.S. security. Since America's current defenses could not stop a Soviet nuclear attack, U.S. security rested on the deterrent power of Strategic Air Command (SAC). Therefore, SAC's forces should be protected against missile strikes. Also, since the vulnerability of the American people could restrict America's strategic options during a future crisis, the U.S. should begin developing missile defenses for its cities at the "earliest possible date."<sup>44</sup>

Where active missile defense was concerned, the report noted that several systems based on air defense interceptors like the Army's Nike-Hercules and the Navy's Talos could become the basis of missile defenses for SAC bases. Since this form of missile defense would be assembled from modified existing components, it could be available in limited form as early as 1960. However, the system developed to protect SAC bases could not be used to defend cities, since it would intercept incoming missiles at altitudes as low as 30,000 feet and even lower. At such altitudes, the nuclear warheads of the interceptors themselves would pose a serious threat to the cities being defended.<sup>45</sup>

Given the limitations of Hercules and Talos and the importance of protecting America's cities, a missile defense system that destroys incoming missiles at much higher altitudes should be developed. Since distinguishing decoys from real warheads would be a major challenge, the report called for a high priority R&D program on discrimination. In spite of the difficulties, a city-defense system should be deployed as soon as possible, even if it were to be deployed in an early limited form and then upgraded.<sup>46</sup>



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As 1957 came to a close, it was apparent that the situation with regard to missile defense had changed markedly. In the words of the official DOD history of defense policies during Eisenhower's second administration:

*By the end of 1957[,] piecemeal decisions, together with technological progress, had rendered obsolete the priority list of missile projects established by the president and the NSC in December 1955. . . . The same held true of the antimissile missile, the importance of which the Gaither panel had noted. The Joint Chiefs of Staff agreed in December 1957 that an anti-ICBM system was urgent, though they could not agree that it deserved the highest priority.*

In short, the Gaither Report and Sputnik provided the impetus for expanding extant missile defense efforts and establishing an agency to provide centralized management of advanced missile defense research.<sup>47</sup> The new oversight agency emerged in early 1958.

After the October 11, 1957, meeting at which Eisenhower and McElroy agreed on the single-manager approach for advanced R&D projects, McElroy worked with Deputy Secretary of Defense Donald Quarles to prepare a charter for the "Special Projects Agency." After coordinating the charter with the Joint Chiefs, McElroy selected Roy W. Johnson, a vice president of General Electric, as the agency's first director. Johnson's appointment was announced on February 7, 1958, the day on which the directive establishing the Advanced Research Projects Agency (ARPA) was issued.<sup>48</sup>

Soon after its establishment, ARPA launched Project Defender "to establish an adequate research foundation upon which to build militarily effective and economic [missile] defense systems."<sup>49</sup> Defender was to become one of ARPA's largest and longest running programs.

Although directed energy devices were in their infancy when Defender started, project leaders showed interest in its military applications almost immediately. ARPA/Defender money began supporting laser research as early as 1959, with possible applications including laser-based radar and

communications systems, as well as anti-missile weaponry. Defender also supported work on particle beams that could be used to destroy enemy missiles.<sup>50</sup>

Defender participants were quick to recognize the importance of destroying enemy missiles while they were still in the boost-phase. During the second annual Project Defender conference in the summer of 1960, the following view of the advantages and disadvantages of boost-phase intercept was presented.

*A ballistic missile is more vulnerable in its propulsion or boost phase than in any subsequent part of its trajectory. At the same time, its identity is most difficult to conceal. These circumstances immediately suggest an early intercept system as an ideal solution to the defense problem. Unfortunately, enemy missiles are relatively inaccessible during this phase. So far, the only promising defense system concept has been a space based or satellite borne interceptor. Such a system requires many thousands of interceptors in space, but at a given instant only a small fraction will be in a position to attack. The economic feasibility of such systems is heavily dependent upon equipment reliability and upon enemy countermeasures.*

Collectively, boost-phase kill concepts were referred to by the acronym BAMBI, which stood for Ballistic Missile Boost Intercept.<sup>51</sup>

At first, the participants in Project Defender were not optimistic about this approach. In 1960, scientists and engineers believed that missile defense interceptors would require nuclear warheads because of their limited accuracy. Such interceptors would have been very heavy, and deploying a constellation of these weapons would have required orbiting such a large mass that the scheme was considered "implausible."<sup>52</sup>

However, as Defender proceeded, there were "dramatic changes in attitude toward reducing achievable intercept miss distances." One of these changes was "a growing feeling" that the use of nuclear warheads should be avoided. This transformation in thought and the new interceptor concept it spawned were described as follows during the July 1960 Defender review:

*Intuitively, one feels, that in trying to intercept anything traveling at ICBM velocities, the resultant miss distance would be large. Until recently, systems considerations have been based on the premise that miss distances would be of the order of one or two hundred feet. This dictated the use of a nuclear warhead with its attendant high cost and weight, and other disadvantages. During our space based interceptor studies, consideration of a light weight, 300 lb., interceptor using an IR [infrared] seeker led to the conclusion that miss distances of 10 to 30 feet could be achieved. At these distances, fragment type warheads exploiting hypervelocity impact for kill appeared reasonable against tankage, motors, and other parts of the ICBM in boost. Further study*

*indicated that a cheap effective warhead could be built weighing as little as 2 lbs.*

Further investigations led to the conclusion that hit-to-kill (HTK) interceptors were feasible:

*Computer simulation runs on several types of interceptors weighing about 50 lbs., and using IR homing have resulted in miss distances of one or two feet. This certainly indicates hypervelocity impact kill could be employed. Incidentally, a nose cone traveling at ICBM velocities in collision with one pound of material releases the energy equivalent of 6 pounds of TNT. In a word, the kinetic energy at that velocity exceeds the chemical energy available at that mass.*<sup>53</sup>

The results of these ARPA system studies pointed “directly to the possibility of miss distances two orders of magnitude less than were generally considered possible a year or so ago. This is highly significant because it removed the necessity of using a nuclear warhead and replaces it with a simple, cheap, lightweight mechanical device.” Eliminating the nuclear warheads from a space-based constellation of interceptors would reduce on-orbit weight requirements by “about two orders in magnitude.” For ARPA this indicated that boost-phase intercept of an ICBM was no longer a fanciful idea; it had become a concept “sufficiently promising to warrant increased study efforts.”<sup>54</sup> Later, when MIRVing<sup>55</sup> ballistic missiles became standard practice, boost-phase kill offered the defense a substantial advantage, since a single interceptor could destroy an ICBM’s multiple warheads (ten in the case of the Soviet Union’s large SS-18 ICBMs) along with its decoys.

Defender explored a number of BAMBI concepts. One of these was SPAD (Space Patrol Active Defense), which envisioned a 60,000-pound satellite that would carry an IR scanner to pick up boosters, a computer to calculate their tracks, and 140 interceptors, each of which would have weighed 300 pounds. These interceptors would be fired at attacking missiles as they rose from launch pads or silos. As an interceptor approached its target, a wire web with a radius of 15 to 50 feet would be spun out from the interceptor. Embedded in this web would be a number of one-gram pellets. Although the pellets were designed specifically to wreck the booster’s vulnerable tankage, their high velocity (they would hit the ICBM at velocities between 6 and 60 thousand feet per second) would also allow them to score attacking warheads, causing them to incinerate on re-entry. A constellation of more than 500 satellites, in orbits 250 miles above the earth, would have been required to provide adequate coverage of the Soviet Union.<sup>56</sup>

Another interceptor concept to emerge from Defender was ARPA Terminal (ARPAT), a hit-to-kill system for use against ICBMs during the terminal phase of their flight. ARPAT’s booster was to loft five carrier missiles to an altitude of 100,000 to meet the approaching threat cloud of warheads,

decoys, booster tankage, etc. Each carrier would contain ten interceptors. As atmospheric friction stripped away tankage and decoys, uncovering the warheads, each of the fifty interceptors would be targeted against a warhead. Equipped with optical sensors for terminal guidance, these interceptors would “kill [their targets] by direct impact.”<sup>57</sup>

Devising concepts like ARPAT and SPAD was one thing, developing them was something quite different. The technology base of the late fifties and early sixties was incapable of reifying the advanced concepts that emerged from Project Defender. Computer technology was still in an early stage of development, and the highly sensitive infrared sensors needed for acquiring and tracking ballistic missiles and warheads were just starting to be developed in conjunction with programs like MIDAS (Missile Defense Alarm System).<sup>58</sup> In 1960, Defender experts believed the detection of rocket plumes against background radiation was manageable. However, the same was not true of using infrared radiation to guide an interceptor during the end game when the interceptor must make its final maneuvers to collide with its target. “Several magnitudes of improvement” were required before this could be achieved. Also, launch costs had to be significantly reduced. Because of limitations such as these, the Army continued its work on the nuclear-tipped, ground-based Zeus.<sup>59</sup>

While the Army pursued its Zeus program, the Air Force —perhaps interested in gaining a role in the expanding, high priority BMD agenda—improperly expanded its own missile defense activities. Specifically, the Air Force diverted some FY1958 funds to its Project Wizard, which by this time had become a full-fledged missile defense program. This expansion of Wizard violated an earlier DOD-service agreement on the division of labor in the missile defense arena.<sup>60</sup>

The origins of this agreement may be traced to a March 1956 Defense Department review of the feasibility of ballistic missile defenses. Conducted by a committee headed by Hector R. Skifter, the review concluded that developing active missile defenses at that time would be prohibitively expensive. Therefore, the U.S. should confine its missile defense efforts to research.<sup>61</sup>

The Skifter report was then reviewed by a higher level DOD committee chaired by Eger V. Murphree, DOD’s special assistant for guided missiles. Murphree’s panel, which included Air Force and Army representation, recommended proceeding with a joint R&D program for missile defense. In this program, the Air Force would develop the forward acquisition radar system, while the Army developed the weapon system and its associated equipment. In November 1956, Secretary of Defense Charles Wilson approved this arrangement and ordered the services to proceed under DOD supervision. In June 1958, Deputy Secretary of Defense Donald Quarles established a steering committee chaired by Skifter to execute the BMD oversight function.<sup>62</sup>

On March 21, 1957, the Murphree committee

**INVESTIGATIONS LED TO THE CONCLUSION THAT HIT-TO-KILL (HTK) INTERCEPTORS WERE FEASIBLE**

**DEFENDER ... ENVISIONED A 60,000-POUND SATELLITE THAT WOULD CARRY AN IR SCANNER TO PICK UP BOOSTERS**

Hugh L. Dryden, NASA Deputy Administrator (at left), and T. Keith Glennan, NASA Administrator (at right) flank President Dwight D. Eisenhower in 1958.



## THE ARMY CONDUCTED A VIGOROUS CAMPAIGN TO BEGIN PRODUCTION OF ZEUS

refined the agreement on the division of labor. Now, in addition to developing the forward acquisition radar, the Air Force would also develop the means of transmitting acquisition radar data to the Army. At same time, the Army's responsibilities were expanded to include developing the target acquisition and tracking radar. Wilson, who was later succeeded by Neil McElroy, also approved the modified agreement.<sup>63</sup>

Secretary of Defense McElroy learned of the Air Force violation of the refined BMD agreement in January 1958. Since the Zeus missile was well along in the development stage and the Air Force had no missile suitable for the ABM mission, McElroy decided on January 16 that the Army would have primary responsibility for the ABM system. However, he directed the Air Force to continue working on the radar system and the command and control electronics that were under development in the Wizard program and to ensure that the equipment developed was compatible with Zeus.<sup>64</sup>

During the remaining years of the Eisenhower administration, the Army conducted a vigorous campaign to begin production of Zeus. This campaign began in October 1958, about a year before the first successful flight test of the Zeus interceptor. In its budget submission, the Army requested \$875 million as the initial outlay for a Zeus defense system that would eventually include 58 batteries. DOD's ABM steering committee reduced this to \$708 million for a system that would include only 29 batteries. Another DOD review reduced this figure to \$40 million for pre-production expenses and \$300 million for R&D. Secretary McElroy approved only the \$300 million for R&D, a position that was accepted by President Eisenhower in November 1958. However, based on testimony from Army officials, Congress offered to allocate to the Army an additional \$200 million, which could be used either for the Zeus program or to upgrade Army ground equipment. The additional funding was dependent on acceptance of the offer by the Eisenhower administration.<sup>65</sup>

In the midst of the Army's campaign to get Zeus into production, President Eisenhower received two reports that undercut the Army's posi-

tion. On March 4, 1959, the President's science advisor, James Killian, submitted a report from a science advisory panel; it concluded that an effective Zeus system could not be deployed before 1964 at the earliest. This report was followed by a more detailed review that was briefed to Eisenhower on June 3.<sup>66</sup>

The second report concluded that active BMD systems could best be used to defend hardened sites such as bomber bases and missile silos. Even in this more limited role, Zeus was not expected to be deployed in an effective posture before the 1964-1965 period. Furthermore, Zeus was very complex and would probably have difficulty distinguishing warheads from advanced decoys. Nevertheless, the report recommended proceeding with the Zeus program, since it would provide at least some protection and could serve as the foundation for a later, more advanced system.<sup>67</sup>

Some support for the Army's position came from Dr. Herbert York, former ARPA chief scientist, who had become the Defense Department's first director of defense research and engineering (DDR&E) in December 1958. In a March 21, 1959, discussion with Secretary McElroy, York explained that pre-production funding could be used to develop techniques for mass producing the large numbers of transistors and other components that would be required once Zeus began full-scale production. Allocating \$150 million to \$200 million in the FY1960 budget for this purpose would allow the Defense Department to postpone the full production decision another year without delaying Zeus's activation date should the decision be made the following year to begin production. Recognizing the significance of pre-production funding, on June 9, 1959, President Eisenhower decided to accept the extra money offered by Congress and chose to allocate \$137 million of this money to the Zeus program.<sup>68</sup>

During the fall of 1959, while drawing up the FY 1961 budget, the administration decided to delay the production decision on Zeus for a period that was long enough to obviate the need for the special \$137 million for pre-production work. This decision was apparently based on the recommenda-

KILLIAN, SUBMITTED A REPORT FROM A SCIENCE ADVISORY PANEL; IT CONCLUDED THAT AN EFFECTIVE ZEUS SYSTEM COULD NOT BE DEPLOYED BEFORE 1964

SITE X, WAS A GEOGRAPHICAL LOCATION UNDER U.S. CONTROL THAT COULD BE "BOMBARDED" WITH LONG-RANGE TARGET MISSILES ... KWAJALEIN, THE WORLD'S LARGEST ATOLL, BECAME THE PRIME CANDIDATE

EISENHOWER TENDED TO REMAIN ABOVE THE BUREAUCRATIC FRAY

tions of another review group, this one headed by Hector Skifter and George Kistiakowsky, who had replaced Killian as Eisenhower's science advisor earlier in the year. On December 1, 1959, Secretary McElroy informed the Army that funding for Zeus pre-production work would not be available. This decision notwithstanding, DOD's budget request for FY1961 included \$287 million for Zeus research and another \$15 million for constructing test facilities.<sup>69</sup>

While the FY 1961 budget process was underway, the Army was testing the Zeus missile at White Sands Missile Range (WSMR), New Mexico. The first tests failed because of poorly designed control fins on the missile's upper stage. After fixing this problem, the Army completed Zeus's first successful flight test on October 14, 1959. All told, over seventy missiles were fired at WSMR, with nineteen more launched from the Naval Test Range at Point Mugu, California.<sup>70</sup>

These tests masked the fact that neither White Sands nor Point Mugu could support complete testing of the Zeus system, since full testing required the missile to be pitted against the warhead of a long-range ballistic missile. To keep Zeus within the one hundred mile limit of the White Sands Range, the missile could not be fired to an altitude in excess of 100,000 feet. While the interceptor could be fired to an altitude outside the atmosphere at Point Mugu, severe range restrictions meant that range safety destruction systems were on a hair trigger. As a result, several good rockets were destroyed because of minor flight anomalies. Had the terminated tests been conducted on a larger, more isolated range, the rockets could have been allowed to complete their missions. Because of these limitations, the Army was forced to seek another range to complete Zeus testing.<sup>71</sup>

The principal requirement for the new test facility, known as Site X, was a geographical location under U.S. control that could be "bombarded" with long-range target missiles from another U.S. base. After examining possible locations in the Atlantic Ocean down range from Cape Canaveral, the team searching for Site X switched its focus to the Pacific where Kwajalein, the world's largest atoll, became the prime candidate. The atoll's ninety-plus islands surround the world's largest lagoon, which contains about a thousand square miles of water that is shallow enough to permit recovery of test debris. Furthermore, the atoll is 4,800 miles from the Vandenberg Air Force Base test complex—the range that an ICBM would be expected to traverse. Finally, the U.S. Navy had a base on Kwajalein that it had placed on the list of surplus bases in 1958. In early 1959, the Defense Department approved the selection of Kwajalein as the home of the new missile defense test facility.<sup>72</sup>

About a year later, the Army caused a dustup when it proposed testing Zeus against thirty Army Jupiter missiles that would be fired at Kwajalein from Johnson Island, which is located about 1,300 miles northeast of Kwajalein. Although this plan was approved on February 12, 1960, by the deputy secretary of defense, it was greeted in other quar-

ters with suspicion that prompted opposition. For one thing, the use of Jupiter as the Zeus test target was seen by DDR&E York and others as a transparent Army ploy to keep its Jupiter missile program alive. It also seems to have raised concern in York's mind that a test program completely controlled by the Army might produce questionable test results. In April, the DDR&E proposed testing Zeus against ICBMs fired by the Air Force at Vandenberg. York claimed that his proposal would save \$75 million dollars by eliminating the requirement to finish the Johnson Island launch facility.<sup>73</sup>

When the Army challenged York's proposal, the issue was reviewed by an ad hoc panel selected from members of the President's Science Advisory Committee. The panel's May 26, 1960 report supported York's position, as did President Eisenhower when the issue was put to him.<sup>74</sup>

Based on the president's decision, Secretary of Defense Thomas S. Gates, Jr., who had replaced McElroy in 1959, ordered the Army to procure eighteen Atlas ICBMs for tests against Zeus. He also instructed the Air Force to modify at least two of Vandenberg's launch pads to support Zeus testing. On September 22, 1960, the Army and Air Force signed an agreement to execute the secretary's instructions.<sup>75</sup>

In addition to supporting the Army's Nike Zeus test facilities, the Kwajalein atoll provided a base for a Project Defender program known as PRESS for Pacific Range Electromagnetic Signature Studies. The objective of PRESS was to gather information on the behavior of missile warheads during re-entry. In support of this program, ARPA constructed an extensive radar facility on Roi-Namur, another of the major islands in the atoll.<sup>76</sup>

## Epilogue: Foundation for the Future

Dwight Eisenhower had been present at the dawn of the missile age and was sensitive to the implications of the ballistic missile as a military weapon. Nevertheless, he remained skeptical of ballistic missile defense: hitting a bullet with a bullet seemed too difficult a task.

Without strong presidential support, America's missile defense efforts floated to the top of the defense establishment buoyed upward by a growing awareness that the principal Soviet threat was not the manned bomber, but the ICBM. Eisenhower tended to remain above the bureaucratic fray as officials and advisers sorted through the issues and then generally supported the positions of his senior subordinates. Only in establishing the Advanced Research Projects Agency did he take the lead in an initiative that advanced missile defense developments.

Eisenhower's ARPA decision, which clearly envisioned an agency that would take the lead in advanced BMD research, was vital to the future of missile defense. Project Defender continued until March 1968, when the secretary of defense ordered it transferred to the Army where it became an element in the Army's new Advanced Ballistic Missile

Defense Agency.<sup>77</sup> In its decade of existence, Defender originated the concept of the hit-to-kill interceptor and established the general parameters for boost-phase interception; both of these developments figured prominently in the SDI program launched by Ronald Reagan in 1983. Furthermore, Defender launched the homing interceptor technology (HIT) program that fed into the development of the Air Force ASAT that was tested in September 1985.<sup>78</sup> HIT also provided a starting point for SDI's LEAP (Lightweight ExoAtmospheric Projectile) interceptor. Finally, soon after the invention of the laser, Defender took the first look at directed energy weapons as a possible defense against ballistic missiles and carried out pioneering work in the development of lasers. Arguably, ARPA's laser work set a course that led to today's Airborne Laser, the YAL-1A. Already, the Air Force has begun ground testing the system's laser and flight testing the Boeing 747 aircraft that will carry the laser.

More immediate to Eisenhower's own day, the Zeus program that originated in the Bell Laboratories study initiated in 1955 set the U.S. missile defense program on a path that led directly to the Safeguard missile defense system. Safeguard was deployed at Grand Forks, North Dakota, and was operational from October 1975 to February 1976

when Congress ordered the system closed. To the date of this writing, Safeguard remains the only missile defense system the U.S. has deployed that was capable of defending any part of its home territory.

Finally, the Kwajalein Missile Range, established in 1960 and renamed after President Ronald Reagan in 2001, has continued for more than four decades as America's principal BMD test facility. Only recently with the Bush administration's decision to deploy a missile defense system that will provide limited protection for the entire United States has there been a need to expand the Vandenberg-Kwajalein complex to assure adequate testing of missile defense systems.

The role Eisenhower played in the development of missile defenses contrasts sharply with that played by Reagan. Just over two decades after Eisenhower left office, Reagan resurrected ballistic missile defense through a Presidential initiative and made it the centerpiece of America's strategic relations with the Soviet Union. Reagan's Strategic Defense Initiative (SDI) drew heavily on developments that flowed from the groundbreaking work of Eisenhower's ARPA and Project Defender, just as today's missile defense program draws on the advances produced in the SDI program. ■

## NOTES

1. Dwight D. Eisenhower, *Mandate for Change, 1953-1956* (Garden City, N.Y.: Doubleday & Company, Inc., 1963), p. 491.
2. Though popularly known as the V-2 for *Vergeltungswaffe-2* (Vengeance Weapon-2), the name given the rocket by the Nazi propaganda ministry, the long-range German missile was officially developed as the A-4 (*Aggregat-4*), the fourth model in a series designed and built by Wernher von Braun and his German development team. The A-4 first proposed in 1936, was designed in 1939-1941, and was first launched in June 1942. See Michael J. Neufeld, *The Rocket and the Reich: Peenemunde and the Coming of the Ballistic Missile Era* (New York: The Free Press, 1995), pp. 281-82. I have chosen to use the popular designation V-2.
3. Dwight D. Eisenhower, *Crusade in Europe* (Garden City, NY: Doubleday & Company, 1948), p. 229. Eisenhower claimed that his intelligence staff was able to provide "remarkably accurate estimates of the existence, characteristics, and capabilities of the new German weapons." (p. 230) Operation Overlord was the Allied invasion of continental Europe in June 1944.
4. The first V-1 attacks against England occurred early in the morning of 13 June 1944. The first V-2s were launched in anger on 7 Sep 1944, but these failed during launch. The next day, one was launched at Paris and hit in the vicinity of that city at eleven in the morning. The first missile to strike a city hit London at 6:43 pm the evening of 8 Sep. For information on these launches, see Neufeld, *Rocket and Reich*, pp. 245, 327 (n. 13) and Benjamin King and Timothy J. Kutta, *Impact: The History of Germany's V-Weapons in World War II* (Rockville Centre, N.Y.: Sarpedon, 1988), p. 157 (hereafter cited as King and Kutta, *Impact*).
5. Eisenhower, *Crusade in Europe*, pp. 259-60.
6. *Ibid.*, p. 258. Much of the destructive force of the V-2

was generated by the kinetic energy of the missile's four-ton airframe smashing into its target at hypersonic speeds. See King and Kutta, *Impact*, p. 322, and Neufeld, *Rocket and Reich*, pp. 220-22. Neufeld noted that to preserve the destructive forces of kinetic energy, the Germans worked hard to overcome a problem with the V-2's breaking upon re-entry, even though the warhead usually survived breakup and struck the target.

7. Winston Churchill, *The Second World War*, Vol. VI, *Triumph and Tragedy* (New York: Bantam Books, 1953), p. 45 (hereafter cited as Churchill, *Triumph and Tragedy*). While the numbers given for rockets fired and people killed and injured vary from source to source, I have used the figures provided by Churchill. For examples of other numbers on casualties and rockets fired, see Norman Longmate, *Hitler's Rockets: The Story of the V-2s* (London: Hutchison & Company, 1985), pp. 337, 349, and Basil Collier, *The Battle of the V-Weapons: 1944-45* (London: Hodder & Stoughton, 1964), p. 136.

8. The General Board, United States Forces, European Theater, Antiaircraft Artillery Section, "V-2 Rocket Attacks and Defense," Study 42, n.d. [late 1945 or early 1946], document 502.101-42 in the Air Force Historical Research Center, Maxwell Air Force Base, Alabama, pp. 17-19 (hereafter cited as General Board, "V-2 Rocket Attacks and Defense"); Ronald W. Clark, *War Winners* (London: Sidgwick & Jackson, 1979), p. 102; David Irving, *The Mare's Nest* (Boston: Little, Brown, and Company, 1965), p.280; Frederick Pile, *Ack-Ack: Britain's Defence Against Air Attack during the Second World War* (London: George G. Harrap & Co. Ltd., 1949), pp. 386-388; King and Kutta, *Impact*, pp. 3, 125. An excellent summary of the Allied defensive effort against the V-2 is contained in W[illia]m S. Mark, Jr., Joseph P. D'Arezzo, R. A. Ranson, and G. D. Bagley, "Detection and Plotting of the V-2 (Big Ben) Missile as Developed in E'TO," 4 July 1945, docu-

- ment AFHRC 142.0423-16 Jul-Sep 1945, in the Air Force Historical Research Center at Maxwell Air Force Base, Alabama (hereinafter cited as Mark, "Detection and Plotting of the V-2"). Pile (p. 388) noted that devising this first missile defense architecture involved making "more than 25,000 complicated mathematical calculations."
9. Eisenhower is quoted in King and Kutta, *Impact*, p. 263. For Churchill's assessment, see *Triumph and Tragedy*, p. 165.
  10. King and Kutta, *Impact*, pp. 3, 278-82, 313.
  11. Eisenhower, *Crusade in Europe*, p. 260.
  12. B. Bruce-Briggs, *The Shield of Faith: A Chronicle of Strategic Defense from Zeppelins to Star Wars* (New York: Simon and Schuster, Inc., 1988), pp. 102, 271 (hereafter cited as Bruce-Briggs, *Shield of Faith*). The account of the briefing given here is apparently based on the memories of Lt. Gen. C. J. LeVan, who spent much of his Army career working in the missile defense area. LeVan shared this story with the author in a 1991 interview.
  13. Theodore von Kármán, *Science the Key to Air Supremacy*, a volume in Theodore von Kármán, report director, *Toward New Horizons: A Report to General of the Army H. H. Arnold*, Dec 1945, pp. 2-3, 13, 47-48, 74-75; The General Board, United States Forces, European Theater, Antiaircraft Artillery Section, "V-2 Rocket Attacks and Defense," Study 42, n.d. [late 1945 or early 1946], document 502.101-42 in the Air Force Historical Research Center, Maxwell Air Force Base, Alabama, pp.18-19 (hereafter cited as General Board, "V-2 Rocket Attacks"); United States Naval Technical Mission, Report Number 237-45, as quoted in General Board, "V-2 Rocket Attacks," p.18. See also John B. Medaris, with Arthur Gordon, *Countdown for Decision* (New York: G. P. Putnam's Sons, 1960), p. 39 (hereafter cited as Medaris, *Countdown*). For a more accessible edition of von Kármán's *Science the Key to Air Supremacy*, see Michael H. Gorn, ed., *Prophecy Fulfilled: Toward New Horizons and Its Legacy* (Washington, D.C.: Air Force History and Museums Program, 1994). The Gorn volume includes Von Kármán's *Where We Stand*, an interim report he submitted to General Henry H. Arnold on 22 Aug 1945 after a whirlwind tour of German research facilities that included meetings with top German engineers and scientists. Von Kármán's comments on rockets and missile defense may be found on pp. 30-35, 165-167 of the Gorn edition.
  14. Quoted in General Board, "V-2 Rocket Attacks," p. 18. See also Medaris, *Countdown*, p. 39.
  15. Joseph W. Stilwell, et. al., *Report of War Department Equipment Board*, 19 Jan 1946, pp. 1-2, 11 (hereafter cited as *Stilwell Report*).
  16. *Idid.*, p. 30.
  17. *Idid.*, pp. 11, 68-69.
  18. Robert Frank Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force*, Vol. I, 1907-1960 (Maxwell Air Force Base, Ala.: Air University Press, Dec 1989), pp. 478-79; Headquarters United States Air Force, the Air Force Technical Committee, Wright-Patterson Air Force Base, Dayton, Ohio, *Semi-annual Progress Report of the Guided Missiles Program, Department of the Air Force (31 Oct 1949)*, Case No. 13-2, Report No. 10, pp. 49-51 (hereafter cited as Air Force Technical Committee, *Progress Report, Oct 49*). This document was found in the Redstone Scientific Information Center (RSIC), Redstone Arsenal, Alabama. During the late 1980s, when I visited the center, over a hundred of the Wizard studies were available in the RSIC. Additional information on Wizard may be found in T. C. Tennant, *Survey of Guidance Systems*, Part 1, *United States Missiles*, 31 Mar 1957, pp. III-AC-1 - III-AC-3 (hereafter cited as Tennant, *Survey*). This document is also known as the Gilfillan Report after Gilfillan Brothers, Inc., of Los Angeles, Calif., the company that contracted with the U.S. Army to complete the survey.
  19. Air Force Technical Committee, *Progress Report, Oct 49*, pp. 54-56; Tennant, *Survey*, pp. III-AA-1 - III-AA-7. Thumper and Wizard are also discussed in Max Rosenberg, *The Air Force and the National Guided Missile Program, 1944-1950* (Washington, D.C.: Headquarters United States Air Force, USAF Historical Division Liaison Office, June 1964), pp. 75-79.
  20. Donald R. Baucom, *The Origins of SDI: 1944-1983* (Lawrence: University Press of Kansas, 1992), p. 6.
  21. Steven L. Rearden, *The Formative Years: 1947-1950*, Vol. I, *History of the Office of the Secretary of Defense*, Alfred Goldberg, gen. ed. (Washington, D.C.: Office of the Secretary of Defense, Historical Office, 1984), pp. 542-544 (hereafter cited as Rearden, *Formative Years*); Norman Friedman, *The Fifty-Year War: Conflict and Strategy in the Cold War* (Annapolis, MD: Naval Institute Press, 2000), pp. 123, 127 (hereafter cited as Friedman, *Fifty-Year War*). Proposed in 1947 by Secretary of State George C. Marshall and implemented in 1948, the Marshall plan provided economic assistance to help European nations recover from the ravages of World War II. The Soviet Union refused to participate in the plan.
  22. Paul N. Nitze, with Ann M. Smith and Steven L. Rearden, *From Hiroshima to Glasnost: At the Center of Decision—A Memoir* (New York: Grove Weidenfeld, 1989), p. 91 (hereafter cited as Nitze, *Hiroshima to Glasnost*); John Lewis Gaddis, *We Know Now: Rethinking Cold War History* (New York: Oxford University Press; Clarendon Press, 1997), p. 98 (hereafter cited as Gaddis, *We Know Now*).
  23. Jacob Neufeld, *The Development of Ballistic Missiles in the United States Air Force, 1945-1960* (Washington, D.C.: Office of Air Force History, 1990), pp. 94, 102. Contrary to what one might believe, the real importance of the advent of thermonuclear weapons was not that they made possible weapons of virtually unlimited explosive power. Strategic analysts considered one megaton the optimum size for a warhead. The key point is that hydrogen is an abundant and therefore cheap fuel. Thus, the real significance of thermonuclear weapons is that they ushered in the era of nuclear plenty. For a discussion of this point, see Edward Teller, *Memoirs: A Twentieth-Century Journey in Science and Politics* (Cambridge, Mass.: Perseus Publishing, 2001), p. 346.
  24. Rearden, *Formative Years*, pp. 525-26.
  25. Richard M. Leighton, *Strategy, Money, and the New Look, 1953-1956*, Vol. III, *History of the Office of the Secretary of Defense*, Alfred Goldberg, gen. ed. (Washington, D.C.: Historical Office, Office of the Secretary of Defense, 2001), pp. 379-398 (hereafter cited as Leighton, *Strategy, Money, and the New Look*); Derek Leebaert, *The Fifty-Year Wound: The True Price of America's Cold War Victory* (Boston: Little, Brown and Company, 2002), p. 182 (hereafter cited as Leebaert, *Fifty Year Wound*); Gaddis, *We Know Now*, p. 239. One example of this manipulation occurred during the Tushino Air Show of July 1955. Before the show, the Soviets painted over the tail numbers on their Bison bombers. During the show, they first flew ten Bisons over observers. The ten planes then circled outside the view of people on the ground and were joined by eight other Bisons for a second pass over the observers. These Bison sightings suggested that the Soviets might have the ability to deliver a major nuclear attack on the U.S. as early as 1958.
  26. Robert J. Watson, *Into the Missile Age: 1956-1960*, Vol. IV, *History of the Office of the Secretary of Defense*, Alfred Goldberg, gen. ed. (Washington, D.C.: Historical Office, Office of the Secretary of Defense, 1997), pp. 315, 349, 351 (hereafter cited as Watson, *Missile Age*).
  27. Asif A. Siddiqi, *Challenge to Apollo: The Soviet Union and the Space Race, 1945-1974*, NASA SP-2000-4408 (Washington, DC: National Aeronautics and Space Administration, History Office, 2000), pp. 8, 40-42, 55 (hereafter cited as Siddiqi, *Challenge to Apollo*).



