

# AIR POWER

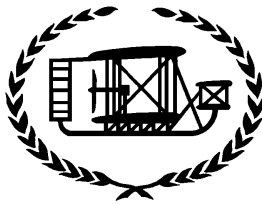
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### “Goodbye Friend”

General Bryce Poe II was a rare individual. Not only was he a pilot and an Air Force general officer, but he was also an accomplished historian. Unique among his contemporaries, General Poe appreciated, understood, and applied historical perspective. Perhaps that was why he was so devoted to the Air Force Historical Foundation as a member, trustee, and president. As President of the Foundation, General Poe persuaded the Air Force's leadership to support *Air Power History*, the journal General Tooley Spaatz had launched in 1953. As the journal's publisher, General Poe was a rock—without whom *Air Power History* would likely not have succeeded.

Historians throughout the official United States Air Force History and Museums Program mourn the general's passing. We will sorely miss his broad knowledge and appreciation of our discipline, as well as his sage advice on promoting the utility of history in our daily affairs. We will miss his insistence on excellence in historical research and writing, his support for historical symposia, and his brilliant leadership in advocating the relevance of history to affect contemporary issues. Representative of his many contributions was the case of the Air Force Institute of Technology (AFIT). In recent years, when the Air Force seriously considered eliminating AFIT as part of governmental “downsizing,” General Poe rose up to argue—successfully—that this was the wrong thing to do. Thanks in large part to his championing of AFIT the school survived. The Air Force and the Nation will continue to benefit from his intervention.

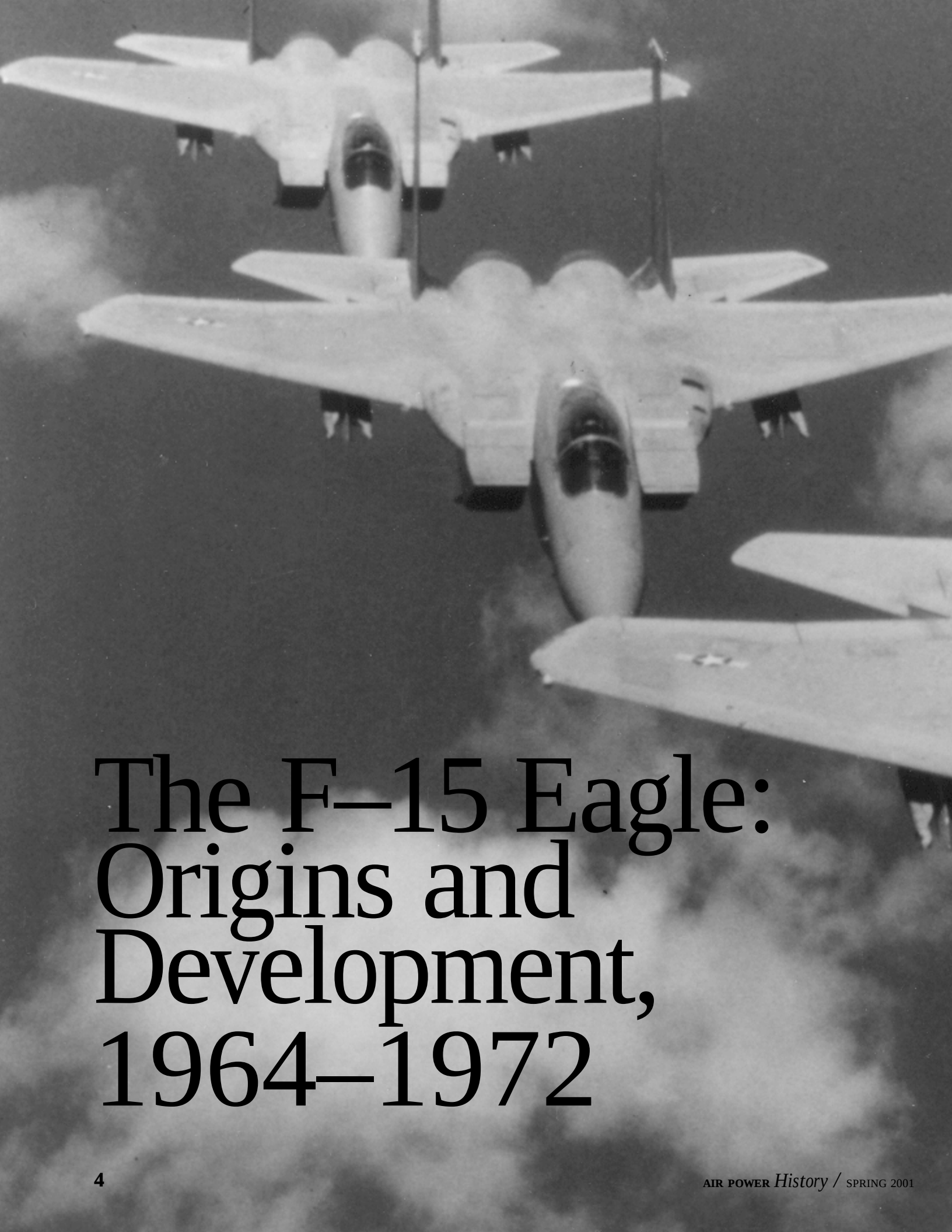
Despite his senior rank, General Poe mingled freely with subordinates, enjoying the give and take of historical discourse. He never felt that any task involving the promotion of Air Force history was beneath his dignity. This egalitarian attitude endeared him to all who knew the general. Indeed, just about everyone who knew General Poe liked him. He was genial and hard working and a straight arrow. An excellent storyteller, he usually began with, “Stop me if you’ve heard this one....” Of course, even if one had heard them before, the stories were simply too entertaining to pass up. Invariably humorous and interesting—a rare combination—the stories often also carried a lesson or a moral.

Finally, General Poe was a devoted family man. He went to any length to ensure the well being of his family. I well remember his touching descriptions of how he employed phonics to help teach his grandson to read and his unbounded joy in the boy's accomplishments. We will miss Bryce Poe; men like him come around only once in a generation. “Goodbye friend.”

General Poe's *obituary* can be found on page 80.

A handwritten signature in black ink, reading "J. Neufeld". The signature is fluid and cursive, with a large, looping initial "J" and a stylized "Neufeld".

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# The F-15 Eagle: Origins and Development, 1964–1972



Jacob Neufeld

THE AIR  
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As the war in Southeast Asia escalated—particularly after air-to-air combat operations over North Vietnam intensified—U.S. Air Force leaders saw clearly that the service needed a new air superiority fighter. After USAF officials initiated studies in 1965 aimed at defining such an aircraft, a lengthy concept formulation phase ensued, during which emerged the important theory of energy maneuverability. In 1969, after the Air Force was authorized to proceed with the project, contract definition studies got under way; industry competition followed, and by year's end the winning contractor was selected. Led by Maj. Gen. Benjamin N. Bellis, the Air Force overcame opponents, critics, and bureaucracy to produce the world's premier fighter.

### That Central Bird

The Air Force owed its very existence to the principle of centralized control of air resources by a separate service commander. This doctrine's chief value lay in its flexibility to exploit the combat situation while managing air resources economically. Given no cost limits and a reduced tactical force structure, the Air Force predictably selected multi-purpose rather than specialized aircraft.

Inflation and the war in Southeast Asia, however, paved the way for low-cost, specialized aircraft. Accordingly, in October 1965, the Air Force moved to acquire Navy A-7s for close air support until it could develop its own A-X candidate for this mission. Besides satisfying the penchant of the Office of the Secretary of Defense (OSD) for commonality and averting forfeiture of the close air support role to the Army, this stratagem helped the Air Force to make a case for replacing its aging F-4 fleet by the mid-1970s. Indeed, the Air Force's advanced tactical fighter concept, the F-X, began life as the best combination of air-to-ground and air-to-air capabilities. These features, plus its short takeoff and landing (STOL) capability, won the F-15 initial funding support for design studies.

However, because diverse interests within the Air Force wanted to stamp their particular imprint upon the aircraft, the F-15 emerged as a highly compromised design that stood little chance of gaining approval. In addition, the Air Force—faced with keen competition from the Navy for funds—had to overcome the OSD Systems Analysis staff's campaign to replace tactical air's inventory of large, sophisticated aircraft with smaller, less costly ones.

*Jacob Neufeld is a senior historian with the Air Force History Support Office. From 1992 to 1994, he was the Director of the Center for Air Force History. He is also the editor of Air Power History. Neufeld earned B.A. and M.A. degrees in history at New York University and did doctoral studies at the University of Massachusetts, Amherst. Commissioned in the U.S. Army, he served with the Corps of Engineers from 1964–1966. He has written and edited numerous works in military history and the history of technology, including Development of Ballistic Missiles in the United States Air Force, 1945–1960. He is a professor at American Military University. Currently, he is writing a biography of General Bernard Schriever.*

In a masterful stroke, the Air Force in the spring of 1968 adopted air superiority—the *sine qua non* of aerial combat—as the best way out of its dilemma. South Vietnam's "permissive environment," the Air Force argued, had lulled OSD into pursuing the mistaken policy of "assuming" air superiority in weapon system development. But the air war over North Vietnam had already shown that even older MiGs could outclass sophisticated but less maneuverable U.S. fighters. Only by hurriedly installing an aerial gun in the F-4 did the USAF manage to keep an air-combat edge. Furthermore, the Air Force emphasized the folly of assuming air superiority over Europe—a region of more vital concern to the United States. The Moscow Air Show in July 1967 forcefully brought this point home when the Soviets paraded a half-dozen new fighters for Americans to evaluate and contend with in the years ahead.

In the summer of 1968, the Air Force rallied behind a new slogan: "To fly and fight." It applied a 40,000-pound weight limit on the F-15 and pointed the design toward an uncompromised air superiority fighter. Significantly, the design yielded a bountiful "fallout" capability: at little extra cost, the F-15 could carry enough fuel, armaments, and avionics to perform a host of air-to-ground missions as well. In short, the Air Force advertised air superiority, while in fact developing a worthy successor to the F-4. The F-15 became "that central bird" the Air Force needed for flexibility under its centralized control doctrine.

### The Air Superiority Mission

After the Korean War, President Dwight D. Eisenhower adopted a policy of nuclear deterrence that relied primarily on strategic air power and downgraded the conventional mission of tactical fighter aircraft. For example, the Century series fighters (F-100 through F-111) were increasingly designed for use against strategic targets in nuclear war rather than for tactical air combat.

Although air superiority remained the "prerequisite" for conducting air operations, the emphasis had shifted to penetration over maneuverability; bomb load-carrying capacity over armament; and alert status over sortie rates. As Air Force Vice Chief of Staff Gen. Bruce K. Holloway noted in 1968, "The tactical fighter became less and less an air superiority system and more and more what was once called an attack aircraft."<sup>1</sup>

This shift in emphasis ignored the political and geographic limitations that had shackled the

(Near right) Secretary of Defense Robert S. McNamara.

(Far right) USAF Chief of Staff, Gen. John P. McConnell.

MANY PENTAGON OFFICIALS BELIEVED THAT THE DOGFIGHT AND AERIAL GUNS WERE RELICS OF THE PAST

ONE OF THE MOST DETERMINED ADVOCATES OF AIR SUPERIORITY... WAS CONVINCED THAT HIGH PERFORMANCE FIGHTER AIRCRAFT WOULD SURVIVE AND REMAIN THE KEY TO SUCCESSFUL GROUND OPERATIONS



Far East Air Forces in Korea. The USAF now promoted attacks on “airfields and parked aircraft.... fuel and ammunition dumps, maintenance facilities and command and control centers” as “the most lucrative method” of gaining air superiority.<sup>2</sup>

But the linkage of tactical fighters and air superiority was not without its proponents, and one of the most determined advocates of air superiority was Maj. Gen. Arthur C. “Sailor” Agan. Upon becoming Air Staff Director of Plans in July 1964, Agan found that many Pentagon officials believed that the dogfight and aerial guns were relics of the past and that missiles would dominate future air battles. Army members of the Joint Staff in particular questioned the effectiveness of all tactical fighters and argued that surface-to-air missiles (SAMs) would impose unacceptable losses on fighter aircraft.<sup>3</sup>

But Agan, a former World War II P-38 pilot and group commander who flew forty-five combat missions over Europe, was convinced that high performance fighter aircraft would survive and remain the key to successful ground operations. Unfortunately, the Air Force had acquired two new multipurpose fighters—the F-4C and the F-111—and was in no position to ask for development of another fighter.

The Office of the Secretary of Defense, particularly Secretary Robert S. McNamara’s Systems Analysis staff, favored purchasing large numbers of small, inexpensive attack aircraft for the tactical air forces.<sup>4</sup> McNamara’s staff measured the effectiveness of air superiority, close air support, and interdiction “by their impact on the force ratio between opposing land forces, and thus...the land/air ‘trade-off’ would be a decisive factor in sizing U.S. tactical air forces.”<sup>5</sup> Agan and the Air Staff did not oppose this approach, but they

believed that in wartime little could be done without first achieving air superiority and argued that the United States should acquire the best possible fighters in the world.

Although Agan failed to convert OSD officials, he managed to persuade Chief of Staff Gen. John P. McConnell that a new fighter was needed. Agan drafted a policy statement on tactical air superiority that McConnell circulated Air Force-wide in May 1965—after combat operations over North Vietnam had begun—recognizing the Air Force’s requirement “to win air superiority.”<sup>6</sup>

### The War’s Impact

OSD became interested in acquiring new fighters only after it became clear that USAF aircraft providing close air support for South Vietnamese troops were obsolete and dangerous. But in January 1965, McNamara allotted only \$10 million in fiscal year 1966 to modify existing USAF tactical aircraft. He also directed the Air Force to consider developing a new fighter “optimized for close support and useful in ground attack” and instructed the service to assume tactical air superiority in their planning for Vietnam.<sup>7</sup> This instruction disturbed Secretary of the Air Force Eugene M. Zuckert and Air Staff officials.<sup>8</sup>

Meanwhile, an Air Staff group, chaired by Lt. Col. John W. Bohn, Jr., had been working since August 1964 to critically assess USAF reliance on high-performance tactical fighters. Completed in late February 1965,<sup>9</sup> the Bohn study recommended that the Air Force acquire a mix of high- and low-cost aircraft as the most economical way to strengthen the tactical force. For the support role, the study narrowed the candidates to the lightweight, comparatively inexpensive F-5 and the Navy A-7.<sup>10</sup>



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McConnell subsequently advised Zuckert that the Bohn study showed the folly of assuming air superiority, citing recent Defense Intelligence Agency estimates that new Soviet interceptors posed a threat beyond the capability of existing U.S. forces to counter. He argued that air superiority required fighter aircraft to survive attacks by both enemy interceptors and anti-aircraft weapons.<sup>11</sup> For the close air support mission, he proposed bringing a mix of lower-cost aircraft into the Air Force inventory.

Zuckert forwarded the Bohn study to OSD and recommended the Air Force be authorized to purchase two wings of F-5s as an interim measure while beginning work on a medium-cost tactical fighter for the 1970s. Zuckert told McNamara that the proposed new fighter would also have "significant air-to-air fighting capability."<sup>12</sup> Meanwhile, an Air Staff study completed in June 1965 under the direction of Col. Bruce Hinton concluded that the A-7 would be the best close support aircraft if the Air Force could assume air superiority. However, Hinton's group questioned that assumption and recommended the Air Force select an improved version of the F-5—not the export model.<sup>13</sup>

Aware of Air Staff disagreement about the A-7 vs. the F-5 and noting OSD's indecision on the matter, Zuckert chose not to press for the latter until the Air Force had crystallized its position on tactical forces.<sup>14</sup> Another important reason for delay was to enable the Air Staff to undertake a detailed examination of the proposed medium-cost F-X (fighter experimental).

#### F-X Working Group

In April 1965, Dr. Harold Brown, Director of Defense Research and Engineering (DDR&E), lent his support to the official Air Force position, agree-

ing to the interim acquisition of the F-5 and authorizing development of an F-X.<sup>15</sup> Thereupon, Lt. Gen. James Ferguson, Deputy Chief of Staff for R&D, established an Air Staff work group, to conduct prerequisite studies for an F-X to cost between \$1-2 million each, with a production run of 800 to 1,000 aircraft. The contemplated fighter would possess "superior air-to-air, all-weather, and aided-visual-ground attack" capabilities. It also was envisioned as a single-seat, twin-engine fighter stressing maneuverability over speed. The F-X's initial operational capability (IOC) was 1970.<sup>16</sup>

DDR&E representatives told the F-X group it could obtain study funds only if the F-X was presented as a multipurpose fighter; any attempt to depict it as a specialized combat plane would fail.<sup>17</sup> This view was shared by elements of the Air Staff.<sup>18</sup> Supporters of an air superiority fighter, including Generals Ferguson and Jack J. Catton, Director of Operational Requirements, therefore decided to disguise the F-X as a multipurpose fighter and emphasized air-to-ground capability over air-to-air. In August, the Air Force requested and later received \$1 million for parametric design studies for the F-X under the Close Support Fighter funding line.<sup>19</sup>

Meanwhile, Air Force complacency over tactical air superiority had begun to evaporate after two F-105s on an April 4 bomb run over North Vietnam were shot down by several supposedly obsolete MiG-15s or -17s.<sup>20</sup> The episode rekindled interest in tactical air superiority,<sup>21</sup> lent added urgency to the F-X effort, and prompted Ferguson to seek cooperation from the field. On April 29, using the same guidelines established for the Air Staff's concurrent F-X studies, he directed the Air Force Systems Command (AFSC) to undertake studies of a multipurpose fighter with a STOL capability.<sup>22</sup>

The requirement for a STOL fighter attracted the attention of Col. John J. Burns, Assistant Director of Requirements, Headquarters, Tactical Air Command (TAC). Burns, who had been a member of the Bohn group and was an ardent air superiority advocate, pounced on the STOL requirement and immediately drafted a position paper for a lightweight day air superiority fighter.<sup>23</sup>

Gen. Gabriel P. Disosway, a World War II fighter pilot commander, took over TAC on August 1. He immediately reviewed Burns' work. In October, he sent to the Air Staff a qualitative operational requirement (QOR) that emphasized TAC's interest in an "aircraft capable of out-performing the enemy in the air." Challenging the notion that only a multipurpose fighter could gain OSD and congressional approval, it specified a lightweight day fighter in the 30,000- to 35,000-pound range. The requirement also called for equipping the new aircraft with a radar capability similar to the F-4s, with both infrared and radar missiles. TAC also emphasized the need for maneuvering performance and high thrust-to-weight ratio; but because of temperature limitation, it lowered the



ALTHOUGH CRITICIZED IN SOME AIR FORCE CIRCLES AS A CAPITULATION TO OSD, THE DECISION TO BUY THE A-7 WAS IN FACT A SENSIBLE COMPROMISE



maximum speed requirement from Mach 3.0 to 2.5—a change that would save between 35 and 40 percent of the total cost, or \$4.5 versus \$2.5 million per copy.<sup>24</sup>

### The Pivotal Decision

During the summer and fall of 1965, the Air Force continued to wrestle with the F-5 versus the A-7 issue. OSD, particularly Systems Analysis, was still enamored of the “commonality” principle, wherein the Air Force and Navy would possess a combined tactical force comprised of F-111, F-4, and A-7 aircraft. In July, McNamara directed OSD and the Air Force to begin a joint study to select either the F-5 or A-7 for the close air support role in Vietnam. At the same time, but on a lower priority, he endorsed the Air Force’s prerequisite work on developing the new F-X fighter.<sup>25</sup> Meanwhile, Brown—who as DDR&E had backed the F-5—reversed his position after being named Secretary of the Air Force, a position he assumed on October 1. In November, he and McConnell proposed acquiring eleven squadrons (264 aircraft) of A-7s. Although criticized in some Air Force circles as a capitulation to OSD, the decision to buy the A-7 was in fact a sensible compromise that ultimately gained approval for the F-X. Agan recognized this point and endorsed the decision. The F-X could now be justified as a “more sophisticated, higher performance aircraft...an air superiority replacement for the F-4.”<sup>26</sup>

F-X work statements—which had previously aimed at the production of a medium-cost, multi-purpose aircraft highlighting close air support—now called for an aircraft with the “best combination of air-to-air and air-to ground characteristics.”<sup>27</sup> More than mere semantics, this revision permitted the Air Force to launch a major effort to

acquire a new fighter. Secretary Brown had opened the door to the F-X and, more importantly, he emphasized the air-to-air mission and the need to expand the tactical force.

Meanwhile, Disosway and his colleagues in the United States Air Forces, Europe (USAFE) and the Pacific Air Forces (PACAF) held firm to the TAC view that designing the F-X to accommodate both air-to-air and air-to-ground missions would severely jeopardize air superiority. Disosway and his fellow “four-stars,” Generals Holloway and Hunter Harris, urged Chief of Staff McConnell to endorse air superiority as the primary mission of the F-X, with secondary missions being considered a bonus from the aircraft’s superior design.<sup>28</sup>

Disosway and his operations advisers believed that, given the limitations on the employment of tactical air power—such as the enemy sanctuaries that existed during the Korean and Vietnam Wars—the only way the Air Force could meet the challenge posed by lightweight, maneuverable Soviet fighters in the 1970s was to design a superior, uncompromised air combat fighter.<sup>29</sup>

Nevertheless, Headquarters USAF decided to continue to study the case for a fighter capable of both the air superiority and ground attack missions. Ferguson, who became AFSC commander in September 1966, asked Disosway to await the results of parametric design studies that had begun in March. Ferguson personally opposed the parametric study requirement, but believed the results would substantiate the case for an air superiority fighter.<sup>30</sup>

### Concept Formulation Phase (CFP)

In December 1965, the Air Force had sent requests for proposals (RFPs) to thirteen aircraft manufacturers for the initial F-X parametric design studies. Three winning contractors drew up some 500 proposed designs and in July 1966, the Aeronautical Systems Division (ASD) selected the one it considered the best for an air-to-air and air-to-ground aircraft.<sup>31</sup>

Indeed, the emphasis on the multipurpose features of the F-X dominated the parametric studies. ASD’s goal was to develop an aircraft with sufficient capability to offset the alleged Soviet superiority in maneuverability while maintaining the U.S. edge in range. What emerged was a proposed F-X weighing more than 60,000 pounds to accommodate all the avionics and armaments packages. In this F-X, the Air Force would get a very expensive aircraft resembling the F-111 but which, in no sense, would be an air superiority fighter.<sup>32</sup>

### Energy Maneuverability

Ferguson and his development planners sensed that the F-X requirements were “badly spelled out.” They persuaded Disosway to modify his requirements, thanks in large part to the work of Maj. John R. Boyd. In October 1966, Boyd joined the

THREE WINNING CONTRACTORS DREW UP SOME 500 PROPOSED DESIGNS AND IN JULY 1966, THE AERONAUTICAL SYSTEMS DIVISION SELECTED THE ONE IT CONSIDERED THE BEST

**WHILE COM-  
PLETING AN  
ENGINEER-  
ING COURSE  
AT GEORGIA  
TECH [MAJ.  
JOHN R.  
BOYD]  
DEvised A  
METHOD TO  
MEASURE  
AIRCRAFT  
MANEUVER-  
ABILITY**

**BY THE  
SPRING OF  
1967,  
THROUGH  
THE  
EFFORTS OF  
BOYD AND  
OTHERS, A  
40,000-  
POUND F-X  
AIRCRAFT  
WAS  
“POPPED  
OUT”**



Tactical Division of the Air Staff Directorate of Requirements. When asked to comment on the “Representative F-X design,” he summarily rejected it. A veteran pilot of the late 1950s and author of the air combat training manual used by the Fighter Weapons School at Nellis AFB, Nevada, Boyd was well qualified to assess fighter aircraft. In 1962, while completing an engineering course at Georgia Tech, he had studied the relationships between energy and energy changes of aircraft during flight and devised a method to measure aircraft maneuverability—the ability to change altitude, airspeed, and direction.

Boyd continued his energy maneuverability (EM) studies at his next station, Eglin AFB, Florida. There he met mathematician Thomas Christie, and in May 1964 they published an official two-volume treatise on energy maneuverability.<sup>33</sup> That year, the EM theory was brought to the attention of members of the Air Staff, including Generals Agan and Catton.

Although the EM theory did not represent anything new in terms of physics or aerodynamics, it led Boyd and Christie to devise a revolutionary analytical technique that permitted fighter “jocks” to communicate with engineers. The EM theory expressed in numbers what fighter pilots had been trying to say for years by moving their hands. It also permitted planners and developers to compare competing aircraft directly and to demonstrate the effects of design changes on aircraft performance. Finally, the theory could be used to teach pilots how to exploit their aircraft’s advantages over that of the enemy.<sup>34</sup>

Meanwhile, working within the Tactical Division, Boyd began applying the EM theory to the F-X, projecting how the aircraft would perform in the critical maneuvering performance envelope—the subsonic and transonic speeds up to

Mach 1.6 and altitudes up to 30,000 feet. He then asked TAC, ASD, and the study contractors to provide tradeoffs between range, structural requirements, and on-board equipment. Then, by comparing configuration changes for fixed and variable wing sweeps, Boyd designed a model that would demonstrate the effects of specific requirements on the F-X design.<sup>35</sup>

By the spring of 1967, through the efforts of Boyd and others, a 40,000-pound F-X aircraft was “popped out.” Its proposed engine bypass had been lowered to 1.5, thrust-to-weight increased to .97, and top speed scaled down to a range of Mach 2.3 to 2.5. During the various design tradeoffs, Boyd challenged the validity of ASD’s drag polars (lift versus drag charts) and argued that lower wing loadings on the order of eighty pounds/ft<sup>2</sup> would be more appropriate for the F-X design. Pursuing his research into drag polars, he later examined the effects of optimizing propulsion, configuration, avionics, and weapons for the fixed and variable sweep-wing designs. His calculations of these tradeoffs pointed to 0.6 as the “best” engine bypass ratio and to a sixty to sixty-five pounds/ft<sup>2</sup> wing loading. The design studies incorporated into the final F-15 configuration confirmed these values.<sup>36</sup>

### **Concept Formulation**

The F-X formulation phase continued through the spring and summer of 1967. By March, a three-part concept formulation package (CFP) and a technical development plan (TDP) had been drafted, specifying the F-X rationale, cost, and development schedule. In August, Secretary Brown submitted to OSD a revised cost proposal for the F-X as the Air Force’s recommended new tactical fighter candidate to replace the F-4. He noted the Air Force’s tactical force structure for the mid-1970s—limited to twenty-four wings by OSD—included thirteen F-4, six F-111, and five A-7 wings, respectively oriented to perform air superiority, interdiction, and close air support missions. Brown now argued for the paramountcy of air superiority, without which the other missions would be either impossible or too costly, and for the need to protect ground forces against enemy air attack. He noted that although the multipurpose F-4 Vietnam workhorse was a capable air-to-air fighter, its continued effectiveness was doubtful. U.S. intelligence in March 1967 had projected that by the mid-1970s approximately half the Soviet tactical aircraft inventory would consist of modern fighters said to excel the F-4 in air combat.

While Soviet fighter designs stressed range and payload, U.S. tactical air superiority in the Korean and Vietnam Wars was attributed to “superior pilot skill and better armament and avionics.” These advantages were not expected to prevail in a conventional war in Europe, given the likelihood of encountering well-trained Soviet pilots. Moreover, the Soviets were increasing their maneuverability edge and significantly improving their missile and fire-control systems. The Air



Air Force procurement of the A-7 in concert with the Navy helped pave the way for F-15 procurement.

**"TO WIN AN AIR WAR AGAINST SOVIET FORCES IT IS ESSENTIAL THAT U.S. PILOTS BE GIVEN THE BEST AIRCRAFT THAT TECHNOLOGY CAN AFFORD"**

**THE FEAR THAT THE NAVY WOULD WALK OFF WITH THE PRIZE UNLESS THE AIR FORCE DECIDED TO "SPEAK WITH ONE VOICE" UNITED THE FACTIONS**

Force cautioned in August that it could no longer "rely on pilot skill alone to offset any technical inferiority of U.S. aircraft.... To win an air war against Soviet forces it is essential that U.S. pilots be given the best aircraft that technology can afford."<sup>37</sup>

According to various Air Force analyses, little improvement could be expected from modifying existing aircraft such as the F-4, F-111, YF-12, A-7, and a U.S.-West German V/STOL design. Additionally, the cost of such an effort would be extremely high, approaching that required to develop a completely new fighter. Brown conceded that additional study was required to refine the F-X characteristics.

In a memorandum to McNamara, Brown reiterated that there were several unresolved areas involving the "Representative F-X." Brown also foreshadowed the commonality issue by predicting that certain components and subsystems of the F-X and the Navy's VFAX fighter could be made interchangeable. He was less optimistic about the possibility of using common airframe assemblies for the two planes.<sup>38</sup>

### **The Commonality Issue**

By the spring of 1965, there was a general consensus in the Air Force and Navy that the TFX (F-111) would not meet the needs of both services, and in October the Air Force and Navy independently issued operational requirements for multi-mission fighter aircraft. Anticipating that OSD might impose a new commonality requirement on them, the services from the outset "agreed to disagree" about operational requirements.

In May 1966, McNamara ordered a joint review of the commonality issue.<sup>39</sup> Conducted over the next eighteen months, the review confirmed that the needs of the Air Force and Navy could not be met by a single airframe. The Air Force emphasized maneuverability performance through low wing loading; the Navy was more concerned with mission versatility, such as extended loiter time for fleet air defense.<sup>40</sup> The differences that emerged during the joint study convinced some in the Air Force that they were in direct competition with the

Navy for money to support development of a new fighter.