28. *Ibid.*, pp. 41, 62, 71, 83. In 1947, Stalin was interested specifically in the German concept of an antipodal bomber, a piloted rocket glider. (See Siddiqi, pp. 50-51.)
29. *Ibid.*, pp. 73-75, 87, 97, 105-108.
30. *Ibid.*, pp. 129, 132-133. Sakharov was the Soviet equivalent of Edward Teller, who has been called the father of the American hydrogen bomb.
31. Leighton, *Strategy, Money, and the New Look*, p. 287.
32. Walter A. McDougall, . . . *the Heavens and the Earth: A Political History of the Space Age* (New York: Basic Books, 1985), pp. 117-18 (hereafter cited as McDougall, *Heavens*); Leighton, *Strategy, Money, and the New Look*, p. 348.
33. Leighton, *Strategy, Money, and the New Look*, p. 353-56; McDougall, *Heavens*, pp. 117-18.
34. Leighton, *Strategy, Money, and the New Look*, pp. 423-25, 433-36, 677; McDougall, *Heavens*, p. 116.
35. McDougall, *Heavens*, p. 116.
36. Bell Laboratories, *ABM Research and Development at Bell Laboratories: Project History, 1975* (Study completed for the U.S. Army Ballistic Missile Defense Systems Command under contract DAHC60-71-C-0005), p. I-1 (hereafter cited as Bell Labs, *ABM Project History*).
37. *Ibid.*, p. I-11.
38. *Ibid.*, pp. I-12, I-14.
39. *Ibid.*, pp. I-15 – I-16.
40. Security Resources Panel of the Science Advisory Committee, *Deterrence & Survival in the Nuclear Age*, Washington, D.C., 7 Nov 1957, p. iii, reprinted in U.S. Congress, Joint Committee on Defense Production, 94th Congress, 2nd Session, *Deterrence and Survival in the Nuclear Age (The "Gaither Report" of 1957)* (Washington, DC: U.S. Government Printing Office, 1976) (hereafter cited as *Gaither Report*); Watson, *Missile Age*, pp. 136-37.
41. McDougall, *Heavens*, pp. 60-61, 250; Siddiqi, *Challenge to Apollo*, p. 160. *Life* is quoted in Gaddis, *We Know Now*, p. 241. McDougall mistakenly gives the date of 3 Aug 1957 for the first successful R-7 launch.
42. Watson, *Missile Age*, pp. 129, 133, 187-88, 247.
43. *Gaither Report*, pp. 8-9.
44. *Ibid.*, pp. 5-8.
45. *Ibid.*, p. 28.
46. *Ibid.*, p. 29. Defense against submarine launched missiles is also briefly discussed here.
47. Watson, *Missile Age*, pp. 179-86. For the quoted material, see p. 186.
48. *Ibid.*, p. 189. Some in Congress doubted that McElroy had the authority to establish ARPA. Supporters of the new agency secured passage of a bill that removed any doubt about the secretary's authority. Although this legislation was apparently unnecessary, Eisenhower signed the bill into law on 12 Feb 1958.
49. G.P. Sutton, "Summary of 1960 Defender Program," in Ballistic Missile Defense Program of the Advanced Research Projects Agency, *A Review of Project Defender for the Director of Defense Research and Engineering, 25-29 July 1960*, Volume II, p. 907 (hereafter the article is cited as Sutton, "Summary" and the volume as *Defender Review*, 1960, Vol. II). Herbert York, *Race to Oblivion: A Participant's View of the Arms Race* (New York: Simon and Schuster, 1970; A Clarion Book), p. 118 (hereafter cited as York, *Race to Oblivion*), stated that Project Defender was "a collection of new ideas, proposals, and research programs related to missile defense."
50. Robert W. Seidel, "How the Military Responded to the Laser," *Physics Today*, Oct 1988, pp. 36-37; Bruce-Briggs, *Shield of Faith*, pp. 224-25; R. C. Weidler, "Kill Mechanisms—Introduction," in *Defender Review*, 1960, Vol. II, pp. 793-94; Sutton, "Summary," pp. 913-14.
51. Harold N. Beveridge, "Defender Introduction," in Ballistic Missile Defense Program of the Advanced Research Projects Agency, *A Review of Project Defender for the Director of Defense Research and Engineering, 25-29 July 1960*, Volume I, pp. 8-9, 18 (hereafter, the article is cited as Beveridge, "Defender Introduction," and the volume is cited as *Defender Review*, 1960, Vol. I).
52. *Ibid.*, p. 18.
53. *Ibid.*, p. 17-18.
54. *Ibid.*, pp. 18-19.
55. In the early sixties, U.S. missile designers developed the concept of placing multiple warheads on each ICBM giving rise to the term multiple independently-targeted re-entry vehicle or MIRV. See Friedman, *Fifty-Year War*, p. 294.
56. Everett T. Welmers, "BAMBI: Ballistic Missile Boost Intercept," *Defender Review*, 1960, Vol. I, pp. 36-41, 46-47 (hereafter cited as Welmers, "BAMBI").
57. Beveridge, "Defender Introduction," pp. 20-23.
58. MIDAS, an early-warning satellite that used an infrared sensor to detect the launch of rockets, was first orbited in 1960. For the story of MIDAS, see R. Cargill Hall, *Missile Defense Alarm: The Genesis of Space-Based Infrared Early Warning*, (Washington, D.C.: NRO History Office, June 1999).
59. Welmers, "BAMBI," pp. 48-65; Sutton, "Summary," p. 914. Welmers made an interesting remark about the development of countermeasures: "Although it is often easier to conceive of countermeasures than to create effective hardware for their accomplishment, there are very serious aspects of BAMBI countermeasure[s] which must be considered." Sutton noted that the "nuclear kill scheme [was] still a favorite mechanism" in the summer of 1960. For a discussion of efforts to develop the means of detecting a rocket plume against background radiation, see Hall, *MIDAS*, pp. 3-22.
60. Watson, *Missile Age*, p. 189.
61. *Ibid.*, pp. 170-71.
62. *Ibid.*, pp. 171, 197, 379.
63. *Ibid.*, p. 171.
64. Neil H. McElroy to Secretary of the Air Force, Memorandum, Subject: "Program for Defense Against the Intercontinental Ballistic Missile," 16 Jan 1958; Neil H. McElroy to Secretary of the Army, Memorandum, Subject: "Program for Defense Against the Intercontinental Ballistic Missile," 16 Jan 1958. A copy of each letter was printed in U.S. House, Committee on Armed Services, *Investigation of National Defense Missiles: Hearings before the Committee on H.R. 67, 85th Cong., 2nd sess., 1958*, pp. 4196-97.
65. Watson, *Missile Age*, pp. 379-80.
66. *Ibid.*, p. 380.
67. *Ibid.*, p. 380.
68. *Ibid.*, pp. 288, 380-381.
69. *Ibid.*, pp. 326, 381.
70. Eugene M. Emme, compiler, *Aeronautics and Astronautics: An American Chronology of Science and Technology in the Exploration of Space, 1915-1960* (Washington, D.C.: National Aeronautics and Space Administration, 1961), p. 114; Bell Labs, *ABM Project History*, pp. I-22 – I-23.
71. Bell Labs, *ABM Project History*, p. I-21.
72. Bruce-Briggs, *Shield of Faith*, pp. 142-44.
73. *Ibid.*, p. 144; Watson, *Missile Age*, p. 382; York, *Race to Oblivion*, p. 140.
74. Watson, *Missile Age*, p. 382.
75. *Ibid.*, p. 382.
76. Bruce-Briggs, *Shield of Faith*, p. 144.
77. James A. Walker, Frances Martin, and Sharon S. Watkins, *Strategic Defense: Four Decades of Progress* (Huntsville, Ala.: Historical Office, U.S. Army Space and Strategic Defense Command, 1995), pp. C-7 – C-8.
78. For a recent article on the Air Force ASAT, see Robert Kilgo, "The History of the United States Anti-Satellite Program and the Evolution to Space Control and Offensive and Defensive Counterspace," *Quest*, Vol. 11, No. 3, 2004, pp. 30-39. Kilgo does not discuss the Defender roots of the miniature homing vehicle that became the heart of the AF ASAT system tested in 1985.

# Lt. Gen. Forrest S. McCartney: The First Space Professional





David C. Arnold

The United States is a spacefaring nation. As the nation's dependence on space continues to grow, the country needs people with the right skills to acquire, operate, and employ military space capabilities. The 2001 report of the Commission to Assess U.S. National Security Space Management and Organization, commonly called the Space Commission (appointed by the Senate Armed Forces Committee and by the Secretary of Defense in consultation with the Director of Central Intelligence) identified the lack of space leadership as a critical limiting factor to a continued American advantage in space capabilities. The commission found that about one-third of the officers commanding space wings, groups and squadrons have "extensive" space experience, while the remaining two-thirds have less than 4.5 years in space-related positions.<sup>1</sup> The commission members, therefore, asked, "Why is there no space experience among military space professionals?" Part of the answer was that the space force was young and small. Further, the infusion of personnel with largely missile operations backgrounds had broadened career opportunities for missile launch officers without having the same corresponding effect for space professionals. This merger of the two career fields has had a negative impact on the overall experience level of space professionals because missile operations skills do not translate readily into space operation or acquisition skills. In addition, space professionals are still in demand in the commercial world, as they have been since the beginning of the military's involvement in space, draining space talent from the military. Finally, there has been a lack of focused career development in the military space community<sup>2</sup>

Who are space professionals? In developing the Space Professional Strategy in 2004, in response to the commission report, Air Force Space Command designated three principal career paths that identified a space professional: 1) space operations, 2) missile operations, and 3) space systems acquisition. Space and missile operations involved personnel trained and certified in the employment of space and ICBM systems. Acquisitions professionals included engineers and scientists skilled in basic research, able to translate user requirements into designs, and adept at managing the development, testing, and fielding of space and ICBM systems. Some individuals entered these career paths as direct accessions, while others came from acquisitions or missile assignments. Furthermore, space professionals served not only in Air Force Space Command, but also throughout the Air Force and

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*[There] was a different premium on success but, hey, folks were kind of stumbling around. They'd never done [space operations] before. As my daddy would say, "This time and once more will make twice we did that."*

— Lt. Gen. Forrest McCartney, USAF, (Ret.)  
Operator of Corona XIV, which took the first photographs of the USSR recovered from space

the joint warfighting community, the National Reconnaissance Office, and in other government agencies.<sup>3</sup>

Why did the nation need space professionals? In part, for the same reasons that we needed the same depth of experience in space, as we would expect of an F-16 Fighting Falcon pilot or a Red Horse civil engineer. Originally, space career fields relied on taking officers and training them in space on the job. As the range of space mission areas and the size of the space cadre grew this contrast becomes an even more difficult balancing act. Because space benefited from the development of close relationships between the research, development, acquisitions, and operations communities, the interchange of officers across all these areas proved difficult, and potentially detrimental to an officer's career development. While the original system had provided officers with more breadth, it gave them little depth. In general, the Space Commission found that leadership in the space field suffered from limited experience among officers in the field, little technical education and too short tour lengths averaging less than 1.5 years. As a result, space organizations failed to reach their potential.<sup>4</sup>

In his March 2003 testimony before Congress, Under Secretary of the Air Force and Director of the National Reconnaissance Office, Peter B. Teets, spoke about the nation's need for a "space cadre." The commander of Air Force Space Command, Gen. Lance W. Lord, reiterated Mr. Teets's comments by stating that "A strong proactive space professional development program is essential to safeguarding our nation's leadership position in space...."<sup>5</sup>

To that end, Air Force Space Command built a comprehensive strategy to develop space professionals by addressing their training, education, and experience needs. The new career development plan focuses on producing capable and competent space professionals who should have the basic knowledge needed to do their jobs, and whose skills, developed through technical training, education, and experience, are specific to their pri-

## WHY DID THE NATION NEED SPACE PROFESSIONALS?

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HE WANTED TO GET INTO AIR RESEARCH AND DEVELOPMENT COMMAND (ARDC), WHERE SPACE AND MISSILE R&D WAS JUST GETTING STARTED

MCCARTNEY [WENT] TO SUNNYVALE, CALIFORNIA, TO JOIN THE AIR FORCE'S ONLY SATELLITE OPERATIONS UNIT

mary specialty. As Air Force officers, space professionals must also possess the requisite leadership, interpersonal, and organizational skills that they develop through initial accession schools, professional military education, and experience. This combination of technical expertise with leadership experience ensures that members of the space professional cadre are officers first and technical experts second.<sup>6</sup>

Part of a useful space professional development program must include some real-life examples of successful space professionalism. Their successes offer some key lessons about what makes a space professional. One of the first, if not the very first, space professional was Air Force Lt. Gen. Forrest S. McCartney. During both his time in service and afterward he personified a professional space career. After graduation from college and a temporary assignment at Cape Canaveral, Florida, laying the same communications cables he would later use for space launches, McCartney had assignments in space operations, including taking pictures of the Soviet Union from Corona satellites, in acquisitions buying the Titan III space launch booster, communications satellites, and the Peacekeeper (M-X) ICBM, and along the climb to lieutenant general, developed his professional skills as a leader of military organizations.

### Background and Early Career

Forrest Striplin McCartney was born on March 23, 1931, at Fort Payne, Alabama, the self-proclaimed “Sock Capital of the World.” His parents both graduated from Alabama Polytechnic Institute (API, now Auburn University) in the 1920s, his father, Charles, as an engineer and his mother, Elizabeth, as a teacher. “Daddy Mac” joined the military in World War II, serving as an engineer in the U.S. Army Air Corps until the war ended, and later ran an electrical contracting business in Fort Payne. Forrest, a good student, graduated from a military prep school and then followed in his parents’ footsteps to Auburn. He pushed himself through college, attending year round, and graduated, in 1952, with a degree in electrical engineering in just three years. Electrical engineering majors had their choice of two specializations, power distribution and electronics. McCartney chose the latter.<sup>7</sup> Because he had already taken junior ROTC as part of his high school program, McCartney enrolled in the senior ROTC program at API, a land-grant institution that required ROTC enrollment for underclassmen.<sup>8</sup> McCartney’s stellar academic and military performances were enough to earn him a regular commission in the Air Force at a time when most ROTC graduates received reserve commissions. McCartney was commissioned in the Air Force in March 1952.<sup>9</sup>

### Into the Space Business

Because of his poor eyesight, he did not qual-

ify as a pilot, but became an Air Force engineer and was stationed at Robins AFB, Georgia, as an aircraft maintenance officer and later as an engineering officer. He did not spend much time in Georgia, but instead performed temporary duty at Cape Canaveral, Florida, installing the first communications cables at the newly built missile proving grounds. “I was privileged to be a part of the team that put some of the original communications in down here, and I became kind of captivated by the space [business]—or by the missile business—it wasn’t space then by any stretch of the imagination.”<sup>10</sup>

But engineering support to the missile business did not hold enough fascination for him. As he later explained, because “engineering really turned me on,” he wanted to get out of Air Materiel Command (AMC) and into Air Research and Development Command (ARDC), where space and missile R&D was just getting started.<sup>11</sup>

Because he was on a directed duty assignment, the only way he could join ARDC was first to accept a school assignment. McCartney attended the Air Force Institute of Technology, earning a master’s degree in nuclear engineering. He specialized in weapons technology and graduated in March 1955. To take advantage of his new expertise, the Air Force sent him to Kirtland AFB in Albuquerque, New Mexico, which was the center for “special weapons,” a euphemism for nuclear devices. In a series of assignments, he worked on nuclear weapons system safety for ballistic missiles.

In New Mexico, McCartney met Maj. Charles “Moose” Matheson, one of Maj. Gen. Bernard A. Schriever’s “chosen ones.” In early 1959, Matheson offered McCartney an opportunity to get into space. “I did not know what I was getting into when I went up” to Sunnyvale, California, to join the Air Force’s only satellite operations unit. “I knew that Colonel Matheson was there. I had a great amount of respect for him, and if he wanted me there, that was good enough for me.”<sup>12</sup>

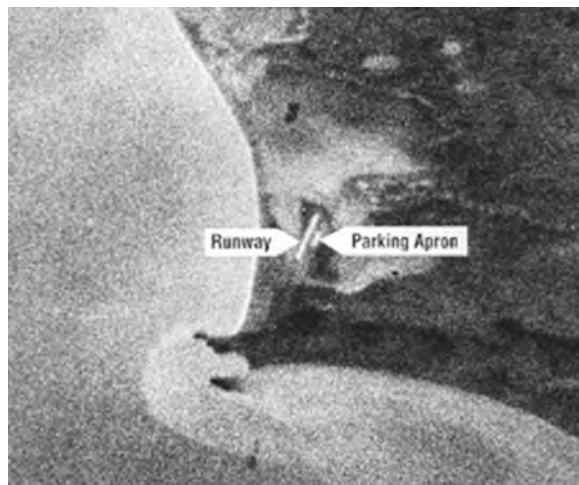
The Air Force had no uniformed personnel experienced in operating and maintaining satellites, so the first Air Force officers joined civilian contractors “already on console” in 1959. Joining McCartney in Sunnyvale were two other Air Force captains, Al Crews, and Mel Lewin. The Air Force assigned the three space operations pioneers to work alongside Lockheed employees on the covert Corona satellite reconnaissance program. Recalled Lewin, McCartney’s carpool partner at the time and now a retired Air Force colonel, “I was so excited about what I was doing and enjoyed it a lot. It’s not often you get in at the start of something.”<sup>13</sup> They went on to become the first Air Force officers to “fly” satellites.

The early days of Corona were challenging. The first attempt to launch a reconnaissance satellite on board a Thor/Agena booster had come on January 21, 1959, before McCartney arrived in California. While the Thor booster sat on the launch pad, the Agena upper stage malfunctioned

**THE AIR FORCE CONSIDERED A LACK OF FORMAL TRAINING ACCEPTABLE BECAUSE OF THE EXPERIMENTAL NATURE OF THE SPACE OPERATIONS ENVIRONMENT**

when small, solid rockets that forced propellant into the rocket engine's fuel inlet fired prematurely. After inspection, the Agena upper stage turned out to be a total loss. Engineers referred to this launch attempt as Discoverer Ø.<sup>14</sup> On February 28, 1959, the Air Force launched Discoverer I carrying only a light engineering payload. The Air Force Satellite Control Facility, responsible for satellite command and control, presumed it to have crashed near the South Pole, even though at least one tracking station claimed to have heard the satellite on orbit. Discoverer II, the first mission to reach orbit, failed when controllers lost the satellite on the seventeenth orbit because a bad command sequence ejected the capsule at the wrong time, forcing reentry near Spitzbergen, Norway. Efforts to recover the capsule ended when aerial reconnaissance revealed the Soviets probably found the capsule, which carried a pair of mice, not a camera.<sup>15</sup> The first mission to successfully return a capsule from space, Discoverer XIII, occurred in August 1960, a year and a half after the program's initial launch; it carried a water-recovered diagnostic package that included an American flag. The very next mission, Discoverer XIV, included the first air-recovered film capsule, returning more imagery of the USSR than the 24 previous U-2 flights combined.<sup>16</sup> McCartney took the first of these pictures.

Mys Shmidta Airfield, USSR, August 18, 1960. (Photo courtesy of the NRO.)



**SITTING ON CONSOLE AS A SATELLITE OPERATOR FELT LIKE [BEING IN ] "A PRESSURE COOKER"**

The newest space operators, without the benefits of formal schools or textbooks, learned about satellite hardware, orbital mechanics, and vehicle commanding. The Air Force considered a lack of formal training acceptable because of the experimental nature of the space operations environment. The satellite "operators" depended on Lockheed to help them with technical training, such as, understanding the Agena booster's technical specifications. Lockheed had built the Agena across the street from the satellite operations area in Building 104, so the operators often went over there to see the equipment before it reached orbit. Life for a new satellite operator included constant study and an informal class. The operators went to meetings, got data, and would say "Hey, that's a

good book on that," so, in a sense, they "scavenged" their training, figuring out what made the best sense. Corona's status as a test program let them take their time.<sup>17</sup>

In addition, engineers rehearsed an on-orbit operation almost every day, whether a vehicle orbited or not, by taking tapes from previous flights and playing back the data. The technician in the back of the control room tried to see if he could devise a problem that would fool the person trying to control the vehicle. McCartney recalled that sitting on console as a satellite operator felt like [being in ] "a pressure cooker ... , because in those early days that equipment was not very good to you. You ... really had to think ahead, and you had to be able to ... assess the situation, understand what was going on, think on your feet, figure out what to do, and do it. And you didn't have time for other people to do any real prompting of you." The operators never treated a rehearsal or a simulation like a game, the operators learned through the devious problems they threw at each other. "The knack was to be able to think fast and think like that hardware would [act] and keep your cool and, you know, figure out what you need to do and do it under a pressure condition. And while everybody had to have a good education and understanding, it's really how well you react" to stressful situations that arose during satellite missions.<sup>18</sup> McCartney paved the way for Air Force satellite operators, using his engineering training as only a starting point because no formal training program existed for new satellite flyers, whether contractors or blue-suiters. Three weeks after he arrived in Sunnyvale, McCartney had become an expert on satellite operations.<sup>19</sup>

To be fair, one could describe the early Corona reconnaissance satellite system as the Model T of the satellite business. McCartney and company did not have far to go on the learning curve of this rudimentary system when they arrived in 1959. The first-generation Corona vehicles only had four commands: reset, increase or decrease, and a "gray" command.<sup>20</sup> A continuous, punched Mylar tape controlled systems on the vehicle, which meant the satellite controller had to know what point the tape had reached and what point the vehicle had reached in its orbit, all from hundreds of miles away. Controllers reset the tape and increased or decreased its speed to match whatever orbit the satellite happened to enter, achieving orbit being an imprecise feat at the time. For the early satellites, reconnaissance planners punched the tape well before launch because they knew what targets they wanted to photograph. The Mylar tape had thirteen channels for the thirteen metal "fingers" that rode on top of the tape; when the "finger" went into one of the rectangular holes, it activated a relay and initiated a function. Using the tape, operators turned the receivers on or off, or the camera on and off, or the reset monitor, or whatever they needed to do. Adding to the challenge, and emphasizing the importance of situational awareness, the operators also had to take

IN JANUARY 1961, DOD AND THE CIA JOINTLY RECHARTERED THE ORGANIZATION AND RENAMED IT THE NATIONAL RECONNAISSANCE OFFICE

THE AIR FORCE REFOCUSED SPACE ACTIVITIES ONLY ON LAUNCHING AND TRACKING SATELLITES

Early artist's conception of the X-20, Courtesy USAF

into account errors on the tape. Although the intelligence community preplanned each mission, the success of the operation relied on the operators on console to synchronize the timer to get the satellite to operate the way the reconnaissance community needed it to perform.<sup>21</sup>

### To the Staff

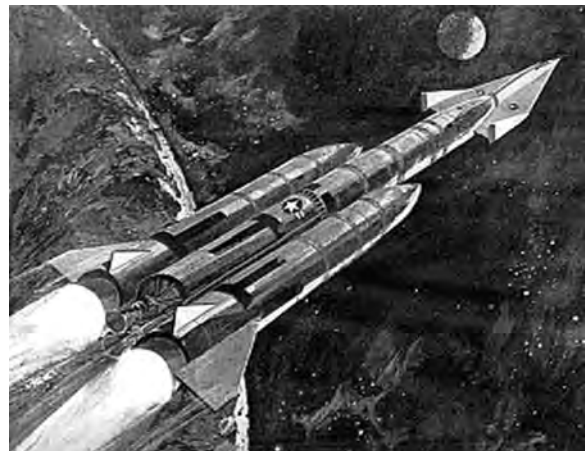
By 1961, McCartney was the lead operator for the Midas infrared warning satellite and also served as one of the controllers on the original Samos satellite. General Schriever moved on to Andrews AFB to command Air Research and Development Command and then to establish Air Force Systems Command from parts of ARDC and Air Materiel Command. A big decision was looming in Washington, D.C., about how to manage the new space reconnaissance systems. Although very few people knew about the space-based reconnaissance effort, the intelligence community recognized what they had in the Corona program and the "117L babies," as Schriever later called them. Consequently, a big fight ensued over how they were going to be managed.<sup>22</sup> Schriever tried to bring some officers with him to the new AFSC to manage the satellite programs out of Andrews AFB, instead of the Ballistic Missiles Division in California. He wanted to have people who had experience in on-orbit operations on his staff so that if he gained control of the reconnaissance satellite programs, he would have a staff in place. Schriever had a very close staff and a regular staff; McCartney served on his close staff.<sup>23</sup> But on August 31, 1960, the Air Force lost its role in overhead reconnaissance, when DoD created the Office of Missile and Space Systems. The new organization came under Assistant Secretary of the Air Force Joseph V. Charyk, who reported directly to the Secretary of Defense on reconnaissance satellite matters. Then, in January 1961, DoD and the Central Intelligence Agency (CIA) jointly rechartered the organization and renamed it the National Reconnaissance Office, classifying its very existence. The NRO became a separate agency responsible for consolidation of all DoD "satellite and air vehicle overflight projects for intelligence," and "for the complete management and conduct" of these programs.<sup>24</sup> The covert space program's share of the military space program took a huge bite out of the nation's total space activity and shrank the amount of space work under "normal" military development procedures and control.<sup>25</sup>

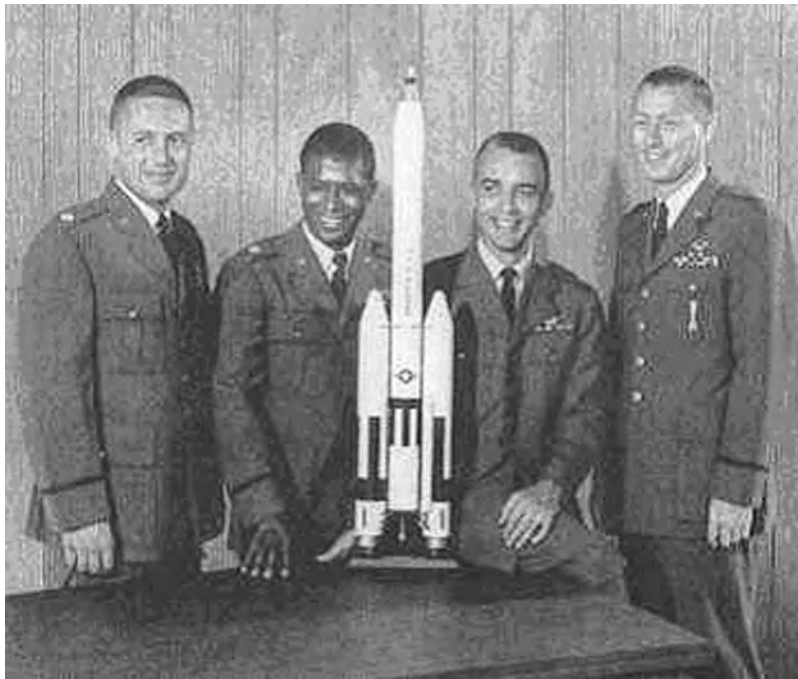
The NRO assumed operational authority for overhead reconnaissance while also being designated the prime customer for all overhead intelligence, taking away the Air Force's authority for operating the nation's reconnaissance satellites. The Air Force refocused space activities only on launching and tracking satellites, not on mission planning or operations. For that, the NRO had primary responsibility.<sup>26</sup> The space programs went underground.

When the NRO took over those programs, only the upper stages, boosters, and communications satellites remained under Air Force authority. In the meantime, as the size of satellites increased, the Air Force saw the need for more powerful boosters than the Atlas and Thor to launch their newest communications satellites. McCartney became the program officer for the Titan III booster. By adding a third stage to the first two stages of the Titan II booster, engineers achieved the required thrust to place even larger satellites in orbit. The Titan IIIA booster made its first successful flight in December 1964. The Titan IIIB, which usually had an Agena D as the third stage, quickly replaced the Titan IIIA, and launched numerous Air Force satellites during the 1960s and 1970s.<sup>27</sup>

The biggest change to the Titan series, however, was the addition of two large, "strap-on" solid rockets to the main vehicle to increase the available thrust at liftoff from 463,000 to 2,360,000 pounds. These solid rockets lifted the rocket to a certain altitude where the main engines then ignited. After exhausting their propellant, the solid rockets were jettisoned, and the main, liquid-propellant rocket continued on. The Titan IIIC, the first of the series to have the additional solid rocket boosters, had its first successful test flight in June 1965. All of the succeeding members of the Titan family—the Titan IIID, III-E, 34D, IVA, and IVB—have used the solid rocket boosters to increase their lifting capacity. These solid rockets were so successful that NASA adopted them as the primary boosters for the space shuttle.<sup>28</sup>

If the Air Force's role in space was limited to the approved defense support missions, then what missions were there for manned space flight? The 1958 NASA Act had organized the U.S. space program into civil and military space (itself divided into two separate programs, overt and covert), but a debate still raged within the DoD about the role of manned space flight for the military. An experimental space program called Dynamic Soaring, or Dyna-Soar, was to go into orbit on board the Titan IIIC booster, a descendent of the Titan ICBMs Schriever's team had designed in Los Angeles in the 1950s.





Third group of MOL astronauts (1966). Left to right, Bob Herres, Bob Lawrence, Don Peterson, Jim Abrahamson (USAF Photo).

## THE FIRST AIRPLANE EQUIPPED FOR SATELLITE COMMUNICATIONS WAS PRESIDENT LYNDON JOHNSON'S AIRCRAFT, AIR FORCE ONE

Like the dinosaurs themselves, though, the program was doomed from the start. The Air Force failed to promote it either as a prestige program, a system to test ballistic missiles, or a manned military space station. It was approved eventually as a program to test military systems and orbital flights, and renamed the X-20. It did not have as big a payload as a Gemini capsule, and X-20 cost more than the NASA capsule. Troubled by funding limitations and the absence of a clearly defined military mission, the Air Force cancelled the program.<sup>29</sup>

After Dyna-Soar was cancelled, the Air Force again promoted the idea of a manned reconnaissance platform in space. The Manned Orbiting Laboratory's (MOL) primary objective was to test the usefulness of piloted spacecraft for the military. The basic MOL design included a single spacecraft launched on a Titan IIIC booster. Although originally not designed as a reconnaissance platform, the Air Force shifted the focus of MOL in early 1965 to operational-type missions and moved the launch site from Florida to California. From Vandenberg AFB, MOL could achieve polar orbits from which astronauts could perform reconnaissance of the USSR. But MOL, like Dyna-Soar, died without completing a manned mission. Suffering from technical, weight, budget, and support problems, DoD cancelled MOL in June 1969 to make room for the war in Vietnam.<sup>30</sup>

### Mr. Communications Satellite

While McCartney was still at Headquarters AFSC in 1963, Col. Henry B. Kucheman asked him to become the project officer for the communications satellites. Communications satellites underwent development quickly. Some were, and still are, classified, but the Air Force managed to pry away from the NRO some of the classified work.

After four years of hard work, McCartney "took some time off" in summer of 1967 to attend the Armed Forces Staff College. He assumed that after leaving that school he would go back to Sunnyvale to work on the MOL program. Much to his chagrin, however, the Air Force sent him to the Pentagon. There he continued his work on communications satellites, picking up where he had left off before going to school. As he explained,

*I was known as, "Mr. Communications Satellite," as the person you contact for communications satellites when I was over at Andrews and, then, when I went away to school for a year, I just went back and kind of picked the ball up where it was when I left it.... [T]here wasn't a lot of depth in manning up there. So, one person kind of did an awful lot, [on] both sides of the [Potomac] river.<sup>31</sup>*

McCartney's major work was establishing requirements and achieving the support from the operational side of the Air Force to spend the dollars necessary to develop and acquire the hardware. McCartney spent a lot of time educating people and convincing them that the Air Force could, and should, use communications satellites operationally. Satellite technology, particularly for use in the cockpit, was not readily accepted by the Air Force in those days. The service most advanced in accepting the use of communications satellites was the Navy. The Navy had high-frequency stations, seeking approval and resources to continue the communications satellite programs.

One of the programs McCartney led was the Lincoln Laboratory experimental communications series, for which he served as program element monitor. The first four Lincoln experimental satellites were launched in 1965. Although not all reached their intended orbits, they demonstrated communications payload operations in space, supported atmospheric propagation measurements, and helped improve ground equipment for both communications and satellite control. The Tactical Communications Satellite, following the Lincoln satellites, was designed for operation with small land-mobile, airborne, or shipborne tactical terminals. The first airplane equipped for satellite communications was President Lyndon Johnson's aircraft, Air Force One. McCartney's team successfully demonstrated how space-based communications could support the airborne war fighter, indeed the commander-in-chief himself.<sup>32</sup>

McCartney next went out to Los Angeles to the Advanced Development Plans office at the Space and Missile Systems Organization. Shortly after he arrived, the position of program director for the Air Force Satellite Communications System (AFSATCOM) opened. It interfaced very closely with some of the NRO systems at the time but also gave him a chance to extend the reach of satellite communications to aircraft. Among other platforms, AFSATCOM became the primary command and control system for the nuclear fleet—B-52s and land-based missiles. (Anyone who has served



MCCARTNEY BECAME ... COMMANDER, OF BMO, WITH RESPONSIBILITY FOR THE SUSTAINMENT OF THE MINUTEMAN ICBM FORCE AND FOR DEVELOPING THE M-X MISSILE

THE AIR FORCE ESTABLISHED SPACE COMMAND IN 1982, WITH HEADQUARTERS AT PETERSON AFB, COLORADO

in a missile launch control center will remember the AFSATCOM receiver.) In addition, as de facto executive agent for space, the Air Force was building a communications system for the Navy, using Navy money called the Fleet Satellite Communications System. McCartney was on hand for some of the first launches and the first of those communications satellites are still in orbit working. Because of his success as lead of some extremely important programs, the Air Force promoted McCartney to brigadier general.<sup>33</sup>

### Ballistic Missile Organization

With his promotion, the Air Force wanted McCartney back in the special weapons field. Gen. Alton D. Slay, then deputy chief of staff for research and development at Headquarters USAF, assigned McCartney to the Ballistic Missile Office (BMO) at Norton AFB, California. McCartney became deputy commander, then commander, of BMO, with responsibility for the sustainment of the Minuteman ICBM force and for developing the M-X missile, which President Reagan dubbed the Peacekeeper.

Since the early 1970s, the U.S. had been engaged in an R&D effort to develop a new land-based ICBM. The triad of bombers, submarines, and land-based ICBMs needed a significant upgrade to meet the threat of increasingly accurate Soviet missiles. Submarine-based missiles did not have enough accuracy to ensure the destruction of hardened targets and the air-based portion of the nuclear triad was extremely costly to operate. In addition, the Minuteman fleet had been built in the early 1960s and upgraded, but remained hardened only to a level corresponding to the accuracy of the Soviet missile threat in the 1960s. As the Soviets proliferated their number of missiles in the 1970s, they also increased the accuracy of the SS-18 and SS-19 to the point where they could hold the Minuteman fleet at significant risk. The SS-18, in fact, was a two-stage, liquid-propellant, cold-launched missile that included four multiple independently targetable re-entry vehicles (MIRVs). Consequently, as McCartney explained, "The survivability of the fleet of missiles—land-based ICBMs—was a major, major concern."<sup>34</sup>

The service considered nine methods of basing the new M-X missiles so that even a highly coordinated multi-wave Soviet attack would exhaust their supply of SS-18s. Among the methods considered, the most controversial was Closely Spaced Basing, which the press dubbed "dense pack." Another plan, Closely Spaced Basing with Concealment, provided higher levels of deterrence by playing a shell game with 100 ICBMs in 300 silos. But it required even larger fenced-off land areas, which increased the environmental concerns surrounding the new ICBM.<sup>35</sup> The controversy over M-X basing was only beginning.

McCartney led the initial effort to secure the approval through the National Environmental Protection Act to put M-X in Nevada and Utah in

a concept called the Multiple Protective Shelter system, which the Carter Administration approved in 1979. The enormous program envisioned twelve shelters per missile. They called the concept "position location uncertainty," believing that the Soviets would never know which shelters contained live missiles. The plan was to put 3,600 shelters in the desert, any one of which could accommodate an operational missile. The Air Force would then truck the missiles from one shelter to another in a kind of shell game. All of this was intended to increase survivability in the fleet because the land-based ICBM was the highly accurate part of the triad. It was an unbelievably controversial program, particularly among environmentalists who were concerned about 35,000 miles of new roads in the desert. McCartney recalled:

*I spent an enormous amount of time in Nevada and Utah conducting, I don't know, about twenty public meetings called "scoping hearings" to try to ... introduce what we were going to do and to understand the concern of the citizens in Nevada and Utah. And, I will tell you, that was less than a pleasant experience. We were not warmly ... received, but it was mostly hostile, because they didn't want [M-X] out there.<sup>36</sup>*

Nevada Senator Paul Laxalt, manager for Ronald Reagan's presidential campaign in 1980, did not want 3,600 potential nuclear targets in Nevada, either. In 1981, the newly formed Reagan Administration selected existing Minuteman silos at F.E. Warren AFB, Wyoming, for the Peacekeeper missiles, because "they were the driest holes in the ICBM fleet."<sup>37</sup> Meanwhile, Maj. Gen. McCartney's cool-headed leadership style marked him for bigger things.

### Space Division

Air Force space activities had expanded apace with McCartney's career, and he found himself returning to Los Angeles and to space. No separate operational command had existed for the missions the Air Force performed in space, despite space professionals working Air Defense Command, Strategic Air Command, Air Force Systems Command, and elsewhere. After a period of study, however, the Air Force established Space Command in 1982, with headquarters at Peterson AFB, Colorado, where Air Defense Command had been located until its disestablishment in 1980. The first two satellite programs assigned to the fledgling space operations command were the Defense Support Program infrared missile warning satellite, a descendant of the Midas and Samos satellites on which McCartney had worked, and the Defense Meteorological Satellite Program, the weather satellite program that had been the first operational satellite program in the Air Force.<sup>38</sup> Air Force Systems Command chief Gen. Robert T. Marsh named McCartney to be vice commander at Space Division under Lt. Gen. Richard C. Henry.

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IN JANUARY  
1986  
BROUGHT A  
COMPLETE  
HALT TO  
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SPACE  
FLIGHTS

The first person to be dual-hatted as vice commander of Space Command and commander of Space Division, General Henry retired about a year after McCartney arrived. McCartney, who gained a third star in 1983, assumed both of General Henry's "hats."

Although the demise of Dyna-Soar and the Manned Orbiting Laboratory had left the USAF without a human spaceflight program, military interest in manned spaceflight continued. Working with NASA, the military influenced the design of NASA's Apollo successor, the Space Transportation System, commonly called the space shuttle. To support military shuttle operations, intended mainly for the deployment of satellites, Congress authorized a new control center in 1979. The Consolidated Space Operations Center's (CSOC) two elements consisted of several Space Operations Centers for the on-orbit control of DoD satellites and the Shuttle Operations and Planning Center (SOPC) for control of manned military missions. The CSOC, located several miles east of Colorado Springs, would eventually replace the Consolidated Space Test Center at Sunnyvale AFS, California, for satellite command and control and was envisioned as the "Johnson Space Center" for military manned missions. In May 1983, as Space Command vice commander and Space Division commander, Lt. Gen. McCartney joined Space Command's first chief, Gen. James V. Hartinger, in breaking ground for the CSOC at newly created Falcon AFS (now Schriever AFB).<sup>39</sup>

Soon thereafter, former MOL astronaut Gen. Robert T. Herres replaced General Hartinger. McCartney, mindful that his dual-hatted responsibilities were too much for one person to handle effectively and tired of the frequent trips between Los Angeles and Colorado Springs, suggested to General Herres that he needed a full-time vice commander. Herres, now commander in chief of North American Aerospace Defense Command and United States Space Command, as well as commander of Air Force Space Command, agreed. McCartney relinquished the vice commander's hat and focused on commanding Space Division.<sup>40</sup>

As commander of Space Division, McCartney was heavily involved in preparations to launch the space shuttle from the West Coast. For polar-orbiting missions, the USAF planned to launch the shuttle from Space Launch Complex 6 (SLC-6) at Vandenberg AFB. Banking everything on NASA's ability to launch the shuttle regularly, the military abandoned the concept of expendable boosters in favor of the shuttle. Astronauts at Houston also used McCartney as their point of contact to keep abreast of what the Air Force was doing. "I was really transitioned, as a commander, to spend an awful lot of time out there working the manned space flight part of things," he recalled.<sup>41</sup> That experience would pay off for the nation in 1986.

Loss of the space shuttle *Challenger* in January 1986 brought a complete halt to military space flights for nearly a year, and to shuttle flights for

two and a half years. In the wake of the accident, the USAF terminated plans to launch shuttles from Vandenberg, mothballed SLC-6 and, eventually, turned over much of its equipment to NASA. In 1987, President Reagan cancelled the SOPC when he restructured the shuttle program to focus on space science. Without dedicated, expendable boosters, the military space program was in crisis. Immediately affected was the Global Positioning System navigation satellite program, with satellites scheduled for launch exclusively on the shuttle after 1986. The back up of satellites awaiting launch had far-reaching effects not only for the Air Force but also for the National Reconnaissance Program. Payloads remained in warehouses waiting development and delivery of boosters to launch them. On-orbit satellites aged in the harsh environment of space, while engineers cleverly devised ways to extend their effective lifetimes.<sup>42</sup>

### Kennedy Space Center

After *Challenger*, only a year remained before McCartney's 35-year mandatory retirement date. He knew he could have probably stayed in Los Angeles and finished his military career as commander of Space Division. But he wanted to go back to Florida, and NASA wanted a new director at Kennedy Space Center (KSC). McCartney turned out to be just the man to restore operational confidence at KSC.

After asking his close friend Secretary of the Air Force Edward C. "Pete" Aldridge if he would allow McCartney's assignment to NASA if the Kennedy job came open, the Space Division commander talked to NASA Administrator Dr. James C. Fletcher, who said he would like to hire McCartney to fix KSC. The Air Force allowed him to go, much to the chagrin of Air Force Chief of Staff Gen. Larry D. Welch, whose objections Secretary Aldridge overrode, at McCartney's request. In October 1986, the Air Force reassigned McCartney to NASA, which assigned him as the KSC director. McCartney served on active duty as the Kennedy director until he retired from the Air Force in August 1987. He remained KSC director another four years as a NASA civilian employee.<sup>43</sup>

Often, particularly in major organizations like the one at Kennedy Space Center, new bosses come in after an accident or a crisis and they began lopping off professional heads, but McCartney chose not to do that. Instead, taking the team that remained after NASA had laid off many people, McCartney chose to make very subtle organizational adjustments. He knew KSC had some very capable people because he had worked with them to get Vandenberg ready for shuttle launches. He explained, "I chose to build the team, and changes weren't necessary." The big push was to rehire the work force, to retrain them, and to get them very disciplined in their approach to shuttle operations. The disciplined approach that had been a hallmark of space work for years slowly returned to Kennedy. McCartney stressed discipline, not in a

McCartney at NASA. (Photo courtesy of NASA.)



## MCCARTNEY STRESSED DISCIPLINE

punitive way but through rigorous adherence to checklist discipline: have a checklist, run the checklist, and keep records. He told the author:

*[One] of the things that [was] needed, if you look at the presidential report after Challenger, was inserting discipline into the system. So, I did that without making a lot of changes. I made some changes, obviously—subtle changes, but I did not go in and, I'll say, do a major reorganization, ... .”<sup>44</sup>*

McCartney left NASA in 1991 and consulted for a couple of years on space hardware—looking at hardware that had failed and trying to determine if it was ready to fly again. In 1993 he went to work for Lockheed Martin as chief of launch operations on both coasts. After completing six years with Lockheed, he returned to consulting work, including taking a role in both the shuttle Columbia accident investigation and the space shuttle return-to-flight panel. But he never wavered from his vision of what it means to be a space professional.

### Space Professionalism

Chief among General McCartney's complaints about military space professionals today is that they do not stay in place a long time before moving to another assignment. As a result, you get a transient force that is not as effective. He said, “Does that mean that they're not as smart as they used to be? No, it's just that on complex things, and in the space business almost every part of it is complex, experience weighs out. There's no way to ‘quick time’ that experience.”<sup>45</sup> The bottom line is that he disagrees with the Air Force's policy of rotating people through jobs rapidly, because no sooner is someone successful or proficient and they move. The space business is unforgiving, particularly on the launch side. “You get one bite at the

apple,” he asserts, “and in ... complex, dynamic situations, there's just no substitute for experience. And, you don't get experience overnight.”<sup>46</sup>

His viewpoint is supported by the Space Commission report, which suggests that experience is a major problem for the U.S. military space program. Pilots such as Billy Mitchell, Hap Arnold, and Curtis LeMay succeeded in developing U.S. airpower because they drew upon the talents of thousands of “rated” officers at all levels of command and staff. Among Air Force pilots, leaders have spent about 90 percent of their careers within their fields. In contrast, military leaders with little or no previous experience or expertise in space technology or operations often lead space organizations. A review by the Space Commission of over 150 people serving in key operational space leadership positions in 2003 showed that fewer than 20 percent of the flag officers came from space-related backgrounds. The remaining flag officers on average had spent just 2.5 years, or 8 percent of their total service time, in space or space-related positions. Although the space force is young and small, the number of personnel is growing and a few of its members have reached the four-star rank. Space leadership in the military requires highly trained, experienced space professionals in both very senior positions and throughout all echelons of command. These leaders must provide the vision for space, the technological expertise, and the doctrine, concepts, and tactics for effective employment of space forces and for building the cadre of space professionals future military operations will require.<sup>47</sup>

McCartney believes the greatest challenge facing military space is efficiency, trying to reduce the cost of operating in space. The one thing that he came to appreciate, particularly as he climbed the Air Force ladder, and even more after he left the service, was the importance of efficient operation. “I used to say that if you're not trying to violate the laws of physics,” McCartney philosophizes, “you can do anything if you have enough resources. You can go to the Moon in ten years. This country did that.”<sup>48</sup> The costs of maintaining, developing, acquiring, and operating space systems are great. Although the Air Force should continue to be the lead service for military space, McCartney believes that should come with the sober realization that space is hard, expensive work. The Air Force should be dedicated to fielding—on time and within cost—systems that are advanced and that readily meet the needs of war fighters.

If a separate space service is ever established, the undertaking will be difficult, costly, and inefficient for a long time. McCartney will be the first to say that people, not organizations, make things happen. “You know, Schriever made that statement, and it stuck with me,” he recalled, “and I believe [to] this day that you can organize to facilitate the situation, but you get the right people working the right problems, and they'll make any organization work.”<sup>49</sup> In fact, McCartney believes the Air Force is currently organized well for handling its space responsibilities. As General Lord

## MCCARTNEY BELIEVES THE GREATEST CHALLENGE FACING MILITARY SPACE IS EFFICIENCY, TRYING TO REDUCE THE COST OF OPERATING IN SPACE



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said in Los Angeles in November 2003, “We have a separate space force. It’s called the Air Force.”<sup>50</sup> If the way the Air Force is operating now is not as efficient or as effective as it could be, however, we might consider a separate space force.

### Conclusion

In recent testimony, Air Force Under Secretary and NRO director Peter B. Teets talked about the need for space professionals. “People remain central to our success in space, and meeting the serious challenges of today and the future...”<sup>51</sup> Forrest S. McCartney was schooled in engineering, both electrical and nuclear, and understood the technical requirements of the vehicles that operate

in space and the means to develop them. Operationally, McCartney—in the first group of Air Force officers to fly satellites—understood the strategic environment he supported during the Corona program, constantly rehearsing the space-unique tactics, techniques, and procedures. He was sensitive to the needs of the many and varied end-users of communications satellites and booster rockets. Along the way, he developed new technologies, systems, training methods, operational concepts, and organizational perspectives that sustained the U.S. as the world’s leader in space. For these accomplishments and qualities, Forrest S. McCartney—space operator, acquisitions expert, and missileer—deserves recognition as the first space professional. ■

### NOTES

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3. Gen. Lance W. Lord, USAF, commander, Air Force Space Command, “Vigilant Vector,” July 2003, Internet, available from <http://www.peterson.af.mil/hqafspc/news>

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7. Forrest S. McCartney, telephone interview by author, 1 Feb 2004.
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9. McCartney interview, 2004.
10. Forrest S. McCartney, telephone interview by author, 9 Nov 2000.
11. McCartney interview, 2004.
12. McCartney interview, 2000.
13. Col. Melvin Lewin, USAF, (Ret.), telephone interview by author, 21 Dec 2000.
14. James S. Coolbaugh, "Genesis of the USAF's First Satellite Programme," *Journal of the British Interplanetary Society* 51 (Aug. 1998): 299. The Air Force refurbished the Thor for use on a subsequent mission.
15. Dwayne A. Day, et al., *Eye in the Sky: The Story of the CORONA Satellites* (Washington: Smithsonian Institution Press, 1998), pp. 52-53; Curtis Peebles, *The Corona Project: America's First Spy Satellites* (Annapolis: Naval Institute Press, 1997), pp. 66-67. According to Peebles, this mission was the source for Alistair McLean's novel *Ice Station Zebra*, in which Americans and Soviets raced to recover a Soviet reconnaissance satellite that came down in the Arctic carrying film of American missile silos.
16. Dwayne A. Day, "The Development and Improvement of the Satellite," *Eye in the Sky*, p. 52-62. *Discoverer XIII*, a diagnostic mission, did not carry a camera, but the water-recovered capsule did carry an American flag.
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18. McCartney interview, 2000.
19. By contrast, the author went to school for four months before joining his operational Defense Support Program squadron, and then it was another month before he could run a satellite support without supervision.
20. Lewin interview; McCartney interview, 2000; Memo, [Name Redacted], Colonel, USAF, Acting Chief, DPD-DD/P, to Deputy [CIA] Director (Plans), Subj: "Ground Controlled Commands Available in CORONA Prime Vehicles," Aug. 17, 1960, National Reconnaissance Office Corona/Argon/Lanyard Collection, 2/E/0047.
21. Arnold, pp. 60-61; Lewin interview; McCartney interview, 2000.
22. Gen. B. A. Schriever, USAF (Ret.) interview by the author, Washington, DC, June 2000. WS-117L was the original program name for the Air Force's space-based reconnaissance satellite program that evolved into, among other things, the Corona reconnaissance satellites.
23. McCartney interview, 2000.
24. Cyrus Vance, Deputy Secretary of Defense, DoD Directive Number TS 5105.23, "National Reconnaissance Office," March 27, 1964, in John M. Logsdon, *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program*, Vol 1: *Organizing For Exploration* (Washington: NASA, SP-4407, 1996), pp. 373-74. With the exception of this directive, the DoD prohibited use of the terms "National Reconnaissance Office," "National Reconnaissance Program," or "NRO" in any document. Any reference to NRO had to use the phrase "Matters under the purview of DoD TS-5105.23."
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35. "Strategic Forces Technical Assessment Review," Senate, Hearings Before the Committee on Appropriations, 98th Cong., 18 Apr-3 May 1983 (Washington: GPO, 1983), pp. 106-13.
36. McCartney interview, 2004.
37. Wrenn, p. CRS-1; McCartney interview, 2004.
38. David N. Spires, *Beyond Horizons: A Half Century of Air Force Space Leadership* (Colorado Springs, 1997), p. 202.
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40. Rick W. Sturdevant, "The United States Air Force Organizes for Space: The Operational Quest," in Roger D. Launius, ed., *Organizing for the Use of Space: Historical Perspectives on a Persistent Issue* (San Diego: American Astronautical Society, 1999), pp. 174-84; McCartney interview, 2000.
41. McCartney interview, 2000.
42. Spires, pp. 222-230.
43. McCartney interview, 2000.
44. McCartney interview, 2004.
45. McCartney interview, 2000. As an example, the author has spent eight years in space and missile operations in his 14-year career. Half that time was in ICBM operations, followed by two years in DSP satellites, one year overseas at a remote satellite command and control station, and one year in satellite command and control for the National Reconnaissance Office.
46. McCartney interview, 2000.
47. Space Commission Report, pp. 42-44.
48. McCartney, 2004.
49. McCartney, 2004.
50. Gen. Lance W. Lord, presentation to the Air Force Association Space Symposium, Los Angeles, Nov 2003.
51. Under Secretary of the Air Force Peter B. Teets, "Statement," US House, Committee on Armed Services, Subcommittee on Strategic Forces, 25 Feb 2004, available from [http://www.af.mil/policy/letters/pl2004\\_03.html](http://www.af.mil/policy/letters/pl2004_03.html), accessed Mar 12, 2004.

# From the Shadows to the Stars: James Webb's Use of Intelligence Data in the Race to the Moon





Dwayne A. Day

(Overleaf) President Johnson meets with members of the Cabinet and NASA Administrator James Webb, center, in March 1965. (Photo courtesy of NASA.)

## THE DECLASSIFICATION OF COLD WAR ERA DOCUMENTS HAS SHED SOME NEW LIGHT

## AMERICAN INTELLIGENCE ASSETS ON THE SOVIET SPACE PROGRAM WERE EXTREMELY LIMITED

Intelligence collection has become a hot topic in the wake of September 11 and the invasion of Iraq, and some of the most scalding discussion is over the release of intelligence information to the media. There is no clear and distinct rule about how intelligence information becomes public. Sometimes individuals with access to information leak it to the media solely on their own initiative and violate laws when doing so. Sometimes they leak it with the acquiescence, or encouragement of their superiors, including the President. And sometimes information is made public as a result of a senior policy decision, often by the same people who have previously decried the revelation of intelligence sources and methods by their predecessors. Sometimes the definition of a “leak” depends upon where one sits in the government—Congress has leaked information to the press that the President did not want released, and administration officials have often leaked information to the press in order to influence congressional legislation. Sometimes information gathered through sensitive means becomes public because that is necessary for government officials to justify their actions, or gain approval for future actions or budgets.

There is nothing at all new about this. It was just as common during the Cold War as it is today. Students of Cold War history can find countless examples of intelligence information finding its way into the press either with or without presidential approval. Examples include the 1957 Gaither report about strategic vulnerability—whose leak infuriated President Eisenhower—to the slick Soviet Military Power reports produced by the Defense Department during the Reagan administration and used to justify the defense buildup. At times administration officials have even gotten creative. For instance, Reagan administration officials had SR-71 aircraft re-photograph targets in Nicaragua and Cuba that had already been photographed by spy satellites because the SR-71 photos were considered less sensitive than satellite photos and, therefore, could be released publicly to justify political action.<sup>1</sup>

In recent years the declassification of Cold War era documents has shed some new light on a relatively overlooked example of intelligence information being used to justify policy during the race to the Moon with the Soviet Union. During the 1960s NASA Administrator James Webb spoke in public and before closed door congressional hearings about Soviet space developments. In particular, he discussed the development of a new large Soviet rocket equivalent to the American Saturn V. Webb’s remarks were reported in various media.

Congressional staffers and Washington journalists soon began calling this “Webb’s Giant” and the “James E. Webb Memorial Rocket.” Webb usually discussed the Soviet rocket during budget hearings. He never presented any evidence that the rocket actually existed, because the source of his information—reconnaissance satellite photographs of the launch facility and eventually the rocket itself—was highly classified. Because the Soviets never publicly discussed this rocket, and because it was never successfully launched into orbit, many people doubted that it even existed.<sup>2</sup>

Within the last few years a number of highly classified intelligence reports concerning the Soviet space program and launch ranges have been made available to the public. What the reports reveal is that Webb’s public pronouncements about the Soviet challenge to Apollo closely tracked with what the intelligence community—primarily the CIA—was telling the NASA administrator that the Soviet Union was doing. Webb was regularly briefed on Soviet progress and apparently allowed by the CIA to speak publicly about what he knew. As the intelligence information changed, and improved, Webb’s public statements changed as well. A comparison of Webb’s public statements with the contemporary intelligence reveals that Webb did not exaggerate the Soviet developments. In contrast to the public image of a NASA administrator desperate to exaggerate the threat in order to protect his agency’s budget, this new information presents a more complex impression of a public official worried that the United States could lose prestige in the space race.

Furthermore, newly declassified records also indicate that by the latter 1960s, relevant congressional committees were also regularly briefed about Soviet space developments. The amount of information they were given has not been revealed, but clearly they did not have to take the NASA administrator’s words about the Soviet space program at face value.

### A Giant Leap of Faith

When John F. Kennedy approved the Apollo program in May 1961 he did so essentially “blind.” He did not know if the Soviet Union had its own lunar program. The Soviets did not talk about landing humans on the Moon, and American intelligence assets on the Soviet space program were extremely limited. Usually, the CIA knew about a Soviet space project only after it was orbiting overhead, an unwelcome situation that happened all too frequently.

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A KH-4A CORONA reconnaissance satellite during final assembly at a Lockheed facility in California. The CORONA satellites regularly returned photographs of Soviet rocket launch ranges. (Photo courtesy of NRO.)

## AMERICAN SPY SATELLITES PHOTOGRAPHED A MASSIVE CONSTRUCTION PROJECT AT TYURA-TAM

When Jim Webb became NASA administrator in early 1961 he was granted top security clearances—not only access to intelligence data, including satellite photographs, but access to the technical information about the spy satellites themselves. The relationship between the CIA and NASA had become strained under Webb's predecessor, T. Keith Glennan. NASA had been asked to provide a cover story for the U-2, which quickly fell apart and embarrassed the agency after the shoot-down of Gary Powers' U-2 spy plane in May 1960. Webb assured the CIA leadership that he wanted to work with them, and in return they granted him access to all the best information.<sup>3</sup>

The earliest known communication between NASA and the CIA on the subject of a possible Soviet effort to land a man on the Moon was in November 1962, a year and a half after Kennedy's decision. NASA Deputy Administrator Hugh Dryden met with CIA representatives to discuss NASA's interest in information on the Soviet space program.<sup>4</sup> A NASA document stated the challenges associated with identifying Soviet actions and predicted that if the Soviet Union was starting a manned lunar program, they would start flight testing in a year or two.

The problem was that it would be difficult to tell the difference between simply a large rocket test and the start of a lunar program. Project Apollo proved this, for NASA planned to launch several

Saturn I rockets as precursors to actual lunar test flights and the Soviets would probably take the same approach.

NASA officials desired better knowledge of Soviet capabilities in electronics, life-support, heat shield technology, and launch vehicle technology, and apparently told their CIA contacts this. Presumably, NASA officials wanted access to raw data, not simply the bi-annual National Intelligence Estimates.

But in the years immediately after Kennedy established the lunar goal there was almost no information at all indicating that the Soviets had a lunar program. In summer 1963, a Soviet scientist told a British scientist that the Soviets did not have plans for landing humans on the Moon. This information was at the time accurate, but it rippled through American government circles. Why was the United States spending billions of dollars to race the Soviets to the Moon if the Soviets were not planning to go there themselves? This situation presented a public relations problem for James Webb.<sup>5</sup>

Late in the year, shortly before his assassination, President Kennedy had proposed greater cooperation between the Soviet Union and the United States in the exploration of the Moon. These plans did not progress after the Soviets showed little interest and Kennedy was murdered. However, the government machinery had been started in motion, and in early December 1963 the CIA's Directorate for Science and Technology was assigned to support NASA in any cooperative space efforts with the Soviet Union.<sup>6</sup>

Starting in spring 1963, American spy satellites photographed a massive construction project at Tyura-Tam, the Soviet launch range.<sup>7</sup> They soon designated this "Launch Complex J"—the tenth launch facility detected at Tyura-Tam—and speculated that it was intended for launching a massive new space rocket.<sup>8</sup> But what this rocket was for remained unclear.

### Going Public

Jim Webb was briefed regularly on these developments. In May 1964, he finally went public and said, "There is some evidence the Soviets are working on a larger rocket, but we cannot say yet for sure." His reluctance to provide more detail accurately reflected the confusion within the intelligence community.<sup>9</sup>

By October 1964 he was certain, saying publicly that "there is increasing evidence" of the new rocket. That increasing evidence was an indication that the Soviets were building launch pads equipped with massive flame trenches. In a speech in Missouri, Webb speculated that the Soviets would flight test the rocket by 1967-1968.<sup>10</sup>

Webb's public comments were consistent with what the CIA and other members of the intelligence community had concluded. It is probably no coincidence that in October 1964, at around the same time Webb made his public statement, the



A CORONA satellite atop its Thor booster prior to launch in the mid-1960s. The United States launched reconnaissance satellites approximately twice a month during this period. (Photo courtesy of Paul Gatherer.)

**WEBB WAS REGULARLY RECEIVING THE NATIONAL INTELLIGENCE ESTIMATES ON THE SOVIET SPACE PROGRAM**

CIA's Office of Scientific Intelligence had produced a report titled, "New Space Facilities at the Tyuratam Missile Test Center." Webb would have been briefed on this subject, possibly before the document was actually finalized. But even then, there was some confusion within the CIA as to what kind of pad construction was underway, and how big a rocket it would support.<sup>11</sup>

In February 1965, Webb said that "during the last year, the Russians have shown more progress than we thought they could a year ago."<sup>12</sup> In March, Webb testified before the Senate Aeronautics and Space Sciences Committee saying, "We do not know whether they have selected some specific goal, such as a lunar landing, or even a duplication of our Apollo mission .... There is no evidence that they are building a booster as large as the Saturn V."<sup>13</sup>

At the time, the intelligence community estimated that the Soviet rocket was roughly two-thirds the size of the Saturn V. A National Intelligence Estimate on the Soviet space program, produced in spring 1965, stated that the rocket had a liftoff thrust of roughly five million pounds, compared to 7.5 million pounds for the Saturn V. The Estimate also concluded that the Soviet manned lunar program was "not competitive" with Apollo.<sup>14</sup>

During this time the United States flew a number of reconnaissance satellites over the massive Soviet launch complex and in October 1965 the intelligence community produced a detailed report on the complex, complete with timelines for the construction of the facility and estimates of the

size of various buildings. But there was still no evidence that the rocket was specifically intended for a lunar landing program. CIA analysts concluded that it could also be intended to launch a large space station into orbit.<sup>15</sup>

The CIA had also by this time created a Space Intelligence Panel to advise the Director of Central Intelligence. Dr. Simon Ramo, then president of the Bunker-Ramo Corporation, was named as its chairman. In September 1965 the Director of Central Intelligence, W.F. Raborn, asked Ramo to address "the status of Soviet plans to land a man on the moon in competition with the NASA Apollo program" at its first meeting.<sup>16</sup>

Jim Webb was regularly receiving the National Intelligence Estimates on the Soviet space program—and being cautioned about its classification. But although NASA received NIEs on the Soviet space program, the agency rarely received them on any other subject.<sup>17</sup> Webb was also briefed on more general subjects. For instance, in October 1965 he was briefed by the CIA about the Soviet electronics industry.<sup>18</sup>

By this time Congress was also being briefed by the CIA on Soviet space developments. In August, CIA officials briefed some Senators on Capitol Hill and then alerted Webb as to what subjects were discussed.<sup>19</sup>

**Fleeing From the Press**

In September 1966, stories appeared in the Washington Post and the New York Times stating that the United States had information that the Soviet Union was "developing a rocket booster bigger and more powerful than its own gargantuan and untried Saturn-V moon rocket." The New York Times article estimated that the rocket's thrust was 7.5-to-10 million pounds, compared to the Saturn V's 7.5 million pounds. But both articles stated that U.S. intelligence analysts had not yet seen the rocket itself. Neither article mentioned Webb as the source of the information.<sup>20</sup>

Previous estimates of the still-unseen rocket were that it would have a thrust of around five million pounds. But by summer 1966, this estimate had been increased, although exactly when and why the CIA increased its estimate remains classified. However, it may have been the increased power estimate that prompted the leaks to the press.

The National Photographic Interpretation Center was finalizing what by now was an annual report on the giant launch complex. That report was officially dated October 1966, but drafts of it would have circulated throughout the intelligence community, and to some NASA officials, beforehand. Whether the leaks to the press occurred from the intelligence community itself, from NASA officials, or from congressional officials briefed about the information, remains unknown.<sup>21</sup>

In this case the press leaks apparently created problems for Webb, for they soon appeared in both the Post's sister edition, the Herald Tribune



President Lyndon Johnson with NASA Administrator James Webb over his shoulder during a visit to the George C. Marshall Space Flight Center in December 1967. The two men had excellent ties. (Photo courtesy of NASA.)