### **An Air Force Position Emerges**

Sensing that the Navy was about to promote its new aircraft as an air superiority fighter, and convinced that the Air Force could produce a better design, Disosway decided the time had come to settle the controversy within the Air Force between the multipurpose and air superiority advocates. In February 1968, he issued TAC Required Operational Capability (ROC) 9-68. The document cited two new threats in justifying its call for an air superiority fighter. First, the MiG-21, exploiting its ground control interception advantage, continued to trouble USAF fighter pilots in Vietnam—where the air-to-air combat ratio between U.S. and North Vietnamese aircraft was about 2.5 to 1. Secondly, the Soviets had displayed several new fighters at the July 1967 Moscow Air Show, and one of these—the Foxbat—was regarded as superior in speed, ceiling, and endurance to existing and projected U.S. counterparts (including the "Representative F-X" described in the summer 1967 CFP).

Both Headquarters USAF and TAC wanted a new fighter, but the multipurpose advocates believed it best to present the F-X as a successor to the F-4, whereas the air superiority proponents were equally convinced that only their approach could defeat the Navy's bid. At any rate, by early 1968, the air superiority advocates had gained the upper hand. A decisive factor favoring the air superiority school was that Generals Disosway and Holloway occupied key positions at the same time and fought persistently for their viewpoint. However, the fear that the Navy would walk off with the prize unless the Air Force decided to "speak with one voice" united the factions.<sup>41</sup> In May, McConnell explained the Air Force position to the Senate Armed Services Committee: "There were a lot of people in the Air Force who wanted to make the F-X into another F-4 type of aircraft. We finally decided—and I hope there is no one who still disagrees—that this aircraft is going to be an air superiority fighter."<sup>42</sup>

Meanwhile, the Navy had undertaken to improve its fighter's energy maneuverability characteristics whenever the Air Force did so. Dissatisfied with the VFAX, its replacement for the F-111B model of the TFX, the Navy decided to cancel it and tacitly accept an unsolicited bid from Grumman Aircraft to develop a more competitive fighter. Designated the VFX—it subsequently entered the inventory as the F-14 "Tomcat"—the Navy's proposed aircraft combined previous multi-mission requirements, including air superiority, in two variant designs—the VFX-1 and the VFX-2. The Navy now argued that the VFX could match the F-X performance and was also adaptable to both carrier- and land-based operations.

Clearly, the Air Force's task was to counter Navy strategy by presenting an air superiority



While the F-4 was a workhorse in Vietnam, and a capable air-to-air fighter, its ability to continue in that role was doubtful, making the F-15 more essential.

**McCONNELL ASSIGNED TOP PRIORITY TO THE F-X PROGRAM AND DESIGNATED JANUARY 1, 1969, AS THE TARGET DATE**

**THE ONE-MAN CREW DECISION WAS PREDICATED ON THE ABILITY OF A SINGLE PILOT TO PERFORM NEARLY ALL MISSIONS ASSIGNED**

fighter uncompromised by secondary mission requirements. One compromise remained, however: the F-X had to accommodate Sparrow missiles to shoot down the high-flying, high-speed Soviet Foxbat.

In May 1968, McConnell assigned top priority to the F-X program and designated January 1, 1969, as the target date for implementing contract definition.<sup>43</sup> This meant strengthening the F-X program office at Wright-Patterson AFB, Ohio, and providing all available manpower and other resources.<sup>44</sup> Further encouragement came from Dr. John Foster, the new DDR&E, who predicted that the F-X would get OSD approval by September 1968. AFSC's vice-commander, Lt. Gen. Charles Terhune, stressed the importance of running an exemplary program to gain support for the F-X from the Nixon administration, which would take office in January 1969.<sup>45</sup>

By the spring of 1968, DDR&E accepted that its commonality drive had failed. Still, Foster recommended that the Air Force and Navy conduct a joint engine development program—the one item both services had agreed upon. However, in June, Assistant Secretary of the Air Force for R&D Alexander Flax told AFSC to proceed with a unilateral program because he considered commonality “dead.” To unify the effort, the Air Force appointed Brig. Gen. Roger K. Rhodarmer as liaison for F-X activities. He proceeded to select a staff of fighter pilots, including Colonels John Boyd and Robert Titus and Maj. John Axley, to help him sell the F-X program. Rhodarmer's task was twofold. First, he had to achieve a unified position within the Air Force, specifically by resolving outstanding differences. This was no mean task, since TAC and ASD continued to clash over such basics as the F-X's maximum speed, energy maneuverability, and structural loads. Second, he had to steer the F-X documentation through OSD and Congress.<sup>46</sup>

#### Point Design Studies

Meanwhile, in August 1967, the Air Force had solicited bids from seven aerospace companies for a second round of studies. These “point design”

studies sought to establish a technical base for the F-X proposal, refining the F-X concept in four areas: (1) validating the aircraft's performance in wind tunnel tests; (2) matching propulsion requirements against performance; (3) examining the preferred avionics and armaments systems; and (4) studying the effects of crew size. All investigations were completed by June 1968, at which time a composite Air Force team, headed by Col. Robert P. Daly, assembled at Wright-Patterson AFB to “scrub down” the results and rewrite the concept formulation package.<sup>47</sup>

#### CFP Supplement

Although many high-risk, high-cost items remained, the point design studies and scrub down proved fruitful. In August 1968, the Air Staff issued a supplement to the CFP. There was no longer any ambivalence about the Air Force's air superiority doctrine. Thus, the CFP supplement stated that

*It is sometimes held that air combat of the future will assume an entirely different complexion than that of the past. The Air Force does not share that contention. To the contrary, tactical applications of air superiority forces will remain essentially the same for the foreseeable future.*<sup>48</sup>

The war in Southeast Asia had taught the Air Force that smaller-sized aircraft could better escape radar and visual detection; thus, the supplement specified a one-man crew for the F-X but retained a two-man trainer version. The wing planform remained open, although the “Representative F-X” described a swing-wing rather than a fixed-wing design. The major subsystems—engine, radar, and gun—would be selected on a competitive flyoff basis. While the Air Force did not resolve some of the difficult issues, it decided to stress the air superiority aspects of the F-X and relegated air-to-ground capabilities to a secondary or bonus status.

In mid-August, McConnell approved the F-X source selection plans and the joint Air Force-Navy engine development program. Brown's endorsement came the next month.<sup>49</sup>

The final task in the concept formulation phase was to write an F-X development concept paper (DCP). Prepared by DDR&E's staff with Air Force assistance, the DCP described the F-X as “a single-place, twin-engine aircraft featuring excellent pilot visibility, with internal fuel sized for 260 nm design mission and.... a balanced combination of standoff [missiles] and close-in [gun] target kill potential.” The one-man crew decision, validated during the point design studies, was predicated on the ability of a single pilot to perform nearly all missions assigned. The penalties for adding a second crewman, including 5,000 to 6,000 pounds of extra weight at a cost of \$500,000 per aircraft, were considered unacceptable. The twin-engine design was selected because it fea-



The F-111, the result of the TFX procurement effort, did not provide the air superiority fighter the Air Force needed.

THE CHOICE WAS BETWEEN A SMALLER, LIGHTER AIRCRAFT THAT WOULD BE DIFFICULT FOR THE ENEMY TO DETECT AND A LARGER AIRCRAFT LIKE THE F-X THAT COULD MORE EASILY DETECT AN ENEMY AIRCRAFT

tured faster throttling response, commonality with the F-14, and earlier availability.<sup>50</sup> The most ambiguous features, however, involved the F-X radar and avionics packages, which were lumped together as “flexible vs. specialized counterair capability.” Thus, the choice was between a smaller, lighter aircraft that would be difficult for the enemy to detect and a larger aircraft like the F-X that could more easily detect an enemy aircraft. Although selecting the latter, the Air Force left open a final tradeoff until sometime during the contract definition phase.<sup>51</sup>

Cost estimates changed again because of a revised aircraft buy. The Air Force's future tactical force had been restructured to twenty-nine wings, including nine F-4, five F-X, seven F-111, and four A-7 and four A-X (later A-10) wings. This plan required only 520 aircraft.<sup>52</sup>

#### DCP 19 F-X Program Costs\* (\$ millions)

|                            |       |
|----------------------------|-------|
| Development cost           | 1,078 |
| Investment cost            | 4,059 |
| Flyaway cost per aircraft  | 5.3   |
| Operating costs (10 years) | 2,991 |
| Total system cost          | 8,128 |

#### Prototyping Rejected

The final issue in the F-X DCP was whether to pursue contract definition or prototyping for aircraft procurement. Foster supported the Air

\* The unit cost of an aircraft can be very confusing because of the misleading terminology used. *Flyaway cost* represents the basic cost of an aircraft without R&D, spares, initial production and support costs. *Unit production cost* omits costs for R&D. *Unit program cost* includes the unit production cost plus all R&D, test and evaluation, ground support, training equipment, spares, and depot tooling. For example, *Air Force Magazine*, June 1971, p 30, cited the F-15 flyaway cost at \$6.2 million, unit production cost at \$7.6 million, and unit program cost at \$10 million. [Memo, Hansen to Seamans, subj: Congressional Hearing Resume, 22 Jul 69.]

Force's request to begin contract definition immediately.<sup>53</sup>

Actually, the Air Force position on this issue had grown out of a “sense of urgency” because of the challenge from the Navy's VFX and the inauguration of a new president who would make the usual changes in OSD's civilian leadership. The F-X airframe would be purchased via the total package procurement concept, but higher risk subsystems would undergo competitive prototyping. On September 28, 1968, Deputy Secretary of Defense Paul H. Nitze approved contract definition of the F-X.<sup>54</sup>

These efforts demonstrated that, although differences remained within the Air Force, outwardly it could present a unified stand. The Air Force had won approval to develop a new fighter, the F-X becoming the F-15; marshaled its resources toward that goal; and established a central office in Washington to deal with whatever problems arose.

#### Contract Definition

On September 30, 1968, the Air Force launched the F-X contract definition phase by soliciting bids from eight aircraft companies. Fairchild-Hiller, General Dynamics, McDonnell Douglas, and North American responded. Boeing, Lockheed, Grumman (which had won the F-14 contract in February 1969), and Northrop had participated in the concept formulation effort but did not submit bids. On December 30, Flax announced the award of \$15.4 million in contracts for contract definition to all bidders except General Dynamics. The three bidders were asked to submit technical proposals—including the projected cost of the aircraft and a development schedule—by the end of June 1969.<sup>55</sup>

As contract definition began, a question arose over the number of competitors the Air Force should maintain and for what length of time. In February 1969, the new Secretary of the Air Force, Dr. Robert C. Seamans, issued guidelines to enable him to eliminate one of the three contractors by April and another by September.<sup>56</sup> Foster, on the other hand, believed that a more extended period of competition might decrease the final cost of the F-15 development contract.<sup>57</sup>

#### A New Contracting Philosophy

Meanwhile, a rising tide of public and congressional criticism over the enormous cost overruns in the C-5A program forced the Air Force to reconsider its plan to procure the F-15 under the fixed-price “total package” concept used for the huge cargo aircraft. ASD commander Maj. Gen. Harry E. Goldsworthy pointed out to Ferguson that the proposed F-15 integrated system would be a major challenge to an industry that had little recent experience in developing an air superiority fighter. Moreover, he maintained that cost estimates for an aircraft yet to be designed were highly unreliable.<sup>58</sup>



The F-15 became a common sight around the world. (Photo courtesy of Robert F. Dorr.)

**BY JULY 1969, THE F-15 DEVELOPMENT AND PROCUREMENT PROGRAM WAS CONSIDERED THE MODEL FOR BOTH THE AIR FORCE AND OSD**

**BRIG. GEN. DESIGNEE BENJAMIN N. BELLIS BECAME THE HEAD OF THE SPO**

Goldsworthy advocated some kind of production commitment during the competitive phase of the program but only if it also protected the contractor against unreasonable financial risk. As a corrective, he recommended relying on a cost-type arrangement for the development phase with a fixed-price incentive provision to govern the production phase.<sup>59</sup>

#### **Selling the New Approach**

If the Air Force seemed satisfied with the Goldsworthy procurement method, OSD was not. Through the spring and early summer of 1969, Seamans pressed OSD for its approval.<sup>60</sup> Foster, however, continued to oppose anything other than a fixed-price contractual arrangement.<sup>61</sup>

Meanwhile, Deputy Secretary of Defense David Packard had not made a decision. At a crucial meeting with Seamans in June, he conceded it was unrealistic to delay further the setting of a price for the F-15.<sup>62</sup>

With OSD delaying its authorization, Seamans was forced to withdraw his original February 1969 guidance to the contractors regarding the proposed production schedules and to ask them to provide ceiling-price estimates that the Air Force might invoke at its discretion. He also asked the contractors to propose a set of demonstration milestones that they would be committed to reach so as to "provide technical confidence in the program." These milestones, which were to prove central to the new weapon system acquisition approach, would be negotiated with the successful bidder.<sup>63</sup>

Foster, who continued to insist that a fixed-price arrangement was the only approach he would support, recommended another round of design studies to reduce the F-15's requirements and realign the aircraft's flyaway costs to the \$5.33 million figure specified in the DCP.<sup>64</sup> Though opposed to his reasoning, the Air Force offered to ease some of the aircraft's air-to-ground mission requirements.<sup>65</sup> On June 27, with contract time running out, Seamans appealed once again to Packard, who finally gave the Air Force the go-ahead.<sup>66</sup>

The F-15 contract negotiations, conducted during November and December 1969, involved a total of six contracts with three airframe companies. Each company also signed contracts with two

engine manufacturers. The idea was to have all these contracts in force, pending the Air Force's selection of an airframe builder and then the engine developer. In effect, the Air Force obtained commitments without having to wait for the results of the competitions. Although Foster continued to provide "informal direction" to the F-15 program office, the new contracting method remained intact.<sup>67</sup>

#### **The F-15 Program Office**

In August 1966, several years before contract negotiations began, the Air Force had established an F-X special projects office at Wright-Patterson AFB to oversee development of both the F-X and A-X close air support aircraft. The office, which first came under ASD's Deputy for Advanced Systems Planning, was initially headed by Col. Robert P. Daly with a staff of seventeen.<sup>68</sup>

Following OSD's approval of the F-X DCP in September 1968, the System Program Office (SPO) was reorganized in October and assigned to the Deputy for Systems Management for both operational and administrative support. A number of internal changes occurred at this time, including setting up divisions for configuration management, program control, procurement and production, and test and deployment. By July 1969, the F-15 development and procurement program was considered the model for both the Air Force and OSD.

On July 11, 1969, Brig. Gen. designee Benjamin N. Bellis became the head of the SPO. Bellis was one of the Air Force's most experienced managers, with service dating back to 1947. He had made his reputation in the development field with the Matador and Atlas missiles, managed the F-12/SR-71 aircraft development project, and served as ASD Deputy for Reconnaissance and Electronic Warfare. Bellis had written the Air Force 375-series management regulations, acquired a warrant as a procurement specialist, and earned advanced degrees in aeronautical engineering and business administration.

In October, the F-15 office became a "Super SPO." Bellis now reported directly to the AFSC commander, bypassing ASD. He reorganized the SPO, assuming total responsibility for program management, including the engine, armaments, and avionics systems and he made the Joint Engine Program Office (JEPO) a component of his office.<sup>69</sup>

Bellis reorganized his directorates into procurement and production, test and deployment, configuration management, integrated logistics support, program control, systems engineering, and projects. The latter was responsible for insuring that vital components—airframe, avionics, and armaments—were developed and available when needed.<sup>70</sup>

Bellis was also authorized to select the best personnel available to join the F-15 project. In a short time, his handpicked staff grew to about 230 people—half military and half civilian. The presti-

BELLIS BELIEVED THAT HE ALONE WAS RESPONSIBLE FOR PROGRAM MANAGEMENT AND BROOKED NO OUTSIDE INTERFERENCE

SEAMANS AND PACKARD INSTRUCTED AIR FORCE AND OSD OFFICIALS TO OPERATE STRICTLY THROUGH THE F-15 SPO IN THEIR WORK

THESE STREAM-LINED PROCEDURES ACCOUNT FOR THE HARMONIOUS RELATIONSHIP THAT EXISTED BETWEEN OSD AND THE AIR FORCE

gious F-15 assignment attracted many experienced, highly competent people. Moreover, because Bellis was keenly interested in the career advancement of his staff, he was able to build a tightly-knit and well-motivated group.<sup>71</sup>

Bellis' staff also included liaison officers from TAC, Air Training Command (ATC), and Air Force Logistics Command (AFLC). They would provide close coordination with the user commands so that the first F-15 wing could become fully operational at the end of the development and testing phases. A systems application panel brought together veteran TAC pilots to make sure the F-15 would remain a "fighter pilot's plane."<sup>72</sup> Finally, Bellis established a straight arrow group to guard against improper conduct between SPO personnel and the F-15 contractors.

Some aspects of Bellis's management caused controversy. He was sometimes overly secretive in managing the F-15 office. Bellis believed that he alone was responsible for program management and brooked no outside interference. His tough stance at times embittered his relations with officials in the Air Force Secretariat who were authorized to monitor the F-15 program. During the source selection phase in the late summer and fall of 1969, he complained about the intensive scrutiny from various agencies. As a result, Secretaries Seamans and Packard instructed Air Force and OSD officials to operate strictly through the F-15 SPO in their work.<sup>73</sup>

#### Management Facelift

The F-15 reorganization marked the beginning of a thorough housecleaning of Air Force management procedures. Under congressional pressure because of the unhappy C-5A experience, Defense Secretary Melvin Laird decided that a presidential blue-ribbon panel should examine Department of Defense (DoD) procedures. However, because the development problems could not wait, Secretary Packard conducted his own assessment. Concluding that "total package" was not working, he undertook to make extensive changes. He eliminated unessential staff layers in decision-making; improved cost-estimating procedures; and placed greater emphasis on prototyping, i.e., "flying before buying."

In April 1969, anticipating the need to improve the Air Force weapon-system acquisition process, General Ferguson decided to centralize program control. He advised ASD that all configuration changes for the F-15 "affecting the mission, increasing the weight or target cost, and impacting the schedule" would be approved by a triumvirate including himself, General Ryan, and Lt. Gen. Marvin L. McNickle, the Deputy Chief of Staff (R&D).<sup>74</sup> Next, Ferguson convinced Seamans and Ryan to reorient the Air Force management philosophy. The first step was to get the Air Staff out of the management "business" by shifting the Program Element Monitor (PEM) function to AFSC. Effective August 1, 1969, this action freed

the Air Staff to "focus on policy and plans," and enabled AFSC to monitor the program through the new F-15 SPO.<sup>75</sup>

The new reporting channel—from Bellis to Ferguson to Ryan and Seamans—was called the Blue Line. It fulfilled the Air Force's desire to reduce "the number of review echelons."<sup>76</sup> The AFSC program monitor, known as the Assistant for F-15, assumed the duties previously assigned to Rhodarmer during the F-15 advocacy stage and also served as the Washington area focal point for all F-15 matters. The monitor briefed the Air Staff monthly on the F-15's progress while Bellis presented quarterly briefings and written reports—known as Selected Assessment Reviews—to Seamans, Ryan, and other top officials. This arrangement insured tight program control and released the F-15 SPO to concentrate on day-to-day management activities.<sup>77</sup>

These streamlined procedures, which closely paralleled Secretary Packard's views on weapon system management, account for the harmonious relationship that existed between OSD and the Air Force on the F-15 program.

#### Source Selection

On July 1, 1969, Fairchild-Hiller, McDonnell-Douglas, and North American submitted technical proposals and on August 30, their cost proposals. The Source Selection Evaluation Board (SSEB), headed by General Bellis, then evaluated these bids, examining eighty-seven separate factors under four major categories—technology, logistics, operations, and management. They rated the competitors in each category and, without making a recommendation, submitted the raw data to a Source Selection Advisory Council (SSAC), comprised of representatives from the user commands and chaired by ASD commander Maj. Gen. Lee V. Gossick. The council then applied a set of weighting factors that they had defined in June 1969, before the start of the evaluation. Although rating the contractors in the four major categories, the council, too, did not select a winner. Instead, it forwarded the scores through the Air Staff to Secretary Seamans, who, as Source Selection Authority (SSA), had the final decision.<sup>78</sup>

#### Project Focus

During this evaluation, Secretary Packard directed the Air Force to make a final review of the F-15 program requirements. He acknowledged that the review, called Project Focus, would delay the F-15 IOC, but believed this compromise would be worthwhile if it avoided costly mistakes.<sup>79</sup> Packard also clamped a \$1 billion per year spending limit on the F-15 program and directed that Project Focus be completed by mid-November 1969 to avoid disturbing the source-selection process.

Foster, too, wanted to more thoroughly evaluate the contractor proposals. Citing the F-111 and C-



**MCDONNELL'S F-15 GENERAL MANAGER, REPORTED THAT THE FIRM HAD ALREADY SPENT 2.5 MILLION MAN-HOURS IN WINNING THE F-15 CONTRACT**



5A competitions as examples of programs that had suffered from inadequate evaluation, he stated that last-minute changes were the cause of their problems. Foster warned that F-15 cost estimates had already exceeded the September 1968 DCP threshold and asked the Air Force to control escalating costs.<sup>80</sup>

Meanwhile, the Air Force had acted promptly to meet Packard's call for a program review. Bellis established a Program Evaluation Group (PEG),<sup>81</sup> which quickly suggested a long list of items to reduce F-15 costs by more than \$1.5 million per aircraft. The cost review continued throughout the F-15 project and a subsequent General Accounting Office (GAO) report in July 1970 credited it with about \$1 billion in savings.<sup>82</sup> In December 1969, encouraged by the work of Project Focus, Packard authorized the Air Force to go forward with the F-15 development.<sup>83</sup>

#### **McDonnell Wins**

Secretary Seamans, having announced the award of the F-15 contract to McDonnell-Douglas on December 23, 1969, estimated that the development phase, including the design and fabrication of twenty aircraft, would cost \$1.1 billion.<sup>84</sup> Donald Malvern, McDonnell's F-15 general manager, reported that the firm had already spent 2.5 million man-hours in winning the F-15 contract. His team of between 200 and 1,000 people had worked for two years examining over 100 alternative designs with thousands of variations. From an economic standpoint, the F-15 contract "saved" one third of the company's 33,000 jobs in the St. Louis, Missouri, area. The F-15 contract also promised to increase McDonnell's sagging commercial airliner sales and absorb the slack of lowered F-4 production.<sup>85</sup>

#### **Air Force Weathers Congressional Scrutiny**

Before and after the award of the contract to McDonnell-Douglas, the F-15 competition was the target of congressional and media scrutiny. One of the thorniest issues concerned disclosure of the Air Force's source selection criteria. In July 1969, John R. Blandford, chief counsel for the House Armed Services Committee (HASC), asked the Air Force to reveal this information. Assistant Air Force Secretary Philip N. Whittaker argued that complying would compromise "business confidentiality."<sup>86</sup> Even when the competition was completed, Whittaker parceled out only selective bits of information to Congress.<sup>87</sup>

A November 22 *Armed Forces Journal* article charged that the Air Force had illegally withheld disclosure of the F-15 source selection weighting factors from the contractors.<sup>88</sup> Representative Otis Pike (D-N.Y.), a critic of defense spending, brought the case to the House floor. Seamans stated that the Air Force *could* furnish the weighting factors, but that such action was "in no sense mandatory." He also reminded his critics that the selection criteria had been established on June 2, 1969, *before* the contractors had submitted their proposals. Though further explaining the source selection process, he did not divulge the requested criteria.<sup>89</sup> The Air Force position in this case was later vindicated through a GAO investigation that found itself "in full agreement with the Air Force."<sup>90</sup>

#### **The Subsystems: The Engine**

Although USAF officials had rejected a prototype competition for the F-15 airframe contract, they readily pursued this approach for the airplane's subsystems, including the engine, radar, and short-range missile. A prototype competition among several contractors would reduce program costs and risks. System contractors were to be selected on the basis of proof-testing and demonstration of subsystem prototypes.

In December 1967, the Air Force and Navy agreed to conduct a joint engine-development program.<sup>91</sup> They would develop a high-performance afterburning turbofan Advanced Technology Engine (ATE), drawing upon the experience gained in the development of the lift-cruise engine of the U.S.-West German V/STOL and Advanced Manned Strategic Aircraft (AMSA) bomber programs. Developing the ATE emerged as the main problem in an otherwise exemplary F-15 program.<sup>92</sup>

From the start of the project, the Air Force and Navy disagreed about its management. In early 1968, the Air Force proposed establishing within one service a joint engine program office (JEPO). This proposal reflected the Air Force's single-management concept for the F-15 program and had precedent in other joint projects. On the other hand, the Navy favored single-source procurement and creation of a joint executive committee to oversee separate project offices in each service.<sup>93</sup>

**A GAO INVESTIGATION THAT FOUND ITSELF "IN FULL AGREEMENT WITH THE AIR FORCE"**

OSD AUTHORIZED THE AWARD OF TWO EIGHTEEN-MONTH CONTRACTS TOTALING \$117.45 MILLION TO GENERAL ELECTRIC AND PRATT & WHITNEY

TO CUT COSTS, THE AIR FORCE ORDERED ANOTHER THOROUGH "SCRUB-DOWN" OF THE F-15 REQUIREMENTS

The situation reached an impasse. The issue was partially resolved in April 1968, when Foster named the Air Force executive agent to manage the Initial Engine Development Program (IEDP), but he left open his decision on management of the final development phase.<sup>94</sup>

At the end of August, OSD authorized the award of two eighteen-month contracts totaling \$117.45 million to General Electric and Pratt & Whitney.<sup>95</sup> Jointly funded by the Air Force and Navy, the contracts authorized each company to build one prototype for each service. The purpose was not merely to develop different engines, but to fulfill each service's thrust requirements. Since the Navy's proposed aircraft was heavier than the F-15, it required a larger engine. Both the Air Force and Navy engine models were to be designed. However, since the Navy planned to use the TF-30 engine in their F-14 prototype, the services agreed that only the Air Force engine model and some components of the Navy model would be built initially.<sup>96</sup>

In February 1970, after reviewing the technical and cost proposals and design substantiation data submitted by the two engine contractors, the Source Selection Evaluation Board designated the Pratt & Whitney design as "clearly superior to the General Electric System." After the source selection authority—Secretary Seamans—also chose Pratt & Whitney, that company received the formal award on March 1, authorizing the Air Force and Navy to sign separate engine contracts with it.<sup>97</sup>

The Air Force engine model, designated the F100-PW100, was an augmented twin-spool, axial-flow gas turbine that delivered more than 22,000 pounds of thrust and weighed less than 2,800 pounds. Using the same "common core" as the F100, the Navy version of the ATE, the F401-PW-400, generated over 27,000 pounds of thrust and weighed under 3,500 pounds. The two engines differed in the fan, afterburner, and compressor sections. The addition in the Navy model of a "stub" compressor in front of the main compressor increased the engine airflow but, by raising its weight, lowered the engine thrust-to-weight ratio.<sup>98</sup>

In November 1970, because of F-14 funding cuts, the Navy pared its engine request in fiscal years 1972 through 1974. In the spring of 1971, the Navy further cut its order to fit the lagging F-14B airframe schedule. Then, on June 22, a new Navy decision to buy 301 F-14As—the model that used the TF-30 engine—canceled the remaining engines and voided the joint Navy-Air Force engine production contract.<sup>99</sup>

Earlier, in February 1971, Pratt & Whitney projected a \$65 million cost overrun in the engine funding for fiscal year 1973. Although the JEPO stood fast then, advising the contractor that no more funds were available, these new circumstances forced the Air Force to rewrite its own engine production contract. The new agreement raised Air Force costs by about \$532 million. Under this revised program, development milestones for the F401 engine slipped from February to December for the preliminary flight rating test

(PFRT), from February to June 1973 for the military qualification test, and from June 1972 to mid-1974 for the delivery of production models.<sup>100</sup>

The ATE also suffered from several technical problems. At the start of the development program, there were two compressor designs: the primary aerodynamic compressor Series I, and the advanced aerodynamic compressor Series II. In October 1970, both services favored Series I because it was lighter and on schedule. However, by mid-1971, when it appeared that Series I would not meet its full production requirements, the services revived Series II. The Air Force eventually installed Series I in its first five test aircraft and Series II in all remaining test aircraft and in its F-15 and F-14B production models.<sup>101</sup>

In February 1972, the YF100 (Series I) engine passed its PFRT milestone on schedule, in time for the first F-15B flight in July. The Air Force rated Series I superior in thrust-to-weight, fuel consumption pressure ratio per stage, and turbine temperature levels. Meanwhile, in August 1972, the Air Force suspended the Military Qualification Test (MQT) testing three times for the Series II engine—an early warning of the many engine troubles to come in 1973.<sup>102</sup>

### Other Subsystems: Radar and Armament

The F-15's remaining subsystems were open to competitive development. After soliciting industry bids in August 1968, the Air Force selected Westinghouse Electric and Hughes Aircraft in November to develop, produce, and test models of the attack radar subsystem. McDonnell-Douglas, the airframe contractor, was responsible for selecting the winner of the twenty-month competition after night testing and evaluating both radar prototypes. The Air Force wanted a lightweight, highly reliable advanced design suitable for one-man operation. The radar's capabilities were to include long-range detection and tracking of small, high-speed objects approaching from upper altitudes down to "tree-top" level. The radar was to send tracking data to a central on-board computer for accurate launching of the aircraft's missiles. For closing dogfights, the radar was to acquire targets automatically on the head-up display so that the pilot would not have to accomplish this manually.<sup>103</sup> In July and August 1970, McDonnell-Douglas conducted more than 100 flights to test competing radar units aboard its modified RB-66 aircraft. With Air Force approval, McDonnell awarded Hughes Aircraft the radar contract in September.