European edition, and the New York Times European edition while Webb was touring Europe. Webb immediately returned home from Bonn, Germany—as he explained to President Lyndon Johnson—because he “felt it unwise to expose myself to questions by the European press with respect to this report of a new large Russian booster.” Webb clearly did not want to undercut an upcoming announcement by Johnson about space cooperation with the Germans by having the focus turn to the race with the Soviet Union.<sup>22</sup>

Although Webb ducked the issue in early September 1966, a month later at the International Astronautical Federation conference in Madrid there was widespread discussion and speculation about the new Soviet rocket.<sup>23</sup>

### The Giant Awakes

In March 1967, the intelligence community produced an updated National Intelligence Estimate on the Soviet space program. In January NASA had suffered a devastating setback with the Apollo 1 fire, but this new estimate stated that despite the American disaster, the Soviets were still not likely to beat the Americans to the Moon at their present schedule.<sup>24</sup>

Through summer 1967, NASA was under considerable pressure because of the Apollo 1 fire, and Congress looked harder at its budget. Webb felt it necessary to go public about the Soviet capabilities. In February, the CIA briefed Webb on the Soviet space program.<sup>25</sup> In July, Webb told the Senate Subcommittee on Appropriations that “in my view, they are preparing to launch a booster with an appropriate large payload that will be larger than the Saturn V and that will give them the image and capability for the next several years of being ahead of the U.S. program. So at the time we are reducing at the rate of 5,000 per month in manpower, they are increasing.”<sup>26</sup>

Webb also said that he had told the committee the same thing the previous year. But that information did not make it into the press, possibly because it was presented in closed session—although it is possible that the September 1966 newspaper reports could have resulted from his congressional testimony.<sup>27</sup>

In October, at a news conference in Houston, Texas, a reporter asked Webb about the space race. Webb responded that the Soviets “are preparing to fly boosters bigger than the Saturn V with appropriate payloads.” But the CIA was still uncertain if the Soviets were preparing to launch a lunar mission or a large space station.<sup>28</sup>

In December 1967 for the first time American spy satellites photographed the Soviet rocket on the launch pad. The Soviets designated this rocket the N-1. The CIA was unaware of this designation and instead designated it the “J-vehicle,” or the “Jay-bird.”

In early February 1968, Webb spoke about the rocket before the House Science and Astronautics Committee where he said that the Soviets “soon will be in a position to launch a booster with greater thrust than the Saturn V.” In response to questions supplied to him ahead of time, Webb stated that “in the coming year, still larger Soviet boosters will be coming into use. During 1968, or shortly thereafter, they will have available a booster with over 10 million pounds of thrust.” Dr. Wernher von Braun was there as well and also answered some questions about the vehicle. He said “as Mr. Webb testified, there is reason to believe that the Russians are indeed working on such a vehicle.”<sup>29</sup>

That reason was the photographs of the rocket sitting on its launch pad, taken by satellites that the U.S. government would not acknowledge existed. But von Braun also added “today they are at most a year behind us,” a statement that was entirely consistent with the latest intelligence information.

Webb’s comments may have made someone in the intelligence community uneasy, because late in the month two people from the CIA, including the agency’s assistant legislative counsel, went to NASA to review his testimony. But if they found any problems with it, the result remains unknown. An alternative explanation is that they were reviewing the testimony to determine if it could be publicly released.<sup>30</sup>

By this time the CIA was also regularly briefing members of Congress, such as the House Science and Astronautics Committee, and select staff members, on various Soviet space developments, such as the Zond-5 circumlunar mission and other space launches.<sup>31</sup>

By September 1968, Webb called the CIA to seek approval to show satellite reconnaissance photographs of Complex J to President Johnson. David Brandwein, the Director of the CIA’s Foreign Missile and Space Analysis Center, told Webb that there was no problem with doing this. Johnson, Brandwein knew, had already been briefed on this information.<sup>32</sup>

IN  
FEBRUARY,  
THE CIA  
BRIEFED  
WEBB ON  
THE SOVIET  
SPACE PRO-  
GRAM

NASA Administrator James Webb briefs President Lyndon Johnson, Wernher von Braun, and others during a visit to the Saturn V first stage assembly building in December 1967. (Photo courtesy of NASA.)



**THE N-1 WAS INTENDED TO PLACE A MANNED SOVIET SPACECRAFT ON THE MOON, ZOND WAS A PARALLEL PROJECT TO PLACE A MANNED SPACECRAFT IN LUNAR ORBIT**

### The Pipsqueeks Argument

Another case where Webb's public statements about Soviet accomplishments created some controversy concerned the Soviet space project Zond. Whereas the N-1 was intended to place a manned Soviet spacecraft on the Moon, Zond was a parallel project to place a manned spacecraft in lunar orbit. In mid-September 1968, the Soviets launched the Zond-5 spacecraft around the Moon. Zond was launched on another large Soviet rocket known as the Proton, roughly the equivalent of the American Titan III. The spacecraft was recovered upon flying back to Earth. The flight was widely reported in the press and White House science advisor Donald Hornig was angered by statements made by Webb, NASA Deputy Administrator Tom Paine, and others that he believed "have unnecessarily inflated the Soviet accomplishment and were undoubtedly motivated by their budgetary problems."<sup>33</sup> Hornig felt that in the case of the Moon race, the United States was at least a year ahead of the Soviets. Hornig wrote President Lyndon Johnson, who advised him to drop the matter. (Hornig's memo included three options at the end. Johnson ticked the one labeled "Drop the matter.")

An unsigned memorandum, possibly written by President Johnson, was sent to Hornig in reply to his letter.<sup>34</sup> The memo stated:

*It is hard for me to believe that Jim Webb would make 'unconscionable statements' or be 'motivated' entirely by budgetary problems. During each of the past two budgetary preparation periods, he has carefully and responsibly arranged to have before me the intelligence estimates and data on which he*

*based his serious concern regarding the USSR: the trend of the Soviet program upward and the U.S. program downward that could produce for the Soviets a base of competence that would provide options they could take up and use to achieve both the image and reality of power and forward motion. I know he now feels they are beginning to take up these options.*

Instead of dropping the matter as Johnson suggested, Hornig apparently took it to the Executive Secretary of the National Aeronautics and Space Council, Edward Welsh. Welsh wrote a summary of the accomplishments of the Zond-5 mission and determined that: "As far as preparation for manned flight at lunar re-entry speed is concerned, the U.S. is somewhat ahead of the Soviets."<sup>35</sup> Welsh then wrote the President on his own, stating: "Assertions that the United States is trailing the USSR in space accomplishments and space capabilities are, in my judgment, inaccurate."<sup>36</sup>

On October 1, Webb wrote President Johnson, defending his public comments about the budget and noting that: "The Soviets show every indication of continuing to build upon their capabilities to demonstrate their power in aeronautics and to master space." Webb continued: "We have the best of reasons to believe that the Soviets are nearing the end of a long developmental period in aerospace technology which will give them the ability to advance significantly ahead of us in space and challenge us in important areas of aeronautics."<sup>37</sup>

The next day Webb followed this up with another letter to Johnson where he stated: "The

(Near right) A KH-7 GAMBIT high-resolution reconnaissance satellite photograph of construction worker barracks at the Soviet Tyura-Tam missile test range. This photo, taken in fall 1963, indicated that a large construction project was starting at the test range, involving thousands of workers.



(Far right) Launch pads under construction in fall 1966 at Tyura-Tam. This photo indicated that two massive launch pads were being built to launch a rocket the size of the American Saturn V.



## JOHNSON SUGGESTED THAT WEBB AND WELSH SIT DOWN AND DISCUSS THEIR DISAGREEMENT

importance that I have attached to the successful circumlunar flight of the Soviet Zond V derives not from the feat itself but from the confirmation it gives to accumulating mission successes as indications that the USSR is thrusting forward across a broad spectrum.” Webb continued: “As I told the press, the mission represented in my view ‘the most important demonstration to date of all the capabilities required for operations around the Earth and outward to the moon and planets—in other words, all the capabilities for any purpose in space.’”<sup>38</sup>

President Johnson suggested that Webb and Welsh sit down and discuss their disagreement, which they did. As a result, Webb wrote a final letter to the President on October 5, 1968, indicating that he and Welsh had engaged in a friendly chat. Webb stated: “The real difference between us is, I believe, in how to appraise our present situation with reference to that of the USSR. Dr. Welsh uses, as a basis of measurement, what has been accomplished by the United States to date, including accomplishments by the Department of Defense. My statements have been based on a present and growing capability in the USSR for future use, as

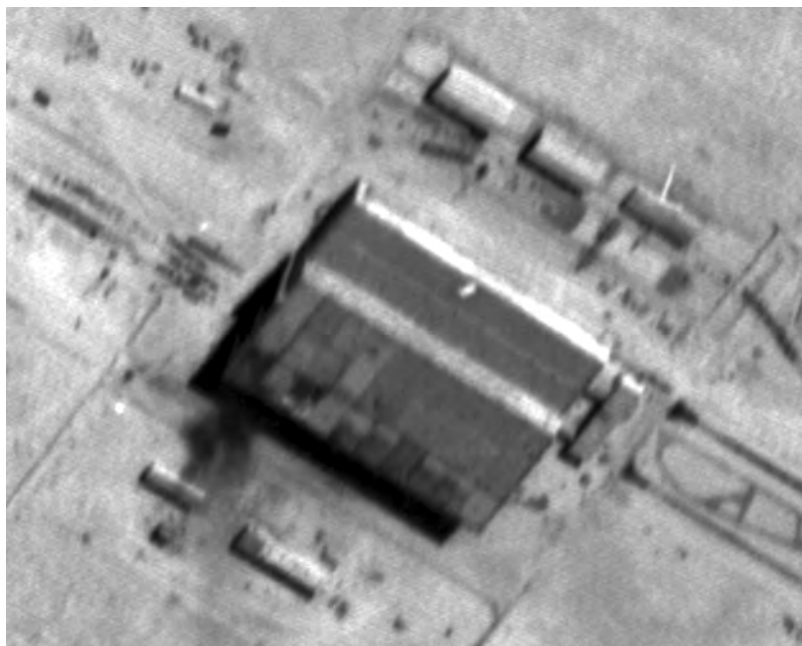
demonstrated by USSR accomplishments such as the Zond 5 flight.”<sup>39</sup>

What this little incident demonstrates is that the intelligence information on the Soviet space program was sufficiently ambiguous that different people with access to it could reach different conclusions. Welsh and Hornig interpreted the intelligence far more conservatively and did not feel that the Soviets were competitive with the American lunar program. But they were in essence viewing the issue from a different perspective than Webb—solely in terms of achieving the immediate goals of a circumlunar flight and a manned lunar landing. Webb never indicated that he believed the intelligence demonstrated that the Soviet Union would beat the United States to the Moon, but he did think that it indicated that they would soon have an overall lead in space capability. In other words, the Moon landing was not the end of the race in Webb’s view, only a major milestone in an ongoing race.

But Webb was virtually alone in this view outside of NASA, where many other Johnson administration officials had other priorities and saw the lunar landing as the end of the finish line of the space race. The political environment had shifted considerably since 1961, and Johnson, Welsh, Hornig and many others did not care if the Soviets would eventually surpass the United States in space capability as long as America beat them to the Moon. By the time this argument occurred, Webb had already announced his resignation, and he left NASA later in October.<sup>40</sup> Neither the Apollo 8 circumlunar flight nor the Apollo 11 Moon landing happened on his watch.

The one person in the White House who most definitely was not upset by Webb’s comments was President Johnson himself. Following the Zond-5 flight and Webb’s comments to the press, Johnson’s National Security Advisor, Walt Rostow, wrote a Top Secret memo on September 24, 1968—before either Hornig or Welsh complained. Someone hand-wrote on the bottom of the note: “Pres doesn’t consider anything Webb says as irresponsible. It’s those pipsqueeks. [sic]”<sup>41</sup> It is not clear if it was Johnson or the author who used the term “pipsqueeks,” or who they were referring to, but it may have been members of the press who reported Webb’s remarks. In any event, the sentiment was clear.

An American KH-7 GAMBIT reconnaissance satellite took this photograph of the massive rocket assembly building at the area that the CIA called “Complex J” at Tyura-Tam.



NASA Administrator James Webb in 1967. During the 1960s, Webb oversaw a large government agency with a significant percentage of the federal budget. (Photo courtesy of NASA.)



**WEBB NEVER EXAGGERATED ABOUT SOVIET SPACE CAPABILITIES, NOR DID HE JUMP TO CONCLUSIONS**

### The Giant's Legacy of Failure

The dispute over Zond-5 and Webb's comments about it took place within the White House, not the pages of national newspapers. But the debate over the large unseen Soviet rocket continued in public. By the time of the Apollo 11 mission, members of the Washington press had nicknamed it "Webb's Giant." According to Florida's Today newspaper, some of them also called it "the James E. Webb Memorial Rocket."<sup>42</sup> They never saw it, and they wondered if it was real. Although the whispering campaign continued at Washington cocktail parties, the few people in the know, the ones who really mattered, understood that Webb's Giant was not a product of the administrator's over-active imagination.

Although Webb's public comments led people to question his motives, a careful review of both his comments and the intelligence documents they were based upon indicates that he never exaggerated about Soviet space capabilities, nor did he jump to conclusions. His concern appears to have been genuine. Webb always stated carefully the implications of the information. He never claimed that the Soviet Union would beat the United States to the Moon, only that they would soon have a rocket with more powerful liftoff thrust than the Saturn V. Of course, raw liftoff power is not the most important factor in how much a launch vehicle can actually place into orbit. The Saturn V pos-

sessed both more powerful second and third stages, as well as lightweight payloads, giving it a greater advantage over its Soviet counterpart. Webb was concerned about the symbolism of Russia possessing a rocket bigger than the American rocket, repeating the situation in the late 1950s. But American technology in the late 1960s, as in the late 1950s, meant that liftoff thrust—or missile throwweight—was not extremely important.

In fact, the Soviet N-1 was Webb's ultimate insurance policy against canceling Apollo, and a useful weapon to fight cuts in NASA's budget. As long as the Soviets continued to roll out that massive rocket onto the pad and American satellites photographed it, the threat was real. Nobody was going to cancel the Moon program, or even slow it down significantly. That kind of powerful shield against program cancellation has not existed for any other NASA administrator.

Unfortunately, Webb's Giant suffered poorly in the annals of history. The N-1 blew up four times between early 1969 and November 1972. One of the legacies of this failure was that it removed pressure from American presidents and the Congress to maintain higher levels of NASA spending. By the late 1960s the Soviets were not rivaling the United States in space to the same extent they had at the beginning of the decade, making it safe to cut NASA's budget and to shut down the Saturn V production line. If the Soviets had successfully flown the N-1, it would have increased pressure to maintain an American heavy lift launch capability.

Some of these failures were reported in the press. But no photographs were ever released of the Soviet rocket until two decades later, and the lack of photographs created another historical legacy as well. Because Webb's Giant never reached orbit, reporters and others who doubted its existence had no independent confirmation that it was real. They soon concluded that it had only been a figment of James Webb's imagination, and that the United States had never been involved in a race to the Moon. ■

### NOTES

1. Discussions of the leaking of intelligence information can be found in numerous books and articles on the Cold War. An excellent introduction can be found in Daniel Patrick Moynihan's book *Secrecy* (Yale University Press, 1998).
2. The earliest reference I have found to the term "Webb's Giant" dates from September 1969. But the author wrote that the rocket vehicle "is sometimes referred to as 'Webb's Giant,'" i.e. indicating that the author himself had not coined the term but had heard it somewhere. G. Harry Stein, "The Big Boosters of the U.S.S.R.," *Analog, Science Fiction, Science Fact*, September 1969, p. 68. See also: "Webb's Giant at Last?" *Flight International*, Dec 4, 1969, p. 892.
3. James A. Cunningham, Jr., Assistant Chief, DPD-DD/P, Memorandum for the Record, "Briefing of Mr.

- James E. Webb, NASA Administrator, on 24 February 1961," Feb 28, 1961. CIA Records Search Tool, National Archives, Archives II (hereafter CREST). Cunningham wrote: "The briefing lasted for well over an hour, and Mr. Webb very carefully read every word of the briefing material and security forms. My personal opinion is that we should have little problem with Mr. Webb in terms of his ability to separate one program and system from the other, which is a refreshing change in the briefing of high level officials of other Agencies."
4. "NASA Comments on Soviet Space Program." Nov 19, 1962. The time and date of the meeting at the CIA is contained in a cryptic note written in the margins of the document.
5. Sir Bernard Lovell to Hugh L. Dryden, July 23, 1963; Dodd L. Harvey and Linda C. Ciccoritti, *U.S.-Soviet*

*Cooperation in Space* (Miami, Fla.: Center for Advanced International Studies, University of Miami, 1974), pp. 114-19.

6. Albert D. Wheelon, Deputy Director, Science and Technology, Memorandum for Assistant Director, SI, "United States/Soviet Space Cooperation," Dec 4, 1963. CREST.

7. The CIA regularly used the spelling "Tyuratam." My colleague Asif Siddiqi suggests that "Tyura-Tam" is a more accurate translation.

8. For an extensive discussion of American intelligence monitoring of the Soviet lunar program see: Dwayne A. Day and Asif Siddiqi, "The Moon in the Crosshairs, Part 1-Launch Complex J," *Spaceflight*, Nov 2003, pp. 466-75, and Dwayne A. Day and Asif Siddiqi, "The Moon in the Crosshairs, Part 2-The J Vehicle," *Spaceflight*, Mar 2004, pp. 112-25. A much shorter discussion of this subject can be found in: Dwayne A. Day, "The Secret at Complex J," *Air Force*, July 2004, pp. 72-76.

9. See, for instance, Abraham Hyatt, "Will the USSR Reach the Moon First?" *Astronautics & Aeronautics*, July 1965, pp. 114-16.

10. Howard Simons, "Russia Builds Huge New Rocket," *The Washington Post*, October 14, 1964, p. 7.

11. For a discussion of the confusion over the Soviet rocket facility see the two articles by Day and Siddiqi, "The Moon in the Crosshairs." In particular, see part 1, page 472.

12. Radio TV Reports, Inc., "Russians Improved in Space Report," from "WMAL Evening Report, WMAL Radio, Washington, DC," Feb 3, 1965. This document was kept in the CIA Mail Room Library. CREST.

13. "Soviet Space Programs, 1962-1965; Goals and Purposes, Achievements, Plans, and International Implications," prepared for the Committee on Aeronautical and Space Sciences, U.S. Senate, 89th Cong., 2d sess. (U.S. Government Printing Office, December 1966), pp. 388-89.

14. Central Intelligence Agency, "National Intelligence Estimate, Number 11-1-65, The Soviet Space Program," Jan 27, 1965.

15. It is still difficult to determine from existing documentation at what point CIA analysts became convinced that the Soviet Union had a dedicated lunar landing program. The 1965 and 1967 National Intelligence Estimates still contained qualifiers and no specific information about Soviet lunar plans.

16. W.F. Raborn, Director of Central Intelligence, Central Intelligence Agency, to Dr. Simon Ramo, Bunker-Ramo Corporation, Sep 24, 1965. CREST. No records from this special panel have been released.

17. W. F. Raborn, to James E. Webb, Administrator, NASA, June 25, 1965. The information that NASA was furnished with few NIEs is contained in: J.S. Earman, Memorandum for the Record, "Morning Meeting of 16 August 1965," Aug 16, 1965. CREST. Webb "meticulously refrained from briefing on military space matters," according to one source. "Journal - Office of Legislative Counsel," Nov 7, 1967. CREST.

18. L.K. White, Memorandum for the Record, "Morning Meeting of 4 October 1965," Oct 4, 1965. CREST.

19. L.K. White, Memorandum for the Record, "Morning Meeting of 3 August 1965," Aug 3, 1965. CREST.

20. Howard Simons, "Russia Building Rocket Larger Than Untried U.S. Moon Booster," *The Washington Post*, Sep 11, 1966, p. A1; Evert Clark, "Soviet is Reported Developing a Big New Rocket," *The New York Times*, Sep 13, 1966, p. 28.

21. National Photographic Interpretation Center, "National Photographic Interpretation Report, Tyuratam Missile Test Center Launch Complex J," October 1966.

22. James E. Webb, Administrator, NASA, Memorandum for the President, Sep 19, 1966, President Confidential File ND19-1, Box 74, Outer Space, Lyndon

Johnson Presidential Library.

23. Kenneth W. Gatland, "Russia's Moon Program," *New Scientist*, Mar 21, 1968, pp. 630-31.

24. Central Intelligence Agency, "National Intelligence Estimate Number 11-1-67, The Soviet Space Program," Mar 2, 1967, p. 23.

25. "Journal - Office of Legislative Counsel," Feb 1, 1967. CREST.

26. Julian Scheer, Assistant Administrator for Public Affairs, Memorandum to Distribution, Nov 2, 1967, with attached: "Some Representative Statements by Mr. Webb to Congress or the Press on the Soviet Space Program," NASA Apollo Records Collection, University of Houston, Clear Lake, Box 068-65. Excerpt is from "Testimony before the Subcommittee of the Committee on Appropriations, U.S. Senate, 26 July 1967."

27. *Ibid.*

28. *Ibid.*

29. *Ibid.* The original testimony appears in "Hearings before the Committee on Science and Astronautics of the House of Representatives on the 1968 NASA Authorization, 28 February 1967," pp. 13-15.

30. Assistant Legislative Counsel, Note for the File, "Review of Webb Testimony," Feb 28, 1968. CREST.

31. See, for instance, "Journal - Office of Legislative Counsel," Sep 19, 1968, and "Journal - Office of Legislative Counsel, 22 October 1968." CREST. Although when the CIA began to regularly brief congressional staffers on this subject is unknown, declassified documents imply that briefings were common by late 1968 and continued into the early 1970s, but that they were probably not regular before 1967.

32. David S. Brandwein, Director, Foreign Missile and Space Analysis Center, Memorandum for the Record, "Telephone Conversation with Mr. James Webb, NASA Administrator, 1130, 16 September 1968," Sep 16, 1968. CREST.

33. Donald Hornig, Memorandum for the President, "NASA Distortion of Where the U.S. Stands in Space," Sep 26, 1968, Lyndon Johnson Presidential Library.

34. Memorandum for Dr. Hornig [no author, no date], Lyndon Johnson Presidential Library. The memo is confusing, for the author states "I have supported his strong desire to present to the Congress..." But it also refers to Webb's service "during both the Kennedy and Johnson Administrations." If the memo was written by Johnson, why does he not write "my administration"? Nevertheless, the most obvious conclusion is that the memo was written by Johnson and it certainly offers a firm defense of James Webb.

35. E.C. Welsh, "Zond 5," Sep 28, 1968, Lyndon Johnson Presidential Library. It is unclear to whom Welsh wrote this memo or if it ever reached the President.

36. E.C. Welsh to the President, Sep 30, 1968, Lyndon Johnson Presidential Library.

37. James E. Webb to the President, Oct 1, 1968, Lyndon Johnson Presidential Library.

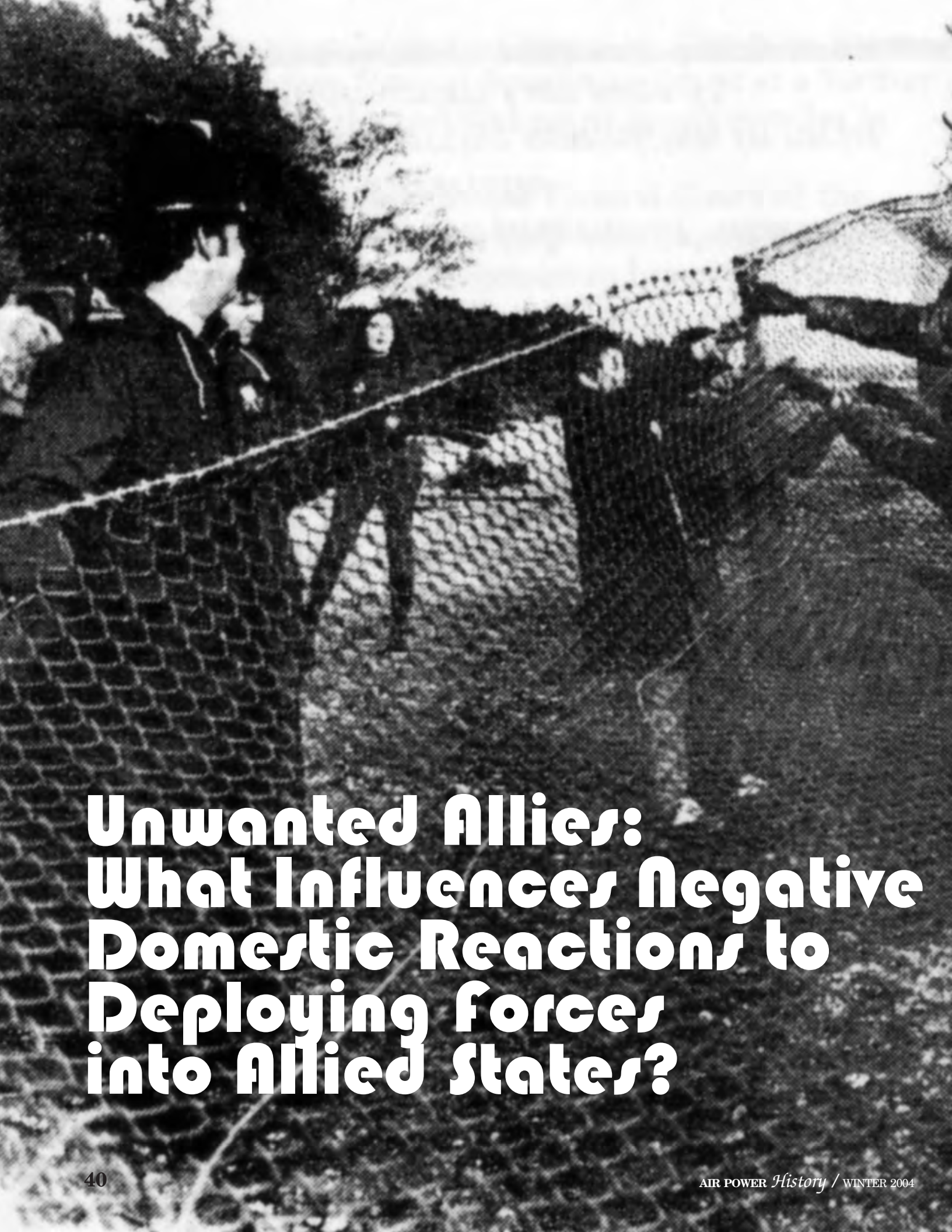
38. James E. Webb to the President, Oct 2, 1968, Lyndon Johnson Presidential Library.

39. James E. Webb, Memorandum for the President, "Letter from Dr. Edward C. Welsh with respect to my statement on US and USSR positions in space," Oct 5, 1968, Lyndon Johnson Presidential Library.

40. Although the reasons why Webb announced his resignation when he did are somewhat unclear, this debate is ultimately of limited importance, for Webb was going to be out of a job no matter what, and whether he left in October or in December made little difference.

41. W.W. Rostow to the President, "Information," Sep 24, 1968, Lyndon Johnson Presidential Library.

42. "Webb: Former NASA Boss Fought Battle to Moon—And Won," *Today*, July 1969. (Note: this appears to have been a special section of the newspaper now known as *Florida Today* printed during the Apollo 11 mission.)



# **Unwanted Allies: What Influences Negative Domestic Reactions to Deploying Forces into Allied States?**





Sean Atkins

(Overleaf) Protesters against Greenham Commons missiles cut the fence. (All photos courtesy of the author.)

## SEVERE AND POLICY-SHIFTING CONSEQUENCES CAN RESULT FROM THE DEPLOYMENT OF MILITARY FORCES INTO AN ALLIED STATE

## THE U.S. MILITARY REPORTS THAT IT MAINTAINS 702 FACILITIES WORLD-WIDE

An often overlooked consideration in security planning is that severe and policy-shifting consequences can result from the deployment of military forces into an allied state. A negative reaction to the deployment within the host state itself is one of the most visible. In defiance of careful negotiations, domestic dissatisfaction has historically altered policies and security objectives of the host state, deploying state, and larger alliance structure, if applicable. With the rise in media and communication technology fueling international grassroots political movements, it is now more critical than ever that policy planners understand the factors that encourage negative domestic reactions. Growing international concerns have prompted many to establish, or consider establishing, postings in allied countries, and future deployments of this type are currently being planned. Thus, it is also vital to future security studies. Yet despite its importance and relevance, there has been little focus onto this general question within international relations literature. We are left asking: What motivates and encourages negative domestic reactions to the deployment of military forces into an allied state?

The answer is critical to a growing number of nations. Several states maintain a military presence within allied countries today. French military personnel are located in at least nine different allied countries outside of France. British troops can be found in Canada, Germany, and Cyprus. The U.S. military reports that it maintains 702 facilities worldwide.<sup>1</sup> Russian troops are located in several former Soviet countries. India has recently established a base at Farkhor in Tajikistan.<sup>2</sup> The placement of military forces into an allied state occurs often and is done by more than just the United States.

As the world's security landscape and alliance structures become increasingly interwoven, it is increasingly probable that extraterritorial military bases will become the norm. A current example is the Pentagon's plans to restructure the U.S.'s overseas military deployments in order to meet "the nation's evolving security challenges."<sup>3</sup> Kurt Campbell and Celeste Johnson wrote recently in *Foreign Affairs* that the U.S. "will shift people and assets from safe, secure, and comfortable rear-echelon facilities to jumping-off points closer to the flame."<sup>4</sup>

In these new areas the presence of U.S. forces might spark a negative public reaction. These future host states, which may be relatively less stable, will face heightened protest with intensified results. Being able to anticipate potential

uprisings will assist planners and negotiators in determining where to deploy troops and how best to do so.

The following analysis of the U.S. deployment of cruise missiles to the United Kingdom in the early 1980s illuminates some of the more influential factors. These are: 1. the perceived level of threat incurred by hosting the allies, 2. the level of control the host state has over the actions of the visiting forces, 3. the level of mistrust and anti-ally sentiment present in the hosting state, 4. how protestable are the visiting forces.

### Cruise Missiles in the UK

Throughout the Cold War, the arsenal disparities between the two super-powers and their allies was often the most critical issue in their relations. Toward the end of the 1970s, a widening asymmetry in U.S. and Soviet theater nuclear forces, which are limited in geographical range, led to "more attention being paid to long and medium range components."<sup>5</sup> Europe was easily within range of the Soviet Union's increasing number of theater nuclear forces and after the removal of Thor and Jupiter intermediate range missiles from Europe, NATO was left only with long range tactical nuclear forces (LRTN). These manned Vulcan and F-111 bombers were considered inadequate as they were too "old and vulnerable to pre-emptive attack, and would have difficulty penetrating Russian air defenses."<sup>6</sup>

NATO feared that the growing disparity would result in the greater vulnerability of its members. The U.S. was especially concerned that, based on the flexible response strategy, the existing NATO arsenal would no longer deter a Soviet attack at the intermediate level.<sup>7</sup> It was reasoned that "the Soviets would be more surely deterred" from striking Europe "if they knew that they could be defeated 'in theatre.'"<sup>8</sup> Europeans feared that "there was a real danger of decoupling European and American security."<sup>9</sup> Without an in-theater counter to Soviet LRTN forces, only the Soviet assumption that the U.S. would retaliate for an attack on Europe, using its home based intercontinental ballistic missiles (ICBMs), gave credibility to deterrence. A U.S. attack on behalf of Europe with its ICBM's would most certainly precipitate a retaliatory strike on the U.S. from the USSR. Many questioned the U.S.'s willingness to "risk its own cities in defense of Europe."<sup>10</sup>

With these concerns in mind and European pressure building, NATO's Nuclear Planning Group created a High Level Group (HLG) to assess

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ON JUNE 17,  
1980, ...  
BRITISH  
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ANNOUNCED  
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160 MISSILES  
WERE TO BE  
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“NATO’s requirements for theatre nuclear forces.”<sup>11</sup> The HLG began work in December 1977 and decided to modernize NATO’s LRTN. Cruise missiles, it was thought, provided an excellent option as “they were relatively cheap, promised to be highly accurate, capable of avoiding air defences when used in substantial numbers, and could be fired from a variety of different platforms.”<sup>12</sup>

At the NATO conference of foreign and defense ministers in December 1979, the HLG’s modernization plan was approved. On June 17, 1980, in the House of Commons, British Defence Secretary, Francis Pym, announced that 160 missiles were to be stationed at “the United States Air Force standby base at RAF Greenham Common, in Berkshire, and RAF Molesworth, a disused airfield in Cambridgeshire.”<sup>13</sup> Three years later, the first cruise missiles were delivered to RAF Greenham Common on November 14, 1983, to a largely unenthusiastic British public.<sup>14</sup>

### The Domestic Reaction in Britain

NATO’s December 1979 announcement, that it planned to base cruise missiles in Britain, sparked immediate opposition. Within only a couple of years the anti-cruise movement had grown to include mass demonstrations, peace camps at the proposed bases, and many anti-cruise civil action organizations. Public opinion against the cruise missile deployment paralleled the movement and quickly grew to a majority in Britain. This sentiment was reflected by an increasingly vocal opposition within Parliament itself.

British public opinion against the cruise missile deployment was substantial to begin with, but it increased quickly to include a majority of Britons. A Marplan poll, conducted in September 1980, revealed that 43 percent of the UK was opposed to U.S. cruise missiles being stationed there.<sup>15</sup> By November, it had risen to 53 percent.<sup>16</sup> This majority was sustained well beyond the initial period. A national poll conducted for the Sunday Times, in January 1983, showed that 54 percent were against Britain allowing “cruise missiles to be based in Britain.”<sup>17</sup>

RAF Greenham Common, the first deployment site, became the focus of much of the opposition. During the summer of 1981, a group of forty women, called “Women for Life on Earth,” marched 120 miles from Cardiff, Wales, to Greenham Common in protest of stationing cruise missiles there.<sup>18</sup> Upon their arrival at Greenham the marchers demanded a public debate on the issue with the Ministry of Defence. The debate was denied and they “spontaneously set up a camp outside the U.S. Air Force Base.”<sup>19</sup> Thus began the Greenham Women’s Peace Camp that was to exist for nineteen years.

What began with a forty-woman march drew national attention and support. In the south of England alone there were forty-seven women’s groups involved with the Greenham protest by

April 1983.<sup>20</sup> Before the deployment of cruise missiles began, the Greenham camp aimed to “seriously disrupt all the work being done there in preparation.”<sup>21</sup> In December 1982, more than 30,000 women gathered to join hands around the base in what was called the “Embrace the Base” event. Other disruptive tactics were more overt, such as those used on October 29, 1983, when 1,000 women “cut down four and a half miles of fence surrounding the air base.”<sup>22</sup> Before and after the deployment, members of the peace camp were a constant disruption to Greenham operations.

The Greenham Peace Campers were not alone either. There were many other anti-cruise missile groups created with the same goal. Joan Ruddock, then chair of CND, noticed that “outrage at the secret NATO decision, revealed in December of 1979, to deploy American cruise missiles in Britain ... led to the formation of dozens of new anti-missile groups.”<sup>23</sup> At RAF Molesworth, the second cruise missile site, a similar but not gender-specific peace camp was created to protest and impede preparation for deployment. One unique group, called Cruisewatch, had the objective of monitoring “cruise missile convoys when they are deployed on exercise, in order to demonstrate that their movement cannot be kept secret.”<sup>24</sup> Cruisewatch reasoned that if the general public could monitor their whereabouts they were obviously vulnerable to the Soviets, thus demonstrating their uselessness. The creation of these groups involved people from every position in society and occurred at both the national and local levels.

With the cruise missile issue as a primary impetus, the national movement against nuclear weapons, led by the Campaign for Nuclear Disarmament (CND), began to experience a strong revival.<sup>25</sup> While CND had a membership of 2,000 in early 1980, it quickly grew to more than 17,000 by April 1981.<sup>26</sup> Bruce Kent, CND’s general secretary at the time, realized that cruise missiles were “influencing most people coming” to CND. This growth continued and the membership reached 85,000 by 1986.<sup>27</sup> Kent noted that “week by week arrived more letters, more membership applications, more callers, more journalists, more requests for speakers, more orders for badges and leaflets.”<sup>28</sup> At the top of the list of reasons why the revival occurred was “the decision to deploy cruise missiles.”<sup>29</sup>

With the majority of Britons (according to national opinion polls) objecting to the deployment of U.S. cruise missiles in the UK, CND enjoyed massive national support for its activities. Even Bruce Kent thought their October 26, 1980, rally in Trafalgar Square “was over ambitious,” but it went on to attract some 80,000 participants.<sup>30</sup> The accelerated membership growth was reflected by the participation in CND demonstrations. From Trafalgar Square the annual CND rally was moved to Hyde Park to accommodate the surge in popularity. In 1981, the participants numbered some 250,000 and in 1982 it increased to 400,000 participants.<sup>31</sup> It was no coincidence that “all the

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-PETITION,  
PRESENTED  
TO THE  
HOUSE OF  
COMMONS,  
NOVEMBER  
11, 1983**



speakers on the platform criticized Britain's recent acceptance of 160 American cruise missiles.<sup>32</sup> Serving as a conduit of this sentiment, CND's support and membership grew alongside the anti-cruise reaction.<sup>33</sup>

Britain's political parties were soon mired in the cruise missile controversy. Labour, which had long-existing connections to CND, was buttressed by this wave of sentiment. The party explicitly "rejected the deployment of U.S. cruise missiles in Britain."<sup>34</sup> Labour's leader, Michael Foot, speaking at CND's 1981 Hyde Park rally, expressed the new party policy of "no cruise missiles on British soil."<sup>35</sup> Labour was not the only one to feel the influence, however. In 1981, the Liberal party assembly "demanded a campaign against NATO's deployment of cruise missiles," and in 1984 it supported "calls for the immediate withdrawal of cruise missiles."<sup>36</sup> The opposition to cruise missiles within Britain's political parties grew in response to that of the public.

Parliament itself became another forum for voicing disapproval over cruise missiles being based in the UK. During parliamentary question times, it became a common task for the Defence Secretary to defend the government's acceptance of deployment against severe and constant criticism. Statements against the cruise missile deployment such as, "it is utterly unacceptable both to CND and Labour," and, "the vast majority of people in Britain do not want cruise missiles anywhere," were common.<sup>37</sup> Additionally, petitions with hundreds of thousands of signatories were presented by MPs on the floor of the House of Commons.

The details of NATO's decision to deploy cruise missiles to Britain are inconsistent with the

domestic response it evoked and provokes several questions. Why would the cruise missile plan, devised by NATO for European security be protested by Europeans? Why would a policy European leaders (particularly the British and German leaders) pressured the United States so heavily, be so heavily criticized domestically? Finally, why would the deployment of U.S. cruise missile forces to its closest ally evoke such a fiercely negative reaction? In answering these questions four contributing factors become clear.

### **The Perceived Level of Threat**

The level of threat, both in degree of possible harm and in likelihood, incurred by the United Kingdom by hosting U.S. cruise missiles was perceived by the public to be extreme.<sup>38</sup> Questions regarding the weapon's reliability and potential for mishap left many uneasy about its deployment to the English countryside. The issue of whether the missiles were secure or not added to this anxiety. However, the most disconcerting issue by far was whether hosting cruise missiles brought the UK closer to a nuclear strike from the Soviet Union. John Grigg, coordinator of West London CND, recognized that what drove the surge in support for CND "was a fear from many other people that they were in danger and U.S. nuclear weapons on our soil increased that danger."<sup>39</sup>

The reliability of the cruise missiles and their potential for accidents was widely questioned and reports of faulty missile guidance systems found their way into the national papers. In June 1980, *The Observer* reported that "of the 20 tests so far ... eight have failed, some badly: Cruise missiles have veered off course and crashed into the California countryside to the alarm of the local inhabitants."<sup>40</sup> No doubt, this alarmed the local inhabitants around proposed sites who were now threatened directly from their own soil. In the House of Commons this issue was discussed during several sessions. Tam Dalyell, MP for Linlithgow, asked for a team to visit the United States to verify any technical downfall to the cruise missiles. This request was sparked by a report in *Electronic Times* which alleged that "the guidance system in cruise missiles were defective and had not been properly tested and that there were various other listed technical teething troubles."<sup>41</sup>

Others feared mishaps involving the nuclear material in the cruise missile warheads. Several MPs and their constituents expressed concern over the possibility of escaping radioactive material. This issue led Bob Cryer, MP for Keighley, to ask "what precautions will be taken to prevent radioactive leakage."<sup>42</sup> It also brought Michael McNair-Wilson, MP for Newbury (the town located next to RAF Greenham Common), to ask the Defence Secretary to reassure his constituents "about the storage of nuclear warheads? Can he [the Defence Secretary] say that, as far as humanly possible, the danger of a radioactive leak

or accident can be ruled out?<sup>743</sup>

The possibility of an accidental firing of a cruise missile brought even greater distress. If a cruise missile was unintentionally launched and struck a Soviet target, it would certainly bring a devastating retaliation from the Soviet Union. Several MPs demanded to know “what controls against accidental launch will be fitted to the cruise missile system.”<sup>744</sup> Martin Flannery, MP for Hillsborough, expressed this uneasiness stating that “many millions of people throughout the world are deeply concerned and afraid that an accident could now precipitate us all into a nuclear war.”<sup>745</sup>

There were also questions regarding the security of the missiles. Members of the Greenham Women’s Peace Camp, who would often cut through the perimeter fences and intrude on the base, gave immediate credibility to this concern. MP Ronald Boyes noted that the “women at Greenham common have brought to our attention a further reason for concern—that missiles or missile heads cannot be protected all the time and could fall into the hands of our enemies or terrorists.” He further added that it was wrong “to believe that the military can defend such bases 24 hours a day, 365 days a year.”<sup>746</sup> The planned dispersal of the cruise missiles outside the base and across the countryside caused more unease. The intention of the ground launched cruise missile strategy was “to deploy the weapons in moments of crisis to secret sites within about 50 miles of the storage positions.”<sup>747</sup> Members of Parliament began to express concern over the security of the missiles during transit.<sup>748</sup> If the security of on-base cruise missiles remained uncertain, the security of dispersed off-site missiles added a new dimension for concern.

Even more alarming than the security issue was the belief that the cruise missiles represented “a dangerous escalation of the nuclear arms race.”<sup>749</sup> This escalation magnified existing fears over the possibility of a nuclear attack on Britain. John West, a CND organizer at the time, noted that the public knew “that Russian retaliation meant annihilation and that the installation of cruise missiles, against which the Russians had no defense, must increase tension to a degree where a misjudgment on either side would bring holocaust.”<sup>750</sup> This thought alone encouraged much of the opposition to the deployment of cruise missiles. A petition submitted to the House of Commons in November 1983, regarding the decision to accept cruise missiles in Britain, stated that, “such decisions will only bring us closer to nuclear war.”<sup>751</sup> MP Bob Cryer noted that “millions of people in Holland, Belgium, West Germany, and Britain [rejected] the potential escalation in nuclear weaponry.”<sup>752</sup>

The concept of a limited nuclear war, which cruise missiles represented, further fueled fears of a nuclear attack on Britain. NATO’s flexible response strategy envisioned situations where a nuclear war, should it occur, could be contained within Europe (limited nuclear war). Cruise missiles, as theatre nuclear weapons, were part of this

strategy. Those opposing cruise missiles in the UK believed that “the very concept of a limited nuclear war made it more likely that there will be a nuclear war.”<sup>753</sup> Bob Cryer expressed this view in the House of Commons in 1980 saying that, “the installation of cruise missiles represents the implementation of the Pentagon’s limited nuclear war strategy” and that “a limited nuclear war as envisaged by the Pentagon [would] be a radioactive cinder heap for the United Kingdom.”<sup>754</sup>

Moreover, those who opposed cruise missiles saw them as inviting a particularly disturbing type of nuclear attack. Many believed that cruise missiles were, or appeared to be, offensive first strike weapons. The cruise missile’s low flight altitude and advanced guidance system gave it the capability to fly undetected into the Soviet Union, and to accurately destroy a portion of the Soviet nuclear arsenal before it could be launched in retaliation. This counter-force potential was thought to invite a pre-emptive strike on the United Kingdom in a time of tension to eliminate the possibility of a first strike from NATO. This type of thinking led many in Britain to “believe that these are essentially offensive weapons which invite a pre-emptive strike and that they are, therefore, very dangerous indeed.”<sup>755</sup> Bob Cryer, speaking in the House of Commons in April 1980, noted that cruise missiles were “a potential first strike weapon, and ... the people of East Anglia are becoming increasingly aware of the dangers that potential sites in East Anglia represent to them and to this country.”<sup>756</sup>

Dispersing missiles throughout the countryside posed another disturbing problem. As Dafydd Wigley, MP for Caernarvon, noticed, “if an enemy thought there was no way of knowing from where cruise missiles would be fired, the logical response would be to hit Britain with everything at once, as a pre-emptive strike, and by multiple overkill to ensure that everything was knocked out.”<sup>757</sup> This thought was echoed by David Polden, coordinator for CND’s non-violent resistance network, when he realized that “since they in theory might turn up anywhere, we were all potential nuclear targets.”<sup>758</sup> The thought of hosting a weapon system which could provoke a pre-emptive nuclear attack and one that would “make the whole of the United Kingdom a target” did not sit well with many in Britain.<sup>759</sup>

### Level of Control

Although the British government was ensured consultation, actual control over the launch of the missiles remained ambiguous.<sup>760</sup> The lack of control alone encouraged tremendous opposition. As Prime Minister Margaret Thatcher later admitted, the “ultimate control of cruise missiles was the most tricky issue.”<sup>761</sup>

There was historical and contractual precedent for joint control. The 1951 Attlee-Truman agreement, an arrangement made between Prime Minister Clement Attlee and President Harry

**NOBODY IN EUROPE COULD STOP THE UNITED STATES OF AMERICA FIRING ITS NUCLEAR WEAPONS SYSTEM FROM [BRITAIN]**

**HOW ON EARTH CAN THE DEPLOYMENT OF AMERICAN OWNED AND CONTROLLED CRUISE MISSILES IN THIS COUNTRY BE JUSTIFIED?**

Truman, stated that the use of U.S. bases in the UK “would be a matter for joint decision between the two governments in the light of the circumstances at the time.”<sup>62</sup> Although this gave Margaret Thatcher’s government a basis for their claims of joint control, it also left an uncomfortable ambiguity when applied to possible real world situations. The phrase “in light of the circumstances at the time” was particularly worrisome. Despite the Attlee-Truman agreement there was still, among many, a “deep feeling that the people who will decide to fire those missiles are not in this country but in the Pentagon.”<sup>63</sup>

There were several factors that contributed to UK fears. Statements made by officials in the U.S. and UK strengthened the impression of a lack of British control. Speaking in the House of Commons in 1980, MP John Farr expressed concern regarding a comment from the U.S. Secretary of Defense that “the firing of the missiles [would] be an American responsibility alone.”<sup>64</sup> A similar statement made by U.S. Rear Admiral Gene La Rocque made it onto the 1983 British television program called “The Truth Game,” widening the scope of awareness. The day after its broadcast MPs discussed in Parliament Admiral La Rocque’s comment that “nobody in Europe could stop the United States of America firing its nuclear weapons system from [Britain].”<sup>65</sup> A report regarding the Attlee-Truman agreement and U.S. nuclear weapons, presented to the U.S. Senate’s Committee on International Relations in 1975, seemed to further justify fears over a lack of British control of cruise missiles. It stated that “... such consultation procedure does not imply any actual inhibition on the capacity of the United States to operate the systems.”<sup>66</sup> From the view of the United States, which held the ability to fire the cruise missiles, it seemed to the British that even the requirement of consultation might be disregarded. Francis Pym’s (UK Secretary for Defence) statement in the House of Commons that the United Kingdom would “have a degree of say in the authorization for the use of the new systems,” provided little reassurance.<sup>67</sup>

These fears seemed to be confirmed when in 1983 the United States invaded Grenada, a member of the British Commonwealth, without consulting the UK. Margaret Thatcher recognized the popular apprehension stating that “if the Americans had not consulted us about Grenada, why should they do so as regards the use of cruise missiles?”<sup>68</sup> It also heightened concern over the possibility of the U.S. sacrificing Britain for its own interests. As MP Stan Newens stated in the House of Commons, “the United States, on many occasions, particularly recently, has made it clear that it is prepared to put the United States’ interests before those of Britain where it suits it, how on earth can the deployment of American owned and controlled cruise missiles in this country be justified?”<sup>69</sup>

Then a NATO exercise showed that the U.S. was all too eager to cross the nuclear threshold in

Europe. The war game, codenamed WINTEX, simulated the escalation of a Cold War conflict in Europe. The scenarios included requests to fire nuclear weapons to prevent the loss of an endangered European battlefield. In nearly all situations “the decision ended up on the desk of the President of the United States.”<sup>70</sup> The senior military official playing the President often decided “quickly to go nuclear” in Europe.<sup>71</sup> This exercise proved even more disconcerting to the British when it was noticed that “not once had ‘the President’ moved toward that button that would have launched Titan or Minuteman rockets from their U.S. bases into the Soviet Union.”<sup>72</sup> It appeared that Britain was expendable to the U.S.

The perceived lack of control of the British government over the cruise missiles did much to build the opposition. In Parliament, the Secretary for Defence was constantly faced with questions of whether he was “aware that what most perturbs the majority of the British people ... is the issue of who is really in charge.”<sup>73</sup> Inside and outside Whitehall the British were clearly “anxious at the prospect of such a deterrent, based on British soil, not being under sovereign British control.”<sup>74</sup> As Polly Woolly, the public affairs officer for Cruisewatch, noted, “crucial decisions were being taken with regard to our security that we had no power at all to control. Even if the entire country opposed them, we had no chance of reversing them—nor did our democratically elected government have any say.”<sup>75</sup>

The denial by the British government of a dual-key option further accentuated the perceived lack of control. In December 1979, when the NATO conference met to decide on placing cruise missiles in Europe, the U.S. offered a dual-key control option to all of the proposed host governments. This would have required “active participation ... to activate the weapon.”<sup>76</sup> The dual-key system is one that had been used previously in Britain when U.S. Thor missiles were stationed there in 1959. The problem, as Margaret Thatcher noted, was that “to exercise that option we would have had to buy the weapons ourselves, which would have been hugely expensive.”<sup>77</sup> In fact, “the estimate for a force of 160 GLCMs would be in the order of £1 billion.”<sup>78</sup> This proved to be too high a price tag for complicity and the dual-key option was refused.

The refusal of dual-key became a major factor in creating opposition to cruise missiles. As MP Dr. David Owen, leader of Britain’s Social Democratic Party, stated in the House of Commons in March 1983, “opinion polls demonstrate that, were there to be a dual key, the majority of the people of this country would be ready to accept.”<sup>79</sup> A poll conducted for The Sunday Times in January 1983, showed that the British public wanted “dual control of American missiles,” citing 93 percent in favor of “the ‘dual key’ approach.”<sup>80</sup> A similar article entitled “Dual Key Demand,” in a November issue of the Daily Mail, reported that 94 percent of Britain wanted “dual control of cruise missiles.”<sup>81</sup> It was clear that the government’s decision to

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accept U.S. cruise missiles had “the support of only 6 percent of the population ... without dual key.”<sup>82</sup>

Without the reassurance of the dual-key option ideas began to circulate about how to ensure UK control over the launch of cruise missiles. Proposals in the House of Commons often considered some type of “physical bar on the use of cruise missiles.”<sup>83</sup> Ministers desired an “effective blocking device which would prevent the use of cruise missiles on sites in the United Kingdom until authorization for their use has been given by Her Majesty’s Government.”<sup>84</sup> One article in *The Sun* even suggested that “in the event of cruise missiles leaving the base without British permission, British service men [would] have permission to fire on the Americans.”<sup>85</sup>

The issue of British control was key in creating opposition to the deployment of U.S. cruise missiles in Britain. The official Attlee-Truman agreement, which was supposed to ensure a “joint decision,” seemed too ambiguous to provide any reassuring certainty. Statements by U.S. and UK officials and the refusal of the dual-key option accentuated the seeming lack of British control. Considering that the launch of cruise missiles would probably have meant the destruction of much of the United Kingdom, it is easy to understand why control was such an influential issue in this case.

#### Level of Mistrust/Anti-Ally Sentiment

Mistrust of the United States in Britain was evident even prior to the December 1979 announcement that cruise missiles would be stationed in the UK.<sup>86</sup> Dan Keohane noticed in his book, *Security in British Politics*, that “as British confidence in USA leadership declined quite sharply from the late 1970s, opposition to U.S. controlled systems increased.”<sup>87</sup> Deep mistrust and anti-American sentiment was expressed by many of those who opposed cruise missiles. As will be discussed shortly, the level of national mistrust was consistently polled at between 25 and 30 percent before and after the cruise missile announcement. As Simon Duke noticed in *US Defence Bases in the United Kingdom*:

*The visibility of the missiles was designed to boost confidence amongst Europeans in the U.S. nuclear guarantee. Instead the missiles became ... the focus of anti-American sentiment.*<sup>88</sup>

Margaret Thatcher believed that the opposition to cruise missiles was based heavily on feelings of anti-Americanism.<sup>89</sup> Although this may be an exaggerated claim it was an undeniable, if latent, factor.

National public opinion polls indicate that much of the British population did not trust the United States and its leadership during the Cold War. In researching his 1983 Chatham House Paper, *Defence and Public Opinion*, David Capitanichik found “that over the years something

between a quarter and a third of the population has regularly exhibited a degree of distrust or a lack of confidence in the United States.”<sup>90</sup> He additionally found that “for many years ... over 50% of the respondents in any opinion poll have regularly expressed little or no confidence in the ability of the United States to deal wisely with current world problems.”<sup>91</sup> A January 1983 Gallup poll revealed that as many as 70 percent of Britons had little or no confidence in the United States.<sup>92</sup>

Regarding more specific issues the mistrust was higher still. A Mori poll conducted for the *Sunday Times* in October 1983, shortly before the arrival of the first cruise missiles, showed that 73 percent of the public believed that “if the American government wanted to fire the missiles and the British government objected ... America would fire them anyway.”<sup>93</sup> Mistrust and anti-American sentiment were rampant among those who opposed the cruise missile deployment. A 1985 national membership survey of the Campaign for Nuclear Disarmament showed that half of CND members believed the United States was solely responsible for the arms race, while none believed the Soviet Union held sole responsibility.<sup>94</sup> Additionally, over 90 percent desired “to reduce Britain’s defence and foreign policy links with the United States.”<sup>95</sup> It is no surprise that demonstrations of anti-Americanism were common at many anti-cruise protests. Even the son of Geoffrey Howe (Chancellor of the Exchequer and later Foreign Minister) participated, dressing up like President-elect Ronald Reagan and leading a female student dressed and made up as Margaret Thatcher through the streets of York by a noose tied around her neck.<sup>96</sup>

The mistrust and anti-Americanism was exacerbated by the belief that the United States was keeping much of its activities in Britain hidden from the public. An October 1980 article in *The Sunday Times* shocked many when it reported that the United Kingdom was host to at least “one hundred American bases.”<sup>97</sup> The widespread frustration among many in the UK was captured by a question posed by MP Martin Flannery in the House of Commons who asked: “why we almost never see an American in uniform in this country? Is it being concealed from the British people just how many there are here?”<sup>98</sup> Many in Britain felt as though they were “living in an occupied country.”<sup>99</sup>

The suspicion that the United States was hiding its activities in Britain from the public transferred to the cruise missile issue. A 1983 publication entitled “Women in Action” by the World Women’s Action Campaign for Peace and Disarmament reported that “the United States is engaged in secret moves to smuggle cruise missiles with nuclear warheads into Western European countries even before their governments have officially approved their deployment.”<sup>100</sup> The belief that the U.S. conducted secret activities without host government knowledge fed into the worst assumptions.

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Interviews with previous leaders of CND provide further insight into this sentiment. Bruce Kent, chair of CND during the cruise missile debate, said that he believed that there was a sense among the British of “being pulled in two directions.”<sup>101</sup> One direction was to be sympathetic to the U.S. The other was to reject the U.S. and its militant stance which thought it possible to fight and win a nuclear war in Europe. He believed that the crassness of U.S. generals and President Reagan towards the issue of nuclear war alienated the British public. According to Janet Bloomfield, former chair of CND, many believed President Reagan to be an “ex-movie star buffoon” who knew little about what he was doing.<sup>102</sup> Many of those who opposed cruise missiles did so partially because they did “not trust President Reagan’s finger on the nuclear trigger.”<sup>103</sup>

The mistrust/anti-ally sentiment variable intersects with the control variable here. A lack of trust in the United States made many Britons nervous about U.S. controlled cruise missiles being stationed in their country. This is evidenced by several of the questions directed to the Defence Secretary during question time in the House of Commons. Many of these focused on the ability of the British military personnel stationed with the U.S. airmen at cruise missile bases, to “prevent a unilateral firing of cruise by the United States.”<sup>104</sup> It requires a high degree of trust to allow a foreign military to base nuclear weapons in your country, especially with an ambiguous control arrangement. Many in Britain did not hold so high a faith in their American allies. Between the lack of control over a potentially dubious ally and the possibly catastrophic consequences, deep seated opposition was inevitable.

#### Protestability of the Forces

The Protestability of the cruise missile sites encouraged an active and numerous opposition. The two sites, RAF Greenham Common and RAF Molesworth, were highly visible, close to population centers and had obvious vulnerabilities which protestors could exploit.<sup>105</sup>

The impending cruise missile deployment was common knowledge throughout Britain years before their arrival. The NATO decision to deploy, the government’s acceptance, the decision on location, and their physical arrival all made the front pages of the major British newspapers. This was no accident: encouraging concentrated media attention to the cruise missile deployment was part of NATO’s strategy. The publicity “was designed to boost confidence amongst Europeans in the U.S. nuclear guarantee.”<sup>106</sup>

The further attention from the Greenham Common women’s’ peace camp and other protests made the controversy a fixture in newspapers and on television. In addition to their media presence the missiles themselves had a tremendous physical presence, especially for those who lived in the south of England. John West, Secretary of

Southend CND (near RAF Molesworth), noted that seeing cruise missiles on the road was “a constant reminder of their presence.”<sup>107</sup> The high and constant level of attention that the cruise missiles garnered ensured that greater numbers of people would be reassured or, conversely, threatened. But there would be no doubt as to their existence and details.

The proximity of the two cruise missile sites to large population centers made them a convenient target of protest. Janet Bloomfield, former chair of CND, stated it was only 30 to 40 minutes from London, which increased accessibility from the nation’s most populous and politically active metropolis.<sup>108</sup> More people could “go see it or even live there,” as many of the women of the Greenham Common peace camp decided to do.<sup>109</sup> The Greenham peace activists encouraged participation and day trippers with pamphlets that advertised: “trains hourly from Paddington Station and the single fare £5.”<sup>110</sup> Easy access to the sites allowed the opposition, many of whom might not have wandered into deeper parts, to easily raise their level of involvement and turn the bases into weekend protest camps for anti-cruise Londoners.

The vulnerability of the cruise missile sites added to their attractiveness as a target of protest. At Greenham Common, with miles of perimeter fence that were difficult to guard effectively, protestors could easily snip through an unwatched section of fence, sneak onto the base, and vandalize buildings or equipment. One press release by the peace campers claimed that they had actually “entered the flight control tower” and looked over sensitive material.<sup>111</sup> On other occasions protestors cut down “several miles of fence around the air force base.”<sup>112</sup> The second cruise site, RAF Molesworth, was initially even more vulnerable in this regard as it did not even have a fence to destroy. A “Greenfield” site, it was undeveloped and required significant building and construction. This offered “considerable scope for disruption and passive resistance.”<sup>113</sup>

The placement of the bases themselves also increased vulnerability. RAF Greenham Common is surrounded by common land, which is publicly owned and generally accessible to all. This made the site even more alluring to day-activists who wanted to protest without involving themselves in legal entanglements from trespassing and vandalism. It also allowed the Greenham women to legally set up a permanent peace camp around the base and use it for their operations. Though the U.S. Air Force was prepared for nuclear strikes, it had not planned on attacks based in the field next door.

With these local operations centers the protestors could easily make a direct attack using a front-door approach. Instead of sneaking onto an armed military installation, protestors could simply sit down at the gates, effectively blocking the cruise convoys from exiting and preventing their dispersal. This strategy later became more prominent as protestors met to blockade the base gates at a des-





A peace camp set up on common land outside RAF Greenham Common

ignated time. They would offer passive resistance for as long as possible, thus grinding most base activity to a halt until they were eventually removed. By not escalating from civil disobedience, large numbers of the protestors could block operations without risking serious punishment, lowering the level of required commitment.<sup>114</sup>

The cruise convoys themselves were easy and inviting targets for protest. Cruisewatch, a cruise missile specific protest group, was created to take advantage of the vulnerabilities of the cruise convoys. One Cruisewatch participant recalled his activities:

*We bought citizen band radios and each night cars went to Greenham and waited at the exits. Our job, if the convoy came out, was to report by phone from a call box to a contact (CB radios had a limited range) who then arranged for the cruise missile convoy on exercise to be followed and harassed.*<sup>115</sup>

Janet Bloomfield mentioned that one of the more enticing protestable features of cruise missiles was that you could “play tag with the convoys.”<sup>116</sup> To assist and encourage protest of this kind, Cruisewatch created handouts containing directions on identifying and tracking cruise missile convoys (see figure at end of this section). Meant to keep the missiles safe in case of a Soviet attack; the dispersals in fact made them more vulnerable to domestic attack.<sup>117</sup>

The cruise missile deployment was particularly protestable. The media coverage for the missiles, even years before they arrived in England,

Protestors Blockade RAF Greenham Common



ensured that their existence was common knowledge. Their proximity to population centers and the obvious vulnerability of the two missile sites allowed those in opposition to cruise missiles easy methods of disruption and protest. Additionally, sending cruise missiles out in exercise convoys made them even more open and interesting targets. In the words of Bruce Kent, “they invited a quite heroic and colorful type of protest.”<sup>118</sup>

## Conclusion

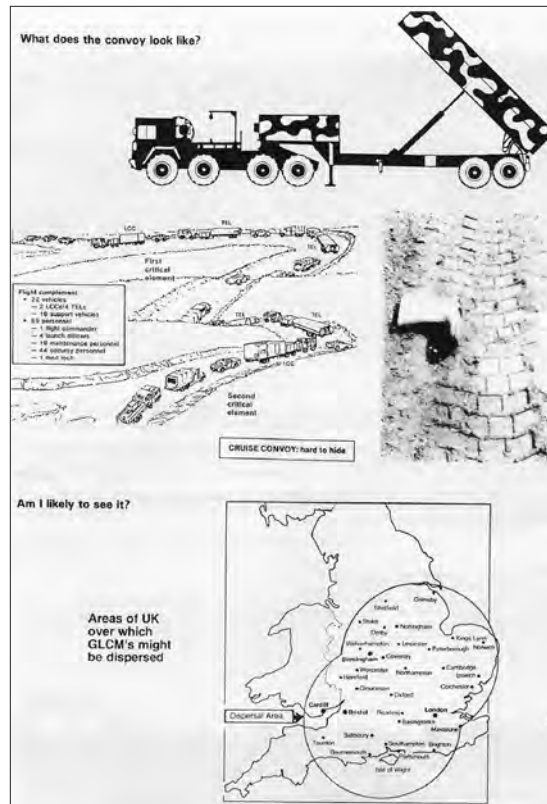
In studying history, lessons for the future can always be found. The four domestic reaction factors discussed here are as relevant today as they were twenty years ago. For at least the last year overseas forces “realignment” has been in the thoughts of America’s defense leadership. While this means the return of thousands of U.S. military men, women, and families to the U.S., it also brings with it the positioning of troops to new locations. One such location is Khanabad airfield in Uzbekistan, which has been used recently by a small group of U.S. troops during Operation Enduring Freedom.<sup>119</sup>

Despite the obvious differences between the United Kingdom and Uzbekistan, the four factors can be applied here. Even before U.S. forces have officially solidified their presence at Khanabad, the issues of threat, control, mistrust/anti-US sentiment and protestability are surfacing.

Instead of facing an increased nuclear threat as the UK did, Uzbekistan must deal with the increased internal threat of terrorism. Several terrorist organizations make their home in Uzbekistan. The seriousness of the problem was demonstrated during March and April 2004, when a string of bombings killed more than fifty people. Arkady Dubnov, a Central Asia expert for the Russian newspaper Vremya Novostel, warns that Islamic radicals will react fiercely to the arrival of more U.S. forces in Uzbekistan.<sup>120</sup> In the words of an individual close to Uzbek extremism it will only “calm down when the U.S. base goes.”<sup>121</sup>

The Uzbek leadership, recognizing the high possibility of public discontent, has realized the importance of the appearance of control over U.S. operations from Khanabad. The Uzbek government insists publicly that U.S. forces are only allowed to conduct humanitarian operations. However, the U.S. -Uzbekistan Declaration on the Strategic Partnership and Cooperation Framework leaves considerable ambiguity as to the type of operations the U.S. military is able to do from Uzbekistan.