To cut costs, the Air Force ordered another thorough "scrubdown" of the F-15 requirements. Starting in July 1970, a panel headed by Maj. Gen. Jewell C. Maxwell reviewed the avionics and armaments, focusing on three items: (1) the Tactical Electronic Warning System (TEWS), whose development cost the panel favored separating from the F-15 program; (2) Target Identification Sensor—Electronic Optical (TISEO), a device for target identification beyond visual

The 1st Tactical Fighter Wing at Langley AFB, Virginia, was the first F-15 wing in the USAF. (Photo courtesy of Robert F. Dorr.)

**THE F-15's ARMAMENT INCLUDED BOTH MISSILES AND AN INTERNAL CANNON. THE AIR FORCE ADDED THE GUN ON THE ADVICE OF VETERAN PILOTS**

**CRITICISM OF THE F-15 MADE THE AIR FORCE REEXAMINE THE PROJECT AND DESIGN AN AIRCRAFT MARKEDLY SUPERIOR TO THE ONE IT HAD PROMOTED AT THE BEGINNING OF THE PROGRAM**



range; and (3) the AIM 7-E-2 missile, a backup for the AIM-7F Sparrow. The Air Force adopted the panel's recommendation to eliminate the last two systems.<sup>104</sup>

The F-15's armament included both missiles and an internal cannon. The Air Force added the gun on the advice of veteran pilots and Vietnam returnees as well in light of the Israeli success with cannon in the June 1967 Six-Day War. Though the primary gun for the F-15 was the M61 Vulcan (a 20-mm Gatling-type cannon used in Vietnam), the Air Force also began a long-term project to develop a 25-mm cannon using caseless ammunition. In the spring of 1968, it selected Philco-Ford and General Electric to design a prototype of the advanced gun, designated the GAU-7A Improved Aerial Gun System. The \$36 million fixed-price competition ended in November 1971, when Philco-Ford won the contract.<sup>105</sup>

The Air Force also proposed to equip the F-15 with a new short-range missile (SRM) for use against maneuvering fighters at close range. But in September 1970, the Air Force canceled the SRM because of rising costs, agreeing with the Navy to substitute an improved version of the Sidewinder missile.<sup>106</sup>

#### **Dissent and Decision**

Despite USAF attempts to stem criticism of the F-15, basic differences arose inside and outside the Pentagon over the kind of aircraft to acquire. The Air Force was especially sensitive to criticism because of competition with the Navy to get funds for an air superiority fighter. Having established the F-15's basic requirements, the Air Force decided to "speak with one voice" and not tolerate any dissent. Nevertheless, criticism of the F-15 made the Air Force reexamine the project and design an aircraft markedly superior to the one it had promoted at the beginning of the program.

One proposed alternative to the F-15, dubbed the F-XX, was the brain child of Pierre M. Sprey of Systems Analysis. He believed that ASD engineers, responding to TAC's exorbitant requirements and paying little heed to cost, had produced a design that was too expensive, incorporated high-risk technology, was unnecessarily complex, and would not achieve its advertised air superiority performance. Sprey's alternative was a 25,000-pound, single-seat, one-engine fighter with a high thrust-to-weight ratio and an estimated 25 percent greater range than the F-X. The Air Force and Navy were not impressed. They rejected the proposed lightweight fighter because it lacked range for missions deep in enemy territory and could not carry the requisite avionics for countering enemy defenses. Finally, the services argued that only the F-15 and F-14 could counter the high-speed, high-altitude Foxbat.<sup>107</sup>

But Sprey was not alone in advocating a lightweight fighter. Several members of the Air Staff, aided by dissident Navy fliers, designed a lightweight fighter alternative to the F-15 and, in August 1969, submitted their proposal to General Ryan. Suppressing the proposal, F-15 advocates used the episode to unify the Air Force position on the air superiority fighter.<sup>108</sup>

As later events showed, Sprey's F-XX idea, though having considerable merit, was ill-timed. His criticism only united the Air Force and Navy against him because they were too far along in their advocacy to turn back to the "drawing board." Although by no means the last challenge to the F-15 and F-14 programs, it set the stage for their defense. A critical factor here was OSD's inflexibility on the tactical air force structure. Because they could not shake OSD force size limits, both services preferred to develop aircraft that were as versatile as possible.

DESCRIBING THE FOXBAT AS A TECHNOLOGICAL THREAT ONLY, THE AIR FORCE REMAINED CONVINCED OF THE F-15's ABILITY TO "OUT-FLY, OUT-FIGHT, AND OUT-FOX THE REST."

## F-15 vs. Foxbat and the F-14

In urging development of the F-15, the Air Force was pressed to explain the aircraft's alleged "inferiority" to the Soviet Foxbat. Basically, industry sources claimed the F-15 could not defeat the high-speed, high-altitude Foxbat (Mach 3+ at 80,000 feet) and urged scrapping the F-15 program. Rhodarmer's team, however, convinced Congress that, in terms of maneuverability, the F-15 was superior to any existing or projected Soviet aircraft. They noted its superior maneuverability in air combat, emphasizing the F-15's decided edge in such key dogfight factors as wing loading and thrust-to-weight ratio.<sup>109</sup>

|                                           | F-15 | Foxbat |
|-------------------------------------------|------|--------|
| Thrust-to-weight                          | 1.1  | .78    |
| Wing loading<br>(pounds/ft <sup>2</sup> ) | 65   | 98     |

Critics of the F-15 prodded the Air Force to look at other aircraft. But the Air Force eventually concluded that the F-15's maneuverability, radar, and "shoot-up" Sparrow missiles could defeat the Foxbat. Describing the Foxbat as a technological threat only, the Air Force remained convinced of the F-15's ability to "out-fly, out-fight, and out-fox the rest."<sup>110</sup>

In authorizing development of the next generation tactical fighters, OSD generally presented the F-15 and F-14 as noncompetitive aircraft. The F-14 would provide the Navy with a long-range missile capability (AWG-9 Phoenix) for fleet air defense, with the F-14 variants performing "other fighter roles"; the F-15 was to achieve for the Air Force overall air superiority. In the spring of 1969,

General McConnell and Adm. Thomas Moorer, Chief of Naval Operations, agreed to toe the OSD line—namely, that the two aircraft were intended for different missions. Whenever the issue did arise, the Air Force highlighted the F-15's maneuverability advantage and the mission differences between it and the F-14.<sup>111</sup>

## Modifications and First Flight

Criticism of the F-15's design assumptions obliged the Air Force to reexamine the aircraft's design more critically and "scrub out" extraneous requirements. In particular, the role of the National Aeronautics and Space Administration (NASA) as a consultant during the source selection and its independent laboratory evaluation uncovered certain deficiencies that might otherwise have gone unnoticed. Between the time of its contract award and the spring of 1971, the F-15 had undergone a number of major design changes. The F-15 made its ceremonial debut on June 26, 1972, at McDonnell-Douglas's St. Louis plant. Painted "air superiority blue" and christened the Eagle, it was hailed as the first U.S. air superiority fighter since the F-86 appeared two decades earlier. The F-15's flight test program was launched on July 27 with a 50-minute maiden flight over Edwards AFB, California. With all systems working "as expected," and piloted by Irving L. Burrows of McDonnell-Douglas, the Eagle attained 12,000 feet and about 320 miles per hour. The flight-test program continued on schedule without any significant problems through the 1,000th flight in November 1973, by which date the F-15 had flown above 60,000 feet at speeds over Mach 2.3.<sup>112</sup> n

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# A “Pretty Damn Able Commander” Lewis Hyde Brereton: Part II







Roger G. Miller

(Overleaf) Lt. Gen. Lewis H. Brereton, Commander, First Allied Airborne Army, waves as his aircraft take off. (Photo courtesy of George Kirksey Collection, Special Collections and Archives, University of Houston Libraries.)

(Below) Brig. Gen. Henry B. "Sue" Clagett, air commander in the Philippine Islands prior to Major General Brereton.

The summer and fall of 1941 saw dramatic changes in U.S. military policy in the Philippine Islands. Contingency plans for war with Japan, including the immediate prewar plan, Rainbow 5, approved on May 14, 1941, called for American forces to withdraw into the Bataan Peninsula on the main island of Luzon until relieved by the U.S. Pacific fleet. Japan's occupation of French Indo-China in July 1941, however, forced the War Department to reassess the American position in the Southwest Pacific. On July 26, President Franklin D. Roosevelt nationalized the Philippine Commonwealth Army and recalled Lt. Gen. Douglas MacArthur, military advisor to the Philippine government, to active service as commander of the United States Army Forces in the Far East (USAFFE). A brilliant, charismatic, almost mystical prima donna, MacArthur argued that an expanded American-Filipino army, properly trained and armed, could defeat a Japanese invasion. By the end of July, the War Department had altered its policy to include defense of the main island of Luzon and had begun dispatching reinforcements.<sup>1</sup> On September 7, Gen. George C. Marshall, Chief of Staff of the U.S. Army, assured MacArthur that "I have directed that the United States Army Forces in the Philippines be placed in the highest priority for equipment including authorized defense resources for fifty thousand men."<sup>2</sup>



Air reinforcements also arrived. In October 1940, Maj. Gen. Henry H. "Hap" Arnold, Commander of the U.S. Army Air Corps, diverted to the Philippines forty-eight Republic P-35 pursuits originally consigned to Sweden. In March 1941, the Hawaiian Department sent eighteen Douglas B-18 Bolo medium bombers to the Philippines, and a ship from the U.S. the following month brought thirty-one Curtiss P-40B Tomahawks, the latest U.S. pursuit aircraft. On May 6, the 3d, 17th, and 20th Pursuit Squadrons, 28th Bombardment Squadron (Medium), and 2d Observation Squadron were organized into the Philippine Department Air Force under Brig. Gen. Henry B. "Sue" Clagett. With the creation of USAFFE, the Philippine Department Air Force became the Air Force, U.S. Army Forces in the Far East. The War Department furnished additional P-40Bs and newer P-40E Warhawks in the fall of 1941 and planned for the 27th Bombardment Group (Light), equipped with Douglas A-24 Dauntless dive bombers, to reach the Philippines by the end of 1941.<sup>3</sup>

The most dramatic response to the threat in the Far East was the decision to deploy the U.S.'s premier offensive weapon, the four-engine Boeing B-17 Flying Fortress. The early Fortresses lacked the armament, armor, and high-altitude capability critical for survival in combat; but based upon misleading reports of success with the Royal Air Force, Secretary of War Henry L. Stimson accepted that a small number of B-17s might deter further Japanese moves in the Southwest Pacific. The War Department determined to send USAFFE four heavy bombardment groups by April 1942, the earliest that most leaders believed the Japanese would attack.<sup>4</sup> Stimson approved this plan in August, and, in the words of historian Daniel F. Harrington, "the effort to establish four groups at full strength in the Philippines became the most important air force project in the months before Pearl Harbor."<sup>5</sup>

On September 5, nine B-17s from the Hawaiian Air Force, formed into the provisional 14th Bombardment Squadron under Maj. Emmett "Rosie" O'Donnell, Jr., took off from Hickam Field, Hawaii, for Clark Field, near Manila, by way of Midway Island, Wake Island, Port Moresby, and Darwin, arriving on the afternoon of September 12. An additional twenty-six B-17s of the 19th Bombardment Group under Lt. Col. Eugene Eubank had flown from New Mexico to Hawaii by October 22. Bad weather and persistent engine problems hampered Eubank's progress, but all of his aircraft had reached Clark by November 6 save one grounded at Darwin for an engine change.<sup>6</sup> As the big bombers flew west,

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Maj. Gen. Lewis H. Brereton, Commander, Far East Air Force, circa Fall 1941.

**MACARTHUR:  
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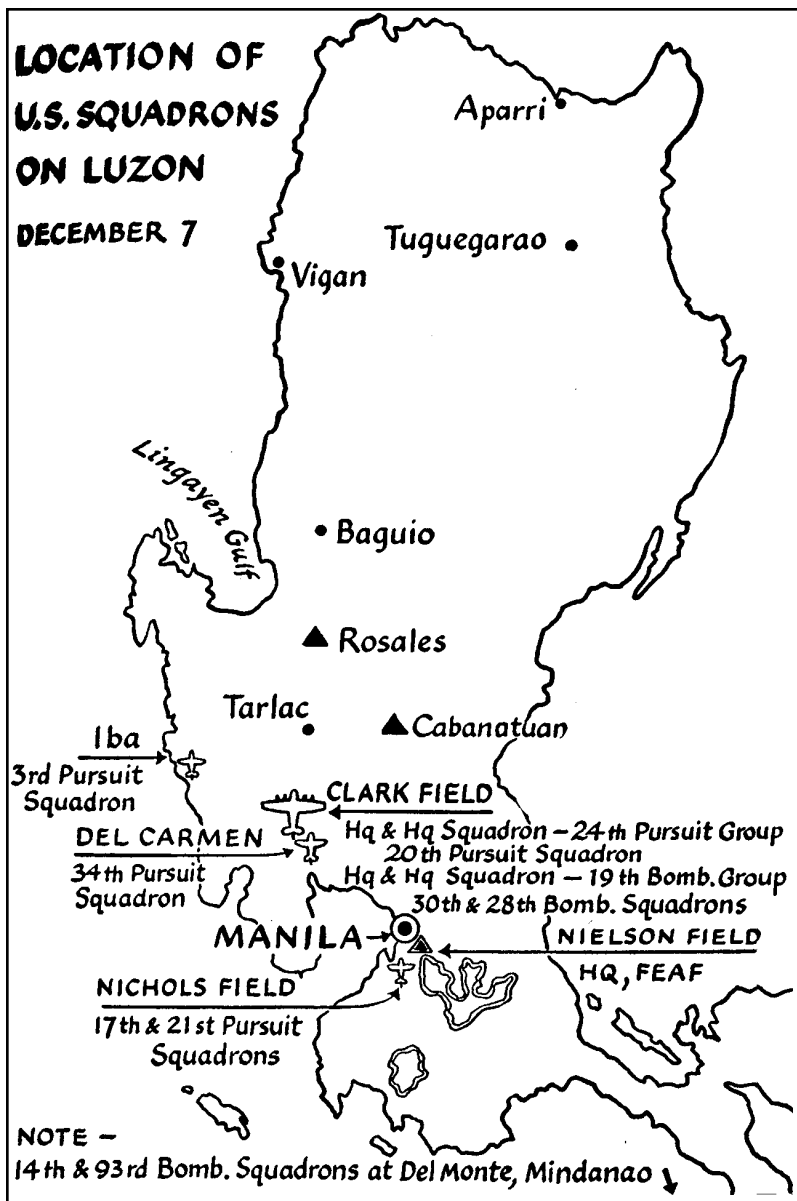
the War Department issued MacArthur explicit instructions about their purpose. On October 14, Arnold emphasized that heavy bombers were offensive, not defensive weapons, and were to be used to control, not only the sea routes between Japan, Singapore, and the Dutch East Indies, but to reach the Japanese home islands, themselves.<sup>7</sup> And, most important, Marshall emphasized to MacArthur on November 21 that the latest revisions to Rainbow 5 authorized him to conduct "air raids against Japanese forces and installations within tactical operating radius of available bases."<sup>8</sup>

With the buildup of aircraft in full swing by September, Arnold also moved to replace Clagett, a heavy-drinking old timer who suffered from high blood pressure, hardening arteries, and tertiary malaria. On September 30, Marshall asked MacArthur to select a new air commander from among Maj. Gen. Lewis H. Brereton, Maj. Gen. Jacob E. Fickel, and Brig. Gen. Walter H. Frank.<sup>9</sup> MacArthur remembered the tough, aggressive little commander of the 12th Aero Squadron from World War I: "Regard all three officers as highly qualified," he responded, "but would prefer Major General Lewis Brereton."<sup>10</sup> On October 3, Brig. Gen. Carl A. Spaatz, Chief of Staff of the Air Corps, called Brereton, then commander of Third Air Force in Florida, and told him that Arnold wanted to see him immediately. The summons surprised Brereton, whose command had just performed poorly during the U.S. Army maneuvers in Louisiana. He fully expected to be exiled to some Siberia, Brereton wrote later, not offered

what had the potential to be the most critical operational command in the U.S. Army Air Forces.<sup>11</sup>

Lewis Brereton was an interesting choice. An experienced senior officer with the appropriate age, rank, and length of service—important considerations for promotion and assignment in the U.S. Army prior to World War II—Brereton was a 1911 graduate of the U.S. Naval Academy, early military aviator, and highly decorated combat veteran of World War I. He had risen to command quickly as one of William "Billy" Mitchell's boys, and following the war had aided Mitchell's effort to pry responsibility for coastal defense from the U.S. Navy. Despite his early association with Mitchell, however, most of Brereton's assignments had involved army cooperation and ground support and placed him outside the volatile controversies over an independent air force and strategic bombardment that had afflicted military aviation between the wars. Just prior to World War II, he had played a role in developing close air support doctrine. More recently, Third Air Force had operated two air maintenance commands during the Louisiana maneuvers, and Brereton was already planning maintenance and supply arrangements for the upcoming Carolina maneuvers. These activities gave him the kind of logistical experience needed in the Southwest Pacific where much of his work would be to establish bases and prepare support facilities. On the other hand, Brereton's lack of recent experience with heavy bombers and modern interceptors might have been considered negatives, and, in practice, would lead him rely on experienced subordinates like Gene Eubank and the energetic pursuit specialist, Col. Harold H. "Hal" George.<sup>12</sup>

Brereton reported to Arnold and Spaatz at Army Air Forces Headquarters on October 5, and during the next few days, he met with Marshall and Brig. Gen. Leonard T. Gerow of the War Plans Division. Brereton quickly recognized serious problems. He warned Marshall and Arnold that the War Department was putting its most powerful offensive weapon in danger. In Brereton's words: "The lessons of the war in Europe were being completely ignored in placing a heavy bomber force in the Philippines without providing adequate protection."<sup>13</sup> The B-17s might be fortresses in the air; on the ground they were little more than lucrative targets. Basing them on vulnerable fields without a capable early warning system, efficient communications, facilities for dispersal, and adequate air and ground defenses was courting trouble. Marshall and Arnold recognized the War Department decision as a calculated risk, but it was a gamble they believed well worth taking. By April 1942, the air reinforcements would be in place along with the strong ground forces promised to MacArthur. In response to Brereton's concerns, however, Arnold agreed to send an air warning service battalion, an airfield engineer unit, and additional support units beyond the units already planned.<sup>14</sup>



Brereton, his chief of staff, Col. Francis M. Brady, deputy for operations, Maj. Charles Caldwell, and aides, Lt. Edgar W. Hampton and Capt. Norman J. Lewellyn, reached Manila on November 4, after a long, wearying flight across the Pacific. On November 5, he presented MacArthur with the latest amendments to Rainbow 5 and, in turn, learned that the training and mobilization schedule for USAFFE was based upon the conviction that nothing would take place before April 1, 1942. Brereton then inspected his new headquarters at Nielson Field, where he found a small, inexperienced staff operating on a relaxed, peacetime schedule.<sup>15</sup> Capt. Allison Ind found him personable but all business: "I'm Brereton," he said crisply but without drama as he came into my office and shoved out his hard, tough hand to me. He caught me for one real moment in the direct glance of his brown eyes, and I experienced for the first time the magnetism of his broad grin. 'I hear you've been doing some good work here. I hope that you'll feel free

to pitch right into it just as before and give it all you've got.'"<sup>16</sup>

Brereton descended like a tornado. "We found that few people work here," Captain Lewellyn wrote home, "and you can imagine how that affected Gen. B. and he is starting out to change it very abruptly and we are supposed to set the example and we are sure doing it. Everyone is betting even money that in 30 days we will slow down but unless the Gen[eral] has me fooled I don't think he will."<sup>17</sup> Brereton reorganized the staff, abolished peacetime procedures and schedules, ordered additional measures for air defense and force dispersal, and began the difficult process of effusing his units with a sense of urgency. He held conferences with the commanders and "every attempt was made to put operations on a 'war time basis.'"<sup>18</sup> Brereton increased work hours to the maximum and initiated a new training schedule on November 6, which required 40 percent of training to be night operations. He ordered each headquarters to establish a message center operating around the clock. Tactical units were to emphasize operational readiness, aircraft were ordered dispersed, and aircrew were placed on call around the clock. FEAF stepped up maintenance, and aircraft were not allowed to be taken out of commission for routine checks or for twenty- and forty-hour inspections.<sup>19</sup> By November 15, all available pursuit aircraft were armed and on constant readiness. On the following day, Brereton activated Far East Air Force (FEAF) with three subordinate commands, Vth Bomber Command under Colonel Eubank, Vth Interceptor Command under General Clagett, and Far East Air Service Command under Col. Lawrence S. Churchill. Colonel George served initially as chief of logistics, but by December 8 was chief of staff for Vth Interceptor Command, although he continued to devote considerable time to FEAF's support problems.<sup>20</sup> "The General 'cleaned house' pretty thoroughly after arriving" Lewellyn wrote, "and we are just beginning to see the light of day as far as our work is concerned."<sup>21</sup>

In one crucial operational area, Brereton was unable to gain a satisfactory decision. Marshall specifically authorized USAFFE to undertake aggressive aerial reconnaissance. The thirty PBY Catalina flying boats of the U.S. Navy's Patrol Wing Ten had conducted flights as far as Formosa, but their lack of speed made them vulnerable to Japanese fighters. At the beginning of December, Admiral Thomas C. Hart, commander of the Asiatic Fleet, proposed that Patrol Wing Ten cover the areas to the west of Luzon and that FEAF's B-17s fly reconnaissance to the north. MacArthur agreed. Brereton recommended high-altitude, photo-reconnaissance missions over Formosa. MacArthur refused, because War Department instructions cautioned him to avoid acts that might antagonize the Japanese. The bombers thus had to remain well outside the legal limits of Formosa. The 19th Bombardment



Capt. Norman J. Lewellyn, aide to Major General Brereton, in front of their house in Bandoeng, Java, circa January-February 1942. (Photo courtesy of Robert J. Lewellyn, Pebble Beach, California.)

Group began reconnaissance missions on November 29, normally with two aircraft each day.<sup>22</sup>

As Brereton asserted his leadership and changes in FEAF began to take hold, orders sent the air commander out of the Philippines for twelve precious days in mid-November. As commander of FEAF, Brereton was responsible for all U.S. Army Air Forces activities in the Southwest Pacific, not just the immediate forces on Luzon. By late 1941, the War Department had begun exploring a less vulnerable air route to the Philippines south of the one via Midway and Guam. On October 3, a Presidential letter authorized the Secretary of State to open talks about bases with the British, Australians, New Zealanders, Dutch, and Free French. The State Department responded quickly, and the U.S. Army's Hawaiian Department despatched surveying parties to sites across the Pacific. On October 16, Secretary Stimson asked Secretary Cordell Hull to request permission from the Australian government for the use of airfields in Australia, New Britain, and New Guinea. When Arnold wrote MacArthur on October 14 spelling

out the plan to reinforce the Philippines with bombers, he stressed the vulnerability of the existing ferry route and the need for the southern route. Consequently, by the time the War Department passed responsibility for developing the route west of the Solomon Islands and New Caledonia to USAFFE on October 27, MacArthur had already begun site surveys. By November, Australian authorities had granted permission for ferrying routes, training bases, and maintenance facilities in Australia. MacArthur directed Brereton to finalize agreements and obligate funds.<sup>23</sup>

On November 16, Brereton and a small party left for Darwin in a B-17 with Eubank at the controls. They toured Darwin, Townsville, and Brisbane in Australia, Port Moresby in Papua, and Rabaul on New Britain. The trip had its curious aspects. Everyone wore civilian clothes to preserve secrecy, but a group of civilians touring in a B-17 would more likely attract than repel attention. The B-17 was mandatory, however, because of its range and because the final test of a potential airfield was actually putting a bomber on it. At Rabaul, for example, the Fortress broke through the crusted surface of the field suggesting limitations of that site as a transit station. During a series of meetings in Melbourne with the Chief of the Australian Air Staff, Air Chief Marshal Sir Charles Burnett, Brereton hammered out a program with three objectives. The first was for bases for the air ferry route across Australia, including facilities for the assembly of fighter aircraft at Townsville and Brisbane. The second was for additional airfields to accommodate three pursuit groups, three bomber-reconnaissance squadrons, and a heavy bomb group. The third objective was the construction of training centers for both bombers and pursuits. Subsequently, Australia became the main U.S. base in the Southwest Pacific, and Brereton's trip was an important contribution to its establishment. While this mission was important, however, it cost Brereton two of the five weeks between his arrival and the Japanese attack. And MacArthur subsequently ordered the airman to visit the Netherlands East Indies, Malaya, Burma, and China. Brereton asked for a delay while he inspected his tactical units, which had continued training during his absence. MacArthur concurred, and Brereton scheduled his departure for the morning of December 8.<sup>24</sup>

When his B-17 returned to Clark Field on November 26, Brereton found the B-17s at Clark parked in neat, straight lines. The irate commander bluntly criticized the commanders at Clark for making it easy for a hostile air force to eliminate the entire heavy bombing strength of the Philippines in a single mission. He ordered them to disperse the force and never allow them to be lined up in the open again. Brereton's anger notwithstanding, there was little that Vth Bomber Command could do about dispersing bombers. Clark simply lacked that capacity. The



Philippines, in fact, lacked the physical infrastructure to support the expanding air force or disperse it properly. Hal George had made a study of air requirements prior to Brereton's arrival and concluded that the projected force required fifty-six completely equipped air bases. At the time, FEAF had fewer than ten fields, most of which consisted of little more than bare ground. USAFFE had begun surveying additional sites, but little construction had been accomplished.<sup>25</sup> As Lewellyn complained: "There has been no money spent by the army for the past four years and now we are expected to make up for all that in just a few months."<sup>26</sup>

Prior to Brereton's departure for Australia, MacArthur asked FEAF to prepare another plan delineating the "installation and operation of the Air Force as projected." Brereton left this assignment in the hands of his capable chief of staff, Colonel Brady, assisted by George and Capt. Harold Eads, FEAF's engineer.<sup>27</sup> On November 21, Brady submitted the plan to MacArthur's

chief of staff, Brig. Gen. Richard K. Sutherland, "a first-class son of a bitch"<sup>28</sup> generally disliked as a brusque, hard-working, intelligent hatchet man who "built a wall around MacArthur by intimidating his staff and isolating him from outsiders."<sup>29</sup> FEAF's plan differed from previous ones by calling for the establishment of air bases for two heavy bombardment groups, a pursuit group, and a reconnaissance squadron on Mindanao, a major island south of Luzon well out of range of Japanese aircraft based on Formosa. Sutherland opposed moving the bombers to Mindanao, because USAFFE's defensive plans excluded that island. Brady was insistent, however, and Sutherland reluctantly agreed to allow FEAF to prepare facilities at Del Monte and to base bombers there temporarily until new fields could be completed on Luzon, Cebu, and other islands north of Mindanao.<sup>30</sup>

Initially, Brereton appears to have considered sending all heavy bombers to Del Monte. Eubank, however, pointed out that the site could hold only six squadrons. With the 7th Bombardment Group expected from the United States—some of its aircraft would be attacked while approaching Hawaii on December 7—it made sense to base two squadrons of the 19th at Del Monte and send the 7th's four squadrons there as they arrived. Brereton deferred to Eubank's judgement. In later years, MacArthur's supporters, especially, Sutherland, claimed that Brereton disobeyed direct orders to send all B-17s to Del Monte. The written record fails to support Sutherland's assertions, however, and while it is possible that USAFFE gave verbal orders, the events that can be documented suggest that no such orders were issued. Further, the decision to split the bomber force with half at Clark protected by pursuit aircraft and half camouflaged and hidden at Del Monte was correct in retrospect. Clark could neither disperse four squadrons of bombers adequately, nor scramble them quickly enough in an emergency.<sup>31</sup>

On November 28, USAFFE ordered the newly-arrived 5th Air Base Group to Del Monte to prepare the field, while FEAF alerted Vth Bomber Command for the move. It took the 5th Air Base Group almost a week to obtain boats, load equipment, make the 500-mile voyage to Mindanao, and convey everything inland. Shortages of construction equipment, supplies, and transportation added further delay. Despite these problems, the primitive field was ready by December 6, and "Rosie" O'Donnell led the 14th and 93rd Bombardment Squadrons south.<sup>32</sup> FEAF's insistence on preparing and stocking a field at Del Monte would prove providential in the coming weeks. "This was something that you had to give Brereton and his staff some credit for," pilot John Carpenter recalled. "They arranged to get some stuff laid in at Del Monte—additional gas and bombs. . . . He had some competent officers working for him; some good logistician types."<sup>33</sup>