Despite the Uzbek’s generally favorable view of the U.S. military presence, mistrust of the U.S. and anti-Americanism is present. The Uzbek president, Islam Karimov, has some repressive domestic policies which many see the U.S. as bolstering with its new ties to Tashkent. The opposition Erk party leader, Atonazar Arifov, suggests that a more permanent U.S. base could strengthen anti-Americanism as many have seen only a “reverse



effect” on the growth of democracy.<sup>122</sup> According to Kenley Butler of the Monterey Institute of International Studies, this “could drive the country’s religious, poor, and disaffected to the very groups the U.S.-Uzbek Agreement hopes to destroy.”<sup>123</sup>

There is some concern as to the protestability of Khanabad as well. The airfield is located next to the administrative center of the region, Karshi, which has a sizable population of 177,000. It is connected to other population centers, including Tashkent, by rail thus making access to the airfield area relatively easy. Additionally, Khanabad has been well established in the Uzbek collective mind. State-controlled TV and radio broadcasts have been saturated with talk of the U.S. presence.<sup>124</sup>

The increasing quality and distribution of communication and travel technologies has made it easier for domestic populations to react and organize. Realizing that threat, control, mistrust, and protestability can be primary factors in encouraging and motivating negative domestic reactions is imperative for the growing number of states who plan to host or deploy allied forces. Analyzing the U.S. cruise missile deployment to the UK can assist in negotiating future arrangements which are more durable and would help prevent the U.S.

## NOTES

1. This number can be misleading as a facility can be anything from a Girl Scout park to an operational airbase. The actual number of bases is far less than 702. Source: Department of Defense’s Base Structure Report: Fiscal Year 2003 Baseline. This report is produced by the Office of the Deputy Under Secretary of Defense (Installations and Environment).
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4. *Ibid.* p. 96.
5. *Ibid.* p. 170.
6. *Ibid.* p. 173.
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12. Ruston, Roger. p. 181-182
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# FOR THE RECORD

## Flying Dog's Parachute Lands at the National Museum of the U.S. Air Force

By Rob Bardua  
NMUSAF Public Affairs

A parachute made for a dog that flew alongside pilots during the Berlin Airlift has been added to the back of a dog mannequin in an exhibit at the National Museum of the U.S. Air Force. The parachute, donated by Mr. Clarence "Russ" Steber, was worn by his boxer dog, "Vittles," during their flights on C-47s and C-54s to help deliver food to West Berlin.

According to Museum Senior Curator Terry Aitken, the parachute is a significant addition to

the Berlin Airlift exhibit. "Throughout the history of the Air Force, animal mascots have provided unit identity and made valuable contributions to esprit-de-corps," said Aitken. "The parachute allows us to tell the story of the Berlin Airlift's mascot and the special bonds between Vittles and the pilots that he flew with as a 'crew dog'. It's a wonderful story and already a special hit with our visitors."

Mr. Steber said it didn't take long for him to grow fond of Vittles and soon realized that he would make a great companion. "I had a friend in Germany who had a one year old boxer that I fell in love with and he sold him to me," said Steber, a former Air Force pilot who flew 415 missions during the Berlin Airlift.

When some of his missions required him to be away for two to three days at a time, Steber started taking Vittles along and soon other pilots began to fly Vittles on their missions as well. He recalls, "In Berlin, as soon as we were unloaded, we had to take off again. Sometimes Vittles would be nosing around other airplanes and I had to take off without him."

The dog began catching rides with other pilots and sometimes it would be several days before they would meet again.

"Everybody knew who Vittles belonged to and eventually got him back to me," said Mr. Steber. "The other pilots would feed him and even take him to the Officers' Club."

Steber remembers that sometimes pilots would even give Vittles pans of draft beer until the dog got so looped that his legs would go straight out and he had to carry him back home.

Capt. Steber and "Vittles."  
(Photo courtesy of the NMUSAF and "Russ" Steber.)



Mr. Clarence "Russ" Steber (left) fastens the dog parachute he donated to the U.S. Air Force Museum on the back of a dog mannequin along with the help of Exhibits Specialist Mr. Jerry Miracle (right). Mr. Steber holds the record for flying the most missions during the Berlin Airlift with 415 and shared the cockpit on 131 of those flights with his boxer dog "Vittles". (NMUSAF Photo.)



Shortly thereafter, Gen. Curtis LeMay heard about the dog and summoned Lt. Steber to his office. He asked, "Are you the pilot who owns the dog who is flying in our airplanes?" Steber affirmed that he was, thinking he was in a great deal of trouble.

But General LeMay replied, "Without a parachute? That dog is one of the best morale builders that I've had over here. I want that dog to have a parachute!" Soon afterwards, Vittles had a parachute of his own designed with a static cord that was connected to Lt. Steber's parachute and would automatically open the dog's parachute in case they would ever need to bail out.

Although Vittles accumulated thousands of flying hours, including flying on 131 missions with

Lt. Steber during the Berlin Airlift, he never needed to use his parachute.

Lt. Steber wasn't quite as fortunate, needing his parachute once when the C-47 he was piloting went down over Soviet-controlled territory. Lt. Steber was able to bail out just seconds before his plane crashed. "My parachute opened and I hit the ground at nearly the same time," recalled Steber, who was knocked unconscious from the impact and then captured by the Russians.

For three days, Steber was interrogated and "roughed up" by the Russians, but eventually released when he could not provide them with any information.

Despite his own ordeal, Steber was thankful that Vittles was not with him on that flight. "It's a good thing the dog wasn't with me that time or we probably both would have gotten killed," he said. At the age of six, Vittles died from heart worms likely caused by a mosquito bite at Biggs Air Force Base, now known as Biggs Army Airfield.

When contacted by National Museum officials about donating the parachute, Mr. Steber agreed, but only after he fulfilled a promise to display it for two years on-board the "Spirit of Freedom," a C-54 aircraft that serves as a flying museum dedicated to telling the story of the Berlin Airlift at air shows and events around the world. "That exhibit became an immediate hit with children. Kids just loved it because they see a dog wearing a parachute and they get interested and learn more about this humanitarian airlift."

Steber hopes many more people will see the Vittles display and learn more about the Berlin Airlift now that the dog's likeness is at the National Museum. The one thing he's sure about is that Vittles would have enjoyed the exhibit. "He loved flying and I'm very proud that Vittles is now part of an exhibit at the Air Force Museum," said Mr. Steber. "That dog would have loved it!" ■

Mr. Clarence "Russ" Steber stands proudly beside the display of his flying boxer dog "Vittles" in the Berlin Airlift Exhibit at the National Museum of the U.S. Air Force. Mr. Steber recently donated the parachute his dog used during the Berlin Airlift to the Museum. (NMUSAF Photo.)



**Baghdad or Bust: The Inside Story of Gulf War 2.** By Mike Ryan. South Yorkshire: Pen & Sword Books, 2003. Illustrations. Abbreviations. Index. Pp. 214. \$29.95 ISBN: 1-88415-020-8 and **Dark Victory: America's Second War Against Iraq.** By Jeffrey Record. Annapolis: Naval Institute Press, 2004. Notes. Bibliography. Index. Pp. 155. \$16.97 ISBN: 1-59114-711-5

Generally, there should be an interval to allow the smoke to clear before expecting an objective appraisal of a conflict. In this case, both of these books serve a purpose because of their immediacy—rather than in spite of it. The intent of each is different. The backgrounds of the authors vary widely but qualify them for the particular story they attempt to convey. Record has a Ph.D. and broad experience as an assistant provincial adviser in Vietnam, legislative assistant to two senators, work at several think tanks, and professor of strategy at the Air War College. Ryan is a television defense analyst. Both have published a number of other books.

*Baghdad or Bust* is a straightforward story of the events leading up to the war and the fighting itself. It is well illustrated and lists the players, shows much of the equipment in considerable detail, describes the intelligence cycle, and names “fallen heroes.”

In contrast, *Dark Victory* examines the origins, objectives, conduct, and consequences of Iraqi Freedom. Though it is critical of each step, it is most damning in the last, charging that the war was unnecessary and damaging to our long-range interests. This is obviously more controversial than straight facts and figures. It is judgmental, and there may not be universal agreement with this brief. It is, however, well argued. Unlike Ryan, Record has 22 pages of sources, bolstering his case. He is more directed at policy analysis than historic narrative. Both examine the continuities of Gulf Wars I and II.

The books are relatively short (especially with the tables and pictures in *Baghdad or Bust*). My only real complaint is that both also violate the rule that when a place is mentioned in the text, it should also be shown on a map, but this is not a major drawback for anyone with a good atlas. The bottom line is that because of the differences in approach, both are worth the reading effort in order to try for a balanced and complete understanding. There are, of course, additional works that contribute to this, such as the book by Gen. Wesley Clark.

*Brig. Gen. Curtis H. O'Sullivan, ARNG (Ret.), Salida, California*



**Heroes Never Die: Warriors and Warfare in World War II.** By Martin Blumenson. New York: Cooper Square Press, 2001.

Index. Pp. xii, 641. \$32.00 ISBN: 0-8154-1152-9

*Heroes Never Die* is a collection of previously published Blumenson articles. On the one hand, it is nice to have such a large collection of his work in one handy volume, as many of the essays continue to resonate in today's uncertain military environment. On the other hand, any work of this type will have flaws.

Although spanning over four decades of writing, the essays lack any contemporary introduction or explanation. How, for instance, did the author's view change about Mortain after the Ultra secret came to light? The reader is left to ponder. The book also suffers from a lack of graphics. As mentioned, these essays were previously published and most certainly contained photos and maps pertinent to the text, but *Heroes Never Die* contains none of these. Although not necessary for comprehension, their absence leaves the reader less than satisfied.

There seems to be no binding theme or attempt to tie the essays together. Blumenson simply put the essays in chronological order of publication. Thus, for instance we see Gen. George Patton appear periodically throughout the book in chapters 10, 12, 13, 19, 24, 26, 34, 36, 42, 43 and 47. In chapter 43, “General Patton's Death,” the reader is presented with an almost duplicate essay as in Chapter 10, “Patton's Last Fight.” Further, Blumenson's belief in some form of sixth sense for the Patton family is bizarre.

In the introduction, Blumenson argues that he pushes “no particular point of view or interpretation.” For an historian of Blumenson's caliber and experience to make this statement is baffling since, in Chapter 11, “Why Military History,” he argues military professionals should study war at all levels including the economic, social and political context in order to be better warriors themselves.

The quirks aside, *Heroes Never Die* holds many thought-provoking essays. Those of particular interest to us today include “This Age of Violent Transition” and “The Changing Nature of War: Old Parameters are Vanishing.” In the first, written in 1971, Blumenson predicted that the world was moving from an environment of total war to one of limited war. Although one could argue that in the 1970s it didn't take a rocket scientist to figure out that the superpowers' nuclear arsenals precluded total war, Blumenson moved beyond the proxy war milieu to encompass wars of terror, arguing that the U.S. would have to return to limited objectives in war. This included peace short of unconditional surrender even when dealing with terrorists. One is struck by Blumenson's prescience on the trends of war and by the notion that in the two wars since September 11, 2001 we have indeed fought

for limited objectives from our perspective (regime change in both cases). But from the enemies' perspective these wars have had unlimited objectives (survival). As such, the U.S. has not achieved unconditional surrender.

In the second essay, written in 1982, Blumenson succinctly elucidates the Westphalian system of legal and illegal combatants. As the Treaty of Westphalia gave the power to wage war to the states, guerrillas and terrorists not representing a nation are outside the legal system and as such have no rights under the laws of war. In history, these combatants were many times summarily executed upon capture. Given this history, the detention of suspected terrorists in Guantanamo Bay takes on new meaning.

*Heroes Never Die* has certain disadvantages that the reader needs to understand; but, on the whole, the book provides a view into the evolving scholarship and ideas of one of our most highly regarded military historians. Further, many of the essays continue to echo for us today, flatly disproving the author's assertion of no particular point of view or interpretation.

*Lt. Col. Jim Gates, USAF, Defense Systems Management College*



**The Two O'clock War: The 1973 Yom Kippur Conflict and the Airlift that Saved Israel.** By Walter J. Boyne. New York: Thomas Dunn Books, 2002. Photographs. Maps. Notes. Appendix. Bibliography. Index. Pp. xvi, 334. \$29.95 ISBN: 0-275-97706-4

The October or Yom Kippur War in the Middle East is a milestone in United States diplomatic and military history. Historian and retired Air Force Colonel Walter Boyne has done an excellent job of providing an overview of the conflict in this book. Apparently, the title is taken from the time of day at which the Arabs launched the attack that caught Israel by surprise and nearly doomed the nation. A resounding cry throughout the work is that the Israeli government and military had allowed itself to fall into hubris following their resounding military victories of the Six-Day War. Israeli leaders, including the dynamic, one-eyed Moshe Dyan, had come to believe that the military could quickly repel any Arab attack and rout the attackers as they had done in 1967. Such, however, was not the case six years later as a more disciplined Egyptian and Syrian force overran Israeli positions and took back territory that had been lost to them in the Six-Day War. Even the vaunted Israeli Air Force suffered heavily due to the proliferation of Soviet-supplied surface-to-air missiles.

Although the subtitle states that the

book is about "The 1973 Yom Kippur Conflict and the Airlift that Saved Israel," Boyne actually includes a lot more conflict and less airlift than the statement implies. That the U.S. airlift provided the materials—including sophisticated air-to-air and anti-SAM missiles—that allowed the Israelis to regain the initiative and ultimately repel the Egyptian and Syrian attacks is made clear in the narrative. However, the inner workings of the airlift itself and the experiences of the crews who flew the missions of Operation Nickle Grass take a back seat to the description of the events taking place on the front lines.

*The Two O'Clock War* does give the reader an appreciation for the role played by the U.S. in saving Israel from defeat—and the possible use of nuclear weapons in a last ditch effort to save the country. In addition to the airlift, Boyne mentions other U.S. military roles and alludes to American fighter pilots having flown combat against the Arab air forces—a rumor that has yet to be confirmed. He covers in some detail the many dispatches that flew back and forth between Washington and Moscow and between Secretary of State Kissinger and the Soviet leaders at a time when President Nixon's attention was diverted by the unfolding Watergate investigation. Boyne relates how one message from Soviet Premier Brezhnev was misinterpreted by the White House, leading to U.S. nuclear forces being placed on DEFCON III alert for the first time since the Cuban Missile Crisis ten years before.

Finally, the book includes an epilogue and a short history of Israel, with emphasis on the events that led to the numerous conflicts experienced in the region prior to the 1973 October War.

This book is a worthwhile read for those with an interest in the Middle East and the role played by the U.S. prior to the Gulf War intervention. Boyne well makes the point of the hubris that developed in the Israeli military after their spectacular success in the Six Day War, and how it came close to losing the 1973 war.

*Sam McGowan, USAF veteran, author, writer, and Nickel Grass Veteran*



**In the Company of Soldiers: A Chronicle of Combat.** By Rick Atkinson. New York: Henry Holt and Co., 2004. Maps. Photographs. Glossary. Index. Pp. 319. \$25.00. ISBN: 0-8050-7561-5 and **Generation Kill: Devil Dogs, Iceman, Captain America and the New Face of American War.** By Evan Wright. New York: G. P. Putnam's Sons, 2004. Maps. Photographs. Pp. 354. \$24.95. ISBN: 0-399-15193-1

The best war correspondents report from as close to the battle as they can get. In covering the U.S. invasion of Iraq during March and April 2003, Rick Atkinson and Evan Wright hump alongside the frontline troops. Their books describe a nearly insane

dedication to mission by American fighting men. With *In the Company of Soldiers*, Atkinson continues his Pulitzer Prizes-winning style of reporting by following the 101st Airborne Division from Fort Campbell, Kentucky, to Baghdad, focusing on the activities of Maj. Gen. David Petraeus. In *Generation Kill*, Wright rides in the back seat of a Marine First Reconnaissance Battalion Humvee commanded by 28-year-old Sergeant Brad Colbert. The authors present two dramatic views of the war: Atkinson's cerebral account of command-level action provides excellent reading. In comparison, seen from the very tip of the spear, Wright's visceral stories explode in breathtaking and, at times, mind-numbing detail. The books are nearly the same length, but it took me a while longer to finish *Generation* because I reread so many paragraphs and entire pages.

Wright's boldest message is, despite obsessive soul searching about the rules of engagement (ROE), the Marines killed a large number of civilians, many unarmed. Before leaving Kuwait, Lt. Nathaniel Fick, Colbert's boss, says, "If we kill civilians, we're going to turn the populace against U.S. and lose the war. But I don't want to lose Marines because the ROE have taken away their aggressiveness." The "mantra echoed by every commander throughout the Corps" is that each man is accountable for those he kills, not in hindsight but under the facts as they appeared at the time. The problem expands due to an inability to identify com-

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batants because so many armed people do not wear uniforms; furthermore, Iraqis generally fail to react to warnings. The invasion "comes down to a bunch of extremely tense young men in their late teens and twenties, with their fingers on the triggers or rifles and machine guns." Known as "The Iceman," Colbert constantly enforces the ROE, going so far as to stop his team from shooting wild dogs. He epitomizes the fearless warrior, but inside he is "basically a decent, average suburban guy...who believes in the American way." Nevertheless, Wright narrates numerous haunting scenes in which Marines anguish over having killed civilians, even though the deaths are justifiable. Wright portrays "rough men" of whom we can be proud, whom we can admire.

Wright also shows flaws in his image of the American warrior through the behavior of incompetent officers. Misassigned "Encino Man" has difficulty understanding or articulating the simplest of orders and leads his men into avoidable dangers. Hysterical "Captain America" gives improper commands, shoots at people unnecessarily, and abuses prisoners. After being temporarily relieved of command, he otherwise goes unpunished. Devised by enlisted men, the nicknames show "the judgment of the pack is relentless and unmerciful."

The authors agree that the U.S. fought the war on the cheap. To compensate for having fewer men and tanks, the Marine division commander originates an unorthodox plan to draw fire and flush out the enemy by deploying 160 men of the First Recon in lightly armored or open-top Humvees ahead of his main battle force. The Humvees are expected to rely on speed and maneuverability rather than their meager firepower to survive. Wright admires the plan before admitting, "I'm glad I didn't know about it in advance, because it would have been scarier to remain with Second Platoon." And nobody tells the Marines "brazenly driving into ambushes is part of the plan." Consequently, time after time they find themselves fighting or fleeing for their lives after entering an enemy-held town.

Combat induced wisdom provides some of *Generation's* best quotes. A lance corporal concludes, "Everything in life is overrated except death." An old sergeant warns, "Don't pet a burning dog." A younger sergeant decides, "For the wild dogs, war is a feast."

Both authors highlight major postwar problems that Americans encountered while still in the process of invading Iraq. Their accounts often make the invasion appear to be merely a warm-up for the real fight to come.

Atkinson is an expert on military command. He has served as a correspondent in Somalia, Bosnia, and the Persian Gulf. His *Crusade: The Untold Story of the Persian Gulf War* (1993) analyzed Army leadership during that time. In *Company*, he does much of the same with the latest conflict. Granted complete access to command level activities such as the twice-daily Battle Update

Briefing, Atkinson observes Petraeus and wonders "what the world looked like through the commanding general's eyes. Trying to parse his moods and action had become an intriguing exercise." The two men strike up a harmonious relationship. Petraeus confides in Atkinson to a point that, when Atkinson's tour nears its end, a seemingly-envious brigadier general tells him, "You're probably closer to [Petraeus] than anyone in the division." As a result, Atkinson provides an almost unobstructed view into the stresses and anxieties of logistical and tactical decision-making regarding the command of 17,000 soldiers in combat.

In keeping with his style, Atkinson interjects stories related to the region's history. After describing Cyrus' unrestrained welcome by the inhabitants of Babylon, Atkinson writes: "And, usually, in short order, life had soured. Liberator had become occupier, occupier has become oppressor, and oppressor had become someone whose throat needed cutting." He also informs us: "In its thirteen-hundred-year history, Baghdad had been conquered thirty-one times, according to an Arab tally. Now the count was thirty-two." Simultaneously he has an eye for the enlisted men's attitudes. He cites pre-invasion latrine graffiti: "If you'd voted for Gore, you wouldn't be here." Like Wright, Atkinson doesn't miss a detail.

The text of both books derives from assignments the authors fulfilled for major publications. Atkinson covered the war for the *Washington Post*. Wright wrote for *Rolling Stone*. Combined, the two books tell everything the average reader wants to know about U.S. ground operations during the invasion of Iraq.

*Lt. Col. Henry Zeybel, USAF (Ret), Austin, Texas*



**Combat Legend: F-117 Nighthawk.** By Paul Crickmore. United Kingdom: Airlife Publishing, Ltd. 2003. Photographs. Appendices. Pp. 96. \$14.95 Paperback ISBN: 1-84037 3946

British author Paul Crickmore's book is a recent addition to the Combat Legend Series. Every volume in the series of paperbacks is dedicated to analyzing a specific model of military aircraft and contains fewer than 100 pages. These books are easy to understand and are geared toward the novice instead of military historians or aviators. This primer provides a snapshot into the Lockheed Martin F-117 design and procurement process while touching on some of the operational capabilities exhibited during Operations Desert Storm and Allied Force.

Crickmore's chronologically takes the reader from the initial design phases in the mid-1970s, to the F-117's first flight in 1981, to combat in the Middle East. Along the way he addresses structural, mathematical, and

mechanical factors which contribute to production of an aircraft undetectable by radar, with enough detail to leave the reader with an appreciation of the complexity of the F-117 design process. He then successfully examines the impact the Nighthawk had on the operational planning and target selection process during Desert Storm. Since it often provided the greatest probability of accomplishing mission objectives, it was frequently used against the most critical, highly defended, and difficult-to-hit targets.

Anyone interested in military aircraft or possessing a basic understanding of aeronautical concepts will undoubtedly benefit from reading *F-117 Nighthawk*. An abundance of photos, starting with the initial concept designs, and a detailed accountability of each specific operational airframe acknowledge the author's comprehensive research. Appendices cover a wide range of topics to include weapons specifications and information for model airplane builders.

However, the reader is taken down an uneven path at a varying pace. Given no author's note or introduction, the reader is not guided into the Government procurement process but is, rather, abruptly dropped into it. Despite tight efficiency in the early chapters regarding the design and development process of the F-117, later chapters wander. In some passages, Crickmore nearly overwhelms the reader with an abundance of technical information. Conversely, pilot interviews were insightful but stopped short of giving the reader an appreciation of the relationship between the pilot and aircraft.

The use of non-standard military acronyms, the author's fascination with tail numbers, and an overabundance of F-117 technical data do not contribute to a study of a "Combat Legend." More pilot insight (comparing flight characteristics against other aircraft) and "there I was" stories would have remedied this problem.

Despite being published in 2003, Crickmore's work stops abruptly in 1999 by briefly mentioning the shoot-down of an F-117 by Serb forces during Operation Allied Force. Additionally, I was eager to learn if the decades of research and billions of dollars spent on this project, as presented by the author, met the objectives of the original designers and needs of the customers.

Although advertised as a book providing insight to a combat legend, it's more of a developmental history. Based on the title, I expected to learn more about the 117's combat effectiveness. A more appropriate title would be *A Historical Primer of the F-117*.

*Maj. Kenneth G. Holliday, USAF; Commander, 8th Security Forces Squadron, Kunsan AB, ROK*



**The Battle of Britain in Victory and Defeat: The Achievements of Air Chief**



**Marshal Dowding and the Scandal of His Dismissal from Office.** By J. E. G. Dixon. Bognor Regis, West Sussex, UK: Woodfield Publishing, 2003. Illustrations. Tables. Photographs. Notes. Appendices. Bibliography. Index. Pp. 285. £25.00 (c. \$48), £15.00 (c. \$30) Paperback ISBN: 1-903953-40-5

Professor Dixon enlisted in the RAF in 1940, was remustered aircrew, emigrated to Canada, and from 1959 to 1990 was a lecturer at the University of Winnipeg. He had long been interested in the disgraceful case of Air Chief Marshal Lord Dowding of Bentley Priory, the victor in the critical 1940 Battle of Britain. He has researched the matter at the Air Historical Branch and at the Public Record Office in London. Unfortunately, in the course of writing the book, he moved twice and mislaid some of his notes. Thus, the book suffers not only from the loss of vital references, but also from the lack of the hand of a sound copy editor.

That said, Dixon's work is a thoughtful, long overdue examination of the hidden politics of the RAF, Air Ministry, and Secretary of State of the day. It is a cautionary tale for those naive enough to believe that airmen are above politics, ambition, cliquishness, meddling, and of even letting the importance of winning local political battles at home come before beating the enemy. All are present, including the inner circle of mediocrities and of leaders playing their own games, disliked and feared by the able. And to this mix must be added two retired Chiefs of the Air Staff (CAS) and ex-officio members of the Air Council, Marshals of the RAF Viscount Trenchard and Sir John Salmond. The former, a central figure in air history from 1915 to 1930, was out of touch with realities by 1940, having unsuccessfully proposed himself as generalissimo of all British forces. Their legacy from the First World War was the offensive, enshrined from 1923 in the bomber deterrent of the Home Defence Air Force. Because of the very nature of that doctrine, Trenchard, Salmond, and company, including in late 1940 the new CAS, Charles Portal, had to deny that there could ever be a successful defense against the bomber. But in 1918, Maj. Gen. E. B. Ashmore had created such and continued to develop it until his retirement in 1929, just when Dowding (who had crossed swords with Trenchard in World War I) became the Air Member for Research and Development and, in 1936, the first AOC-in-C of Fighter Command, a defensive establishment. "Stuffy" Dowding, a technical, devoted himself to mastery of technical details of defense, including RDF (later called radar). A fellow AOC-in-C was Sir Edgar Ludlow-Hewitt of Bomber Command, also a knowledgeable and outspoken critic within the RAF. Dixon surgically exposes how the Air Staff got rid of their opponents and notes the costly results of so doing.

While Dowding was busy winning the Battle of Britain, including preparing for the

coming night-battle of the winter of 1940-1941, the old school led by Trenchard, Salmond, Sholto Douglas (the Asst CAS and soon to be Dowding's successor), Portal, and others were working to retire the leader of Fighter Command, using as their instrument the Secretary of State, Churchill's former regimental adjutant, Sir Archibald Sinclair. What makes the tale the more despicable is that the man who saved Christendom—in Churchill's words—was denied the honors and acclaim given Nelson after Trafalgar. He was absolutely dismissed with a phone call from Sinclair, packed off to the U.S., and given a barony. By rights he should have been made a Marshal of the RAF with a generous pension. Given the Ira Eaker precedent, it is still not too late for Parliament to pass an Act to grant him his due.

*Robin Higham, Professor Emeritus of Military History, Kansas State University, and sometime Pilot RAFVR 1943-1947*



**Armed Servants: Agency, Oversight, and Civil-Military Relations.** By Peter D. Feaver. Cambridge: Harvard University Press, 2003. Notes. References. Index. Pp. xi, 381. \$49.95 ISBN: 0-674-01051-5

The key texts on civil-military relations by Samuel P. Huntington and Morris Janowitz have stood the test of time. Each has been compulsory reading for several decades. Although challenged in their major assumptions, no experts had yet fully succeeded in displacing these gatekeepers to the field until Peter Feaver's current *tour de force*.

Feaver is no amateur when it comes to building a coherent, powerful, yet relatively parsimonious explanation of civil-military relations in the United States. Because his approach is theoretically rich, this book is not *prima facie* for the layman, although the case studies on civil-military relations during the Cold War and one on the post-Cold War period 1990-2000 should be of interest to many more than political scientists.

Feaver's ultimate goal is to explain changes in U.S. civil-military relations during the Cold War and after by focusing on how the control relationship is exercised daily. To do this, he develops a new theory articulated around the principal-agent theory. The interaction between civilian principals and military agents is examined on the basis of the former's expectations about whether or not the military will follow their orders, and the latter's expectations about whether or not shirking would be detected. This examination assists in specifying "the conditions under which we would expect civilians to monitor the military intrusively or nonintrusively and the conditions under which we would expect the military to work or shirk." Feaver's approach is rational, and this is one of the main distinctions between his approach to the subject and that of

Huntington and Janowitz, who both rely on nonmaterial determinants of behavior, such as an ideology of professionalism. Therefore, the costs of monitoring for the principal and the likelihood of punishment for the agent are prominent material factors in Feaver's approach.

Using his theoretical construct, Feaver's look at civil-military relations during the Cold War reveals, despite "quibbles over how to code and interpret complex concepts like shirking or expectations of punishment," that the military worked (they expected the costs for shirking to be high) under intrusive monitoring (costs to do so were low while unintrusive monitoring was not very reliable). His study of post-Cold War civil-military relations points at examples of military insubordination, excessive military influence, excessive scandals, military disrespect, and military deference and embrace of political correctness, which collectively point to shirking. The more conflictual civil-military relations of the 1990s, argues Feaver, were due to the concurrence of civilian intrusive monitoring (costs of monitoring decreased) with military shirking (the gap between principal and agent widened, and the expectation of punishment dropped, both providing more incentives to do so).

Feaver recognizes that his two case studies may not be fully sufficient to support his principal-agent theory, but they assuredly are a very solid basis from which to proceed further. His strength resides in the rigor of his analysis; his arguments are logical and well supported. The case studies were well researched, precise, and adequate to the task. This book, in my opinion, will stand the test of time for several years, if not as many decades as Huntington and Janowitz. Even if one find major faults with Feaver's theoretical approach and historical facts, this book will remain a must read to all experts and teachers of civil-military relations. It is highly recommended.

*Mr. Stéphane Lefebvre, former civilian strategic analyst and army intelligence officer, Department of National Defence, Canada*



**Pappy Gunn.** By Nathaniel Gunn. Bloomington, Ind.: Author House, 2004. Photographs. \$30.00 ISBN 1-4184-5574

Walter Edmonds claims that he contributed more to the winning of the war in the Pacific than any other single individual below star rank; the official history of the U.S. Army Air Forces in World War II said his conversion of the Douglas A-20 from a light bomber into a gunship was the most significant event of the Army Air Forces in the Southwest Pacific in 1942, and Gen. George Kenney called him "my secret weapon." Yet little has been written about Lt. Col. Paul Irvin "Pappy" Gunn. Anyone who reads this book will understand that he

was one of the greatest heroes of World War II, a man whose contributions significantly altered the course of events in the Southwest Pacific.

Gunn was a U.S. Navy enlisted aviator who entered military service in 1917, and retired as a chief machinist's mate in 1937. He eventually took his family to Manila, where he helped set up an airline to provide service throughout the islands. Shortly after the war came to Luzon, Maj. Gen. Lewis Brereton called Gunn to his office at Nichols Field and told him that the airline and its personnel were now part of the U.S. Army Air Corps. Gunn immediately went to work, commencing one of the most amazing careers of the war.

Throughout the conflict, Gunn had to fight his own personal war, knowing that his family was in a Japanese internment camp at Manila's Santo Tomas University. Despite this, his military exploits were the stuff of legend. During the first weeks of the war, Gunn flew transport missions throughout the Philippines and removed a group of staff officers when the headquarters of the Far East Air Forces was ordered to Australia. There he found a force in disarray. One of his first accomplishments was organizing a crew of mechanics to assemble Curtiss P-40s and Douglas A-24 dive-bombers that

he found sitting on the Brisbane docks. His naval experience made him the ideal man to get these into working order. When the P-40s were ready to fly, Gunn rounded up pilots to fly them, then led them north toward Darwin with plans to continue on to Mindanao and back into the war in the Philippines. But when they got to Darwin, they were sent to Java instead.

Gunn was soon put in command of the new Air Transport Command. Starting with an assortment of Douglas and Lockheed transports, his command operated all over the area. Gunn himself flew missions to Mindanao in his personal C-45, then went on to Bataan to deliver badly needed supplies. During the Java Campaign, he took a B-17 that had been assigned to his transport squadron, loaded it with bombs, and attacked Japanese ships in the Java Sea.

In March 1942, he spotted a contingent of Netherlands East Indies Air Force B-25s sitting on an airfield near Melbourne. He concocted a scheme to literally steal the B-25s and put them into the new 3d Bomb Group. Gunn was reassigned to that group and a few days later was flying these B-25s on missions to the Philippines. On one of these, he took his B-25 down to wavetop altitudes and skipped bombs into the side of a Japanese transport. He also flew a special

mission to Panay to pick up a Japanese-American intelligence agent and two other men who had been flown out of Bataan.

Upon returning to Australia, Gunn began experimenting with modifications to the B-25, especially the addition of fixed machineguns in the bombardier's compartment. He worked out an installation of three .50-cal guns, but the lack of available B-25s kept him from modifying other ships. The arrival of Douglas A-20s led to a new development. Gunn knew these needed modifications before they would be suitable for combat, and he was given a free hand. He worked out an installation of four .50-cal machine guns in the nose of the A-20, with two others mounted on the sides of the fuselage.