Far East Air Force, on the eve of the Japanese



ON PAPER, BRERETON HAD A REASONABLE FORCE... BUT IN REALITY MOST OF THE FORCE WAS UNPREPARED ON DECEMBER 8

THE PURSUIT PILOTS WERE TOUGH, ENTHUSIASTIC, AND INEXPERIENCED, AND THEY VIEWED THEIR ADVERSARIES WITH A MIXTURE OF PREJUDICE AND CONTEMPT

attack, had more potential than strength. Air defense depended upon the five squadrons of the 24th Pursuit Group. The best prepared of these was the 20th Pursuit Squadron at Clark Field, fully equipped and experienced with P-40Bs. The 3rd Pursuit Squadron at Iba had swapped its obsolete P-35s for P-40Es in November, and had just installed and bore-sighted its guns. The 17th Pursuit Squadron at Nichols Field had barely begun practicing combat tactics in its new P-40Es. The 21st Pursuit Squadron, also at Nichols Field, received ten P-40Es on December 4, another ten on December 6, and expected the remainder on the 8th. None of its aircraft got into the air before they faced combat. And the 34th Pursuit Squadron still flew obsolescent P-35As with worn engines further aggravated by the dust at Del Carmen. On paper, Brereton had a reasonable force of at least 54 P-40Es, 18 P-40Bs, and 18 P-35s, but in reality most of the force was unprepared on December 8. Also, the P-40 was the best American pursuit available, and the "B" model could be effective with the right tactics. The heavier P-40E, however, climbed slowly and performed sluggishly at higher altitudes. At least one squadron, the 20th, had practiced intercepting bombers with some success; but gunnery and combat training were handicapped by a shortage of .50 caliber ammunition, while deficiencies in oxygen and oxygen equipment limited operational ceilings.<sup>34</sup> Finally, the pursuit pilots were tough, enthusiastic, and inexperienced, and they viewed their adversaries with a mixture of prejudice and contempt. This was a fatal error. While the Japanese flew superb aircraft, such as the Mitsubishi A6M2 Zero, their real advantage was in the quality of personnel. In the words of a recent history of the Japanese navy: "It was the skill of Japanese fighter pilots honed in air combat over China [from] 1937 to 1941...that gave Japanese air power its potency in the first six months of the Pacific War."<sup>35</sup>

The severe shortage of antiaircraft guns further compromised defense of FEAF bases. Many of those on hand were obsolete or worn out, ammunition was old and in short supply, and most fuses were set for low-altitude attacks. The only weapons available at Iba Field were World War I-vintage .30 caliber machine guns. The 200th Coast Artillery (AA)—a national guard unit from New Mexico filled out with draftees—reached Luzon in September 1941 to defend Clark Field. Most of its three-inch and 37-mm guns were positioned north of the airfield. Better sites existed on private land to the south and east, but the army lacked the authority to place guns there.<sup>36</sup>

The 19th Bombardment Group provided the offensive punch for FEAF. The 28th, 30th, and Headquarters Squadrons had nineteen B-17s at Clark, sixteen ready for combat. The sixteen bombers of the 14th and 93d Bombardment Squadrons were at Del Monte. The B-17C and B-17D models were not the later model Fortresses

already coming off the Boeing assembly lines and they lacked features that were necessities for survival in combat. A shortage of parts hampered maintenance and the complete absence of spare engines had already begun to restrict operations. The 19th was considered an elite outfit, and the veteran Vth Bombardment Command commander, a pioneer in the operational use of the B-17, was noted for his technical mastery. A superb navigator and excellent pilot and bombardier, Eugene Eubank had trained the 19th to high standards. In the coming weeks, the group would perform well under harrowing circumstances. Many of the 19th's enlisted men who survived the Philippines and Java went on to become officers, and many of its surviving officers became generals.<sup>37</sup>

Basing for the aircraft represented years of penury and neglect. Clark Field north of Manila, the only first-class field in the Philippines, was in the open and easy to locate. It had some revetments, but the limited protection for aircraft was one of Brereton's chief concerns. The principal fighter base, Nichols Field six miles south of Manila, had the only hard-surfaced runway in the islands, but, during the rainy season, the base reverted to swamp land. Nielson Field, southeast of Manila, was little used by combat aircraft. Iba, a pursuit field on the west coast, lacked facilities for extended operations. Del Carmen, fourteen miles south of Clark, had no running water or facilities, and six-inch dust prevented quick or mass takeoffs. Rosales, fifty miles north of Clark, was another dirt field without facilities. Del Monte on Mindanao had just opened and could take B-17s. Four primitive auxiliary strips—O'Donnell north of Clark, San Fernando southeast of Clark, Ternate near Cavite, and San Marcelino northwest of Subic Bay—had no facilities at all. The other major air facility of note, the Philippine Air Depot in Manila, handled maintenance and supply, but was well known, easy to find, and highly inflammable. It also had limited capabilities, and Brereton at the end of November had recommended that engine overhaul be accomplished in the United States until personnel, tools, spares, and parts arrived.<sup>38</sup>

FEAF's communications and air warning systems were improving. The latter depended primarily upon native air watchers who reported to the headquarters at Nielson Field by civilian telephone or telegraph. Nielson relayed reports to a central plotting board at Clark Field by telephone, radio, or teletype. Radar had just been introduced. SCR-270 mobile radar and SCR-271 fixed location radar could detect aircraft at 150 miles under normal conditions, but had difficulty determining altitude and could only vector interceptors to about three miles from a target before they merged on the scope. One SCR-270 set had arrived on October 1. Set up at Iba, it was tied into the central plotting board by telephone and radio. Additional SCR-270 and SCR-271 sets had also arrived, but most were stored until sites



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could be prepared. The U.S. Marines operated an SCR-268 radar set at the Cavite Naval Yard, but it was not tied into the FEAF system. On December 8, the only fully operational set available to FEAF was the SCR-270 at Iba. The radar system was short of experienced personnel and the lack of time to integrate it into the air defense system and exercise properly gave air commanders little familiarity with or confidence in its capabilities. Despite these deficiencies, however, the air warning system would prove effective on the morning of 8 December.<sup>39</sup>

Mention must also be made of the intelligence capability in the Philippines. The 16th Naval District's "Station Cast" was a major player in the U.S. Navy's radio intelligence crypto analytic effort against the Japanese. Located in an underground tunnel on Corregidor, Cast could read the Japanese Red code, had an analogue machine capable of deciphering the Purple code, and was directly involved in efforts to break the JN-25 fleet code. Based upon radio traffic analysis, Cast reported in October 1941 that the Japanese were on a wartime disposition, provided information on the concentration of shipping for the southern invasions, and paid special attention to Japanese air organization and operations. Admiral Hart was Cast's primary customer, but the Navy shared information with USAFFE through a cumbersome hand-transfer system. Station Cast was unable to provide warning of Japanese actions or intentions for December 8 in time to be of use, but since the Philippines had several hours advanced notice of the events at Pearl Harbor, this failure seems insignificant in retrospect.<sup>40</sup>

Brereton and his commanders were well aware of FEAF's abundant weaknesses. Much had been accomplished toward preparing a combat-ready air force in the five weeks since he had arrived, and given money, resources, and, above all, time, much more could be done. The money and resources were promised and reinforcements were on their way. Time, however, had run out.

Early on November 28, a message from General Marshall announced that negotiations appeared to have been terminated and hostile action could be expected at any moment. This message was meant to be a "war warning," but: "If hostilities cannot, repeat cannot, be avoided the United States desires that Japan commit the first overt act."<sup>41</sup> This statement, Marshall warned, however, was not to be interpreted as restricting legitimate defensive measures, and he directed MacArthur to carry out the tasks assigned in the latest revisions to Rainbow 5 if war broke out. Later that day, Arnold cautioned MacArthur to guard against sabotage and subversive activities. In response to these warnings, Brereton called his commanders to Nielson Field and ordered FEAF on full war alert. He directed that all units, personnel, and aircraft be ready for immediate action, placed blackout conditions in effect, and cancelled leave to Manila for combat units, including the 19th Bombardment Group.<sup>42</sup>

Captain Lewellyn wrote home that war with Japan was inevitable and "our air force, small as it is" is on 24-hour alert, with aircraft reconnoitering half way to Formosa and most of the bombers going to Mindanao, "to get them out of reach of Jap bombers, *just in case*."<sup>43</sup> Lewellyn had to call headquarters every thirty minutes while away with Brereton, and he was with Brereton "morning, noon and night."<sup>44</sup> On December 6, Brereton met with Eubank at Clark and reviewed the 19th Group's plans in case of war. If the enemy approached from the west, the two commanders expected a warning from Patrol Wing Ten; if from the north, their own B-17 reconnaissance flights should provide notification. The photographs of Formosa available were dated, but Takao Harbor presented, in Brereton's words, "the juiciest target to bomb immediately on the outbreak of war."<sup>45</sup>

On the evening of December 7, 1941, Brereton attended a dinner and party at the Manila Hotel thrown for him by the 27th Bombardment Group (Light), the dive bomber unit whose A-24s never reached the Philippines. The men had arrived on November 20, and had been kept busy doing infantry drill, filling sand bags, flying obsolete B-18s, and wondering when their airplanes would arrive. The gathering would later be recalled as a wild affair with "the best entertainment this side of 'Minsky's.'"<sup>46</sup> Brereton, however, was edgy, and few in attendance probably noticed him leaving for a few moments to consult with Sutherland and Rear Admiral William R. Purnell, Admiral Hart's chief of staff, who convinced him that war could come at any moment. Brereton ordered Brady to place all airfields on combat alert at daylight the next morning, which required all pilots to be briefed and the pursuit aircraft ready for immediate take off.<sup>47</sup>

Sometime around 0400, Brereton awoke to the news of the Japanese attack on Pearl Harbor. The call came from Sutherland, and Brereton told him "to tell General MacArthur that the 19th Bomb Group would be ready to bomb Formosa at daylight."<sup>48</sup> Brereton then ordered Brady to notify all air units about the attack and telephoned Eubank to prepare to launch an air strike at daybreak. Brereton began to specify the bomb load, but Eubank advised that it would be better to wait in case of a last-minute switch in targets. It would also be better for the aircraft to be unloaded in case of a sudden emergency. Eubank notified his units at Clark and sent a message to Del Monte, ordering O'Donnell to establish patrols and to alert the airfield guards and airplane crews. A second call from Brereton summoned Eubank to FEAF headquarters. Brereton's staff began preparing for an attack on Formosa. Planning data, although lean on detail, contained enough information to make the mission a practical thrust against FEAF's main targets, Takao Harbor and its naval airfield. While his staff prepared, Brereton reported to USAFFE headquarters where Sutherland told him that

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MacArthur was in conference. A War Department message received at 0530 had confirmed the attack on Pearl Harbor and directed MacArthur to implement the tasks specified in Rainbow 5—the second of which, it will be remembered, was to conduct air raids on Japanese forces and facilities within range of FEAF bases. Prevented by Sutherland from meeting with MacArthur, Brereton urged the chief of staff to approve launching the two squadrons at Clark against Formosa and moving those at Del Monte to Clark for a follow-on attack. Sutherland approved the preparations, but told the airman to wait until MacArthur authorized offensive action. Sutherland continued to refuse Brereton permission to speak directly with MacArthur, but in the face of Brereton's persistence finally went into MacArthur's office. He returned with the answer to wait; USAFFE was not to make an overt act. Brereton responded that to him, at least, Pearl Harbor appeared to be an overt act, but his argument fell on deaf ears. By 0715, Brereton had returned to his headquarters. Captain Ind, passed him in the hall walking "in a short, swift stride"<sup>49</sup> with a pale face and clenched jaw. The frustrated, impatient airman told Brady and Eubank to continue preparations for a reconnaissance of the airfields on Formosa, but to delay the attack.<sup>50</sup>

Meanwhile, unconfirmed reports of Japanese air activities had been flowing into FEAF headquarters. About 0800, Maj. David Gibbs, in charge of the B-17s at Clark in Eubank's absence, ordered them into the air based upon a radar report from the set at Iba Field of an approaching air raid. Of the nineteen bombers, one was hangared for repairs, two were being painted, a fourth was on a reconnaissance mission toward Formosa, and one took off late because of mechanical problems. Most of the bombers dispersed to search areas to the north and west of Luzon, while others remained around nearby Mount Arayat.<sup>51</sup> At 0850, Sutherland called Brereton and reaffirmed the earlier order: "Hold off bombing of Formosa for present."<sup>52</sup>

Over the next hour, confirmed reports of Japanese attacks on Baguio, Tuguegarao, and the airport at Davao reached FEAF headquarters.<sup>53</sup> Since these effectively disposed of the question of an overt action in the Philippines, Brereton called Sutherland at 1000 and resumed his plea for permission to attack Formosa. Sutherland told Brereton once again that all aircraft would be held in reserve and that USAFFE was standing on the defensive. Brereton responded that if Clark Field was destroyed FEAF would be unable to operate offensively, but Sutherland continued to disregard his arguments.<sup>54</sup> By then, the airman was beside himself. "General Brereton was sort of a tiger," Eubank remembered later. "He wanted to do something."<sup>55</sup> Shortly after this call, Brereton sent Eubank back to Clark.<sup>56</sup>

Finally, at 1014, MacArthur telephoned Brereton with permission to attack Formosa.

Brereton responded that his plans at this late hour were to hold the bombers in readiness until he received reports from the reconnaissance mission then being prepared. He may not have told MacArthur, but he intended that Formosa would be attacked in late afternoon whether he received reconnaissance reports or not. At 1020 Brereton sent orders to Vth Bombardment Command: Two B-17 squadrons would attack the airdromes on Formosa at dusk; two squadrons of pursuit aircraft would cover the operation as far as possible; and the two squadrons of B-17s at Del Monte would deploy to the primitive landing strip at San Marcelino ready for a strike against Formosa early the next morning.<sup>57</sup> The B-17s were recalled, and they began landing about 1100. By 1130, three were being prepared for reconnaissance missions while the remainder were being refueled and loaded with bombs—which took about an hour-and-a-half—in preparation for an attack on Formosa "at the latest daylight hour today that visibility will permit."<sup>58</sup>

By this time, it was too late. Most of the pursuit units had scrambled earlier, returned to their bases, and refueled, except for the 17th Pursuit Squadron which recovered at Clark. At 1140, the Air Warning Center at Nielson relayed a report from the radar set at Iba to the Clark Field Communications Center of a group of planes over the China Sea west of Lingayen Gulf. Maj. Orrin Grover, commander of the 24th Pursuit Group, ordered the 3d Pursuit Squadron at Iba to scramble. Part remained over Iba; part covered Manila Bay. Five minutes later a second message reported a hostile flight over Lingayen Gulf about 100 miles north of Clark. Grover ordered the 21st at Nichols Field and 34th at Del Carmen to scramble and cover Clark. Subsequently, however, he diverted the 21st to Manila, while the 34th never received its order and remained on the ground. At 1155, Sutherland phoned Brereton at MacArthur's direction and asked for a report of air operations during the preceding two hours. The airman reported that the two Japanese forces appeared to consist of between 15 and 24 aircraft, but there had been no contact with American units, yet. The Communications Center at Clark continued to receive messages tracking the second Japanese force. At 1215, Major Grover ordered the 17th Pursuit Squadron into the air; however, he also sent this unit to Manila. At 1220, a message from Colonel George at the Air Warning Center ordered the 24th to intercept the Japanese force now approaching Clark. Grover hesitated; the only unit at hand, the 20th Pursuit Squadron, remained on the ground. And in the meantime, apparently none of the warnings from FEAF reached the 19th Bombardment Group.<sup>59</sup>

On Formosa, the Japanese force scheduled to attack Clark early that morning had been grounded by fog. Finally in the air by 0845, the force reached Clark at 1235 expecting to find the field empty. It was not. A combination of circumstances thus presented the Japanese with an

IT IS CLEAR THAT BRERETON, DESPITE LATER CLAIMS TO THE CONTRARY BY MACARTHUR, SUTHERLAND, AND THEIR SUPPORTERS, PRESSED VIGOROUSLY FOR AN AIR ATTACK ON FORMOSA

opportunity that should not have existed, an opportunity that they had no right to expect, and an opportunity of which they took full advantage. In minutes they destroyed twelve of seventeen B-17s and twenty of the twenty-three P-40s at Clark. The remaining five Fortresses were severely damaged. The B-17 on the early reconnaissance mission and the one that had taken off late escaped damage. At the end of the day, only fifty-eight of FEAF's pursuit aircraft remained flyable. The airfields were heavily hit; the radar at Iba was among the facilities destroyed. Total Japanese losses were seven Zeros and one bomber.<sup>60</sup> With these successful strikes, the Japanese eliminated MacArthur's ability to defend the Philippines before a Japanese ship had reached the islands or a Japanese soldier had landed. Once the Japanese had established air superiority, the game was up for the United States Army Forces in the Far East.

An examination of the evidence now available suggests the following. Defensively, FEAF depended on an adequate warning system, immediate communications, and proper decision-making to scramble its pursuit aircraft and vector them to the target. The air warning system, especially the radar set at Iba, responded well on December 8; FEAF had ample warning of approaching Japanese air raids. Messages were relayed quickly and smoothly through Vth Interceptor Command to the 24th Pursuit Group. The communications net below that level performed less well. As noted, the order to launch the 34th Pursuit Squadron never reached Del Carmen, while the 24th Pursuit Group failed to pass warnings of the force approaching Clark to the 19th Bombardment Group, a critical breakdown. Less understandable were Major Grover's delays in scrambling units, especially the failure to launch the 20th Pursuit Squadron following the 1220 order from George, as well as the misdirecting of most of the pursuits to concentrate in the Manila Bay area. It is highly unlikely that FEAF's prewar plans emphasized the defense of the Manila Bay area over its own flying fields, so one must conclude that in the confusion that morning, Grover failed to understand that his primary responsibility should have been to protect the airfields, especially Clark and its bombers. The inferior pursuits and inexperienced pilots probably would not have done well against the Japanese force had they been able to intercept, but hesitation and poor decisionmaking on the part of the 24th Pursuit Group commander prevented them from trying and, thus, ensured the destruction of the bomber force at Clark.

Offensively, it is clear that Brereton—despite later claims to the contrary by MacArthur, Sutherland, and their supporters—pressed vigorously for an air attack on Formosa at daybreak in accordance with the latest version of Rainbow 5, standard U.S. Army Air Forces doctrine, FEAF's prewar planning, and his own aggressive nature. The 19th Bombardment Group was prepared to

attack, but USAFFE refused Brereton's request until mid-morning. The evidence fails to sustain Sutherland's assertion in 1945 that "Holding the bombers at Clark Field was entirely due to Brereton."<sup>61</sup> Second, a statement by MacArthur after the war and his subsequent memoirs clearly show that he reacted contrary to his orders from Marshall, recommendations from Arnold, and the provisions of Rainbow 5. According to MacArthur, reports seemed to indicate that the Japanese force had been hurt badly at Pearl Harbor, and the failure to attack the main facilities on Luzon early on December 8 reinforced that conclusion. Accordingly: "I therefore contemplated an air reconnaissance to the north, using bombers with fighter protection, to ascertain a true estimate of the situation and exploit any possible weaknesses that might develop on the enemy's front."<sup>62</sup> Since the limited range of the U.S. pursuits precluded escort for an offensive mission against Formosa, MacArthur obviously expected to save the bombers to counter a Japanese invasion force, rather than use them against the Japanese bases, a decision in line with prewar Army doctrine. Third, MacArthur always denied knowing of Brereton's proposal for a daylight attack on Formosa.<sup>63</sup> While, this assertion seems unlikely, it might just possibly be true. Richard Sutherland controlled access to MacArthur and it is conceivable that he did not bother the USAFFE commander with Brereton's entreaties.<sup>64</sup> In addition, this episode sheds further light on the later claim that USAFFE had ordered all of the heavy bombers to Del Monte prior to the attack. Sutherland failed to express surprise about 0400 when Brereton briefed him on the status of his force and informed him that FEAF was prepared to bomb Formosa at dawn, and MacArthur certainly knew that B-17s were at Clark when he authorized an attack at 1014 that morning. Subsequent claims of surprise at finding that heavy bombers were on Luzon thus remind one of Capt. Louis Renault's shock at discovering that gambling was taking place in the back of Rick's Café in *Casablanca*.

Above all, an historian of air power comes away from the events of December 8, 1941, with considerable frustration. MacArthur's ground force was unable to confront the enemy until Japanese troops landed in the Philippines and the Asiatic Fleet, outside its few submarines, was too weak to face the Japanese navy. Only FEAF had the offensive capability to strike an immediate blow. MacArthur's failure—or Sutherland's refusal to allow MacArthur—at least to talk face-to-face with the commander of that force during that critical early morning remains inexplicable.<sup>65</sup>

That said, it should be noted that discussions would have made little real difference. No matter what took place in the Philippines in the days leading up to and through December 8, the real problem was the decision to place the B-17s in a vulnerable position without adequate bases,

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warning systems, and defenses. Once the U.S. pursuits lost control of the air, nothing could protect the bombers on the ground. The successful attack on Clark merely accelerated the inevitable. Many in MacArthur's headquarters clearly realized that fact, although it must be recognized that this view was convenient since it exculpated USAFFE decision-making. According to Paul P. Rogers, an enlisted clerk in MacArthur's office: "[Col.] Richard Marshall, a steady soul in times of adversity, remarked to Sutherland. 'Well, Dick, it doesn't make much difference. If we hadn't lost them on the ground at Clark today, we would have lost them later, in the air or on the ground, and it wouldn't have made any difference at all.'" <sup>66</sup> Lt. Col. Charles Willoughby, MacArthur's intelligence chief, later wrote: "The attempt has been made to equate the loss of seventeen bombers at Clark Field with the loss of the battleships at Pearl Harbor. But there is really no comparison; Brereton's pitiful number of planes was never enough to affect the issue in the Philippines, and they would have soon disappeared through attrition even with the most careful husbanding."<sup>67</sup> And Maj. Courtney Whitney concluded that "the air force at MacArthur's disposal was doomed as long as it was provided with no spare parts and confined to so few airfields."<sup>68</sup> Whitney reflected the FEAF perspective as expressed by the 93d Bombardment Squadron commander: "[Clark] was out there like a sore thumb in the middle of the damn plain, with no air warning and no air defense," Capt. Cecil Combs asserted bluntly. "Anything on the ground was a dead duck and you couldn't keep them in the air all the time."<sup>69</sup>

The commanders in Washington appear to have accepted that the prewar gamble had failed. While Arnold never came to terms with the destruction of the B-17s at Clark, he seems not to have blamed Brereton, whom he telephoned two days after the attack. According to the transcript, Arnold was obviously mystified and concerned, but supportive. Brereton's words show both confusion and shock—more than understandable given the events of the previous hours—mixed with a realistic understanding of FEAF's predicament. Impatient and ruthless, Hap Arnold refused to tolerate failure, as even close friends like Lt. Gen. Ira Eaker would discover. Had he attributed the debacle at Clark to the air commander, Brereton's combat career would have ended, as they did for many leaders who Arnold found wanting. Likewise, MacArthur appears not to have blamed his air commander, or at least not until the publication of *The Brereton Diaries* in 1946 intimated USAFFE's failure to act and called for instant, but, quite frankly, not well-taken rebuttal.<sup>70</sup>

Despite poor weather that interrupted operations, the Japanese air forces followed up their initial attacks systematically. On the night of December 8-9, they hit Nichols Field. On December 10, they concentrated on Nielson and

Del Carmen Fields and the Naval facilities at Cavite. The initial Japanese landings on Luzon took place on December 10 at Vigan and Aparri. FEAF's desperate efforts were valiant but futile. When the pursuits went up, they met seemingly endless formations of Japanese fighters; the bombers seldom operated in more than threes and fours. On the ground the airplanes could be hidden but not protected. Maintenance and supply proved problematic, and attrition without replacement doomed the force quickly. By the end of December 11, FEAF withdrew the remaining B-17s to Mindanao. Reduced to twenty-two P-40s and eight P-35s, Vth Interceptor Command abandoned its defensive role and reserved its small force for reconnaissance missions and occasional bombing raids. This decision left Luzon defenseless and meant that the few attacks on the Japanese landings were almost completely ineffective.<sup>71</sup> "December 13 was the day the Japanese really began to hit us," Maj. Gen. Jonathan M. Wainwright, the veteran cavalryman commanding the ground forces on northern Luzon, later wrote. "That was the day I realized, for all time, the futility of trying to fight a war without an Air Force."<sup>72</sup>

Effective control by FEAF headquarters was impossible and on December 23, Brereton requested permission to transfer his headquarters out of the Philippines. He followed this request on the next day with a memo asking for orders assigning him to Australia. Brereton, Sutherland, and MacArthur then met. The result was an order that directed Brereton to move south with his headquarters and quoted almost verbatim the mission Brereton had proposed in his memo earlier that day, which called for his primary effort to be support of the Philippines.<sup>73</sup> Captain Ind saw Brereton just before the latter left:

*I felt that . . . he had possessed a clear vision of the horribly grim experience which faced us, and that he would allow nothing to interfere with his measures of preparation. . . . He had instilled tireless energy into the sluggish forward motion of preparation. . . . General Brereton gripped my hand tightly and, in short chopped sentences, expressed his appreciation of my attention to duty.<sup>74</sup>*

By the end of December, the Japanese had driven the Asiatic Fleet to the Netherlands East Indies, crippled FEAF, isolated MacArthur's troops on Bataan and Corregidor, and landed in Borneo. Hopes for stopping this relentless tide now centered on a hastily-assembled force of American, British, Dutch, and Australians known as ABDACOM under British general Sir Archibald Wavell with U.S. Army Air Forces Lt. Gen. George Brett as his deputy. Brereton became deputy air commander under Air Marshal Sir Richard Peirse.<sup>75</sup>

ABDACOM was short-lived. The other allies could offer little in the way of modern aircraft,

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Brereton's headquarters near Bandoeng Field, Java, following a Japanese air raid probably on February 19, 1942. (Photo courtesy of Robert J. Llewellyn, Pebble Beach, California.)

## ABDACOM SIMPLY LACKED THE FORCES TO DEAL WITH THE RAMPAGING JAPANESE ARMY AND NAVY

and Brereton's force comprised a few beat-up survivors from the Philippines and a trickle of new aircraft and units largely manned by inexperienced crews. Conflicting objectives hampered operations. The Dutch were concerned with the defense of Java itself and begrudged any diversions. British concerns about Singapore, Malaya, and Burma drew them to the west. Australians feared an attack on their homeland, thus concentrating their attention to the east. The Americans shared this concern, while Brereton remained deeply committed to succoring MacArthur's forces on Bataan.<sup>76</sup> While the conflicting objectives caused confusion and hampered operations, they had little impact on the final results of the campaign. ABDACOM simply lacked the forces to deal with the rampaging Japanese army and navy.

For Brereton, whose headquarters moved to Java on January 18, it was a miserable time. He could neither respond quickly to the rapidly changing situation nor adequately direct the operations of the small number of bombers at his disposal. His meager staff included ground officers filling in temporarily. He could do little to help MacArthur and saw no way to defend Java.<sup>77</sup> Horace M. Wade, who flew a Consolidated LB-30, an export version of the B-24 "Liberator," across North Africa to Bandung, Java, found nothing but confusion:

*It appeared to me that the instructions that came down on what we were supposed to do didn't reflect the real true course of the military campaign that was going on out there. . . . It didn't look to me that we were going to be effective. We didn't have support. We didn't have parts for the airplane. We were not doing good bombing. We didn't have good supervision. People were scared. That's the situation we were in.*<sup>78</sup>

Eleven weary survivors from the 19th Bombardment Group made up the initial Java contingent. Reinforcements dribbled in. Six B-17s and four LB-30s of the 7th Bombardment Group arrived beginning about mid-January. By February 1, fifteen more B-17Es and four LB-30s had reached Java, many flying the long route from the west across Africa. Ultimately at least sixty-five B-17s, B-24s, and LB-30s reached Java counting those flown out of the Philippines. During its short existence, ABDACOM dispatched over sixty bombing missions, comprising more than 300 individual sorties, an average of about five aircraft per attack. Weather, distance, inexperience, and mechanical breakdown proved almost insurmountable barriers, and over 40 percent of the aircraft failed to reach their targets. Trained maintenance personnel, facilities, tools, and parts were in short supply. As in the Philippines, losses on the ground demonstrated ABDACOM's inability to defend its air bases. The bomber force lost six aircraft in combat, six in air accidents, and twenty-six on the ground. An inadequate air warning system and shortage of anti-aircraft weapons and pursuit aircraft doomed defensive efforts. The shortage of ships meant that many of the new pursuits were assembled in Australia and flown to Java, and the combination of weather and inexperienced pilots contributed to a high attrition rate.<sup>79</sup>

Problems with supply were so critical that on January 26, Brereton sent a message to the War Department proposing that all of Australia be placed under ABDACOM, not just the northwest area. Brereton's efforts appear to have been directed at Maj. Gen. Julian F. Barnes, in command on the east coast of Australia, who, Brereton felt, was failing to furnish the logistical support required. Brereton's proposal met with some consternation in Washington, D.C., however. Though unity of air command in Australia was logical, Brereton's recommendations appeared to indicate a desire to shift the main U.S. effort away from defense of the Malay Barrier. Marshall emphasized that it was the War Department's goal to defeat the enemy through a unified effort under General Wavell, and Brereton's responsibility was to carry out Wavell's orders. Marshall assured Brereton that he could make "direct and authoritative" calls on General Barnes for logistical support. At the same time, Marshall reminded Barnes that his mission was to support Brereton to the utmost.<sup>80</sup>

Personnel problems went deeper than shortages and inexperienced men. On January 25, Colonel Brady, now Chief of Operations, ABDACOM, and Commander of U.S. Army Air Forces in Java, criticized the "lack of discipline and sense of responsibility on the part of Air Corps commissioned officers" who failed to care for their men, equipment, and ordnance. They were, Brady complained, helpless without a "full base installation with unlimited Air Corps supplies, machine shops, etc. to function."<sup>81</sup> Brett agreed and added

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that he and Brereton were concerned about “a general attitude of trying to find how not to do it, instead of doing it.”<sup>82</sup>

February 8, 1942, may have been the lowest point of the war for Brereton. Reading the hand-writing on the wall, he recommended that FEAF withdraw from Java, counsel criticized thoroughly as defeatist by both Wavell and Brett. This episode, differences with Air Marshal Peirse over operations, and the need to deal with the low morale and poor condition of his own air force, led Brereton to request his relief from ABDACOM. His request denied, he soldiered on for the two weeks or so that remained. On February 15, Singapore fell. The Japanese already held Borneo and the Celebes and had begun the invasion of Sumatra. Japanese forces occupied Bali on February 19, and on the same day bombed Darwin, heavily damaging its airfields and port facilities.<sup>83</sup> With Java isolated, ABDACOM was finished, and Wavell telegraphed the news to Prime Minister Winston Churchill on February 21:

*I am afraid that the defence of ABDACOM area has broken down and that defence of Java cannot now last long. . . . It has always hinged on air battle and once [the] weaker air force is outmatched beyond certain proportion its elimination is rapid. I am afraid our air force owing to losses of last few days and failure of reinforcements has reached this stage. Anything put into Java now can do little to prolong the struggle.*<sup>84</sup>

On February 22, Marshall ordered Brereton to send his airplanes out of Java and authorized him to go either to Australia or India. Wavell held his last conference on February 23 and afterward told Brereton in private that he hoped that Brereton would assume command of the U.S. air forces in India. Arnold preferred that Brereton remain in Australia with Brett to supervise the U.S. buildup. These last instructions apparently arrived too late, however. Brett and Brereton had concluded that the way to victory led through China, and, as airmen, they were tired of operating from places that could easily be outflanked. On February 24, Brereton departed for the China-Burma-India (CBI) theater. “I was glad to leave,” he later wrote: “My desire for some time had been to give the [Japanese] territory and get back where we could reorganize the striking forces, and I didn’t care whether it was India or Australia. Brett gave me my choice and I picked India, maybe because I was sick of islands, even one as big as Australia.”<sup>85</sup>

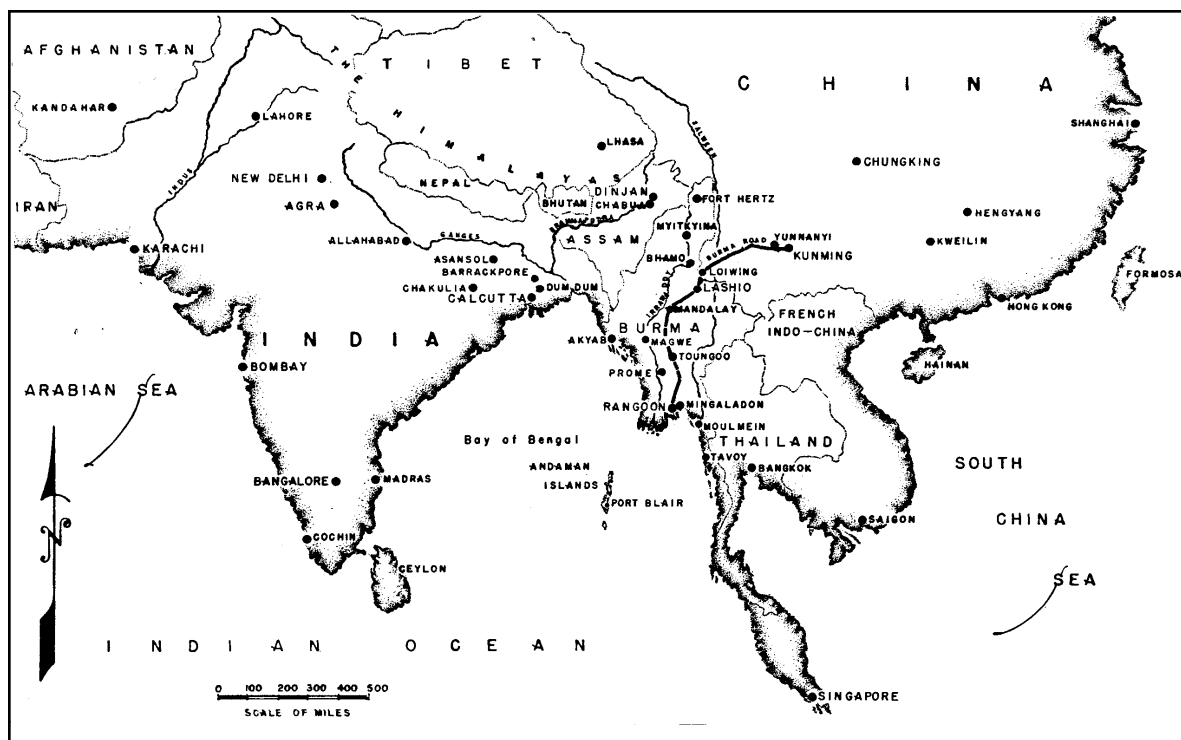
The final air evacuation of Java began on February 25, and on March 2 the last five B-17s and three LB-30s took off for Australia.<sup>86</sup> Rosie O’Donnell’s diary for February 25 summarized everyone’s attitude. “Hell of a feeling to pull out on the Dutch who to my mind [are] one grand people. But our position is untenable for heavy bombardment. Lost 14 planes on the ground in

the last four days & its [sic] just a question of a few days until all will be lost.”<sup>87</sup> Historians Wesley Craven and James Cate later summarized the effort in Java succinctly: “So ended, in still another terrifying demonstration of the cost to those who allow control of the air to pass to their enemies, the air phase of the Java campaign.”<sup>88</sup> For Brereton, the evacuation of Java ended with a touch of humor. In Colombo, he and his party put up at the Galleface Hotel. The pilots had brought out nothing but the clothes on their backs, so Major Cecil F. Combs asked Brereton for money. Brereton divided \$150 between the six or seven men. Combs returned to the air field where he found that the pilot of a newly arrived B-17 was carrying \$250,000 entrusted to him in the United States. Combs signed for the money, then: “I took the \$250,000 and went down and knocked on Louie’s door. He was shaven and having a drink. I said, ‘You stingy old son of a bitch. Here is \$250,000.’ I threw it down on the floor in front of him. I got the biggest kick out of it. I knew that he would forgive my language when I said \$250,000.”<sup>89</sup>

From Ceylon, the party flew to New Delhi, where a reinvigorated Brereton plunged into action again. He first accompanied Wavell on a two-day tour of the theater to view the rapidly deteriorating situation. On March 5, he assumed command of Tenth Air Force with a combat force that comprised eight heavy bombers and their crews. From March 8-13, the bombers served as transports, hauling 474 troops and 29 tons of supplies into Burma and evacuating civilians. Additional forces began to assemble. Three ships reached Karachi on March 13 with the ground echelon of two squadrons from the 7th Bombardment Group, the 51st Air Base Group, personnel from the 51st Pursuit Group, and ten P-40s.<sup>90</sup> “Such were the meager beginnings of an organization,” wrote Craven and Cate, “forced to operate at the end of a longer supply line than that of any other existing American air force, over distances within its theater that exceeded considerably those embraced by the bounds of the United States, and in an area possessed of few of the industrial facilities upon which air power is directly dependent.”<sup>91</sup> Tenth Air Force was Brereton’s “third extraordinarily difficult assignment” of the war. From the beginning, he lacked aircraft, personnel, facilities, and resources and he had to improvise a force in the face of the Japanese avalanche engulfing Burma. He did not even command the most combat-capable air unit in the theater, Claire Lee Chennault’s American Volunteer Group, the “Flying Tigers.”<sup>92</sup>

Brereton had a clear picture of what he wanted to accomplish. “Tenth Air Force,” he told his new boss, Lt. Gen. Joseph W. Stilwell, “would not be committed piecemeal nor employed until its operational training was completed. I had had enough of fighting in dribbles. I insisted on building a striking force with a punch to it.”<sup>93</sup> Stilwell appeared to concur with Brereton, and his orders

**BRERETON'S ACTIONS OVER THE NEXT FEW MONTHS SOON BROUGHT HIM INTO CONFLICT WITH THE TWO GREAT AMERICAN WARLORDS OF THE CHINA-BURMA-INDIA THEATER**



to his air commander were clear: get results, ensure American command, use his own judgment, and let him know if he needed help. Both men agreed that Burma was the first priority for the U.S. forces in the theater.<sup>94</sup> Despite this favorable first meeting, however, Brereton's actions over the next few months soon brought him into conflict with the two great American warlords of the China-Burma-India theater: Stilwell, who was building a Chinese-American ground force to fight in Burma, and Chennault, who had the ear of Chiang Kai-shek and was building an air force to fight in China.

Brereton established his temporary headquarters in a string of offices in the RAF headquarters at New Delhi near the Viceroy's palace. To get space for himself and his men, Brereton was forced to ask the Viceroy of India, Lord Linlithgow, to requisition rooms from British residents, to the great resentment of the dispossessed colonials. He lived in a comfortable, high-ceilinged, two-room suite in the Imperial Hotel. For a combat force, Brereton projected the need for one group of B-17 heavy bombers, one group of twin-engine North American B-25 "Mitchell" medium bombers, and the 51st Pursuit Group equipped with the latest model P-40F. He also wanted Tenth to absorb a detachment of thirty B-24s commanded by Harry Halverson on its way to China to bomb Japan, as well as the Flying Tigers, which would be reorganized as the 23d Fighter Group. These plans were the future, however, and Brereton would see few of these forces arrive. The War Department envisioned limited air forces in India, while other theaters, far more critical than the CBI, were demanding aircraft as they came off the assembly lines. Even the majority of those sent to India failed to arrive

for a variety of reasons. When Brereton flew the entire bomber force of Tenth Air Force to Egypt in June, he took with him a force not appreciably larger than the six bombers he brought from Java in March.<sup>95</sup>

On March 6, Brereton reported to Arnold that it was essential for him to have the latest information in U.S. war plans for the China-Burma-India Theater. In the meantime, he had been consulting with Wavell and his staff. General Wavell promised full support for any size air force that the Americans commit in India, and agreed with the concept of operations that called for action to the northeast through China to Japan under General Stilwell. The proposed operations required an immense American line of communications, and Brereton had already directed establishment of an operational training area in the Karachi area and had diverted a convoy carrying P-40s and other equipment to that port. The British, however, opposed extensive American infrastructure around Karachi, because they had their own plans for the area. As an alternative, Brereton would shift the main effort for Tenth Air Force to Bangalore where the rainy season would pose less of a problem and sufficient room was available for airfields. Brereton regarded the question of a ferry route across India to China as critical, and assigned Colonel Brady to the task because, according to Brereton, he was "lacking in tact and is much better situated in the solution of difficult problems such as this, than for contacts requiring diplomacy and smooth working."<sup>96</sup> Airfield, technical services, and maintenance problems were overwhelming. He asked that Brig. Gen. Elmer E. Adler from the Middle East be sent to help. Finally, Brereton reported that he had developed good relations with Stilwell, who com-



Major General Brereton, Commander, Ninth Air Force, and Brig. Gen. Elwood R. "Pete" Quesada, Commander IX Fighter Command, at the latter's headquarters in England in early 1944. (Photo courtesy of George Kirksey Collection, Special Collections and Archives, University of Houston Libraries.)



**BRERETON HAD EVERY CONFIDENCE THAT HE COULD SUPPORT HIS BOSS, BUT, PROPHETICALLY, HE ANTICIPATED THAT SOONER OR LATER HE WOULD HAVE TO MAKE A MAJOR DECISION THAT WOULD CONFLICT WITH STILWELL'S INTENTIONS**

manded a huge area with responsibilities spread in many directions. Communications between Burma and India were primitive, however, and they were frequently out of touch. Brereton had every confidence that he could support his boss, but, prophetically, he anticipated that sooner or later he would have to make a major decision that would conflict with Stilwell's intentions.<sup>97</sup>

Brereton followed his March 6 letter with a more personal "Dear Hap" missive, which reported that Karachi's air and port facilities were adequate. To his request for Adler, he added several other key personnel including future generals Nathan Twining and Earle Partridge. He also wanted the authority to award medals to his men and asked that FEAF to be cited in War Department orders for its valiant but doomed fight. In more personal matters, Brereton asked for a generous amount of expense money so he could impress the British and maintain a steady supply of American cigarettes for his men. He also asked that Arnold support the Distinguished Service Medal that Brett had recommended for him. Arnold helped Brereton to the full extent of his power. He asked the War Plans Division to send complete instructions to Brereton and to transfer Adler to India. He strongly recommended that Brereton be designated as Stilwell's deputy, enabling him to address his problems in India from a position of greater authority. Arnold also placed \$10 million at Brereton's disposal, and reported that he was pushing for a citation for FEAF and the Distinguished Service Medal for Brereton. Other matters were out of his hands, however. Twining and Partridge were needed elsewhere, and only the theater commander could award medals, so that authority was reserved for Stilwell. Likewise, Stilwell had the

power to appoint Brereton as his deputy and Arnold was urging that action, unsuccessfully as it turned out.<sup>98</sup>

Brigadier General Adler and two assistants reached India on April 26 where they activated an Air Service Command on May 1. The convoy diverted by Brereton reached Karachi two weeks later with supplies and personnel, and many of the latter went to the Air Service Command enabling it to begin operations. Newly-promoted Brigadier General Brady took charge of establishing a reception, classification, and training center that became one of the major Army Air Forces centers in the Far East, and Brig. Gen. Raymond Wheeler arrived to organize port facilities and establish a theater supply system. The ground elements that arrived from Australia provided personnel for the training center and Brereton held the P-40s that reached India at that location for additional preparation and training. Brereton's new chief of staff, Brig. Gen. Earl L. Naiden, drafted plans for two transport commands: Trans-India connected Karachi with Dinjan in Assam, while Assam-Burma-China operated between Dinjan and Loiwing in China by way of Myitkyina in Burma. Brereton wanted the ferry route assigned to Tenth Air Force, but Marshall responded in early April that it would be administered centrally by what would become Air Transport Command. Col. William D. Old took temporary command of the Assam-Burma-China route. His first job was to ensure the delivery of 30,000 gallons of gasoline and 500 gallons of lubricants to China for the use of Jimmy Doolittle's raiders, already at sea on the carrier *Hornet*.<sup>99</sup>

But progress was slow, and not the least of the challenges Brereton faced were the British colo-

Lieutenant General Brereton, Commander, First Allied Airborne Army, and Maj. Gen. Paul L. Williams, Commander, IX Troop Carrier Command. (Photo courtesy of Robert J. Llewellyn, Pebble Beach, California.)



**AS THE HIGHEST RANKING ARMY AIR FORCES OFFICER TO FLY A COMBAT MISSION TO THAT DATE, BRERETON RECEIVED THE DISTINGUISHED FLYING CROSS**

nial leaders, military and civilian, who seemed to have difficulty accepting that there was a war on and that the Japanese were at the gate. Lewellyn wrote on March 20 that Brereton was getting fed up with the British “and I am looking for an explosion as far as he is concerned any day now. I don’t see how he has managed to control himself as well as he has.” And, again, he opined that, “The worst thing about winning this war, when and if we do, is that we will keep the British from getting the hell whipped out of them at the same time.”<sup>100</sup>

Tenth Air Force flew its first two combat missions on the night of April 2. The one against Rangoon aborted when one of two B-17s crashed on takeoff killing the entire crew, including Norman Lewellyn. The other turned back for mechanical problems. Brereton personally led the second mission, two B-17s and one LB-30, against the Andaman Islands. The target was somewhat questionable. Before takeoff, Brereton briefed the crews that the Japanese fleet might be at Port Blair, or it might be their own fleet for all the British knew. Combs responded that he had never seen the Andaman Islands, so they should go anyway. Brereton flew as Combs’s copilot. The little force found Japanese ships at Port Blair and claimed hits from 3,500 feet on a cruiser and transport. Two bombers were damaged, but all returned to base safely.<sup>101</sup> Clare Boothe Luce described a belligerent Brereton “wearing a broad and beatific grin” as he emerged from his bomber. “Boys,” she quoted him as saying, “bombing Japs makes me feel *damned* fine.”<sup>102</sup> As the highest ranking Army Air Forces officer to fly a combat mission to that date, Brereton received the Distinguished Flying Cross, while the other members of the crew were generously decorated. Brereton actively sought the decoration. “About

the only fun a professional soldier looks forward to outside of killing people, is to pin a ribbon on his belly,” he wrote his friend Maj. Gen. George Stratemeyer in his most bellicose style. “Besides it adds prestige in allied circles, were [sic] we are outranked at every corner.”<sup>103</sup>

The Andaman Islands raid surprised Stilwell, who expected missions flown by Tenth Air Force to be devoted to supporting him in Burma and that all decisions be made through him as theater commander. Brereton, in turn, was disturbed that Stilwell expected the heavy bombers only to support operations in Burma. In his view, he had a responsibility to support the British when necessary or opportunity arose. Port Blair, he reported to Arnold in justification, was a supply base for the Japanese army in Burma and as well as naval forces in the Bay of Bengal. The RAF lacked the range to reach the target, conditions for a night operation were ideal, and enemy opposition was ineffective. The raid had not only done material damage, he told Arnold, but its effect on British and American morale more than justified the effort. Marshall commended Brereton for his aggressive blow, but cautioned him that he must operate within Stilwell’s orders. Subsequently, on April 15 Marshall advised Stilwell that Tenth Air Force would cooperate with the British in the Bay of Bengal. This decision violated the principle of unity of command, however. Finally, on May 24 Marshall declared that Tenth was completely under Stilwell’s command as the senior U.S. officer in the theater. In the meantime, however, the controversy placed Brereton in a delicate situation with relation to Stilwell, who already distrusted him.<sup>104</sup> One of Brereton’s strengths was that he worked extremely well with the British. He especially liked Wavell, whom he considered to be “the finest general I have ever met.”<sup>105</sup> The

**MARSHALL COMMENDED BRERETON FOR HIS AGGRESSIVE BLOW, BUT CAUTIONED HIM THAT HE MUST OPERATE WITHIN STILLWELL’S ORDER**

Lieutenant General Brereton, Commander, First Allied Airborne Army, (seated), and (left to right) Lt. Gen. F.A.M. "Boy" Browning, Deputy Commander, First Allied Airborne Army, Brig. Gen. Floyd Parks, Chief of Staff, First Allied Airborne Army, and Maj. Gen. Matthew B. Ridgeway, Commander, XVIII Airborne Corps. (Photo courtesy of George Kirksey Collection, Special Collections and Archives, University of Houston Libraries.)



**BRERETON ALSO RAN INTO TROUBLE WITH CHENNAULT, WHO DEMANDED EVERY AIRPLANE, DROP OF GASOLINE, AND PIECE OF EQUIPMENT IN THE THEATER FOR HIS OWN USE**

austere, acerbic Stilwell, on the other hand, despised all but a handful of "Limeys" and distrusted Americans who were popular with them. Brereton had adopted British uniforms after losing his own in the Philippines, and his staff wore them for comfort in the steamy conditions of India. This affectation probably bothered Stilwell, who criticized Brereton for carrying a riding crop, a symbol of personal authority in India, and having an "oriental rug" on the floor of his airplane.<sup>106</sup> All in all, "Vinegar Joe" Stilwell viewed Brereton as a little too "British" and much too "Raj." "My impression," he wrote Marshall, "is that Tenth Air Force dug in at New Delhi and acquired an orientation nearer to British problems rather than towards the China theater."<sup>107</sup> For this he blamed the Tenth's commander. Had Brereton stayed in the CBI, it is doubtful that he could have remained on good terms with his boss.

Brereton also ran into trouble with Chennault, who demanded every airplane, drop of gasoline, and piece of equipment in the theater for his own use. Anyone who denied resources to this dedicated, single-minded air warrior was a black-hearted, back-stabbing traitor, and Brereton's decision to retain pilots and aircraft in India for training instead of immediately sending them to China fit that criteria. There was justice in both positions. Chennault was nose-to-nose with the enemy, fighting superior forces with whatever resources were available, and he needed men, planes, supplies and equipment immediately. Additionally, Chiang Kai-shek was suspicious about the planned induction of the AVG into Tenth Air Force, fearing that the British might convince Brereton to use the new 23d Pursuit Group in India and leave China without air support. On the other hand, Brereton's refusal to trickle inexperienced and poorly-trained men and

small numbers of planes into combat where they would be chewed up in detail was based upon extensive, recent experience. And as Burma collapsed, Brereton recognized that the fall of India would end any hope of fighting in China. Thus, the defense of India had to be his first priority, another view that placed him in conflict with the commander of the Flying Tigers and his sponsor.<sup>108</sup> As in the case of the situation with Stilwell, had Brereton remained in command of Tenth Air Force, he probably would have run into serious trouble with Chennault and the Generalissimo, and through them, with President Franklin D. Roosevelt himself.

By mid-June, when the monsoon season set in, Brereton had made considerable progress. Though he still lacked a strategic plan from Washington, he had determined that his first priority was to gain control of the air in Burma. In furtherance of this goal, Brereton planned to base most of his short-range fighter units in China. Medium bomber units would base in southern China and eastern India where they would be effective against Japanese air bases in northern Burma. The heavies he planned to operate from India. Tenth Air Force had grown to about 600 officers and 5,000 men, and it had begun to shift its combat weight eastward, although Brereton warned Arnold that until he could prepare more bases Tenth Air Force would continue to operate at extreme range, reducing the intensity of its attacks. For the time being, the 11th Bombardment Group (Medium) and four squadrons of fighters, three from the AVG and one from the 51st Fighter Group, were based at Kunming. The 7th Bombardment Group's two squadrons were at Allahbad in India. The 22d Bombardment Squadron (Medium) had reached Andal where it was expected to begin operations

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TOOK PLACE  
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COMMAND**

**... BRERETON  
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PROMOTED  
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COMMANDED  
THE NINTH  
AIR FORCE  
WHEN IT  
PROVIDED  
TACTICAL  
SUPPORT  
FOR  
OPERATION  
OVERLORD**

after the monsoons. And the advanced echelons of the remaining squadrons of 51st Fighter Group were at Dinjan waiting for their aircraft. Additionally, the transport aircraft and pilots of the Assam-Burma-China Ferry Command had already delivered over 2,000 tons of supplies to Burma and China, pointing the way to what would become the heroic airlift from India to China, the fabled "Hump." Brereton's major immediate problem, he wrote Arnold, was a shortage of engines, which as of June 24 had grounded all of his B-17s and was threatening to do the same to the transport aircraft. Brereton wanted engines shipped to him by air instead of by sea, and for the Middle East Theater to quit stealing them as they passed through on their way to India.<sup>109</sup>

On June 20, Wavell received a message from Gen. Sir Claude Auchinleck in Cairo, notifying him that German general Erwin Rommel had defeated the British Eighth Army, which was in full retreat to Egypt. On June 23, Marshall ordered Brereton to the Middle East with every available heavy bomber. On June 26, Brereton left India, followed by the men and planes of the 9th Bombardment Squadron—one LB-30, four B-24s, and four B-17s—all that could be prepared thanks to the engine shortage.<sup>110</sup> Once more Lewis Brereton was pitchforked into a desperate situation with a potential for disaster. His response was grim, but upbeat: "[It] sounds like another tough job," he wrote Arnold. "However, that's what we're out here for."<sup>111</sup> As he departed India, Stilwell provided a reasonably objective evaluation, rating him "excellent" with a "thorough and practical" knowledge of his profession. He acknowledged differences with Brereton, but stated that they had been resolved, and he placed Brereton in the middle third of the air generals that he knew, although under supervision he rated him in the upper third. In summary, Stilwell called Brereton "an aggressive fighter and therefore of great value."<sup>112</sup> Despite his favorable comments, however, it is clear that Stilwell believed that the British had coopted Brereton, and he did not want him to return to the CBI should his assignment to the Middle East prove temporary. Stilwell argued for, and eventually got, a more compliant Clayton Bissell as commander for Tenth Air Force despite Arnold's objections and Marshal's concerns.<sup>113</sup>

The war finally turned around for Brereton in the summer of 1942, as indeed it did for the Allied cause. Two dates stood out for him personally. On July 4, 1942, he was at British headquarters when Auchinleck ordered the Eighth Army to counterattack Rommel at El Alamein. "This day will long be remembered by me," Brereton wrote. "It was the first time in the war that the question of moving forward not backward, has been raised."<sup>114</sup> And on July 18, Brereton sent a letter to General Arnold vastly different from his previous communications. "I'll bet he'll be glad to get this one," he commented, "because it's the first

time I haven't asked him for a damn thing."<sup>115</sup>

Subsequently, Brereton organized and led the Ninth Air Force, which was closely associated with British Eighth Army's victories over the Germans and Italians beginning with El Alamein. In August 1943, Operation Tidalwave, took place under Brereton's command. Plans for the low-level bombing raid on the Ploesti oil refineries in Rumania originated in the Air Staff, but Brereton determined that the attack would originate from Libyan rather than Syrian bases, trained the bomber force, and ably defended the controversial low-level concept.<sup>116</sup> From the Mediterranean Theater, Brereton went to England. Promoted to lieutenant general he commanded the Ninth Air Force when it provided tactical support for Operation Overlord, the D-Day landings, and Operation Cobra, which opened the door to France for the Allied armies. At its peak strength, Ninth Air Force was the largest tactical air force in history, comprising 4,000 aircraft and almost 180,000 personnel.<sup>117</sup> Subsequently, he took command of the 1st Allied Airborne Army. Under Brereton it conducted Operation Market-Garden, the airborne assault in Holland in September 1944, and Operation Varsity in support of Field Marshall Sir Bernard Montgomery's massive crossing of the Rhine River in the spring of 1945.<sup>118</sup> After Market-Garden, 1st Allied Airborne Army went into eclipse. There was little purpose in holding well-trained airborne divisions and experienced air transport groups in reserve when they were desperately needed in France. Brereton thus finished the war outside the limelight.<sup>119</sup> Following World War II, he served in several positions, most notably as the senior U.S. Air Force representative on the military liaison committee of the Atomic Energy Commission, during which he and General Stilwell participated in Operation Crossroads, the atomic bomb tests at Bikini Island in 1946. Brereton retired on September 1, 1948, and he and his third wife later settled in Florida.<sup>120</sup> He died unexpectedly on July 19, 1967, following surgery.<sup>121</sup>

The evidence examined for this article suggests that Lewis Brereton was a capable commander and effective leader, but not a great general. He was a solid product of the U.S. military system prior to World War II, and as such was neither a star performer nor mediocre failure. He fits into that large middle ground of competent but unspectacular American officers who brought victory in World War II. Brereton had important strengths. In both world wars, he proved himself a brave, aggressive, and candid officer. Gen. Carl Spaatz justly described him as "personally fearless, forthright and given to firm and direct expression of his opinions regardless of the consequences to himself."<sup>122</sup> His effort to get the 12th Aero Squadron into action has been detailed, as has been his willingness to fly hazardous missions. The DSC he won as a Corps Observation Wing commander 1918, was well-earned, and the

Andaman Islands raid in 1942 showed he had not lost this pugnacity. He coupled aggressiveness with considerable leadership ability, especially at squadron and group level where the force of his personality could have immediate impact. His ability to impress his personality on larger commands was evident in FEAF's increased pace of preparation during the few short weeks prior to the Japanese attack. Brereton's superiors recognized these attributes, and throughout his officer evaluations is the refrain: "Best suited to operations in the field with troops."

Brereton was an intelligent airman who knew his business, and a competent planner and administrator. Gen. George Kenney opined, on the other hand, that Brereton lacked the attention to detail necessary in a great commander.<sup>123</sup> This conclusion seems illustrated in the Philippines where he left much of the details to subordinates Brady, George, and Eubank. Mitigating factors, however, must be considered. For one, this was standard U.S. Army practice under which a commander set larger goals and left implementation to subordinates. For another, Brereton had limited experience with pursuit aircraft and heavy bombers and

naturally tended to defer to his specialists. Further, George and Eubank, had been in the Philippines longer and had greater familiarity with local conditions. Finally, his absence from the Philippines for two of the five weeks prior to the Japanese attack must be remembered. Despite these points, however, Brereton's surprise at the parking arrangements for the B-17s at Clark on his return from Australia and the breakdown of command and control under the 24th Pursuit Group on December 8 suggest a need for greater attention to operations one and two levels of command below Headquarters FEAF. This, perhaps, was his failing.

Brereton was neither an innovator nor original thinker like Kenney and younger men such as Curtis LeMay, and Elwood "Pete" Quesada, who had yet to make their mark in 1942. The plans made and actions taken by FEAF reveal a logical, but conventional approach to the extraordinary problems faced in the Far East. Brereton also lacked the breadth of view that would distinguish such senior air commanders as Hap Arnold, Carl Spaatz, and Frank Andrews. His proposal that all U.S. air forces in Australia be placed under his command in February 1942, recommendation later in the month that FEAF abandon Java, and attempt to obtain autonomy for Tenth Air Force in India suggest a commander concerned more with his own immediate problems than the larger picture of conflict expected of a theater commander.