He was working on the A-20s when General Kenney arrived in the Philippines. Upon learning that Gunn was using machine guns retrieved from wrecked fighters, Kenney realized that he had found a man who would be an asset and immediately ordered him transferred to his staff. The A-20s made a spectacular debut as they commenced low-level attacks on Japanese airfields and on the Japanese troops threatening Port Moresby on the Kokoda Trail. The first attack by the A-20s on ground troops broke up an attack on the outskirts of Port Moresby and sent the Japanese fleeing

## Lancaster Index to Defence & International Security Literature

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northward toward Buna. Few made it; most, including the Japanese commander, died before the guns and bombs of the A-20s. Their success led Kenney to give Gunn the go-ahead to modify a squadron of B-25s—and the rest is history as Gunn, Kenney, and the Fifth Air Force continued on to ultimate victory.

Nat Gunn has done an excellent job of telling his dad's story. After his family's rescue from the prison camp, he remained with his father in the Philippines for the next ten years, until Pappy's untimely death in an aircraft accident south of Manila.

Pappy Gunn truly was an amazing man (who produced an amazing family); those who read this book will agree.

*Sam McGowan, USAF veteran, author, and writer, Missouri City, Texas*



**American Soldiers: Ground Combat in the World Wars, Korea, & Vietnam.** By Peter S. Kindsvatter. Lawrence: University Press of Kansas, 2003. Photographs. Notes. Bibliography. Index. Pp. xxiii, 432. \$34.95 ISBN 0-7006-1229-7

Without doubt, this is the most comprehensive analysis yet published on the attitudes and experiences of twentieth century American combat soldiers from the "dough-boys" of World War I to the "grunts" of Vietnam. Of obvious interest to past and present members of the U.S. Army and Marine Corps, this book should also be of value to military historians and scholars in general.

Peter Kindsvatter, a retired Armor officer who is now a civilian Army historian, adapted *American Soldiers* from an ambitious dissertation at Temple University. While consulting a good selection of official reports and academic studies, he relied primarily on numerous memoirs, diaries, oral histories, and war novels. From this cross section of accounts by combat veterans, the author shares carefully selected memories and impressions, often in their own words. Although personal stories—no matter how graphic and truthful—usually offer only a narrow perspective on events, drawing upon a large sample of such sources permits Kindsvatter to arrive at some general principles and conclusions about the nature and effects of combat.

Focusing primarily on infantry soldiers and marines of the draft era (including both enlisted men and company grade officers), the book's chapters are organized thematically by their common experiences rather than chronologically by the wars they fought. Among the themes examined are the social backgrounds and motivations of recruits, the effectiveness of their training, the environments in which they found themselves, the hardships and dangers they endured in the field, the variety of responses to the crucible of combat, and the impor-

tance of comradeship and leadership to small unit performance. Kindsvatter devotes a separate chapter to the special challenges faced by African-American soldiers in their quest for respect and fair treatment. Although this topical approach seems somewhat disjointed when the narrative jumps among the different wars and theaters of operation, it facilitates comparisons and syntheses among the several generations of American fighting men under study.

The book concludes by decrying romantic views of warfare, by emphasizing the random brutality of combat, and by advocating the need to give soldiers a realistic idea of what to expect before sending them into battle. Even though the high-tech all-volunteer forces fighting in our more recent wars have not suffered as many hardships or faced as formidable foes as those discussed in this book, today's soldiers still must contend with difficult circumstances of their own.

Because *American Soldiers* is about front-line ground forces, airmen and air power are mentioned only in passing. It is instructive, however, to read how frightening enemy air raids seemed to some soldiers in World War I and in the early battles of World War II. Even the harassment of "Bedcheck Charlie" flights during the Korean War could be disruptive. For obvious reasons of time and space, *American Soldiers* also has little to say about the experiences of allied or enemy forces. But after reading how miserable life could be for our troops, even when under the protective umbrella of American air supremacy, I can only imagine how much more terrifying and deadly combat has been for enemy soldiers exposed to devastating ground attacks by U.S. air power.

*Lawrence R. Benson, retired USAF historian and U.S. Army Vietnam veteran*



**Out of the Italian Night: Wellington Bomber Operations 1944-1945.** By Maurice G. Lihou. Shrewsbury, England: Airlife Publishing Ltd., 2003. Maps. Photographs. Appendices. Index. Pp. xi, 195. \$16.95 ISBN: 1-84037-405-5

Originally published in two previous editions under the title, *It's Diced Flying Wimpys (Around Italian Skies)*, Maurice G. Lihou's *Out of the Italian Night* is a compelling account of the Royal Air Force (RAF) crews that flew hazardous night missions during the World War II Italian campaign. Flying the fabric-covered Vickers Wellington, affectionately known by the nickname "Wimpy," the men of Nos. 37 and 40 Squadrons in 205 Group served under the Mediterranean Allied Air Forces and provided the strategic nighttime punch to complement Twelfth and Fifteenth Air Force's daylight strikes. I found Lihou's personal story, as told through the eyes of a young sergeant pilot named "Lee," an intriguing look into the austere conditions

and extraordinary privation these brave airmen endured while fighting in the skies over the "soft underbelly" of Hitler's "Fortress Europa."

The author begins his tale with the restless departure of a novice pilot and his fellow crewmen, each one fresh from operational training, from their base in Cornwall, England, en route to the Mediterranean theater of war. The author's particular focus on Lee's anxiety during his first ferrying mission over water sets an important introspective tone for accounts of the combat missions to follow. Upon their arrival at Foggia Main base in February 1944, Lee and his "mates" make the best of mud-spattered tent living, while steeling themselves for action. The book then follows Lee through each mission, his emotions ranging from elation to intense fear, and recounts in detail the unique aspects of night combat in the skies of southern Europe. The author does an excellent job describing the unit's strategic bombing and interdiction missions over Italy, Austria, and the Balkans, as well as some hair-raising interceptions by German night fighters. He also delivers insights into the skillful piloting required for special operations flown by 205 Group, such as mine laying flights over the Danube River and the air-dropping of provisions to Tito's partisans. In interludes between combat missions, Lihou reflects on his background at basic pilot training in Canada and his ongoing relationship with Connie, "the girl back home." Excellent personal and official combat photographs illustrate the book, which also includes appropriately documented appendices from British governmental archives.

Lihou's detail in describing the events of each mission, as well as the personal feelings experienced by one who witnessed those events, make the book rewarding. Even if some consider Lee's doubts in combat and his yearnings for Connie a bit melancholy and nostalgic, these passages help to tell the complete story of the men behind the machines. As a whole, *Out of the Italian Night* is very readable and an enjoyable testament to the determination and endurance of the RAF bomber crews on the Italian front and their indomitable "Wimpys."

*William Butler, HQ Sixteenth Air Force History Office, Aviano AB, Italy*



**Victory on the Potomac: The Goldwater-Nichols Act Unifies the Pentagon.** By James R. Locher, III. College Station: Texas A & M University Press, 2002. Photographs. Notes. Index. Pp. xviii, 524. \$34.95 ISBN: 1-58544-187-2

This book is a combination history and memoir of how Goldwater-Nichols became law. James Locher served as a team leader of the staff supporting the Senate's Task Force on Defense Reorganization and was a princi-

pal author of *Defense Organization: The Need for Change: Staff Report to the Committee on Armed Services* (1985), often referred to as “the Locher Report.” The author was well placed to give an insider’s account of the process, and he delivers here.

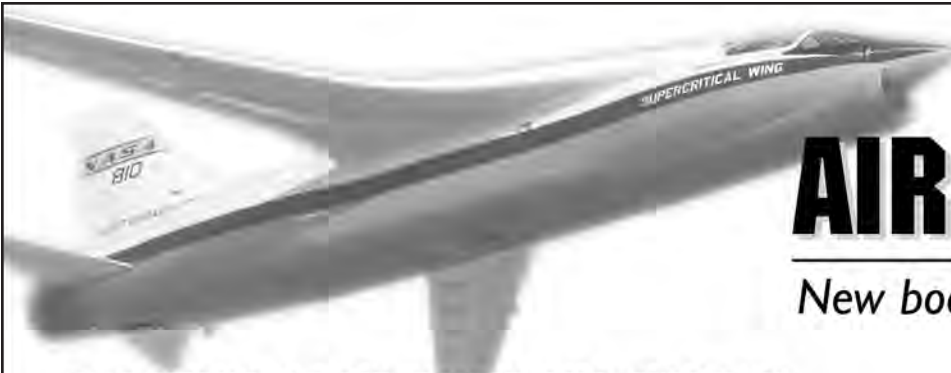
In February 1986, Army Chief of Staff Gen. John Wickham attacked the proposed legislation at a meeting between Senators Barry Goldwater and Sam Nunn (respectively Chairman and Ranking Minority Member of the Senate Armed Services Committee (SASC)), three staffers (including Locher), and the Joint Chiefs of Staff. Paradoxically, the emotional outbursts by Wickham, Marine Corps Commandant Gen P. X. Kelley, and Chief of Naval Operations Adm. James Wadkins steered the senators’ determination to press ahead. Because they could find no common ground with the chiefs, they knew that they faced “bitter and divisive” committee hearings in the weeks ahead. Locher uses this episode to highlight certain themes that run throughout his book: the emotional depth of reform opposition, the paucity of ideas among the opponents beyond a simple turf defense, and the moral courage and legislative sagacity of

Goldwater and Nunn. Locher leaves no question as to who he thinks was wearing the white hats—or the black ones for that matter—on this issue.

Locher begins with a chapter of unannounced and under-researched historical background that sketchily covers the higher organization of the armed forces. After January 1942, his story becomes more detailed if not more sophisticated. Locher hits his stride in a chapter entitled “Jones Breaks Ranks.” In 1982, outgoing Chairman of the Joint Chiefs, USAF Gen. David Jones, testified in closed session before the House Armed Services Committee (HASC) that the existing joint system was not adequate to develop proper strategy, do necessary contingency planning, or conduct wartime operations. Jones laid out five general areas for change: strengthening the Chairman’s role, limiting service-staff involvement in preparing joint papers, upgrading the Joint Staff’s role, giving regional commanders increased power and responsibility, and enhancing preparation for and rewards of joint duty. Jones chose the House rather than the Senate committee because he believed the former was more open to reform. The

Subcommittee on Investigations, under Texas Representative Richard White and, from 1983, Alabama’s Don Nichols, reported out reform legislation that passed the House in 1982 and 1983. The 1982 legislation stalled in the Senate, while the 1983 bill produced only modest changes.

The Reagan administration had at best only tepid interest in reform. Secretary of Defense Casper Weinberger regarded it as an irritant and distraction from his primary responsibility—rebuilding America’s defenses in the wake of the massive Soviet buildup. Navy Secretary John Lehman, adopting the traditional Navy stance as his own, became the most aggressive and persistent foe, a posture at least tolerated by the SecDef and the President. Events—and weaknesses in the existing organization—conspired against the opponents of reform. The terrorist bombing of the Marine barracks in Beirut and perceived shortcomings of the successful intervention in Grenada primed Congress, the media, and the public for reform. But it was Goldwater’s accession to Chairman of the SASC, his December 1984 decision to place reform of the joint system at the top of his legislative agenda, and his non-partisan



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alliance with Georgia Democrat Nunn that permitted wide ranging reforms to become law on October 1, 1986.

Locher's extensive research, including interviews with principals, expanded his narrative well beyond his personal experiences. Nevertheless, this volume remains at heart a memoir. The reader is always in the midst of the legislative process, and at times the aroma of the sausage making is almost overwhelming. The account of developments in the Senate and Washington's think tanks is particularly strong. Locher's portraits of Goldwater and Nunn and his insights into their collaboration are alone worth the price of the book. He also well delineates the critical role played by staffers—the HASC's Arch Barrett is a case in point. At the same time, the themes and the emphasis are very much the product of Locher's experiences. I rather suspect that if Barrett, for example, had written a similar volume he would have given greater attention to the House and in particular to Representative Ike Skelton of Missouri—not that Locher overlooks either.

Locher's treatment of the Department of Defense has a certain uneven quality. He is at his best when discussing reform proposals of Generals Jones and Edward Meyer (Wickham's predecessor), because both Jones and Meyer cooperated with him. Secretaries Weinberger and Lehman did not; consequently his treatment of them has more of an "outside looking in" quality. Lehman may deserve every bit of acid Locher uses to etch his portrait, but it is a character sketch based on not much more information than what an avid reader of newspapers and collector of Pentagon scuttlebutt of the period might have acquired. Regarding Weinberger, I don't believe Locher fully grasps just how much difficulty the Secretary might have caused the reformers if he had truly opposed them.

One of the book's most valuable attributes is how well Locher conjures up the emotions of the time. No reader can doubt how searing the reorganization fight was for him and his colleagues. If this detracts from the volume's value as history, it increases its worth as an historical document. All students of U.S. military policy, civil-military relations, and the legislative process in the late twentieth century will want to read and ponder this work. In addition, Texas A&M University Press deserves note for producing a handsome, well-illustrated volume appropriate for this very important topic.

*Edgar F. Raines, Jr., historian, US Army Center of Military History; coauthor of The Army and the Joint Chiefs of Staff: Evolution of Army Ideas on the Command, Control, and Coordination of the U.S. Armed Forces, 1942-1985 (1986); and member of the U.S. Army Special Review Committee on Department of Defense Reform (1985)*



**Heisenberg and the Nazi Atomic Bomb Project: A Study in German Culture.** By Paul Lawrence Rose. Berkeley/Los Angeles/London: University of California Press, 1998. Notes. Bibliography. Index. Pp. xx, 352. \$19.95 Paperback ISBN: 0-520-22926-6

Recently issued in paperback, Rose's book revives questions concerning the German atomic bomb project and seeks to draw conclusions about the project's leader, Werner Heisenberg, and German character in general. His scientific investigation is splendid, but the social and cultural conclusion is a bit disappointing, all the more so from someone so knowledgeable.

Simply put, the issue surrounding why Germany did not complete a nuclear weapon during World War II has elicited two main schools of thought: One argues, as does Rose, that the German scientific community was simply incompetent partly because the contributions of scientists expelled in 1933 were deemed "Jewish science." Those physicists, like Heisenberg, who nonetheless sought to use this knowledge were too incompetent, in Rose's view, to understand their full implications. Another group of scholars, however, argues that impaired though they were, German physicists understood the basic principles of nuclear reaction but were unable or unwilling to transform these into a practical experiment. Heisenberg himself claimed that, thus dubiously reinventing himself as the resister to Nazism that he never truly was.

Piles of documents feed both schools of thought, especially the "Farmhall transcripts" which contain the conversation of German nuclear scientists held prisoner in England after the war ended in Europe. The most important part of these centers on the scientists' reaction to the news of Hiroshima and ensuing discussions (and arguments). This information, however, does not provide for "an open and shut case" either way, though it does support several middle interpretations that have appeared over the years, including that which suggests Heisenberg viewed the bomb as a means to an end rather than an end in itself.

This does not concern Rose, however, as he characterizes anyone who holds a different opinion as either ignorant of the truth or as an apologist for what he calls the German character. Rose's angry comments following publication of Michael Frayn's play *Copenhagen* (about the 1941 encounter between Heisenberg and his mentor Niels Bohr) demonstrate his deeply ingrained animus. This is sad, for there is much of outstanding quality in Rose's research. His historiographical investigation early in the book is most in-depth, but it would be far more helpful to outsiders and historians alike were it not filled with so many judgmental statements against others. Even those who did not have access to some of the documents he used are rather condescendingly dismissed.

The same goes for Rose's scientific investigation, the subject of the second part of his book. There, Rose lays to rest convincingly the notion that German scientists understood how to make a bomb. While acknowledging that they had ascertained the basic principles, he finds no evidence that they knew how much fissile material was necessary. But Rose carries on, arguing that some of the Germans' mistakes were due to arrogance rather than any specific theoretical slip-up. The case might be made for Heisenberg himself, but years ago Richard Rhodes showed that as late as 1943 most scientists in Europe and the U.S. were arguing that fissile material would have to be the size of a house (i.e., impossible to acquire), not a soccer ball, to become a bomb. Strangely, though, little space is given to considering the inefficiency of the Nazi system of support which, as shown in the cases of jet fighter development and the ballistic missile program, was less a matter of ability than of competing interests. Nonetheless, this section is helpful, and clarifies nicely elements of early nuclear physics for lay readers not familiar with the field.

The third part, however, is a partisan piece of intellectual history that hurts what should have been a great book. Seeking to explain the mentality surrounding Heisenberg and his colleagues' attitude towards Nazism, Rose places their upbringing in line with German philosophical and literary works that suggested German superiority and were dismissive of non-Germanic world views. While one can make a clear case for Heisenberg and others to have bought into a conservative nationalistic world view associated with German academic and professional circles, it is hard to place them automatically in the same mold as that of unreconstructed antisemites. Ordinary men these scientists were, and their flaws under dictatorial circumstances do not require extreme identification to remain glaring in the face of history. In fact, generalizing their attitudes into that of a specific German character suggests a conscious dismissal of historical and cultural evidence.

What may convince a lay reader, though, will confuse readers familiar with Rose's extensive scholarship on anti-semitism and German history. His selective use of evidence suggests an agenda that goes beyond showing Heisenberg's incompetence, resurrecting the old claim of a German *Sonderweg* (special path), where Germans who championed enlightenment ideas are accidents, and a straight line exists between the nineteenth century and Hitler. In so doing, Rose also overlooks important research on World War I and the Weimar Republic. Perhaps this is better, for those who have put *Sonderweg* to rest for years would likely become further targets of his angry scholarship.

To summarize, readers interested in the German atomic bomb project will find

much of use in Rose's book, but they may wish to revert to less partisan, though older interpretations of the evidence, like Mark Walker's or David Cassidy's investigations. In any case, this book feeds the Heisenberg controversy, but does little to resolve it.

*Guillaume de Syon, Associate professor of history, Albright College.*



**Through Eyes of Blue: Personal Memoirs of the RAF from 1918.** By Wing Commander A.E. Ross, DFC, ed. Shrewsbury UK: AirLife Publishing Ltd, 2002. Photographs. Index. Pp. 352. \$34.95. ISBN 1-84037-345-8

Leonard Cheshire, as Air Chief Marshal Sir Peter Squire puts it in the introduction to this fascinating fund-raising volume, "was without doubt one of the most remarkable officers ever to serve in the Royal Air Force." The famous World War II bomber pilot not only won the Victoria Cross, his nation's highest award for gallantry, but also after the war he used his fame for the betterment of society, establishing the first Cheshire Home for the incurably sick in 1948. Proceeds from the sale of this attractive, illustrated volume, the flyleaf proclaims, go to the Leonard Cheshire Foundation, a remarkable legacy of a remarkable airman.

Appropriately, therefore, this is quite a remarkable book. Yet, at the same time it must be said, this is a frustrating book. It offers a great deal of interesting, and possibly important, information; however, it challenges the ingenuity of any reader seeking more detail, context, or substantiation. Fully 193 personal recollections cover virtually every official activity in which any member of the RAF has ever been called upon to engage. And therein lies one of the difficulties: beyond the unevenness found in most such compilations, this one compounds the problem by providing little information about the credentials of the contributors and nothing in the way of sources or suggested reading.

It frustrates the reader to learn about some fascinating, hitherto unknown aspect of the RAF's history only to receive no evidence to support the account, nothing to put it into context, nor any guidance of where to turn for more information. The impressive tome thus serves a wonderful hagiographic purpose but misses the opportunity to make a significant contribution to air force historiography.

The chronological organization of the collection of first-hand accounts, aided by brief section introductions, offers an enjoyable survey of the long (by air force standards) history of the RAF. In fact, it takes the reader back to the early days of British air power with a couple of unique contributions, one a recollection of First World War

flying training and the other from the perspective of a relatively rare aviation pioneer—a female Rigger.

The editor's choices provide some original takes on old themes when it comes to some of the RAF's most well-known activities, from training to testing to traditional operational roles flying every type of aircraft over land and sea. We learn about the use of air power in the colonies, about the trials and stresses of numerous ground and support personnel, about a medical officer who baled out of a stricken glider, and about a pilot's adventures working with the Americans on a spy mission over the Soviet Union. These represent just a sampling of the accounts. All, of course, are first-hand.

In the end, it must be underlined that the editor, Wg Cdr Ross, author of *75 Years* and *The Queen's Squadron*, has hit the target with a collection of personal stories about an impressive range of experiences by an impressive array of airmen and airwomen. Readers should gain an understanding of what life has been like in the RAF as well as an increased appreciation of its wide range of roles during the various eras of its history. Furthermore, with Ross' brief introductions to the chronologically arranged sections, any reader can gain a good understanding and appreciation of the RAF's history—and much more painlessly, we must admit, than through a conventional history.

Notwithstanding the previously mentioned academic reservations, this is indeed a rather remarkable book, an appropriate tribute to a remarkable man, Leonard Cheshire, whose Foundation has done so much for the disadvantaged. The cause justifies the purchase of this volume; so does the marvelous collection of reminiscences of RAF experiences assembled by Ross. Any reader of *Air Power History* would enjoy the book and proudly display it on the shelf.

*Carl A. Christie, Ph.D., Senior Research Fellow, Centre for Defence and Security Studies, University of Manitoba*



**The Wrong Stuff: The Adventures and Misadventures of an 8th Air Force Aviator.** By Truman Smith. Norman: University of Oklahoma Press, 1996. [Red River Books ed., 2002] Illustrations. Photographs. Index. Notes. Maps. Pp. 358. \$17.95 Paperback ISBN 0-8061-3422-4.

There are numerous well-written accounts regarding all aspects of the bomber war, seemingly penned by everyone from the theater commanders down to the "Donut Dollies." Truman Smith presents a story about his four months and thirty-five missions flown in B-17s over occupied Europe in 1944. His title is a play on Tom Wolfe's popular book, *The Right Stuff*; and his theme attempts to show that war often consists of events and actions that go very "wrong."

Some of the narratives certainly will catch a first-time reader's interest. There are vivid descriptions of the terrifying nature of a war, wherein bomber crews were suspended five miles up in slow-moving aluminum casings/coffins while (seemingly) the entire Third Reich was bent on trying to terminate their lives in a most violent manner.

Overall, however, this volume will disappoint the aviation-inclined reader due to numerous grammatical, factual, and editorial problems which diminish the joy of the reading. An initial perusal of the photographs scattered throughout the tome brings the first warnings. A photo labeled "Me 109" actually shows a Spanish-built HA-1112. A picture mentioning cloud cover is in reality one of a very dense flak field. An unlabeled photo depicts a flak concentration map. The Flight Record labeled April is actually May's and vice versa for April's Flight Record.

Grammatical and spelling errors abound: "our offsprings" vice "offspring," "B-17 F" vice "B-17F," "the fired eventually" vice "the fire...," "ME 109's" vice Me (or Bf) 109s, "landing role" vice "landing roll"; "your stupid" vice "you're stupid," "I sang allowed" vice "I sang aloud," and on and on. The use of caps for various noises (BOOM, BANG, TWANG, THUMP) gives the reading a 1960's Batman comic book feel, while the same misuse of caps for various forms of emphasis (A DOOR! A BODY! PIECES! PIECES! PIECES! AWESOME!) is both annoying and distracting.

Factual problems persist throughout as well. A walk-through of the crewmembers' positions has the ball turret gunner incorrectly placed between the waist and tail gunners. The reason the Japanese attacked on December 7, 1941 was because they were "backed into a corner by U.S. trade sanctions." Mission #1 is stated as being flown in a B-17F, but a peek at April's Flight Record shows the aircraft to be a "G." Attacking Bf 109s are depicted as armed with "six machine guns and a 30mm cannon each," although references fail to show six MGs plus a cannon mounted on any 109s. The Germans "could have destroyed the Allied invasion force with the V-1"—a highly doubtful premise considering the weapon's basic inaccuracy. Also he notes that "When fuel was exhausted, it [the V-1] fell straight down." V-1s were programmed to lock their elevators down after a set distance was flown. A news excerpt states, "537 American bombers and 191 fighters were lost on 2 May 44." While losses were at times prohibitive, Eighth Air Force's were never this ghastly. And there is "35 bombers...beat the air with 420... propellers." Of course, 140 is the proper count; 420 is the number of propeller blades.

If Mr. Smith had access to a semblance of an editor; if the above-mentioned problems were corrected; and if the reading flowed a bit easier, this possibly could have been an enjoyable personal tale. Unfortu-

nately, it's a rough read.

*MSgt. Tom Teliczan, USAF (Ret)*



**The Korean War in World History.** By William Stueck, ed. Lexington: The University Press of Kentucky, 2004. Maps Notes. Bibliography. Index. Pp. 203. \$35.00 ISBN 0-8131-2306-2.

For many who participated in the Korean War or who subsequently served in that area, this book brings scholarly dissertations on the war with its many outside influences from major powers. William Stueck provides a comprehensive introduction and then concluding remarks concerning the five essays which make up the body of the work (initially presented at a Texas A & M symposium).

In "The Korean People: Missing in Action in the Misunderstood War, 1945-1954," Allan Millett shows how Korea was a tormented land for centuries because of intrusions and occupations by foreign governments (most notably Japan) but was also influenced seriously by China and Russia and, later, by heavy U.S. involvement. This essay follows the turmoil prior to World War II and the struggles by all parties in the post-World War II era when Korea became the divided and armed nation it remains to this day.

Kathryn Weathersby, in "The Soviet Role in the Korean War: The State of Historical Knowledge," discusses how recent releases of Soviet documents on their involvement in the Korean War have brought a sea change in our knowledge of these activities. Kim Il Sung, North Korea's leader, made several pleas to Stalin to support a North Korean

invasion of South Korea to reunite the country. Stalin was very concerned about the U.S. reaction. After the Fall of 1949, when the U.S. had completed its withdrawal of forces from Korea, Stalin assumed the U.S. would not intervene and granted permission to Kim to invade—without Soviet participation. However, Stalin insisted that China support Kim.

Chen Jian discusses in his essay, "In the Name of Revolution: China's Road to the Korean War Revisited," the Chinese role starting with Secretary of State Acheson's statement that U.S. interest in the Western Pacific area lay behind a line running between Japan and Korea, between Taiwan and China, and between the Philippines and Vietnam. Chen then looks at the history of Truman's decision to come to South Korea's rescue (and also to neutralize the Taiwan Strait to protect Chiang Kai-shek), China's concern about the safety of its industrial base in Manchuria, and the Inchon Landing and subsequent UN successes which led Kim Il Sung to plead with Mao and Stalin to send the Chinese into North Korea. Chinese strategy was to offer only mild resistance as UN units drove to the Yalu before springing their trap, routing UN forces from North Korea, and occupying Seoul. Fighting went on for another two years, but only after Stalin's death in March 1953 did Soviet and Chinese attitudes change to allow an armistice on July 27, 1953. Unfortunately, China could brag it had forced U.S./UN forces from its border and won an important victory that established Communist China as a great power.

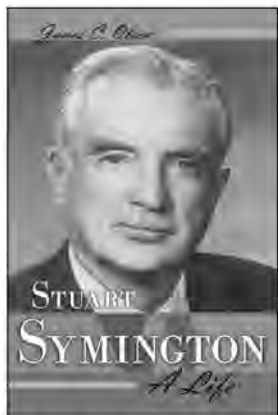
In "Korean Borderlands: Imaginary Frontiers of the Cold War," Lloyd Gardner notes that the preliminaries to the Korean War brought much soul-searching at the highest levels of our government concerning

the global resistance to Communist encroachment. Soviet explosion of an atomic weapon in 1949, retreat of the Chinese Nationalists to Taiwan, and the position of Communist China in this "new world" required urgent new analysis of Korea's delicate problems and the need to preserve U.S. influence there. Many quarrels developed in succeeding weeks and months about "who lost China" and other sensitive issues. As a political maneuver to calm a portion of the Far East difficulties, John Foster Dulles was asked to lead the task of writing a peace treaty with Japan.

Finally, Michael Schaller, in "The Korean War: The Economic and Strategic Impact on Japan, 1950-1953," shows how Japan was the only nation involved in this broad imbroglio that did not suffer terribly from it. It revitalized Japan's economy, ended U.S. occupation of Japan, and shaped peace and security treaties that tether it to the U.S. Great significance is associated with the economic benefits to Japan from its being the "U.S. base" for the Korean War. Further, Japan's prime minister asserted that the "Korean War provided more stimulus to Japanese economic resurgence than did all the occupation efforts" under General MacArthur. The Korean War brought U.S. support to Japan along with abundant economic aid and stability. The network of U.S. air, sea, and land bases in Japan and South Korea, tethered both nations securely to the U.S. orbit and avoided either or both being enticed into Communist China's orbit.

The volume is well-written and should interest anyone with a desire to know more about America's "Forgotten War."

*Col Paul C. Fritz, USAF (Ret), Dallas, Texas*



## Stuart Symington

### A Life

*James C. Olson*

**Stuart Symington** is the first full-length biography of one of Missouri's most influential and effective twentieth-century political leaders. Known as "Harry Truman's Trouble Shooter," Stuart Symington was unanimously confirmed by the Senate for six major presidential appointments—a record. As assistant secretary of war for air, he represented the War Department in negotiations leading to the National Security Act of 1947, which unified the armed services into a single national military establishment under the secretary of

defense. During his tenure as secretary of the air force, he steered that organization through a series of crises, including racial integration, as it developed into an independent entity within the Defense Department. **560 pages, 40 illustrations, \$39.95**

"Stuart Symington's story is as fascinating as it is complicated, and James C. Olson tackles the Herculean task of sorting it all out. This well-crafted book provides the first comprehensive portrait of Symington and his multifaceted career. The writing is clear and to the point. The research is impressive. Olson's access to personal papers still in the hands of the family afforded him valuable insights about Symington and his actions. *Stuart Symington: A Life* is a fascinating read."—William E. Foley

www.system.missouri.edu/upress

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# Books Received

Biddle, Tami Davis. *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas about Strategic Bombing, 1914-1945*. Princeton and Oxford: Princeton University Press, 2004. [Original edition, 2002]. Notes. Bibliography. Index. Pp. viii, 406. \$19.95 Paperback ISBN: 0-691-12010-2

Bille, Matt and Erika Lishock. *The First Space Race: Launching the World's First Satellites, College Station: Texas A&M University Press, 2004*. Illustrations. Photographs. Notes. Glossary. Bibliography. Index. Pp. xviii, 214. \$19.95 Paperback ISBN: 1-58544-3743

Brongers, E. H. Trans. By C.C.W. van Romondt Vis. *The Battle for the Hague, 1940: The First Great Airborne Operation in History*. Nieuwegein, The Netherlands: Aspekt, 2004. Maps. Photographs. Bibliography. Pp. 293. \$15.95 Paperback ISBN: 90-5911-307-1 www.isbs.com

Busch, Nathan E. *No End in Sight: The Continuing Menace of Nuclear Proliferation*. Lexington: The University Press of Kentucky, 2004. Tables. Notes. Appendices. Glossary. Bibliography. Index. Pp. xiv, 490. \$40.00 ISBN: 0-8131-2323-2 www.kentuckypress.com

Distenfeld, Irving. *Bruderlein* [a novel]. New York: Vantage Press, 2004. Pp. 114. \$11.95 Paperback ISBN: 0-533-14824-3

Ewing, Steve. *Thach Weave: The Life of Jimmie Thach*. Annapolis, Md.: Naval Institute Press, 2004. Photographs. Notes. Appendices. Bibliography. Index. Pp. x, 338. \$34.95 ISBN: 1-59114-248-2

Gruntman, Mike. *Blazing the Trail: The Early History of Spacecraft and Rocketry*. Reston, Va.: AIAA, 2004. Illustrations. Photographs. Notes. Glossary. Index. Pp. xiv, 503. \$ ISBN: 1-56347-705-X

Hentz, James J., Ed. *The Obligation of Empire: United States Grand Strategy for a New Century*. Lexington: The University Press of Kentucky, 2004. Tables. Notes. Index. Pp. x, 226. \$35.00 ISBN: 0-8131-2332-1

Hoffman, Richard A. *The Fighting Flying Boat: A History of the Martin PBM Mariner*. Annapolis, Md.: Naval Institute Press, 2004. Illustrations. Photographs. Notes. Appendices. Bibliography. Index. Pp. xiv, 250. \$32.95 ISBN: 1-59114-375-6

Jefford, C. G. *Royal Air Force Historical Society Journal 32: Air Power—Anglo-American Perspectives, 21<sup>st</sup> October 2003*. Northmoor, UK: Advance Book Printing, 2004. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Pp. 169 Paperback ISSN: 1361-4231

Joes, Anthony James. *Resisting Rebellion: The History and Politics of Counterinsurgency*. Lexington: The University Press of Kentucky, 2004. Tables. Notes. Bibliography. Index. Pp. 351. \$35.00 ISBN: 0-8131-2339-9

Millet, Allan R. and Jack Shulimson, Eds. *Commandants of the Marine Corps*. Annapolis, Md.: Naval Institute Press, 2004. Photographs. Notes. Bibliography. Index. Pp. xx, 380. \$55.00 ISBN: 0-87021-012-2

Robinson, Linda. *Masters of Chaos: The Secret History of the Special Forces*. New York: Public Affairs. Maps. Photographs. Index. Pp. xx, 388. \$26.95 ISBN: 1-58648-249-1 www.publicaffairs-books.com

Sharansky, Nathan with Ron Dermer. *The Case for Democracy: The Power of Freedom to Overcome Tyranny and Terror*. New York: Public Affairs, 2004. Notes. Index. pp. xxvi, 303. \$26.95 ISBN: 1-58648-261-0 www.publicaffairsbooks.com

## PROSPECTIVE REVIEWERS

Anyone who believes he or she is qualified to substantively assess one of the new books listed above is invited to apply for a gratis copy of the book. The prospective reviewer should contact:

Col. Scott A. Willey, USAF (Ret.)  
3704 Brices Ford Ct.  
Fairfax, VA 22033  
Tel. (703) 620-4139  
e-mail: [scottwille@aol.com](mailto:scottwille@aol.com)

\* Already under review.