On a personal level, Brereton was loyal to but did not curry favor from his superiors, while his well-documented tendency to blunt speech probably cost him support from peers. There is little evidence that Brereton was a headquarters operator or "water-cooler general." Throughout his service against the Japanese, he was a whirlwind of action and intensity. Some contemporaries later claimed that he treated his work too casually, and this view has been echoed by a few writers who have cited Brereton's alleged indolence as the cause for failures under his command. The historical record, through June 1942, fails to support such a view. On the other hand, it is clear that the general appreciated his comforts, liked women, and loved a good party. He drank. "Am on the wagon," Lewellyn wrote his wife in November 1941. "Finally decided I couldn't keep up with Louie."<sup>124</sup> But the old officer corps was often a hard-drinking crew, and evidence has yet to emerge that alcohol affected his performance during the war. Peacetime was another matter. During the 1920s, Brereton appears to have suffered from the ennui that afflicts many successful veterans of combat, combined in his case with serious problems in his marriage. These interrupted his career in 1927, as described in Part I, and probably damaged his reputation permanently. Everyone knew everyone in the Old Army and long memories were common. A reputation once gained was usually impossible to shed.

In the long run, however, it was Brereton's mil-

At the end of World War II, according to writer Hanson Baldwin, Lt. Gen. Lewis Hyde Brereton was "one of the Air Forces' best known and most controversial figures."



itary ability that mattered, and in that regard, Cecil Combs—who flew Wavell out of Java, flew the Andaman Islands raid, served on the Ninth Air Force staff in North Africa, and ultimately retired as a major general—provided perhaps

the best epitaph. Many years later, Combs described the feisty little airman as “a cocky, aggressive, intelligent, experienced, pretty damn able commander.”<sup>125</sup> n

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11. Lewis H. Brereton, *The Brereton Diaries: The War in the Air in the Pacific, Middle East and Europe, 3 October 1941-8 May 1945* (New York: William Morrow and Company, 1946), p. 3.
12. Roger G. Miller, “A ‘Pretty Damn Able Commander’ Lewis Hyde Brereton: Part I,” *Air Power History* (Winter, 2000), pp. 4-27; Brereton, *The Brereton Diaries*, pp. 3-5, 18; Richard G. Stone, “Climbing the Brass Pyramid: How American World War II Generals Got Their Stars” (Paper Presented at the Ohio Valley Historical Conference, Cookeville, Tenn., Oct. 22, 1999), pp. 2-3.
13. Oral History, “Lewis H. Brereton,” Nov. 30, 1956, Rollins College Library, Winter Park, Fla.
14. Brereton, *The Brereton Diaries*, pp. 3, 5-11; Memo, Lt. Col. Claude Duncan, Sec., Air Staff, to Gen. Marshall, Oct 22, 1941, Box 88, Papers of Henry H. Arnold, Library of Congress (LC); Bartsch, “Was MacArthur Ill-Served by His Air Force Commanders in the Philippines?” p. 49.
15. Ltr, Capt. Norman J. Lewellyn to wife and family, Oct. 18, 1941; Ltr, Lewellyn to wife, Oct. 26, 1941; Ltr, Lewellyn to wife, Oct. 29, 1941; Ltr, Lewellyn to wife, Nov. 6, 1941; Ltr, Lewellyn to parents, Nov. 11, 1941 (Courtesy Robert Llewellyn, Pebble Beach, California.); Brereton, *The Brereton Diaries*, pp. 11, 15, 17; “Memorandum Reference Activities in Philippine Islands,” Dec. 18, 1941, Box 20, Papers of Henry H. Arnold, LC; Brereton, *The Brereton Diaries*, pp. 19-20. Mr. Llewellyn later changed the spelling of his last name from that used by his father.
16. Ind, *Bataan*, p. 65.
17. Ltr, Lewellyn to his wife, Nov. 6, 1941, (Courtesy Robert Llewellyn, Pebble Beach, California.).
18. “Memorandum Reference Activities in Philippine Islands,” Dec. 18, 1941, Box 20, Papers of Henry H. Arnold, LC.
19. Brereton, *The Brereton Diaries*, pp. 19-20; Bartsch, *Doomed at the Start*, p. 27.
20. Ind, *Bataan*, pp. 65-68; Craven and Cate, *The Army Air Forces in World War II*, I, pp. 185-86; Walter D. Edmonds, *They Fought With What They Had: The Story of the Army Air Forces in the Philippines, 1941-1942*, reprint (Washington, D.C.: Center for Air Force History, 1992), pp. 37-38.
21. Ltr, Lewellyn to parents, Nov. 11, 1941, (Courtesy Robert Llewellyn, Pebble Beach, California.).

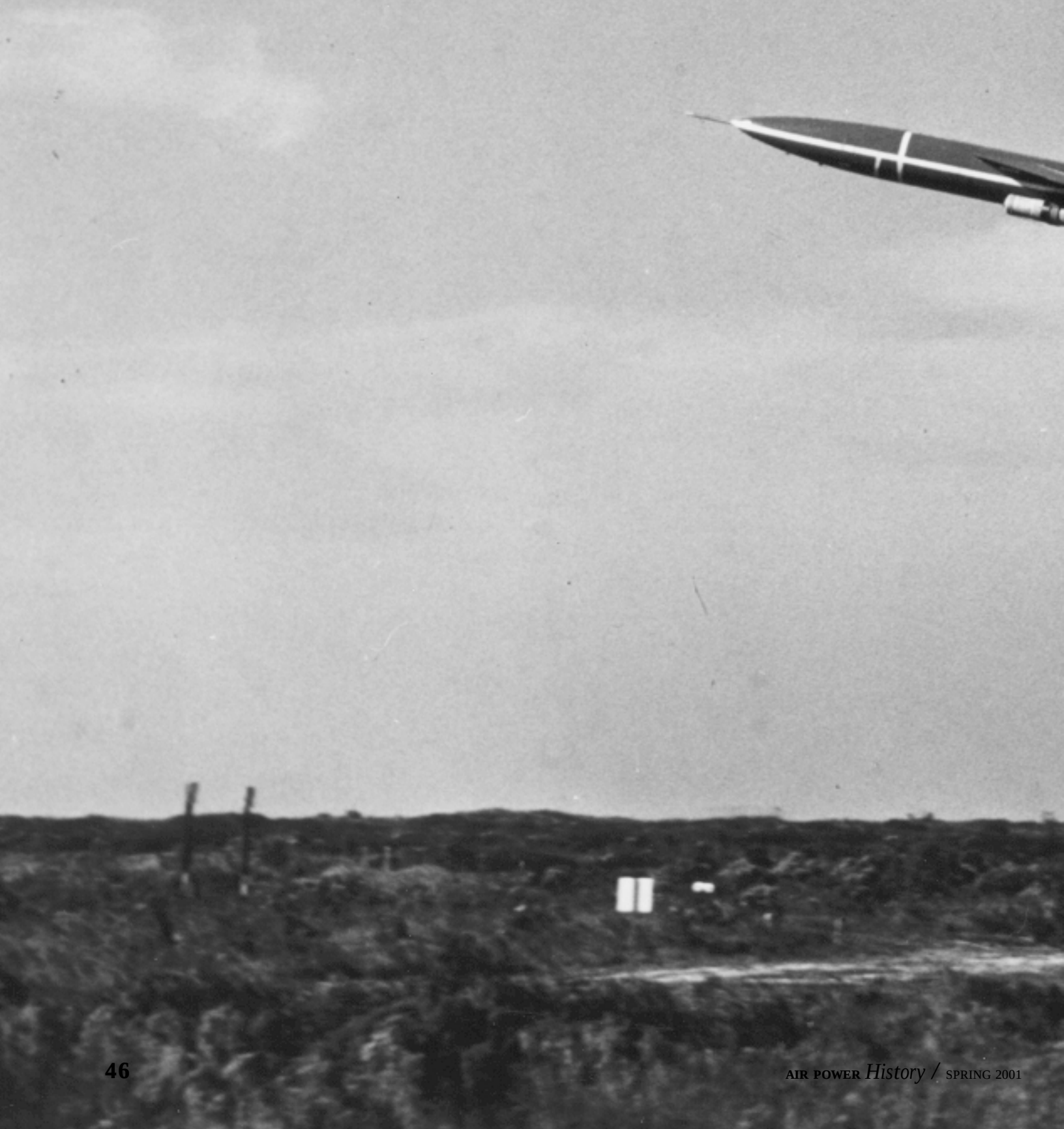
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24. Brereton, *The Brereton Diaries*, pp. 28-29, 31; Ind, *Bataan*, pp. 70-76; Craven and Cate, *The Army Air Forces in World War II*, I, pp. 185-86; Eric M. Bergerud, *Fire in the Sky: The Air War in the South Pacific* (Boulder, Co.: Westview Press, 2000), p. 54. The Brereton trip has been dramatized in a novel. Sky Phillips, *Secret Mission to Melbourne, November 1941* (Manhattan, Kans.: Sunflower University Press, 1992).
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26. Ltr, Lewellyn to parents, Nov. 11, 1941, (Courtesy Robert Llewellyn, Pebble Beach, California).
27. Msg., MacArthur to Marshall, Nov. 18, 1941; Mem, Col. Francis M. Brady, to Cmd. Gen., USAFFE, subj: Proposed Installations and Facilities for Far East Air Force, Nov. 21, 1941, File: "USAFFE: Personal Files of Gen. MacArthur, Nov. 8-24, 1941," Box 2, RG 2, MacArthur Memorial Archives; Futrell, "Air Hostilities in the Philippines," pp. 34-35.
28. This is Sutherland's description of himself. See Rogers, *The Good Years*, p. 40.
29. Stephen R. Taeffe, *MacArthur's Jungle War: The 1944 New Guinea Campaign* (Lawrence: University Press of Kansas, 1998), pp. 35-36.
30. Ltr, Col. Francis M. Brady, Chief of Staff, FEAF, to Cmd. Gen., USAFFE, subj: Proposed Installations and Facilities for Far East Air Force, Nov. 21, 1941; Ltr, MacArthur to Marshall, Nov. 29, 1941, File: "USAFFE: Personal Files of Gen. MacArthur, Nov. 8-24, 1941," Box 1, RG 2, MacArthur Memorial Archives; Brereton, *The Brereton Diaries*, pp. 32-33; Futrell, "Air Hostilities in the Philippines," p. 35; Bartsch, "Was MacArthur Ill-Served by His Air Force Commanders in the Philippines?," p. 50.
31. Intvw, Eugene Eubank, May 8, 1970, Part II, p. 23, Box 64, Hap Arnold-The Murray Green Papers, AFAL; Ltr, MacArthur to Marshall, Nov. 29, 1941, File: "USAFFE: Personal Files of Gen. MacArthur, Nov. 8-24, 1941," USAFFE Special Order No. 83, Nov. 29, 1941, all in Box 1, RG 2, MacArthur Memorial Archives; Intvw, D. Clayton James with Gen George C. Kenney, July 16, 1971, pp. 19-21, MacArthur Memorial Archives; Futrell, "Air Hostilities in the Philippines," pp. 36-37; Bartsch, "Was MacArthur Ill-Served by His Air Force Commanders in the Philippines?," pp. 50-53.
32. Memo, Brady to Commanding Officers, Vth Interceptor Command, Vth Bomber Command, Vth Service Command, and the 2nd Observation Squadron, subj: Readiness Status of Far East Air Force, Nov. 28, 1941; USAFFE Special Order No. 82, Nov. 28, 1941, USAFFE Special Order No. 83, Nov. 29, 1941, all in File: "USAFFE: Personal Files of Gen. MacArthur, Nov. 8-24, 1941," Box 1, RG 2, MacArthur Memorial Archives; Memo, Maj. Gen. Emmet O'Donnell to Chief, Army Air Forces Historical Office, Feb. 13, 1946, AFHRA; Msg, Churchill to Cmd Off., Del Monte, GE6 V OW7 NR 7(D) 40 P, Dec. 5, 1941, 0555, Box 12, Folder 5, Emmett O'Donnell, Jr., Papers, AFAL; Edmonds, *They Fought With What They Had*, pp. 52-55; "Army Air Action in the Philippines & Netherlands East Indies," p. 47; Bartsch, "Was MacArthur Ill-Served by His Air Force Commanders in the Philippines?," pp. 50-51. The report of the 5th Air Base Commander may be found at: Rpt, Lt. Col. Ray T. Elmore to Gen. H. H. George, subj: Air Base Status, Feb. 2, 1942, Appendix 6 to "Army Air Action in the Philippines & Netherlands East Indies," pp. 264-68.
33. Intvw, Lt. Gen. John W., Carpenter, III, Jan 12, 1979, p. 67, K239.0512-1110. AFHRA, Maxwell AFB, Ala.
34. Edmonds, *They Fought With What They Had*, pp. 70-71; Bartsch, *Doomed at the Start*, pp. 41-52; Ltr, Parker Gies to George Kirksey, Dec. 4, 1945, Box 3, File 15, George Kirksey Collection, (Special Collections and Archives, University of Houston Libraries).
35. David C. Evans and Mark R. Peattie, *Kaigun: Strategy, Tactics, and Technology in the Imperial Japanese Navy, 1887-1941* (Annapolis, Maryland: Naval Institute Press, 1997), p. 342; John Prados, *Combined Fleet Decoded: The Secret History of American Intelligence and the Japanese Navy in World War II* (New York: Random House, 1995), p. 202-205.
36. Richard B. Meixsel, "Clark Field & the U.S. Army Air Corps in the Philippines, 1919-1942" (unpublished manuscript.), pp. 65-66; "Army Air Action in the Philippines & Netherlands East Indies," pp. 43-44; Edmonds, *They Fought With What They Had*, p. 13, 70-71; Bartsch, *Doomed at the Start*, p. 47; Craven and Cate, *The Army Air Forces in World War II*, I, p. 187; Morton, *Fall of the Philippines*, pp. 44-45; John F. Kreis, *Air Base Air Defense, 1914-1973* (Washington, D.C.: Office of Air Force History, 1988), p. 31.
37. Brereton, *The Brereton Dairies*, p. 22; Edmonds, *They Fought With What They Had*, pp. 5, 41, 43-45, 68.
38. Ltr summary, Dec 1, 1941, Subject Index, Decimal File, 1940-1945, Box 56, Papers of Henry H. Arnold, LC; Walter D. Edmonds, *They Fought With What They Had*, pp. 26-27, 38, 68-70; Craven and Cate, *The Army Air Forces in World War II*, I, p. 187; "Army Air Action in the Philippines & Netherlands East Indies," pp. 46-47.
39. Brereton, *The Brereton Diaries*, pp. 23-24; Charles H. Bogart, "Radar in the Philippines, 1941-1942" *The Journal of America's Military Past* (Fall, 1999), pp. 27-35; Kreis, *Air Base Air Defense*, pp. 24-31; Craven and Cate, *The Army Air Forces in World War II*, I, pp. 186-87. See also, "Working for the Air Forces" in Dulany Terrett, *The Signal Corps: The Emergency (To December 1941)*, United States Army in World War II (Washington, D.C.: Office of the Chief of Military History, 1956), pp. 251-74.
40. "Reminiscences of Lieutenant Colonel Howard W. Brown," Aug. 4, 1945, Signal Security Agency, SRH-045, pp. 12-16, in RG 457, National Archives (NA); Prados, *Combined Fleet Decoded*, pp. 209-15.
41. Msg No. 624, Marshall to Cmd. Gen., USAFFE, Nov. 27, 1941, quoted in Edmonds, *They Fought With What They Had*, pp. 56-57.
42. Edmonds, *They Fought With What They Had*, pp. 57-58; Brereton, *The Brereton Diaries*, pp. 33-34; Craven and Cate, *The Army Air Forces in World War II*, I, p. 190 Bartsch, "Was MacArthur Ill-Served by His Air Force Commanders in the Philippines?," p. 53. The message from Arnold to MacArthur is quoted in Brereton, *The Brereton Diaries*, p. 34.
43. Ltr, Lewellyn to wife, Nov. 27, 1941 (Courtesy Robert Llewellyn, Pebble Beach, California).
44. *Ibid.* According to pilot Frank Kurtz, Brereton was constantly visiting Clark Field. William L. White, *Queens Die Proudly* (New York: Harcourt, Brace and Company, 1943), p. 13.



45. Brereton, *The Brereton Diaries*, p. 37.
46. Morton, *Fall of the Philippines*, p. 72.
47. "Army Air Action in the Philippines & Netherlands East Indies," pp. 50, 52; Brereton, *The Brereton Diaries*, pp. 37-38; Edmonds, *They Fought With What They Had*, p. 72; D. Clayton James, *The Years of MacArthur, Volume II, 1941-1945* (Boston: Houghton Mifflin Company, 1975), pp. 6-7. Morton, *Fall of the Philippines*, pp. 72-73.
48. Lt. Col. Charles H. Caldwell, FEAF operations officer, quoted in Futrell, "Air Hostilities in the Philippines," p. 38.
49. Ind, *Bataan*, p. 92.
50. HQ FEAF, "Summary of Activities," Brereton Papers, Eisenhower Library; Msg, Eubank to Cmd Off, Del Monte, GE6 V OW7 1(FW) 21, Dec. 8, 1941, 0555, Box 12, Folder Pers, Emmett O'Donnell, Jr., Papers, AFAL; Ind, *Bataan*, pp. 92-93; Brereton, *The Brereton Diaries*, pp. 38-39; Morton, *Fall of the Philippines*, p. 67; Edmonds, *They Fought With What They Had*, pp. 79-80; Barsch, "Was MacArthur Ill-Served by His Air Force Commanders in the Philippines?," pp. 53-54, 59. Among those who witnessed the Brereton-Sutherland exchange was Col. William B. Morse, one of MacArthur's staff officers. See John Toland, *But Not in Shame* (New York: Random House, 1961), p. 41.
51. Intvw, Lt. Gen. John W. Carpenter, III, Jan 12, 1979, pp. 61-62, K239.0512-1110. AFHRA, Maxwell AFB, Ala; Brereton, *The Brereton Diaries*, pp. 39-40; Edmonds, *They Fought With What They Had*, p. 44; Mitchell, *On Wings We Conquer*, p. 33. The 17th and 20th Pursuit Groups took off about 0800 to intercept this reported force, but failed to locate anything hostile. Bartsch, *Doomed at the Start*, pp. 62-63.
52. "Brief Summary of Action in the Office of Chief of Staff, USAFFE, 8:58 AM to 5:40 PM, Dec. 8, 1941," Folder 5 "A Brief Summary of Action," Box 2, RG 2, MacArthur Memorial Archives. This is probably the same call that FEAF recorded as received at 0900 in which Sutherland told Brereton that FEAF's aircraft were not authorized to carry bombs. HQ FEAF, "Summary of Activities," Brereton Papers, Eisenhower Library. USAFFE
53. "Brief Summary of Action in the Office of Chief of Staff, USAFFE, 8:58 AM to 5:40 PM, December 8, 1941," Folder 5 "A Brief Summary of Action," Box 2, RG 2, MacArthur Memorial Archives.
54. HQ FEAF, "Summary of Activities," Brereton Papers, Eisenhower Library; Intvw, Eugene Eubank, May 8, 1970, Part II, pp. 20-22, Box 64, Hap Arnold-The Murray Green Papers, AFAL.
55. Intvw, Eugene Eubank, May 8, 1970, Part II, p. 22, Box 64, Hap Arnold-The Murray Green Papers, AFAL.
56. HQ FEAF, "Summary of Activities," Brereton Papers, Eisenhower Library; Brereton, *The Brereton Diaries*, p. 40.
57. HQ FEAF, "Summary of Activities," Brereton Papers, Eisenhower Library; Futrell, "Air Hostilities in the Philippines," p. 39.
58. Brereton, *The Brereton Diaries*, p. 41; Mitchell, *On Wings We Conquer*, p. 33. The quotation is from FEAF Field Order No. 1 issued at 1120 as quoted in Morton, *Fall of the Philippines*, p. 82.
59. "Brief Summary of Action in the Office of Chief of Staff, USAFFE, 8:58 AM to 5:40 PM, Dec. 8, 1941," Folder 5 "A Brief Summary of Action," Box 2, RG 2, MacArthur Memorial Archives; HQ FEAF, "Summary of Activities," Brereton Papers, Eisenhower Library; Edmonds, *They Fought With What They Had*, pp. 79-98; Bartsch, *Doomed at the Start*, pp. 62-85; Koichi Shimada, "The Opening Air Offensive Against the Philippines," in David C. Evans, ed. and trans., *The Japanese Navy in World War II: In the Words of Former Japanese Naval Officers*, 2nd. edition (Annapolis: Naval Institute Press, 1986), pp. 86, 91.
60. Craven and Cate, *The Army Air Forces in World War II*, I, pp. 210-13; Mitchell, *On Wings We Conquer*, p. 34; Prados, *Combined Fleet Decoded*, p. 208; Shimada, "The Opening Air Offensive Against the Philippines," pp. 79, 86, 90-92, 94.
61. Quoted in Futrell, "Air Hostilities in the Philippines," p. 40.
62. Douglas MacArthur, *Reminiscences* (New York: McGraw-Hill, 1964), p. 117. See also his statement quoted in D. Clayton James, *The Years of MacArthur*, II, pp. 10-11.
63. Intvw, James with Kenney, Jul. 16, 1971, p. 22, MacArthur Memorial Archives; "M'Arthur Denies Brereton Report," *New York Times*, Sep. 28, 1946, p. 6.
64. Futrell, "Air Hostilities in the Philippines," p. 40; James, *The years of MacArthur*, II, pp. 13-14, 200-201.
65. Diary: General Douglas MacArthur [21 Jul. 1941-23 Feb. 1942], p. 28, Box 3, RG 2, MacArthur Memorial Archives; Bartsch, "Was MacArthur Ill-Served by His Air Force Commanders in the Philippines?," p. 53.
66. *The Good Years*, pp. 98-99.
67. Willoughby, *MacArthur*, p. 26.
68. Maj. Gen. Courtney Whitney, *MacArthur: His Rendezvous With History* (New York: Alfred A. Knopf, 1956), p. 12.
69. Intvw, Maj. Gen. Cecil F. Combs, Jun. 29, 1982, p. 62, K239.0512-1344. AFHRA, Maxwell AFB, Ala.
70. Transcript, Telephone Conversation Between General Arnold and General Brereton, Dec 8, 1941, Box 210, Papers of Henry H. Arnold, LC; "M'Arthur Denies Brereton Report," *New York Times*, Sep. 28, 1946, p. 6; Brereton, *The Brereton Diaries*, p. 11; James, *The Years of MacArthur*, II, p. 12; Bartsch, "Was MacArthur Ill-served by His Air Commanders in the Philippines?," pp. 58-60.
71. Shimada, "The Opening Air Offensive Against the Philippines," pp. 94-99; Craven and Cate, *The Army Air Forces in World War II*, I, pp. 215-19; Prados, *Combined Fleet Decoded*, p. 208.
72. Wainwright, *General Wainwright's Story*, p. 25.
73. "Brief Summary of Action in the Office of Chief of Staff, USAFFE," Dec. 23 and Dec. 24, 1941, Folder 5 "A Brief Summary of Action," Box 2; Memo, Brereton to MacArthur, "Plan of Employment, FEAF," Dec. 24, 1941, Box 4, Memo, Sutherland to Brereton, Box 4, RG 2, MacArthur Memorial Archives; James, *The Years of MacArthur*, II, pp. 16-18 Bartsch, "Was MacArthur Ill-Served by His Air Force Commanders in the Philippines?," p. 57; Brereton, *The Brereton Dairies*, pp. 62-63.
74. Ind, *Bataan*, p. 166.
75. Brereton, *The Brereton Diaries*, pp. 76-77; Craven and Cate, *The Army Air Forces in World War II*, I, pp. 366-71; Maj. Gen. S. Woodbury Kirby, *The War Against Japan Vol. I, The Loss of Singapore* (London: Her Majesty's Stationary Office, 1957), pp. 293-94; Alfred Chandler, ed., *The Papers of Dwight David Eisenhower*, 5 Vols. (Baltimore: The Johns Hopkins Press, 1970), I, pp. 49-52.
76. Brereton, *The Brereton Diaries*, pp. 75, 79, 79; Gillison, *Royal Australian Air Force*, pp. 319-20; Craven and Cate, *The Army Air Forces in World War II*, I, pp. 371-74; "Army Air Action in the Philippines & Netherlands East Indies," pp. 102-103.
77. Ltr, Col. Francis M. Brady to Brig. Gen. Carl A. Spaatz, Chief of Air Staff, Jan. 25, 1942, File Diary [Personal], Jan 17-Feb 8, 1942, Box 8, The Papers of Carl A. Spaatz, LC; Brereton, *The Brereton Diaries*, p. 80; Craven and Cate, *The Army Air Forces in World War II*, I, pp. 377-78.
78. Intvw, Gen. Horace M. Wade, pp.76-77, 85, K239.0512-1105. AFHRA, Maxwell AFB, Ala.
79. Craven and Cate, *The Army Air Forces in World War II*, I, pp. 380-87, 400-401; Mitchell, *On Wings We Conquer*, pp. 73-74, 80-81, 88, 174-75.
80. *The Papers of Dwight David Eisenhower*, I, pp. 76-77, 80-81; Connell, *Wavell: Supreme Commander*, pp. 124-26.
81. Ltr, Col. Francis M. Brady to Brig. Gen. Carl A. Spaatz, Chief of Air Staff, January 25, 1942, File Diary

- [Personal], Jan 17-Feb 8, 1942, Box 8, The Papers of Carl A. Spaatz, LC.
- 82.** *Ibid.*
- 83.** Brereton, *The Brereton Diaries*, p. 88; Craven and Cate, *The Army Air Forces in World War II*, I, p. 388.
- 84.** Connell, *Wavell: Supreme Commander*, p. 194.
- 85.** Brereton, *The Brereton Diaries*, p. 99.
- 86.** Note Card on Colonel Eubank, Box 44; Note Card on Evacuation of Java, Box 45, Hap Arnold-The Murray Green Papers, AFAL; Craven and Cate, *The Army Air Forces in World War II*, I, pp. 398-400.
- 87.** Diary, Feb. 25, 1942, Folder 1, Box 44, Emmett O'Donnell, Jr., Papers, AFAL.
- 88.** Craven and Cate, *The Army Air Forces in World War II*, I, p. 400.
- 89.** Intvw, Maj. Gen. Cecil F. Combs, Jun. 29, 1982, p. 119, K239.0512-1344. AFHRA, Maxwell AFB, Ala. Brereton tells a somewhat different story. See Brereton, *The Brereton Diaries*, p. 105.
- 90.** Ltr, Lewellyn to wife, Mar. 5, 1941, (Courtesy William Bartsch); Craven and Cate, *The Army Air Forces in World War II*, I, pp. 484, 493-95.
- 91.** Craven and Cate, *The Army Air Forces in World War II*, I, p. 484.
- 92.** *Ibid.*, pp. 484-85.
- 93.** Brereton, *Brereton Diaries*, p. 106.
- 94.** *Ibid.*, p. 108.
- 95.** Clare Boothe Luce, "Brereton," *Life Magazine* (June 1, 1942), p. 72; John R. Morris, "To Tokyo, Dammit!", *Collier's* (June 6, 1942), p. 31; Brereton, *Brereton Diaries*, p. 109; *The Papers of Dwight David Eisenhower*, I, p. 221; Craven and Cate, *The Army Air Forces in World War II*, I, pp. 493-95.
- 96.** Ltr, Brereton to Arnold, Mar. 6, 1942, Box 199, Papers of Henry H. Arnold, LC.
- 97.** *Ibid.*
- 98.** *Ibid.*; Memo, Arnold to War Plans Division, Mar. 24, 1942, Ltr, Arnold to Brereton, April 28, 1942, Both in Box 199, Papers of Henry H. Arnold, LC.
- 99.** "Index Cards, 04-04-42, Decimal File, 1940-1945, Box 39, The Papers of Henry H. Arnold; Craven and Cate, *The Army Air Forces in World War II*, I, pp. 495-97. Wesley Frank Craven and James Lea Cate, *The Army Air Forces in World War II*, Vol. VII, *Services Around the World*, New Imprint (Washington, D.C.: Office of Air Force History, 1983), pp. 117-19.
- 100.** Ltr, Lewellyn to wife, Mar. 20, 1941, (Courtesy Robert Llewellyn, Pebble Beach, California).
- 101.** Intvw, Maj. Gen. Cecil F. Combs, Jun. 29, 1982, p. 109, K239.0512-1344. AFHRA, Maxwell AFB, Ala.; Brereton, *The Brereton Diaries*, pp. 116-18; Craven and Cate, *The Army Air Forces in World War II*, I, pp. 500-501.
- 102.** Luce, "Brereton," p. 66
- 103.** Award of Distinguished Flying Cross, and Ltr, Brereton to Stratemeyer, Aug. 1, 1942, 201 File.
- 104.** "Summary of Brereton's Letter to Arnold, dated April 17, 1942," Box 199; Index Cards, Decimal File, 1940-1945, 05-03-42, Box 39, The Papers of Henry H. Arnold. Papers of Henry H. Arnold, LC; Herbert Weaver and Marvin Rapp, "The Tenth Air Force, 1942." (Army Air Forces Historical Study No. 12. Historical Division, Assistant Chief of Air Staff, Intelligence, Aug. 1944), pp. 26-30. Craven and Cate, *The Army Air Forces in World War II*, I, pp. 502-503; Msg., Stilwell to Brereton, n.d., Riley Sunderland and Charles F. Romanus, eds., *Stilwell's Personal File: China-Burma-India, 1942-1944*, 5 vols. (Wilmington, Delaware: Scholarly Resources, Inc., 1976), I, p. 228.
- 105.** Alan Moorehead, *The March to Tunis: The North African War, 1940-1943* (New York: Harper & Row, 1943), p. 265.
- 106.** Barbara W. Tuchman, *Stilwell and the American Experience in China, 1911-1945* (New York: The Macmillan Company, 1970), p. 257.
- 107.** Msg, Stilwell to Marshall, Jul, 14, 1942, Sunderland and Romanus, eds., *Stilwell's Personal File*, I, p. 254.
- 108.** "Summary of Brereton's Letter to Arnold, dated April 17, 1942," Box 199, Papers of Henry H. Arnold, LC.; Weaver and Rapp. "The Tenth Air Force, 1942." pp. 30-32.; Claire Lee Chennault, *Way of a Fighter: The Memoirs of Claire Lee Chennault*, Ed by Robert Hotz (New York: G. P. Putnam's Sons, 1949), pp. 164, 168, 184
- 109.** Ltr, Brereton to Arnold, Jun. 24, 1941, Decimal File, SAS 320.2 India-Middle East, Folder 1, Box 91, Papers of Henry H. Arnold, LC; Brereton, *The Brereton Diaries*, p. 125; Craven and Cate, *The Army Air Forces in World War II*, I, p. 512. "Fighter" replaced "pursuit" as a designation in May 1942.
- 110.** Craven and Cate, *The Army Air Forces in World War II*, I, pp. 512-13.
- 111.** Postscript, Jun. 25, 1941, to Ltr, Brereton to Arnold, Jun. 24, 1941, Decimal File, SAS 320.2 India-Middle East, Folder 1, Box 91, Papers of Henry H. Arnold, LC.
- 112.** Lt. Gen. Joseph W. Stilwell, subj: Efficiency Report, Major Gen. Lewis H. Brereton, Jun. 27, 1942, 201 File.
- 113.** Msg No. 921, Marshall to Stilwell, Jun 29, 1942; Draft msg, Stilwell to Marshall, Jun, 30, 1942; Msg No. 976, Marshall to Stilwell, Jul 8, 1942; Msg, Stilwell to Marshall, Jul 14, 1942; Msg, Marshall to Stilwell, Jul 19, 1942; Draft msg, Stilwell to Arnold, Jul 20, 1942; Msg, Marshall to Stilwell, Aug 5, 1942; Sunderland and Romanus, eds., *Stilwell's Personal File*, I pp. 249-50, 253-54, 256-57, 261.
- 114.** Brereton, *The Brereton Diaries*, p. 138.
- 115.** *Ibid.*, pp. 141-42.
- 116.** Telephone intvw, Miller with Gen. Jacob Smart, USAF, Ret., Aug. 26, 1999; Intvw, Gen. Leon Johnson, June 14, 1971, p. 8, Box 68, Hap Arnold-The Murray Green Papers, AFAL; Wesley Frank Craven and James Lea Cate, *The Army Air Forces in World War II*, Vol. II, *Europe: Torch to Pointblank, August 1942 to Dec. 1943*, New Imprint (Washington, D.C.: Office of Air Force History, 1983), pp. 477-83.
- 117.** Phillip S. Meilinger, Hoyt S. Vandenberg: *The Life of a General*, New Imprint (Washington, D.C.: Air Force History and Museums Program, 2000), p. 50. For the selection of Brereton as commander of Ninth Air Force in England, see Msg, 140, Marshall to Eisenhower, Jul. 18, 1943, Files: Cable Off. (GCM/DDE Mar 28-Aug 1, 1943) (1), Box 132, Pre-Presidential Records, Eisenhower Library.
- 118.** Meilinger, *Vandenberg*, pp. 41-42, 44-45, 49, 60; Davis, *Spaatz*, p. 316-19, 354-55, 465-66; Solly Zuckerman, *From Apes to Warlords* (New York: Harper & Row, 1978), p. 348.
- 119.** Meilinger, *Vandenberg*, p. 221; Intvw, Gen. Samuel E. Anderson, Jul. 1, 1976, K239.0512-905, pp. 274-75, AFHRA; *The Papers of Dwight D. Eisenhower*, IV, pp. 2466-69; Gen. of the Army Dwight D. Eisenhower, subj: Special Rating of General Officers, Jul. 12, 1945, 201 File.
- 120.** Telephone intvw, Miller with Gen. DeVol Brett, USAF, Ret., Aug. 30, 1999; "Lt. Gen. Brereton to Wed London Woman Thursday," *The Sunday Star* [Washington, D.C.], Jan. 20, 1946; [Photograph], *The Sunday Star* [Washington, D.C.], Jan. 25, 1946 (Brereton File, U.S. Naval Academy Library, Annapolis, Maryland); Obituary, *New York Times*, 21 Jul. 1967; Intvw, Miller with Mrs. Lewis H. Brereton, Winter Park, Florida, Sep. 26, 1999.
- 121.** Obituary, *New York Times*, 21 Jul. 1967.
- 122.** Officer efficiency report, Jul. 1 to Dec. 31, 1945, 201 File.
- 123.** Intvw, James with Kenney, Jul. 16, 1971, p. 19, MacArthur Memorial Archives.
- 124.** Postcard, Lewellyn to wife, Nov. 19, 1941. (Courtesy Robert Llewellyn, Pebble Beach, California.).
- 125.** Intvw, Maj. Gen. Cecil F. Combs, Jun. 29, 1982, p. 59, K239.0512-1344. AFHRA, Maxwell AFB, Ala.

# Genesis of the Ae



# er ospace Concept



Frank W. Jennings

NOT UNTIL 1957, WAS A TERM COINED TO DESCRIBE AIR/SPACE—SOON SIMPLIFIED TO AERO-SPACE

AIR FORCE LEADERS VIEWED AEROSPACE AS A NOUN, NOT AN ADJECTIVE

The concept of linking air and space first appeared in print on August 6, 1954, in a series of editorials and features sent to base newspapers by the Air Force News Service (AFNS) in the Secretary of the Air Force's Office of Information Services. It was the AFNS newspaper press releases, from 1954 to 1957, that first depicted the skies surrounding our planet as an operational medium comprising the atmosphere and the space beyond—a region for ever-loftier challenges in which the Air Force had been specializing for decades—and for the defense of which it had been assigned national responsibility by law.<sup>1</sup>

Not until 1957, however, was a term coined to describe the medium; that term air/space—soon was simplified to aero-space. But even before Air Force Chief of Staff Gen. Thomas D. White began using the new word, he was expounding on the aerospace concept in public speeches. In an address to the National Press Club on November 29, 1957, he said:

*Whoever has the capability to control the air is in a position to exert control over the land and seas beneath.... in the future, whoever has the capability to control space will likewise possess the capability to exert control of the surface of the earth. We airmen who have fought to assure that the United States has the capability to control the air are determined that the United States must win the capability to control space. In speaking of the control of air and control of space, I want to stress that there is no division, per se, between air and space. Air and space are an indivisible field of operations. It is quite obvious that we cannot control the air up to 20 miles above the earth's surface and relinquish control of space above that altitude—and still survive.<sup>2</sup>*

From 1957 to 1961, when he retired, General White presented this description of the aerospace concept over and over in public speeches and congressional testimony—and other Air Force generals followed his lead.

Officials in the other military services and in some government agencies, as well as their supporters in Congress, recoiled in dismay to the Air Force's new concept. This became evident in the nation's press and in congressional hearings during 1959. If air defense, the legally assigned responsibility of the U.S. Air Force, included space, then the whole universe beyond Earth lay open to

the Air Force's claim to a vastly expanded realm of operations and a lion's share of the Defense budget. Of course, no agency outside the Air Force could willingly accept this. To them, it was vital that no one should assume from the meaning of the word aerospace that the Air Force's air mission intrinsically included space. They saw clearly that the two regions must be delineated as separate entities. Aerospace, they realized, should not be a noun meaning "a seamless medium" or "an operational continuum."<sup>3</sup>

An additional reason for keeping air and space markedly differentiated was the inability of government agencies to agree on a definition of "air-space" and "outer space" in international negotiations on "the peaceful uses of outer space."<sup>4</sup>

The opportunity for Defense officials to sharply split "air" from "space" came when the joint definition of aerospace was formulated for JCS Pub 1, *Dictionary of United States Military Terms for Joint Use*, published by the Joint Chiefs of Staff on February 1, 1962. They presented aerospace in its attributive sense, as an adjective:<sup>5</sup>

**aerospace:** *Of, or pertaining to, the earth's envelope of atmosphere and the space above it; two separate entities considered as a single realm for activity in launching, guidance, and control of vehicles which will travel in both realms.*

The 1962 definition persists essentially to this day in Joint Pub 1-02 (2000)—with the last word, "realms," changed to "entities."<sup>6</sup>

That first joint definition, as well as those that followed, differed distinctly from the Air Force's, which had been published on October 30, 1959, in Air Force Pamphlet (AFP) No. 11-1-4, titled, *Interim Aerospace Terminology Reference*. Air Force leaders viewed aerospace as a noun, not an adjective. They saw aerospace as a medium of operations—an operational continuum—and the Air Force has maintained that position to this day. AFP 11-1-4 defined it as "an operationally indivisible medium consisting of the total expanse beyond the Earth's surface." Part 2 of the definition described at length a number of aspects of space, beginning with the statement: "Space: the expanse (perhaps limitless) which surrounds the celestial bodies of the universe—cannot be precisely defined."<sup>7</sup>

A month later, on December 1, the Air Staff published Air Force Manual 1-2, *United States Air*

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(Right) USAF Chief of Staff, Gen. Michael D. Ryan.

(Below right) Col. Flint O. DuPre. (Photo courtesy of the author.)

SINCE 1954, I HAD BEEN THINKING AND WRITING ABOUT THAT LIMITLESS EXPANSE OF THE SKY BEYOND OUR PLANET'S SURFACE, BUT I NEVER HAD THOUGHT A NEW WORD WAS NEEDED TO DESCRIBE IT

THE AIR FORCE'S LONG CLIMB FROM AIR FORCE TO AEROSPACE FORCE HAS TAKEN GREAT VISION AND COURAGE

*Force Basic Doctrine*. It changed terminology from air power to aerospace power, and defined aerospace as “the total expanse beyond the Earth’s surface.” Twenty-five years later, in the AFM 1-1 basic doctrine published on March 16, 1984, space was redefined as “the outer reaches of the aerospace operational medium.” This kind of aerospace terminology was generally repeated in the basic doctrine manuals and documents throughout the years that followed, that is, until 1997.<sup>8</sup>

In September 1997, these traditionally Air Force-oriented definitions came to an end with the publication of *Air Force Basic Doctrine*, AFDD 1. Nowhere in the new document could aerospace be found. Instead, throughout its ninety pages, two words, air and space, were substituted for aerospace—and nowhere was that disjointed term defined.<sup>9</sup>

Subsequently, on October 6, 1997, a new Air Force chief of staff took command and began to influence a return to the traditional concepts of Air Force doctrine. In 1998, with the publication of AFDD 2-2, *Space Operations*, aerospace was again the preferred term. The new chief, Gen. Michael E. Ryan, said of AFDD 2-2:<sup>10</sup>

*As a keystone doctrine document, it underscores the seamless integration of space into the whole aerospace effort.... the aerospace medium can be most fully exploited when considered as a whole. Although there are physical differences between the atmosphere and space, there is no absolute boundary between them. The same basic military activities can be performed in each, albeit with different platforms and methods. Therefore, space operations are an integral part of aerospace power.*

On May 9, 2000, Secretary of the Air Force F. Whitten Peters and the chief of staff, General Ryan, issued a “White Paper” titled, *The Aerospace Force—Defending America in the 21st Century*, stating that “our Service views the flight domains of air and space as a seamless operational medium. The leadership of the United States Air Force is committed to further integrating its people and air and space capabilities into a full-spectrum aerospace force.”<sup>11</sup>

The Air Force’s long climb from air force to aerospace force has taken great vision and courage. Now, in the year 2001, it has reached cruising altitude. A look back to its take-off between 1954 and 1957 is instructive.

Sometimes, when I see the word aerospace in a newspaper, magazine or book, my heart stirs a bit as I recall how I witnessed the word’s first appearance in October 1957, as “air/space,” and months later, in July 1958, as “aerospace.” On both occasions, it took form at the end of my No. 2 pencil on a yellow legal pad I was using to write an editorial to be typed, reproduced, and sent to newspapers published at Air Force bases worldwide. Since 1954, I had been thinking and writing about that limitless expanse of the sky beyond our planet’s



surface, but I never had thought a new word was needed to describe it. I look back to October 29, 1957, when the term uniting air with space first began appearing in AFNS releases, and I recall how it developed almost by accident.

The news service—part of the Air Force’s program to inform and motivate its military and civilian members—contained news, features, and editorials, as well as illustrations for use each week by editors of base newspapers. I was one of two civilian employees then doing all the writing for AFNS. My colleague, Flint O. DuPre—a newspaperman for fourteen years in Dallas, Texas, before World War II, and a colonel in the Air Force Reserve—handled the news stories. I wrote the editorials and features; there were no bylines.<sup>12</sup>

The thought of the magnitude of the Air Force’s primary responsibility among the military depart-



**LT. GEN. GAVIN  
CONTENDED  
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FORCES  
OBSOLETE**

(Right) Lt. Gen. James M. Gavin, the U.S. Army's chief of research and development.

ments for ensuring the Nation's continued air superiority prompted me to consider just how to explain to Air Force members the full significance of what that meant to them—how important they were individually and how vital were their roles in helping to protect our country. It soon dawned on me that no altitude limit had been set by the government for this officially assigned Air Force mission in the sky.

I first mentioned space as an integral part of the U.S. Air Force air power mission in an editorial released on August 6, 1954, less than six months after I had moved to the Air Force from the Office of the Secretary of Defense. There, I had been the editor-in-chief in the Armed Forces Information and Education Division, producing for all four military Services the *Armed Forces Talk* pamphlet series, plus pocket guides to foreign countries.<sup>13</sup>

It was the first editorial I had written for AFNS—and the first ever published by AFNS. In Editorial No. 54-1, I wrote: "The Air Force's job is as big as the sky and its future as unlimited as space." I went on to describe the scope of the Air Force's assigned responsibilities: "The area of the Earth is about 197 million square miles, and the area of the air immediately above it is, of course, even greater. From there on out, the space distance is measured in feet, then miles, then in many millions of light years." Other editorials carried similar messages.<sup>14</sup>

I also mentioned space as an area of special Air Force interest and responsibility in September 1957, in the second issue of the new internal information magazine, *Airman*. The article was titled, "What IS the Air Force Job?" I explained the National Security Act of 1947—intended to achieve greater effectiveness and economy—assigned primary responsibilities to land, sea, and air forces, with each concentrating on its special geographical realm. I wrote: "Very simply, the new act made the Air Force responsible for conduct of "offensive and defensive air operations" for the Nation. That overall assignment takes in a tremendous number of operations and a limitless area around our globe and above it—far into space."<sup>15</sup>

But combining air and space into a single word came as a spontaneous outgrowth of that concept developed from 1954 to 1957 of a "limitless area" beyond our planet. It was ignited without warning by an onslaught of statements made in the press and Congressional hearings, primarily by Lt. Gen. James M. Gavin, the Army's chief of research and development.<sup>16</sup> Gavin contended that a well-deployed system of the Army's Nike surface-to-air missiles would provide a 100 percent effective area defense—making air forces obsolete. He told congressional committees and the press: "For the combat Infantryman and those who fight on the ground beside him, we want to provide the best mobility obtainable. For in the missile era the man who controls the land will control the space above it. The control of land areas will be decisive." Adding, "we want a 100 percent air defense. And we consider this attainable."<sup>17</sup>

This brash prediction of the impending demise of the U.S. Air Force—a position obviously countenanced by the U.S. Army—can only be understood in the light of the jurisdictional battle over coveted missile and space missions among the military departments. This was the beginning of the era of long- and medium-range ballistic surface-to-surface missiles and long-range and point-defense air defense missiles, and space systems. Many Army supporters believed that long-range and medium-range missiles were a natural replacement for artillery and should be assigned to them. The Army also felt that its air defense missiles should replace Air Force air defense aircraft, because they were certain that the long range and the accuracy of the missiles could handle both point and area defense requirements. The Navy also wanted to take over the strategic air mission, using submarine-launched long-range missiles. It was in this intense period of interservice rivalry that the new word aerospace entered the vocabulary. From the beginning, it was identified with the U.S. Air Force, because it had been coined there.

The issue of ballistic missiles and the control of airspace, and of space itself, reached an apogee of national concern when, on October 4, 1957, the Soviet Union placed Sputnik into orbit around Earth. It arose at about the same time that Fletcher Knebel wrote in *Look Magazine* about "The Coming Death of the Flying Air Force." He cited several reasons supporting his prediction that "the death rattle is in the throat of the flying Air Force." He began with this paragraph:<sup>18</sup>

*It can be heard in the corridors of the Pentagon, in our bases flung around the world, in statements of the brass and in the design rooms of industry: The flying Air Force is being grounded by the missile. Ten years ago, the guided missile was but a whis-*





*per in the laboratories. Three years ago, it became a murmur of the future. Today it bursts from the launching pads with a whoosh and a roar.*

Knebel, a popular and respected writer of the time, concluded his four-page piece with this: "Control of the air? 'In the missile era,' says General Gavin, 'the man who controls the land will control the space above it.' The shadow of the guided missile is upon the land—and upon the silver wings of the Air Force." Along with his prediction of the impending demise of the U. S. Air Force, Knebel reminded his readers that, while the Army was testing its aircraft-killing Nike-Ajax battery at its White Sands Proving Ground in New Mexico, "far away, in a committee room of Congress in Washington, Rep. Daniel J. Flood (Dem.-Pa.) broached the idea of abandoning the \$150 million Air Force Academy that isn't even completed yet."<sup>19</sup>

An advance copy of Knebel's article was quoted in the *Milwaukee Journal* of September 20, referring to "the changing pattern of defense" and "the coming death of the flying air force." It said also: "Secretary [of Defense] Wilson has called the current revolution in weapon technology the 'most drastic' in world history. To an airman, what could be more drastic than a development that keeps him on the ground and puts the army up in the sky?"<sup>20</sup>

In a similar vein, the *Cleveland Plain Dealer* wrote an editorial on September 21, under the heading: "The Old Gray Airplane?" about General Gavin's 100% missile defense predictions with the Nike Hercules, and the Air Force's use of the Bomarc, described as a pilotless interceptor, and Snark, the Air Force's experimental pilotless bomber. The editorial ended with this: "How ironical, too, that the Air Force chose Snark as the name for its latest missile. A variety of Snark, in Lewis Carroll's lexicon, was the Boojam—the hunters of which 'softly and silently vanish away.'"<sup>21</sup>

Of course, the Army's idea of 100 percent control of the air from the ground turned on its head the long-held Air Force doctrine that "victory is practically assured to the commander whose air force has gained and can maintain control of the air." That belief—going back to the Army Air Corps Tactical School in 1931—referred to a commander using air forces in conjunction with his ground forces. To me, General Gavin's and Fletcher Knebel's bluntly dogmatic statements demanded a rebuttal. Was it true that air power would soon be worthless? How much of space could be controlled absolutely from the ground? In the search for the right words to respond to those provocative questions about stratospheric air operations, air/space materialized and slipped into the lexicon virtually by accident. On October 29, 1957 the Office of Information Services in the Office of the Secretary of the Air Force released my AFNS editorial (No. 57-39) that questioned "the statements by some," without mentioning any names. It said, in part:<sup>22</sup>

*So this idea—that if you control the land you control the space above it—is contrary to basic air doctrine and does not stand up under experience. What happens to air offensive forces—airplanes, missiles, or air/space vehicles of the future? According to this new theory they would be rendered completely ineffective. The defense would be invulnerable. Defense would be 100% effective.*

*As an Air Force member with an understanding of airpower, you know that it is the overall mission of the Air Force to gain and maintain general air supremacy. This air mission is not confined to any altitude. It includes the farthest reaches of the air—far into space. The American people have given us the primary responsibility for this.*

*The Air Force does not believe that a successful air attack with airplanes and missiles will be impossible in the missile era. It does not believe in the "Magenot Line concept"—that a nation's security should rely only on its defense at the expense of its offense.*

*The Air Force believes that in the event of war in the missile era, air defense measures, coupled with strong air counterblows against the sources of the enemy's strength will provide the best security. An understanding of the proper relationship between offensive and defensive forces is essential if we are to provide the best possible deterrence to war.*

Air/space was the first embodiment in a single term of the concept that the atmosphere and space were an operational continuum. Air/space was used again from time to time in AFNS and other internal publications. My office was on the fifth floor (5C-941), and I used to walk to the nearby offices of speech writers of the Secretary of the Air Force, the Chief of Staff, and the Air Staff—all three were on the fourth and fifth floors. We would chat about topics of interest, including some of the editorials I was writing. Virtually all those writers were officers with solid operational backgrounds.<sup>23</sup>

I can take very little credit for the simple recognition in the mid-1950s that technology was beginning to permit the movement and operation of airpower weapons, such as ballistic missiles, beyond the atmosphere, into space. Ten years earlier, in October 1947, Capt. Chuck Yeager had flown a rocket-powered experimental plane built for supersonic flight. Scientists and engineers at the time were contemplating what they hoped would become a national aerospace plane capable of Mach 30 speed and single-stage-to-orbit space flight. The Air Force had started its School of Space Medicine in 1949 to study human capabilities beyond Earth's nearest atmosphere. Beginning in 1950, the Air Force held the primary responsibility for long-range strategic missiles, including ICBMs, and had been studying military Earth satellite potentials through contracts with RAND corpora-

(Near right) Lt. Gen. Clarence S. Irvine, USAF Deputy Chief of Staff for Materiel, shown here as a major general.

(Far right) USAF Chief of Staff Gen. Thomas D. White.

AS THE MONTHS WENT BY, THE TERM WAS REFINED QUICKLY TO AERO-SPACE AND THEN TO AEROSPACE



AEROSPACE REPLACED AIR IN THE OFFICIAL NAMES OF VARIOUS AIR FORCE CENTERS AND OTHER ORGANIZATIONS

tion. In November 1957, the Air Force approved the Dyna-Soar plan and allocated funds for researching and developing the hypersonic glider—a “dynamic soaring” vehicle—an aerospacecraft that would serve as a composite manned bomber and reconnaissance system operating in both the atmosphere and beyond.<sup>24</sup>

The time for the term air/space had arrived, and I happened to be in a position that made its use necessary. It was a simple and obvious description of the operational realm the Air Force already had entered. Its usefulness was recognized immediately not only by speech writers, but by Air Force leaders, and, because of them, it spread throughout the Air Force.

As the months went by, the term was refined quickly to aero-space and then to aerospace. The first general to use it was Lt. Gen. Clarence S. Irvine, Air Force deputy chief of staff for materiel, who spoke before the National Defense Transportation Association in Washington on November 21, 1957. Responding to General Gavin's attacks on the Air Force's capabilities, Irvine said: “it is within reason that air/space ships will fight the next major conflict, and that control of space will determine victory.” He continued:<sup>25</sup>

*This, by the way, reminds me of a fallacious statement recently published in a national magazine to the effect that “he who controls the land will control the space above it.” Such a twist of words is a 180-degree reversal of a proved fact, as any student of air/ground warfare knows. Until air- or space-supremacy is achieved, the land itself can always be made untenable.*

In March 1958, the aerospace concept received a powerful endorsement when the Air Force Chief

of Staff, Gen. Thomas D. White, explained it in the preface to the book *The USAF Report on the Ballistic Missile*. Although he did not use the newly combined air/space term, he wrote:

*In discussing air and space, it should be recognized that there is no division, per se, between the two. For all practical purposes air and space merge, forming a continuous and indivisible field of operations. Just as in the past, when our capability to control the air permitted our freedom of movement on the land and seas beneath, so in the future will the capability to control space permit our freedom of movement on the surface of the earth and through the earth's atmosphere.<sup>26</sup>*

General White soon began including the word air/space in his presentations—first on May 16, 1958 in a speech to the Los Angeles Chamber of Commerce. Then, in the August 1958 issue of *Air Force Magazine*, General White referred to “Soviet aerospace power.”<sup>26</sup> Again, in the September *Air Reservist* “Air Force Point of View Column,” General White defined aerospace power.<sup>27</sup>

Soon, aerospace replaced air in the official names of various Air Force centers and other organizations. In November 1958, *Air Force Magazine* added a subhead reading: “The Magazine of Aerospace Power.” The Air Force Association's education foundation changed its name to Space Education Foundation in 1958, after the shock of Sputnik, but in 1961, named itself the Aerospace Education Foundation. The Aero Medical Association became Aerospace Medical Association on April 28, 1959; Aircraft Industries Association became Aerospace Industries Association on May 15, 1959; and the USAF Aerospace Medical Center, Brooks AFB, Texas was dedicated on November 14, 1959. Within Headquarters USAF, Air Policy

Division, AFXPD, was redesignated Aerospace Policy Division on July 27, 1959.

"Aerospace" was proliferating. What now is called "the aerospace industry" found the term apt for its purposes—and the word was quickly adopted also in foreign languages around the world. By 1961, aerospace had been defined in a new edition of *Webster's New World Dictionary of the American Language*, College Edition. Today, most dictionaries correctly define aerospace as a noun meaning "the Earth's atmosphere and the space beyond it, considered as a continuous field."<sup>28</sup>

In the long-running competition among the military departments, beginning in the 1950s—when new missiles were raising questions about who would gain and who would lose traditional roles and missions—some politicians and other supporters echoed the Army's fury about the Air Force's new term, aerospace. More than ever, congressional hearings drew public attention to what a leading congressman called the "many conflicts between the Air Force and the Army and the Navy in outer space."<sup>29</sup>

It is revealing to read the colloquy between Congressman John McCormack (Dem.-Mass.) and Air Force Chief of Staff Gen. Thomas D. White on February 3, 1959. It gives insight to the intense frustration and aversion in some quarters outside the Air Force to the aerospace concept—feelings, though diminished, which have lasted to today. The very definition of the word by which the Air Force defines itself is still questioned. Part of that congressional testimony more than forty years ago went like this:<sup>30</sup>

**Mr. McCormack.** *General, on the light side still, the matter that I would like to get information about, because the word "aerospace" is something new to me and I know that has significance from the Air Force angle, where was that coined?*

**General White:** *Within the last year and by the Air Force, I am willing to add. I would like to explain it if you wish.*

**Mr. McCormack:** *I appreciate that it was coined by the Air Force. I imagine within that space that many of these conflicts between the Air Force and the Army and the Navy in outer space would be very easily adjusted from the Air Force angle because everything then will come under "Aerospace."*

**General White:** *Well, I do not think the conflicts are as serious as some people would like to make them, Mr. McCormack.*

**Mr. McCormack:** *I noticed you stressed the word throughout your whole statement, so I assumed this morning there was some significance in this wording. Why not call it "space-aero?"*

**General White:** *That is a little more euphonious, perhaps.*

**Mr. McCormack:** *You notice I say "on the light side." I can see where it developed, however. We will see what the future holds as to the term "aerospace" and the claim for its jurisdiction."*

Six days later, on February 9, 1959, Congressman McCormack questioned Maj. Gen. Dwight E. Beach, the Army's director of air defense and special weapons in the Office of the Deputy Chief of Staff for Military Operations.<sup>31</sup>

**Mr. McCormack:** *We have heard witnesses of another service use the term "aerospace." What service do you think should have overall responsibility for space activities?*

**General Beach:** *Well, I never heard of that term before. I always heard of "armospace."*

**Mr. McCormack:** *Well, we encountered it the other day, a very sweet term, a very all-embracing term. As I said to somebody in the Army, whoever coined it ought to be made a full general. But my question is, what service do you think should have overall responsibility for military space activities?*

**General Beach:** *Congressman McCormack, I don't believe any one service should have overall responsibility. It should be a national effort. As General [Maj. Gen. W. W.] Dick has outlined, the Army has specific requirements for space, and our position is that no single military department should be assigned sole responsibility for military space operations.*

Thirty years after General White discussed aerospace with Congressman McCormack on the Hill, the word still rankled Army supporters. Newspaper journalist, author, and Pulitzer Prize-winner Russell Baker wrote in his nationally syndicated column, which appeared in the *San Antonio Express-News* on August 25, 1989, that the development of missiles after World War II "made the Air Force's lumbering old bombers as obsolete as the battering ram." He added that: "Control of the new super-weapons (and their sweet billion-dollar budgets) might logically have gone to Army artillery. To avert this catastrophe, which would have reduced it to a minor power, the Air Force invented aerospace.... Since air was the Air Force's domain, did it not follow that space was too? Of course not, unless you could say 'aerospace' without laughing."<sup>32</sup>

More recently, and even more dismissive of aerospace, was a squib published in February 1999, in a nationally syndicated column titled simply *L. M. Boyd*. In Boyd's oddities column, which appears five days a week in more than 100 newspapers across the nation, he wrote: "**Q.** Did anything ever come of the notion to change the name of the U.S. Air Force to the U.S. Aerospace Force? **A.** That notion rattled around a couple of decades ago. Air Force brass wanted bigger buying budgets. It didn't get anywhere."<sup>33</sup>



In 1958, the author accepts a presentation from Brig. Gen. Eugene B. LeBailly, then Deputy Director of the Office of Information.