Starks, Richard and Miriam Murcutt. Guilford., *Lost in Tibet: The Untold Story of Five American Airmen, a Doomed Plane, and the Will to Survive.* Maps. Notes. Bibliography. Pp.x,205. \$22.95 ISBN: 1-59228-572-4 www.LyonsPress.com

Thomasian, Karnig. *Then There Were Six: The True Story of the 1944 Rangoon Disaster.* Bloomington, Ind.: Author House, 2004. Illustrations. Photographs. Pp. ix, 160. Paperback \$22.50 ISBN: 1-4184-4931-8 www.authorhouse.com

Walters, Michael R., et al. *Lone Star Stalag: German Prisoners of War at Camp Hearne.* College Station: Texas A&M University Press, 2004. Tables. Illustrations. Photographs. Bibliography. Index. Pp. xv, 268. \$29.95 ISBN: 1-58544-318-2

Weigley, Russell F. *The Age of Battles: The Quest for Decisive Warfare from Breitenfeld to Waterloo.* Bloomington and Indianapolis : Indiana University Press, 2004 [originally published in 1991] Maps. Notes. Bibliography. Index. Pp. xxvii, 579. \$24.95 Paperback ISBN: 0-253-21707-5 iuporder@indiana.edu

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Donald C. Elder and Christophe Rothmund, Editors



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# Coming Up



Compiled by George Cully

## January 6-9

The **American Historical Association's** 119th Annual Meeting will be held in Seattle, Washington. Contact:

RYA Registration  
AHA Annual Meeting  
504 Shaw Rd. #202  
Sterling, VA 20166  
(703) 904-0901  
e-mail: registration@ryaonline.com

## January 18

The **Military Classics Seminar** meets for dinner-discussion at the Ft. Myer, Virginia, Officers' Club. This month's selection is Stephen Roskill, *Naval Policy between the Wars. Vol. I: The Period of Anglo-American Antagonism, 1919-1929; Vol. II: The Period of Reluctant Rearmament, 1930-1939.* London: Collins, 1968, 1976. Speaker: Jon Sumida, Horner Chair of Military Theory, Marine Corps University. Contact:

Dr. Graham Cosmas  
Joint Staff Historical Office  
(703) 697-3088  
e-mail: cosmasga@js.pentagon.mil

## January 26-28

The **Dwight D. Eisenhower Memorial and the Industrial College of the Armed Forces**, in collaboration with others organizations and agencies will present a symposium on "Dwight D. Eisenhower and National Security for the 21st Century," at Ft. Lesley J. McNair, in Washington, D.C.. Contact:

<http://www.ndu.edu.icafe.ike>

## January 30-February 1

The American Institute of Aeronautics and Astronautics will host its **1st Annual Space Exploration Conference** at Disney's Contemporary Resort in Orlando, Florida. Contact:

AIAA  
1801 Alexander Bell Dr., Ste. 500  
Reston VA 20191-4344  
(703) 264-7551  
website: <http://www.aiaa.org>

## February 4-5

The University of Calgary's Society for Military and Strategic Studies will host its **7th Annual Society for Military and Strategic Studies' Student Conference** at Rozsa Centre on the campus of the University of Calgary, in Calgary, Alberta, Canada. This year's theme is "War and Security." Contact:

Katharine Mascardelli or Stephen Wheatley  
Centre for Military & Strategic Studies  
University of Calgary  
2500 University Drive NW  
Calgary, Alberta T2N 1N4 Canada  
(403) 220-2435, Fax 282-0594  
e-mail: smss@ucalgary.ca  
website: [www.stratnet.ucalgary.ca/smss/](http://www.stratnet.ucalgary.ca/smss/)

## February 9-12

The Southwest/Texas Popular Culture Association/American Culture Association will host its **Annual Conference on Atomic Culture** at the Hyatt hotel in Albuquerque, New Mexico. Contact:

Scott C. Zeman, Associate Professor of History  
Humanities Department  
New Mexico Tech  
801 Leroy Place  
Socorro, New Mexico  
(505) 835-5628  
Fax: (505) 835-5544  
e-mail: szeman@nmt.edu  
website: <http://www.h-net.org/~swpca/>

## February 15

The **Military Classics Seminar** meets for dinner-discussion at the Ft. Myer, Virginia, Officers' Club. This month's selection is Michael Oren, *Six Days of War: June 1967 and the Making of the Modern Middle East.* Oxford, 2002; and Kenneth M. Pollack, *Arabs at War: Military Effectiveness, 1948-1991.* Nebraska, 2002. Speaker: Michael Eisenstadt, The Washington Institute for Near East Policy. Contact:

Dr. Graham Cosmas  
Joint Staff Historical Office  
e-mail: cosmasga@js.pentagon.mil

## February 24-26

The Center for the Study of the Korean War will host its **6th Annual War and Media Conference** at Graceland University in Independence, Missouri. This year's theme is "War and Nonfiction." Contact:

Gregg Edwards  
Center for the Study of the Korean War  
Graceland University  
1401 W. Truman Road  
Independence MO 64050-3434  
(816) 833-0524  
e-mail: [gedwards@graceland.edu](mailto:gedwards@graceland.edu)

## February 24-27

The Citadel, the Military College of South Carolina, will host the **72d Annual Meeting of the Society for Military History.** The conference will take place in historic Charleston, South Carolina, and the theme will be "The Rise of the Military Profession." Contact:

Professor Jennie Speelman  
Department of History  
The Citadel  
171 Moultrie Street  
Charleston, SC 29409  
e-mail: [jennie.speelman@citadel.edu](mailto:jennie.speelman@citadel.edu)  
website: <http://www.smh-hq.org/>

## March 5-6

The Brown University graduate community, in association with the Committee on Science & Technology Studies, will host the **23rd Annual Mephistos Conference on the History, Philosophy, and Sociology of Science, Technology and Medicine.** Contact:

Tanya Sheehan, Chair  
2005 Mephistos Organizing Committee  
e-mail: [mephistos@brown.edu](mailto:mephistos@brown.edu)  
website: <http://www.brown.edu/Students/Mephistos>

## March 15

The **Military Classics Seminar** meets for dinner-discussion at the Ft. Myer, Virginia, Officers' Club. This month's selection is Julius Caesar, *The Battle for Gaul.* Trans. By Anne and Peter Wiseman. London: Chatto and Windus, 1980. Speaker: Diane Gordon, University of Maryland University College. Contact:

Dr. Graham Cosmas

Joint Staff Historical Office  
(703) 697-3088  
e-mail: [cosmasga@js.pentagon.mil](mailto:cosmasga@js.pentagon.mil)

Colorado Springs, CO 80904  
(719) 576-8000, Fax x8801  
website: <http://www.spacefoundation.org>

#### March 17-19

The **Society for History in the Federal Government and Oral History in the Mid-Atlantic Region** (OHMAR) will collocate their annual meetings in the Food and Drug Administration's Wiley Building in College Park, Maryland. Contact:  
SHFG 2005 Conference  
Box 14139, Ben Franklin Station  
Washington DC 20044  
e-mail: [donalps1@ucia.gov](mailto:donalps1@ucia.gov)  
website: <http://www.shfg.org>

#### March 17-19

The Vietnam Center at Texas Tech University will host its **5th Triennial Vietnam Symposium** at the Holiday Inn Park Plaza in Lubbock, Texas. Topics include the 40th anniversary of the first major commitment of US ground forces to Vietnam; the 30th anniversary of the end of the war; and the 10th anniversary of the normalization of relations between the United States and Vietnam. Contact:

James R. Reckner, Ph.D., Director  
The Vietnam Center  
Texas Tech University  
Lubbock, TX 79409-1045  
e-mail: [james.reckner@ttu.edu](mailto:james.reckner@ttu.edu)  
website: <http://www.vietnam.ttu.edu>

#### March 19

The Hagley Fellows at the University of Delaware will host the **2005 Hagley Fellows Conference** at the Hagley Museum, located in Wilmington, Delaware. The conference theme is entitled "The Spectacle of Technology." Contact:

Hagley Fellows,  
University of Delaware  
236 John Munroe Hall  
Newark, Delaware 19716  
e-mail: [hagley.fellowsconference@gmail.com](mailto:hagley.fellowsconference@gmail.com)

#### March 29-30

The American Astronautical Society will hold its **43rd Goddard Memorial Symposium** at the Greenbelt Marriott Hotel in College Park, Maryland. Contact:  
American Astronautical Society  
6352 Rolling Mill Place, Suite #102  
Springfield, VA 22152-2354  
(703) 866-0020, Fax -3526  
e-mail: [info@astronautical.org](mailto:info@astronautical.org)  
website: <http://www.astronautical.org>

#### March 31- April 3

The **Organization of American Historians** will hold its annual meeting at the San Francisco Hilton in San Francisco, California. This year's theme is "Telling America's Stories: Historians and Their Publics." Contact:

OAH Annual Meeting  
112 North Bryan Ave.  
Bloomington IN 47408-4199  
(812) 855-9853  
e-mail: [meetings@oah.org](mailto:meetings@oah.org)  
website: <http://www.oah.org/meetings>

#### April 4-7

The **Space Foundation** will host its 21st National Space Symposium at the Broadmoor Hotel in Colorado Springs, Colorado. Contact:  
The Space Foundation  
310 S. 14th St.

#### April 6-7

The U. S. Naval Institute's **131st Annual Meeting and Naval History Seminar** will be held at the U.S. Naval Academy in Annapolis, Maryland. This year's theme is "Expeditionary Warfare: Past, Present, and Future." Contact:

U.S. Naval Institute  
Beach Hall  
291 Woods Road  
Annapolis MD 21402  
(410) 295-1067, Fax x1048  
e-mail: [frainbow@usni.org](mailto:frainbow@usni.org)  
website: <http://www.usni.org/>

#### April 14-15

To commemorate the 30th anniversary of the end of the Vietnam War, the **University of Newcastle's Research Group for War, Society, and Culture** will host a conference entitled, "The Vietnam War: Thirty Years On: Memories, Legacies, and Echoes.. The conference will be held at the University of Newcastle in Callaghan, NWS, Australia Contact:

Dr. Chris Dixon  
History Discipline  
School of Liberal Arts  
The University of Newcastle  
Callaghan NSW 2308 Australia  
e-mail: [chris.dixon@newcastle.edu.au](mailto:chris.dixon@newcastle.edu.au)

#### April 14-17

The **National Council on Public History Annual Conference** "Defining Regional Historians and the Culture and Meaning of Region," will be held in Kansas City, Missouri. Sponsored by the Truman Presidential Museum and Library. Contact

National Council on Public History  
e-mail: [neph@iupui.edu](mailto:neph@iupui.edu)  
website: <http://www.neph.org/news.html>

#### April 19

The **Military Classics Seminar** meets for dinner-discussion at the Ft. Myer, Virginia, Officers' Club. This month's selection is Robert M. Utley, *Frontiersmen in Blue: The U.S. Army and the Indian, 1846-1865*. New York: Macmillan, 1967; and *Frontier Regulars: The U.S. Army and the Indian, 1866-1891*. New York: Macmillan, 1973. Speaker: Willy Dobak, U.S. Army Center of Military History. Contact:

Dr. Graham Cosmas  
Joint Staff Historical Office  
(703) 697-3088  
e-mail: [cosmasga@js.pentagon.mil](mailto:cosmasga@js.pentagon.mil)

#### May 4-8

The **Council on America's Military Past (CAMP)** annual meeting will be held in San Diego, California. Contact:

CAMP  
P.O. Box 1151  
Ft. Myer, VA 22021  
(703) 912-6124  
e-mail: [camphart1@aol.com](mailto:camphart1@aol.com)

**If you wish to have your event listed, contact:**

George W. Cully  
10505 Mercado Way  
Montgomery Village, MD 20886-3910  
e-mail: [warty@comcast.net](mailto:warty@comcast.net)

## Letters

### Kudos from Kissinger

*The Hon. Henry A. Kissinger wrote the following to Mr. Dino Brugioni:*

I was very interested to see your account of the role played by aerial and satellite imagery in the Yom Kippur War ["The Effects of Aerial and Satellite Imagery on the 1973 Yom Kippur War, *Air Power History*, Vol. 51, No. 3].

May I also take this opportunity to express once again my sincere gratitude to you and your colleagues at the NPIC. Our capacity to assess and respond appropriately to rapidly evolving crises on the ground was highly dependent on your invaluable analytical services.

*Hon. Henry A. Kissinger, Washington, D.C.*

### Mystery Plane: A-11, SR-71, or YF-12?

Just received your Fall 2004 issue. As always, loaded with great stories, pictures, and book reviews. I have a question regarding the SR-71 pictured on pages 4-5. Please note the cutback chine and the pitot tube in the nose. Would this bird be an A-11 by any chance?

*MSgt. Tom Teliczan, USAF (Ret.), Hawaii*

Just a quick note on your excellent journal: the aircraft pictured [in *Air Power History*, Vol. 51, No. 3, Fall 2004] on pages 4-5 is not an SR-71 but more likely a YF-12. Neither the SR-71, nor the A-11 had the cut off chines, but the YF did.

*John Locke, AFOTEC/XPZ (SAIC)*

## News

### National Air and Space Museum Launches Space Hangar

Visitors to the National Air and Space Museum's Steven F. Udvar-Hazy Center will get their first chance to explore the remarkable holdings in its newly filled space hangar on Monday, Nov. 1.

Although the Udvar-Hazy (pronounced OOD-var HAH-zee) Center in Chantilly,

Virginia, opened to much acclaim last December, the 53,000-square-foot James S. McDonnell Space Hangar was inaccessible because of the needed refurbishment of its centerpiece, the Space Shuttle *Enterprise*. With that project now completed, hundreds of other artifacts have been installed in the exhibition hall, from a 69-foot floor-to-ceiling Redstone missile to the tiny "Anita," a spider carried on Skylab for web formation experiments.

The hangar and its holdings illustrate the scope of space exploration history as organized around four main themes: rocketry and missiles; human spaceflight; application satellites and space science.

"The Smithsonian's National Air and Space Museum has always been known as the home of the icons of flight. The James S. McDonnell Space Hangar at the Udvar-Hazy Center gives us the chance to share much more of our vast collection as we present the story of space exploration in richer detail," museum director Gen. J.R. "Jack" Dailey said.

A total of 113 large space artifacts are housed in the hangar. The biggest and heaviest, including *Enterprise*, an instrument ring segment of a Saturn V rocket that was never built, and a Space Shuttle main engine are displayed at ground level. An array of cruise missiles, satellites, and space telescopes hangs from above.

The hangar features two elevated overlooks that allow visitors to study suspended artifacts straight-on and ground-level displays from above.

More than 500 smaller artifacts are exhibited in customized cases throughout the hangar including advanced spacesuit prototypes; research crystals formed in orbit; sounding rocket payloads; space-themed toys from the 1950s and 1960s and even borscht in tubes, prepared for Soviet cosmonauts.

The oldest artifact in the hangar, the Ritchey Grinding Machine, dates back to the 1890s, when it was used to craft a 60-inch mirror for a Wisconsin observatory telescope. The newest artifact is an engineering model created by U.S. Naval Academy midshipmen for a class project. The PCSat communications satellite was launched in 2001 and is still in orbit.

Many of the objects now in the space hangar had been in storage for decades. A portion was previewed over the past months in the Udvar-Hazy Center's aviation hangar.

The museum's unparalleled space collection is built on an agreement that gives the Smithsonian first option to acquire any equipment used and then retired by NASA. The collection includes every retired American spacecraft that flew humans and returned safely to Earth;

every spacesuit used to walk on the moon and backups or engineering models of nearly every major American satellite or probe.

Space artifacts from other nations have been donated by individuals and governments or are displayed on loan.

Other unique artifacts now exhibited in the McDonnell Space Hangar include:

the manned maneuvering unit used for the first-ever untethered spacewalk  
a film return capsule from the last Corona satellite spy mission over the U.S.S.R.  
the flotation collar and bags used for the Apollo 11 splashdown  
a Gemini paraglider research vehicle used to train for potential ground landings  
Pegasus, the first aircraft-launched rocket booster to carry satellites into space  
a form-fitting centrifuge seat made exclusively for Mercury astronaut John Glenn  
a full-scale engineering prototype of the Mars Pathfinder Lander  
a human-sized, NASA-built android used for 1960s spacesuit testing  
the Spartan 201 satellite, deployed for solar research during five shuttle missions

The McDonnell Space Hangar is named for aerospace pioneer James S. McDonnell, whose company built a number of pioneering aircraft and both the Mercury and Gemini spacecraft, flown by the first American astronauts.

The museum plans to install additional artifacts in the hangar over the next few years.

This fall, to mark the Udvar-Hazy Center's first anniversary, 21 additional aircraft will be added to the 82 currently on display at the Udvar-Hazy Center's aviation hangar. They include the Westland Lysander IIIA airplane, used for ferrying secret agents in and out of enemy territory during World War II; and the Bell H-13J, which, in 1957, became the first helicopter to carry a U.S. president, Dwight D. Eisenhower.

The museum will celebrate the Udvar-Hazy Center's first anniversary on Saturday, December 11th. Visitors to the facility will enjoy live entertainment, "story times" for children, free tickets to the new IMAX film "Fighter Pilot: Operation Red Flag," astronaut appearances, book signings and behind-the-scenes presentations by restoration and exhibits specialists.

Since its opening, the Udvar-Hazy Center has attracted more than 1.5 million visitors, making it the most popular museum site in Virginia.

Although admission to the Udvar-Hazy Center is free, there is a \$12 fee for parking. The museum operates a shuttle bus

between its flagship building on the National Mall in Washington and the Udvar-Hazy Center. A roundtrip ticket for the shuttle bus is \$7 (the price will increase as of Jan. 1, 2005), with discounts available for groups. The National Air and Space Museum building on the National Mall in Washington, D.C., home to John Glenn's Mercury spacecraft Friendship 7, the Apollo 11 command module Columbia, an unflown lunar module, the backup Skylab orbital workshop and a touchable moon rock obtained during Apollo 17, is located at Sixth Street and Independence Avenue S.W. The Steven F. Udvar-Hazy Center is located in Chantilly off Route 28 near Washington Dulles International Airport. Both facilities are open daily from 10 a.m. until 5:30 p.m. (Closed December 25th) and admission is free.

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## Reunions

The **Sampson AFB Veterans Association** seeks to contact all 3650th Basic

Military Training Wing members, especially permanent party, Women's Air Force, Basic Trainees, and Special Training school personnel, from 1950 to 1956. Contact:

Chip Phillips  
P.O. Box 31  
Williamsville, NY 14231-0331  
e-mail: chip34@aol.com

The **4th Tactical Fighter Squadron Alumni Rendezvous** will be held at the end of January 2005 in Tampa, Florida. Contact:

Neil Cosentino  
(813) 251-4669  
e-mail: neilcosentino@verizon.net

The **41st Military Airlift Squadron** reunion will be held March 30-April 3, 2005, in Charleston, S.C. Contact:

Scotty White  
(843) 763-6516 or (843) 367-9510  
website: www.41mas.com

The **55th Reconnaissance Squadron** will meet April 27-28, 2005, in Las Vegas, Nevada. Contact:

Buck Buchanan  
330 Vine St.  
Vacaville, CA 95688  
(707) 446-2825

The **20th Fighter Wing Association** will hold its reunion on **October 26-30, 2005**, in Tucson, Arizona:

The **6091st Reconnaissance Squadron** will meet April 27-28, 2005, in Las Vegas, Nevada. Contact:

Buck Buchanan  
330 Vine St.  
Vacaville, CA 95688  
(707) 446-2825

The **P-47 Thunderbolt Pilots Association Final Reunion** will be held May 5-8, 2005, in Seattle, Washington. Contact:

Staryl Austin  
e-mail: p47288@juno.com or  
website: www.p47pilots.com

The **TAC Missileers** will hold their reunion in **2005** in Nashville, Tennessee. Contact:

Joe Perkins  
(904) 282-9064  
e-mail: perkster@fcol.com

To list your reunion, please include your association's name, reunion dates, city and state, contact individual with address, phone number, fax number, e-mail and or website. Send information to Air Power History, PO Box 10328, Rockville, MD 20854 or via e-mail: jneufeld@comcast.net. Please send announcements as soon as possible.

**U.S. Navy readers are advised to log on to [www.navalinstitute.org](http://www.navalinstitute.org) and then click on reunions.**

## Guidelines for Contributors

We seek quality articles—based on sound scholarship, perceptive analysis, and/or firsthand experience—which are well-written and attractively illustrated. The primary criterion is that the manuscript contributes to knowledge. Articles submitted to *Air Power History* must be original contributions and not be under consideration by any other publication at the same time. If a manuscript is under consideration by another publication, the author should clearly indicate this at the time of submission. Each submission must include an abstract—a statement of the article's theme, its historical context, major subsidiary issues, and research sources. Abstracts should not be longer than one page.

Manuscripts should be submitted in triplicate, double-spaced throughout, and prepared according to the *Chicago Manual of Style* (University of Chicago Press). Use civilian dates and endnotes. Because submissions are evaluated anonymously, the author's name should appear only on the title page. Authors should provide on a separate page brief biographical details, to include institutional or professional affiliation and recent publications, for inclusion in the printed article. Pages, including those containing illustrations, diagrams or tables, should be numbered consecutively. Any figures and tables must be clearly produced ready for photographic reproduction. The source should be given below the table. Endnotes should be numbered consecutively through the article with a raised numeral corresponding to the list of notes placed at the end.

If an article is typed on a computer, the disk should be in IBM-PC compatible format and should accompany the manuscript. Preferred disk size is a 3 1/2-inch floppy, but any disk size can be utilized. Disks should be labelled with the name of the author, title of the article, and the software used. WordPerfect, in any version number, is preferred. Other word processors that can be accommodated are WordStar, Microsoft Word, Word for Windows, and AmiPro. As a last resort, an ASCII text file can be used.

There is no standard length for articles, but 4,500-5,500 words is a general guide.

Manuscripts and editorial correspondence should be sent to Jacob Neufeld, Editor, c/o *Air Power History*, P.O. Box 10328, Rockville, MD 20849-0328, e-mail: jneufeld@comcast.net.



Our “What is it?” aircraft in our last issue was the never-built Douglas XC-132 cargo transport. Readers were asked to identify the XC-132 from an artist’s conception of the big aircraft in flight.

Our follow-up photo shows a full-scale mock-up of this behemoth. In February 1957, Douglas announced that the XC-132 would be manufactured for the Air Force at the company’s Tulsa, Oklahoma plant. At the time, Tulsa was ending its production run of 274 Boeing-designed, license-built B-47E Stratojet bombers and would have welcomed new work.

The XC-132 design was a logical follow-up to the manufacturer’s C-74 Globemaster and C-124 Globemaster II transports, and was developed at the same time as the smaller (although by no means small) C-133 Cargomaster. The C-133 was a straight-wing, four-turboprop airlifter that first flew in April 1956 and had a brief, somewhat troubled, career. Douglas built 50 of them at its Long Beach, California plant. They did a superb job of hauling outsized cargoes, including Thor intermediate range ballistic missiles, but three of the planes were lost in

mishaps that claimed a total of 59 lives.

The XC-132 would have been larger, with swept wings and four huge turboprop engines. They were to be 15,000-shaft horsepower Pratt & Whitney YT57s. One of these engines was tested on the nose of a much-modified C-124 Globemaster testbed (aircraft no. 52-1069). The T57 engine drove a four-bladed propeller, which had a span of 20 feet.

The Air Force considered two versions of the XC-132 — a transport and an air-refueling tanker. Both would have had a wing span of about 178 feet and a gross takeoff weight of about 460,000 pounds, putting them in the size category of the jet-powered Lockheed C-5 Galaxy, which came along more than a decade later.

Almost as soon as the Air Force announced the XC-132, it cancelled the project. Douglas went on to manufacture the C-133 fleet, but subsequently surrendered its role of building large Air Force lifters to Lockheed.

Twenty *Air Power History* readers correctly identified the XC-132. The winner of the History Mystery is Dave Sterling of McLean, Virginia.

## This Issue’s Mystery Plane

Once more, we present the challenge for our ever-astute readers. This issue’s “mystery” aircraft was chosen to mark our theme of missiles and space, highlighted in this issue of our journal. But remember, please: postcards only. The rules, once again:

1. Submit your entry on a postcard. Mail the postcard to Robert F. Dorr, 3411 Valewood Drive, Oakton VA 22124.

2. Correctly name the aircraft shown here. Also include your address and telephone number, including area code. If you have access to e-mail, include your electronic screen name.

3. A winner will be chosen at random from the postcards with the correct answer. The winner will receive an aviation book by this journal’s technical editor.

This feature needs your help. In that attic or basement, you have a photo of a rare or little-known aircraft. Does anyone have color slides? Send your pictures or slides for possible use as “History Mystery” puzzlers. We will return them.



## Report of the Semi-annual Meeting of the Air Force Historical Foundation

At the semi-annual meeting of the Board of Trustees in mid-October, the Trustees unanimously approved a strategic plan for the Foundation. To be implemented over the next few years, the plan aims to increase membership, widen services to members, and strengthen our impact on the awareness and appreciation of air and space power within the Air Force community and beyond.

The plan identifies seven objectives which—if fulfilled—will permit us to meet the intent of a new mission statement, also a part of the plan. The mission statement and objectives are quoted below, and I encourage you to have a look and to give us your feedback.

### Mission:

*The Air Force Historical Foundation is dedicated to promoting the preservation and appreciation of the history of the United States Air Force and its predecessors. The Foundation seeks to inform and inspire the men and women who are, or have been, affiliated with the Air Force and the general public, particularly those with an interest in national security, about the dynamic heritage of air and space power and its relevance to contemporary and future issues.*

### Objectives:

- We will have outreach programs for all connected to the Air Force as well as the general public and those interested in military aviation history and heritage.
- We will strengthen our ties with senior leadership of the Air Force, key organizations in the Air Force, and external organizations such as the Air Force Association.
- We will identify areas for preservation of Air Force heritage which are not duplicative, which have high potential interest, and which are within our reach.
- We will expand our technology aggressively, especially to achieve a useful and appealing website.
- We will seek to expand our membership, in and out of uniform.
- We will seek sources of funding which permit us to achieve these objectives.
- We will reexamine the organizational structure of the Foundation.

In many cases, the key to get underway and bring the objectives to life is through the design and creation of a new, dynamic website. I'm delighted to report that the Trustees approved our arranging with a respected, professional website builder to accomplish this. As soon as possible, you will be able to navigate a new, attractive, user-friendly, and informative Foundation site.

I want to thank the members of the Strategic Planning Committee (Gen. Walt Kross, Lt. Gen. John Conaway, Maj. Gen. Chuck Link, Col. Ken Alnwick, Jack Neufeld, John Kreis, and Col. George Williams) for their excellent work. It was a pleasure working with them on this project, and I look forward to continuing our teamwork as we implement the plan.

Of course, in order to make any significant headway, we will need the support of all our members, as never before. And, yes, I'm referring to your gifts. My immediate predecessor, Gen. Bill Smith, who cares for this organization with extraordinary passion, has contributed \$10,000 in challenge grants in the last year (and more before that), leading to double that amount in income to the Foundation. If you would like to squeeze some money out of my pocket, I have added a \$5,000 challenge of my own that expires at the end of December. Send any amount; we'll be grateful and the cause we all support will be advanced. Thanks.

When this magazine arrives each quarter, it goes to the top of my reading pile. And that was true long before I became the president of the Foundation. Fascinating subjects, great variety, skilled writers, superb pictures—and on a subject I love. Thanks, Jack Neufeld, our editor-in-chief, for your commitment to high standards in history writing. I'm proud to be associated with what you're doing.

Sadly, I must also report the recent passing of our longtime publisher, Brig. Gen. "Gundy" Gunderson. His commitment to the Foundation, as its president and in many other capacities, is legend among Foundation advocates, and his leadership and wisdom will be greatly missed. You can read more about Gundy on page 72. Goodbye, good friend.

*Lt. Gen. Michael A. Nelson, USAF (Ret.), President*

## **Brigadier. General Brian S. Gunderson** **1923-2004**



Brig. Gen. Brian S. "Gundy" Gunderson, USAF (Ret.), died on September 29, 2004, in Alexandria, Virginia. He was eighty-one years old.

Born in Winnipeg, Manitoba, Canada, in 1923, he was educated in Canada and England. After his graduation from Modern Preparatory School, Salisbury, Wiltshire, England, in 1937, the family moved to Omaha, Nebraska. He graduated from Creighton Preparatory High School in 1938, and attended the University of Omaha until 1941. He received his bachelor of science degree from the University of Maryland in 1959, and a master's degree in international affairs from The George Washington University in 1965. He graduated from the Air War College in 1960.

In 1941, General Gunderson joined the Royal Canadian Air Force, serving for two years in Canada and England. Then, in December 1943, transferred to the U.S. Army Air Forces. He served with the Eighth Air Force in the European Theater of Operations from 1943 to 1945, as combat crew and group staff navigator in B-17 and B-24 aircraft. He logged fifty-one combat missions, fifty of them on night operations.

From September 1945 to June 1946, he was a squadron commander and the air inspector at Sioux Falls, South Dakota. In December 1946 he was assigned as a personnel research analyst in the Office of Assistant Chief of Air Staff, Personnel, at Headquarters U.S. Army Air Forces.

In December 1947, General Gunderson was assigned to the 28th Strategic Bombardment Wing, Ellsworth Air Force Base, South Dakota, where he served on a Strategic Air Command lead crew, on the standardization board, and as the wing staff navigator, flying in B-29, B-36, and RB-36 aircraft. In May 1953 he was assigned to the 42d Strategic Bombardment Wing, Loring Air Force Base, Maine, where he was the wing war plans officer.

From October 1953 to July 1954, he attended the first Senior Technical Observer Training Course at Mather Air Force Base, California, and was the honor graduate in his class.

In October 1954 General Gunderson was assigned to Headquarters Fifth Air Force in Japan and Korea as chief of the War Plans Branch and later as assistant chief, Plans and Policy Division.

In May 1956 he returned to Headquarters U.S. Air Force and was assigned to the Directorate of Plans, Deputy Chief of Staff, Plans and Programs, as a war plans staff officer. From July 1959 to July 1960, General Gunderson attended the Air War College at Maxwell Air Force Base, Alabama. After graduation he was assigned to NATO in the office of the Supreme Allied Commander Atlantic (SACLANT) at Norfolk, Virginia, where he was chief of nuclear plans. In July 1963 he was assigned to the Office of the Secretary of the Air Force as deputy executive assistant and in July 1967 became executive assistant. In July 1969, he was promoted to the grade of brigadier general and assumed duties as chief of staff, U.S. Air Forces in Europe, with headquarters at Lindsey Air Station, Germany.

General Gunderson became chief, Office of Air Force History, Headquarters U.S. Air Force in June 1972 and served until his retirement in April 1974. Following retirement, General Gunderson dedicated himself to the Air Force Historical Foundation, serving as its president from 1983 to 1987, as a trustee throughout, and a publisher of *Air Power History*, the Foundation's journal. General Gunderson also contributed many articles to the journal, including his popular serialized "Slanguage" dictionary of World War II American-English military terms.

His military decorations and awards include the Legion of Merit with two oak leaf clusters, Distinguished Flying Cross, Air Medal with three oak leaf clusters, Air Force Commendation Medal, Army Commendation Medal, Presidential Unit Citation Emblem, and Canadian service medals. He was a master navigator.

He is survived by his wife of fifty-seven years, Doris; daughter Shelly, wife of Charles Brown; daughter Debbie, wife of Jim Vosburg; son Michael, husband of Nancy; and three grandchildren Adam Brown, Ashleigh and Amanda Gunderson.