## WITH THE ASSIGNMENT OF GEN. MICHAEL E. RYAN AS AIR FORCE CHIEF OF STAFF...THE AIR FORCE RETURNED TO THE PRACTICE OF USING THE TERM AEROSPACE WITH FREQUENCY

While some may find the word aerospace, and perhaps even its concept, merely inelegant—and while it never has achieved universal acceptance—some find it a fearful threat to their budgets. Yet, it will not go away, because it is an inescapable part of the geography of all of us on Earth. Aerospace began to be mankind's everyday living environment in a new way when the first satellite was successfully lofted in October 1957. Now, we are in constant physical interaction within its vast expanses. We view its friendly aspect in every morning sunrise and on every starry night. It is as Earth-oriented as every one of us—and as are the primary interests of most of us. It is our planet's natural environment in the universe. It is the challenging “wild blue yonder” that airmen have sung about for years.

With the assignment of Gen. Michael E. Ryan as Air Force Chief of Staff on October 6, 1997, the Air Force returned to the practice of using the term aerospace with frequency. Historically, this is especially interesting, because the new chief's father, Gen. John D. Ryan, the Air Force Chief of Staff from August 1, 1969 to July 31, 1973, was a strong advocate of the aerospace concept.

Soon after he took command, General Michael Ryan cleared the way for the logical return of “aerospace” to both the Air Force's lexicon and its strategy. In early 1998, he encouraged key Air Force officers to use the term “aerospace power” whenever appropriate—and to avoid the expression “air and space.”<sup>34</sup> His early public discussions reflected his appreciation of the aerospace concept as a better means to both understand and communicate the Air Force's mission. He prompted the establishment of an Aerospace Basic Course at the Air University to provide all new Air Force officers and selected civilians “a full and common understanding” of aerospace power operations. He also saw that other training was initiated, such as Warrior Week—programs to educate all new Air Force officers and selected civilians with “a full and common understanding” of aerospace power operations—and Global Engagement, a similar “air and space fusion program” for Air Force Academy cadets.

In 1999, General Ryan began organizing the ten Aerospace Expeditionary Forces (AEFs) that

would form the overall Expeditionary Aerospace Force (EAF). The expeditionary aerospace force is designed to quickly provide commanders in the field, anywhere on our planet, with a wide array of support—both in and beyond the atmosphere—comprising rapidly responsive forces tailored to specific needs, and using, when necessary, Air National Guard and Air Force Reserve forces.<sup>35</sup>

Finally, last year, a defining moment in the history of the concept and term aerospace occurred, when the Air Force leadership published perhaps the most significant document ever promulgated in the department's fifty-three-year history. It was an official, authoritative report setting out the Department of the Air Force's clear-eyed view of itself. Significantly, its title was *The Aerospace Force: Defending America in the 21st Century*. It was subtitled: *A White Paper on Aerospace Integration*. Signed by both the Secretary Peters and General Ryan, it was aimed at “tomorrow's aerospace leaders, who will be a part of and will lead the Air Force in the 21st Century.”<sup>36</sup> It said:

*At the dawn of the new millennium, the Air Force is directing its strategic vision to meet the nation's requirements within a rapidly changing world. As a key pillar to the strategic vision, this document presents the Air Force view of the future of aerospace power. It pays tribute to those who led the Air Force into the air and then into space, and challenges the leaders of the next generation to take advantage of the synergies inherent in aerospace capabilities. It provides the conceptual foundation for the full-spectrum aerospace force and establishes the context for the Aerospace Integration Plan that outlines the next steps the Air Force will take on its aerospace journey.*

This official pronouncement on “our mission and our future,” made clear that:<sup>36</sup>

*o Aerospace describes the seamless operational medium that encompasses the flight domains of air and space.”*

*o An aerospace force comprises “both air and space systems, and the people who employ and support those systems, and has the full range of capabilities to control and exploit the aerospace continuum....*

*o “Aerospace integration is the set of actions harmonizing air and space competencies into a full-spectrum aerospace force and advancing the warfighting capabilities of the joint force....*

*o “Our Service views the flight domain of air and space as a seamless operational medium. The environmental differences between air and space do not separate the employment of aerospace power with them. Commanders of aerospace power will be trained to produce military effects for the Joint Force Commander (JFC) without concern for whether they are produced by air or space platforms. By focusing on operations, our efforts will not just enhance airpower, but will capitalize on the broader capabilities of aerospace power to field a more capable warfighting aerospace force, domi-*

nating the vertical dimension and achieving decisive results in conflict.”

This describes the United States Air Force of

2001—and it affirms more solidly and more clearly than ever in its history that “the Air Force’s job is as big as the sky and its future, unlimited as space.”

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# Airhead Operations in Kuwait: The 436th ALCE







John L. Cirafici



(Overleaf) Iraqi armor captured at the airport by advancing U.S. Marine Corps elements of Task Force Shepherd. (All photos courtesy of the author.)

THE SIGHT THAT GREETED US IN KUWAIT WAS TRULY HELLISH.... THE SCENE WAS ONE OF THE WORST ENVIRONMENTAL DISASTERS VISITED ON THIS PLANET BY MAN

AFTER SOME NEGOTIATION, KIA'S OPERATIONAL CONTROL PASSED TO THE ALCE WITH USMC PERSONNEL PROVIDING AIR TRAFFIC CONTROL SERVICES

Ten years have passed since the American-led Coalition overwhelmed Iraqi forces and liberated Kuwait from its brutal occupation. This article looks at the role played by the 436th Airlift Control Element (ALCE) in Kuwait. Although the 436th ALCE was a latecomer to the theater, it had been very active facilitating the movement of units to the Operation Desert Shield Area of Operations (AOR). This included a deployment to Cherry Point Marine Corps Air Station, North Carolina, the scene of the largest single deployment of U.S. Marines since World War II. Many members of the ALCE also served as primary aircrew members and flew missions into the AOR.

The 436th ALCE, a U.S. Air Force Military Airlift Command unit, commenced airhead operations at Kuwait International Airport, immediately following Kuwait's liberation, and continued its mission during the most critical period of Kuwait's recovery. It was at a time when the Kuwaiti skies were blackened by a mass of thick, heavy smoke rising from the fires of over 500 burning oil wells, often leaving the air barely breathable.<sup>1</sup> Visibility, crucial to safe operations, was frequently reduced to the point that it was like being in a dark room with a dim flashlight. In the midst of this man-made calamity, the 436th ALCE conducted a critical part of United States Air Force ground operations in the Kuwait Theater of Operations (KTO) and helped Kuwait re-emerge from its nightmare.

In the latter part of February 1991, the 436th Airlift Control Squadron's ALCE deployed from Dover AFB, Delaware, to Dhahran Air Base in Saudi Arabia. I was the unit's director for operations. At that point the ground operations phase of the campaign to liberate Kuwait was underway as Coalition forces began their drive through Iraq and the KTO. The initial objective was to establish forward operating bases (FOBs) to facilitate airlift support for ground forces as they advanced north and east.

Major Robert Bruno, the Military Airlift Command's coordinator for ALCE deployments, alerted us to prepare for possible movement into FOB Cobra in southern Iraq, where elements of the 101st Airborne Division (Airmobile) were being positioned. However, the rapid pace at which forces advanced and President Bush's decision to end offensive operations 100 hours into the ground campaign, refocused our mission objective. We were now directed to move to Kuwait International Airport (KIA) and establish an air-

head there. The ALCE's mission was to provide the basic command, control, and communications for units; to supply the expertise to lead mission support forces; and to direct a bare base operation in support of airlift. The ALCE was augmented with cargo and passenger handlers, aircraft maintainers, fuels specialists, security forces, power generation technicians, and the associated equipment to operate an airhead<sup>2</sup>.

After its deployment from the United States, the 436th ALCE, was temporarily quartered in Dhahran's "rock city," a collection of tents close by the runway, while awaiting follow-on instructions. The order to move the ALCE into Kuwait reached us on the morning of February 28, just as we were listening to President Bush's radio broadcast. He held our full attention as he announced his intent to end the offensive on the 100th hour of the ground campaign. We had little time, however, to contemplate the full significance of the President's decision because in a few hours our C-130s were departing, and we had not even begun the upload of our equipment. We were augmented at this time by the 5th MAPS, a mobile aerial port unit originally deployed from RAF Mildenhall, England, to operate at Dhahran Air Base.<sup>3</sup> Our aircraft departing that morning were able to penetrate the heavy charcoal gray clouds of soot after a one hour flight, and land at KIA. Subsequently, however, the smoke on the airfield became too dense to risk additional landings. The airfield had no lighting or navigational aids and all maneuvers into the airfield were executed visually. We were more successful the following morning when the winds shifted to the south and the C-130 pilot was able to safely execute an approach and land.

The sight that greeted us in Kuwait was truly hellish. Just a kilometer south of the ALCE's bed-down, burning oil wells spit out massive, twisting red-orange flames hundreds of feet high. The high pressure wellheads, all damaged by Iraqi placed explosives, roared loudly as oil forced its way to the surface and sprayed out before igniting. Millions of gallons of crude oil, collecting around the wells, formed deadly rivers and lakes. Clouds of volatile vapors hung over the pools of oil waiting to ignite and the smoke itself contained potentially deadly chemicals, including hydrogen sulfide. The scene was one of the worst environmental disasters visited on this planet by man, but for Kuwait just one more blow to overcome from the bitter Iraqi occupation. The danger to Coalition forces and Kuwaitis alike was heightened by extensive mine

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Raging oil well fires light up the night sky immediately south of Kuwait International Airport.

**IN THE MIDDLE OF THE ONGOING ACTIVITIES AND HAZARDS ON THE AIRPORT, THE ALCE ESTABLISHED A MAJOR AIRHEAD**

fields and booby traps. The main sources of potable water and electricity had been disabled and booby trapped by the departing Iraqis. In addition to mines on the airfield, hand grenades, rocket-propelled grenades, thousands of rounds of ammunition, cluster bomb units (CBUs) dropped by Coalition aircraft, and many still charged anti-aircraft guns peppered the entire airport structure.

The airfield, taken only the previous morning, on February 27, by Task Force Shepherd of the 1st Marine Division,<sup>4</sup> was littered with the debris of air strikes and of battle. Many of the structures were damaged by CBUs, fuel-air bombs, and by six months of Iraqi vandalism. Numerous Iraqi main battle tanks (T-55s and T-62s), antitank vehicles, and Soviet styled jeeps were abandoned around the airfield. In an attempt to deny landings by Coalition aircraft, the Iraqis had positioned Kuwaiti automobiles across all of the hard surfaces and removed their tires and ignition wiring. The wreckage of a British Airways Boeing 747 and a Kuwaiti Air Force DC-9 cluttered the passenger terminal apron. We had much to do in a short time before the airfield would be ready to handle the major airflow expected.

To operate the crippled airfield at its maximum capacity, our ALCE immediately began coordinating with the various aviation units temporarily flying out of KIA. U.S. Marine helicopter elements, U.S. Army OH-58D and CH-47 helicopters, British CH-47 Chinooks, and Kuwaiti Puma and Gazelle helicopters were all intermingled with fixed-wing aircraft as the first elements of the airflow began to reach Kuwait. Occasionally the downblast of a chopper would set off a bomb or mine. Helicopters, flying combat patrols out of the airport, were being refueled from fuel bladders replenished by C-130s, in an area that would better serve the large airlifters when they began to arrive. After some negotiation, KIA's operational control passed to the ALCE with USMC personnel providing air traffic control services. During the first few days, U.S. Air Force combat controllers had controlled air traffic into KIA. Kuwaitis, who would later provide specialized assistance, were returning only gradually. In the middle of the ongoing activities and hazards on the airport, the ALCE established a major airhead.

With the professional expertise of U.S. Marine explosive ordnance disposal specialists, who han-

dled the cluster bombs and antipersonnel mines, the 120-member ALCE began to police up ammunition, weapons, spent rounds, and shrapnel. Aerial port forklift operators lifted the automobiles off the hard surfaces and deposited them in an out of the way car graveyard. We located concrete barriers and moved them into position to isolate the runways and ramps from the ground forces traffic. The ground forces included Omani, Bahraini, Qatari, Egyptian, Saudi Arabian, and Kuwaiti units in addition to U.S. Army and Marine forces.

Shortly after our arrival at KIA, we were joined by Kuwaiti Air Force Major Tahar al-Failakawi, who became our liaison officer throughout the operation. Bright, humorous, warm, and diplomatic, Tahar had been involved in the war almost from the beginning. An F-1 Mirage pilot, he was sent up on the morning of August 2, 1990, to engage attacking Iraqi helicopters. He shot down several enemy helicopters, while awaiting an almost certain response from Iraqi F-1 interceptors. However, the Iraqis never materialized, and he could not understand why they did nothing to defend their own helicopters. After running low on ammunition and fuel, Tahar attempted to return to his base but was told that it was under attack by commandos. He continued on to Dhahran, where the Saudis refueled him with the understanding that he would fly southwest to Taif Air Base and stay there. During the latter part of the air campaign, in February, he was tasked to attack targets in Kuwait. When the war ended he immediately drove up from Dhahran to assist us and to see his wife and four children. At great risk, his family had remained in Kuwait during the occupation. Although the Iraqis searched for Tahar's family, his pregnant wife managed to evade them. During this and a subsequent tour in the desert, I developed a close friendship with Tahar, his family, and through him, many Kuwaitis.

In 1992, when Tahar travelled to the United States to attend F/A-18 Hornet flight training, he stayed with me in Delaware for a week. During the ALCE's operations at KIA, Tahar coordinated with the returning Kuwaiti Air Force and the airport administration, and was always a gracious host. One day he took a few of us on a tour of Kuwait City. We first stopped on what had been Baghdad Street, an important thoroughfare in the Hawalli District prominently lined with several embassies, to look at a street sign. During the occupation, the Kuwaiti resistance had boldly painted over that part of the sign that said Baghdad and substituted Busch—a misspelling of Bush. We also visited the beachside trenches and bunkers intended to repel the Coalition's expected amphibious assault that never came. It was depressing to see a layer of crude oil everywhere the Gulf's waters touched the shore—a mark of the Iraqi occupation.

There also was the surreal. Often, on foggy, smoke filled mornings, two emaciated horses, a gray and a chestnut, would suddenly emerge like wraiths as they made their way through the airport wreckage. I guessed that they had escaped



Kuwaiti Air Force Major Tahar al-Failakawi and the author point out a street's name change from Baghdad to "Busch."

## AFTER AN ABSENCE OF SEVEN AND A HALF MONTHS, THE EMIR OF KUWAIT RETURNED TO HIS COUNTRY

from a nearby racetrack. The air strikes and constant firing of automatic and heavy weapons during the campaign and the strange post-apocalyptic climate, no doubt, did little to settle them down. Then there were the remnants of the Iraqi army. At night Iraqi deserters, renegades, and others who had simply been left behind, emerged in the nearby communities to scrounge for food and things to steal. They would hold up Kuwaitis or just loot their dwellings. As late as April, we discovered that an Iraqi army squad had been living nearby, within a large concrete drainage pipe. Those Iraqis who were rounded up often sought asylum, claiming they were Kurdish or Shiite draftees who did not want to return to Iraq.

The airhead quickly became a conduit for several ongoing activities: relief and recovery operations; movement of forces; support of United Nations operations; the return of embassy staffs and their equipment; the visits of high ranking officials and the return of Kuwaiti leaders; and support for those organizations that were fighting the oil well fires.

A steady parade of dignitaries brought the ALCE into contact with many senior officials. The first to arrive was the American ambassador to Kuwait, Edward "Skip" Gnehm. On March 1, he

flew into KIA on a C-130, personally bearing the American flag that had flown over the embassy until the Iraqis shut it down in August 1990. The next day Ted Koppel, the host of *Nightline*, and Bob Browne, senior editor for *Soldier of Fortune* magazine, came by. On March 4, the prime minister of Kuwait, Crown Prince Sheik Saad al Abdulla al-Sabah, returning from exile, arrived at the airport on board a Saudi C-130. With the arrival of the crown prince and his cabinet members, the Kuwaiti government was officially restored. On March 9, Secretary of State James Baker arrived from Taif, Saudi Arabia, aboard one of the 89 MAW's VC-137 aircraft. After some discussion with Kuwaiti officials, Baker and his staff boarded a U.S. Army UH-60 Blackhawk for a tour of the burning oil fields and the devastated capital. While he was gone, I detected a shifting of the winds from the north quadrant to the south, indicating that the heavy smoke would soon begin to envelop the airfield. If Baker expected to safely depart by air, he had to return immediately to KIA. I radioed his party and got them back. They departed the airport just as the visibility diminished to several hundred feet and getting worse. Baker's visit was followed by several ministerial-level delegations including those from Italy, Turkey, and Pakistan. On March 14, after an absence of seven and a half months, the Emir of Kuwait returned to his country. He was greeted by diplomats and Kuwaitis who danced on the tarmac with swords and AK-47 rifles. A U.S. congressional delegation came on March 18, followed three days later Elizabeth Dole, head of the American Red Cross. Mrs. Dole came for a first-hand assessment of Kuwait's immediate needs. On May 7, Secretary of Defense Dick Cheney arrived. After intensive discussions with the Kuwaitis, Cheney pledged to seek a long term commitment of U.S. military forces to defend Kuwait.

The oil well fires were a major ecological disaster and a significant obstacle to Kuwait's economic recovery. The Kuwaiti government gave top priority to the recovery of their oil fields. In early March, teams from world famous oil well fire fighting companies began to flow through the airport. Some of the companies we supported included Red Adair, Boots and Coots, and an Alberta, Canada based group. Soon after we established the airhead, C-5 Galaxies airlifted in some very large and specially rigged, tracked, and shielded bulldozers, each weighing 78,000 pounds. A C-5 also delivered a 58,000-pound pumping system, which was used to draw water from the Persian Gulf through an existing oil pipeline. While the fire fighters used the bulldozers to close in on the wellheads and build up berms around them, the pump projected a steady high pressure stream of water on the dozer and on the wellhead, cooling both down. The drivers then positioned and detonated explosives to blow out the burning well. When all worked well the fire was extinguished. The fire fighting companies were handsomely compensated for their efforts, receiving millions of dollars in



The 436th ALCE at the airport; unloading supplies for the hospital complex in Kuwait City.

**THE IRAQI SOLDIERS HAD WORKED THEIR WAY THROUGH EVERY BUILDING NOT USED BY THEIR UNITS... LEAVING BEHIND PILES OF DEBRIS**

fees. Some of the roustabouts fighting the fires told us that they were paid \$1,000 per day to do the dangerous work. The cost was well worth it to Kuwait. The effort to extinguish the fires had been described as a nearly impossible and highly complex task that would take several years. In fact, the fires were out by early November 1991, and the wells again pumping crude for export.

As airflow into the airport grew, the ramp became a who's who of the C-130 Hercules world. In addition to the U.S., the nations whose C-130 airlifters passed through KIA included Oman, Norway, Britain, Italy, Turkey, Sweden, the United Arab Emirates, Saudi Arabia, Kuwait, Egypt, Morocco, Spain, New Zealand, and Canada. The Russians jumped on the bandwagon, flying relief supplies into Kuwait with their recently commercialized An-124s and Il-76s. The An-124s were privatized in a joint British-Russian corporation, Air Foyle-Antonov, and the Il-76s flew for Metro Cargo, a joint Russian-Swiss corporation. The big Russian airlifters brought in relief supplies, including huge power generators for emergency electric power in the city (it would take until April before power was restored to Kuwait City). An incident at the airport with one of the giant An-124s gave us some insight into the Russians' sense of what constituted a mishap. As the pilot taxied his aircraft onto one of the aprons, he brushed one wingtip against a blast shield, completely shearing it off. While the aircraft was being downloaded the flight engineer speed taped over the exposed portion of the wing. Without further ado, the pilot then took off and continued with his mission.

### **Bedding Down in Kuwait**

The quality of life varied widely for the troops deployed to Desert Shield and Desert Storm. Kuwait presented its own set of challenges, some very different from those in the rear in Saudi Arabia, Oman, Bahrain, and the United Arab

Emirates. Aside from the unexploded ordnance, mines, and the oppressive smoke, the infrastructure in general had suffered at the hands of the Iraqis. Like termites, the Iraqi soldiers had worked their way through every building not used by their units in Kuwait City, tearing apart the interiors, stripping away anything of value, and leaving behind piles of debris. They also had a propensity for defecating in the corners of rooms. Because we needed shelter from the winter rains and the blowing soot, we had to quickly choose one of the structures, regardless of its condition. We arbitrarily selected a low brick and concrete building that had suffered very little structural damage from the air campaign and the airport seizure. The interior, however, reflected the standard Iraqi abuse. We used our hands to dig through the deeply piled trash and anything we could find to scrape off the feces. We located lumber and a 55-gallon barrel to build outhouses and a shower stall. For water we used what we could drain from holding tanks on the roofs of buildings. We utilized a small five-kilowatt portable generator to provide power for a string of low-wattage light bulbs and for our only indoor entertainment, a VCR and television. We enjoyed MREs and "T" rations until April, when the U.S. Army's Task Force Freedom, under Brig. Gen. Robert S. Frix, gave us a portable kitchen known as a Wolf Burger stand—named for its inventor, CWO4 Wesley C. Wolf. Then, after receiving a large shipment of canned goods, we were able to prepare balanced meals for everyone. In late March, an Air Force civil engineering unit from Oman arrived and erected a temporary toilet facility. Our sanitation improved markedly after the engineering troops set up pipes to drain the toilets into a nearby sewer. Recreation at KIA was, however, somewhat limited. Some of the troops fabricated weight sets and benches and a few jogged whenever the smoke eased. At one point we received a shipment of tennis rackets and golf clubs—useless to us. There was not much to do outside of running the airhead, except to cruise the nearly deserted streets in Kuwait City. City life gradually changed for the better once Kuwaitis returned home to reopen establishments, and electricity and water were restored.

Despite the damage inflicted by the Iraqis, Kuwait City remained an interesting and modern metropolis, served by an excellent system of roads and highways. Its setting on the Persian Gulf—or Arabian Gulf, as many Arabs would insist—with *dhow*s sailing the waterway gave the city a pleasant sense of the contemporary and the traditional. Apparently the Iraqis, in their defeat, did not want the city to escape unscathed. As a parting gesture the Iraqis attempted to burn down, with mixed success, all the hotels, the commercial district, the automobile dealerships, and other structures that caught their fancy. It was shocking to discover the National Museum with its planetarium burned to a cinder. Fires continued to burn in the city due in part to the lack of sufficient fire fighters and equipment. I was to have an opportunity to person-

THE MAIN HOSPITAL COMPLEX, LOCATED IN THE GRANADA DISTRICT, WAS IN DIRE NEED OF ASSISTANCE

ally became involved in fighting a fire downtown.

Close to midnight one March night, Major Mack from Camp Freedom's 352d Civil Actions Brigade contacted me. He was a reservist from Philadelphia and a highly experienced fire battalion commander for that city. Kuwaiti fire fighters were having difficulty extinguishing Iraqi started fires burning in a ten story high rise apartment/ shopping mall complex in the Qibla district, on Wattiya Street. Could we help? I quickly rounded up two of our PT-19 crash, fire, and rescue trucks and crews and headed to the fire. We spent all that night, under Major Mack's direction, running out hoses, attacking isolated fires, and working our way through a building eerily lighted by glowing metal support members and burning debris. We came out of the building grimy and tired but feeling that we did all we could to help Kuwait emerge from the Iraqi nightmare.

The most satisfying project, in which I had a hand, was the support we provided to the central hospital complex in Kuwait City. Shortly after arriving in Kuwait, I discovered that the main hospital complex, located in the Granada District, was in dire need of assistance. The Iraqis had built trenches and weapons emplacements throughout the hospital grounds, callously seized medical equipment and supplies, and took the director, Khalid Ali Al-Mahdi, and some of his staff north to Basra as hostages. I met Khalid soon after he had returned from Iraq following the ceasefire and asked him if there was anything we could do to help the patients, orphans, and staff. He said they would gladly welcome any assistance. I passed the word to the other aerial ports to the south that we would take any food, clothes, medical supplies, and candies left behind by the hundreds of thousands of troops going home. The aerial porters at different bases set up collection points, known as Kuwait Relief and Operation Kiss. The response was incredible as supplies packed on pallets on board USAF C-130s poured in. Back home, Americans were also sending supplies. The Delaware Rotarians, working with Dover's 436th Airlift Wing, sent hospital beds. Each day, five of our own ALCE troops volunteered to help move the supplies to the hospital complex, where Kuwaiti volunteers helped with the distribution. The majority of Kuwaiti volunteers were women, who before the war had worked as professionals in the banking and other commercial offices in the city. During the occupation they made their way to the hospital complex-orphanage to help care for their people. After the war many of them would be actively involved in promoting women's suffrage in Kuwait.

The U.S. Army's 1st Brigade, of the 3d Armored Division, had remained in the KTO and in Iraq after other units in the ground campaign rotated back to their home bases. Their mission was to enforce the ceasefire along the Iraqi-Kuwaiti border and protect refugees in southern Iraq. By April, United Nations forces and civilian staff began arriving at the airport to take over that mis-

sion. However, they had almost no understanding of how to operate an airhead or how to effectively reconstitute forces and equipment at the point of debarkation. We offered to help them to organize for the task and often did the work ourselves. We supported almost all the arriving UN units and their equipment, that soon headed north to the border. At the same time we briefed and prepared the 1st Brigade for their return home. The change-out ceremony between the UN and the U.S. Army took place at Safwan, Iraq, on April 25. When the international press asked the brigade commander what he would do if Iraqi forces attacked Shiite refugees at Safwan, he said that he would crush them. The reporters then spotted two Iraqi Republican Guard officers, who had just arrived for the ceremony. The reporters rushed to ask the Iraqis what they intended to do after U.S. forces departed. One of the Iraqis raised his AK-47 rifle as the other quickly grabbed him, probably telling his buddy that the U.S. Army was still in Safwan and that he had better put down his weapon. He immediately lowered his weapon, as we watched the UN flag rise up the flagpole. The United Nations-Iraq-Kuwait Observer Mission (UNIKOM) now assumed the job. When asked what he would do if Iraqis attacked refugees, the UN commander responded that he would report violations to the Security Council. Understandably, the refugees did not want to find out what was in store for them under the UN umbrella. Saudi Arabia agreed to move the refugees to their side of the border until they could be resettled.

A postscript to the ceremony demonstrated just how dangerous were the burning Kuwaiti oil fields. Some reporters from *The London Financial Times* followed us back to Kuwait, where they hoped to get an updated report on the oil fires. Sadly, they all perished when their vans, driven into the oil fields, broke through the surface crust and were enveloped in burning oil. With the changeout between the U.S. Army and the UN completed, we finished preparing the brigade for their airlift out of KIA. Beginning in late May, we moved the 1st Brigade to Germany via the C-141B Starlifters that had airlifted the U.S. Army's 11th Armored Cavalry Regiment for the defense of Kuwait. Thus began the regular rotation of army units into Kuwait's Camp Doha facility.

After the arrival of UN forces and the rotation of Army units, our activities at the airport diminished noticeably. The various embassies had already brought in the materials they required and the oil fire fighters had almost all the heavy equipment they needed. Task Force Freedom had completed its mission in April and departed. The sense of urgency that drove us in the beginning, when airlift was crucial, ended as much of the relief supplies and rebuilding materials were now trucked overland or came through the seaport. In early June, in response to the diminishing demands of the mission, we sent home the majority of our ALCE. I was now commander of what was called Operating Location D, under the post-

THE AERIAL PORTERS AT DIFFERENT BASES SET UP COLLECTION POINTS... THE RESPONSE WAS INCREDIBLE AS SUPPLIES PACKED ON PALLETS ON BOARD USAF C-130S POURED IN



The hospital complex's staff and orphans thank the 436th ALCE for its tremendous outpouring of support.

Desert Storm reorganization of air base operations in the U.S. Central Command (Forward) AOR. The Kuwaitis had restored full passenger and cargo handling capability at KIA and could be called upon to assist transiting military airlifters. At the end of June, we left a team of four to handle coordination and terminated our operations in Kuwait.

ALCE operations were an exciting, but very busy, mission that had us operating throughout the world. Later in the year, we redeployed to Zaire to run a non-combatant evacuation operation.

Some then deployed to Uruguay, while others went to Guantanamo Bay, Cuba, to support the Haitian relief operation. I returned to the desert, in late 1991, as director of operations for airlift forces forward deployed throughout the CENTCOM AOR. By that time the transformation of Kuwait was nothing short of miraculous. I found Kuwait City to be a fully functional urban center filled with people, traffic, and vitality. It was a testament to the success of all the operations that our ALCE had supported following Kuwait's liberation. n

## NOTES

1. See Michael Wines, "Health Threat From Oil Fires May Rise in Summer", *The New York Times*, Apr. 5, 1991, A-10; Youssef M. Ibrahim, "Another War Begins as Burning Oil Wells Threaten a Region's Ecology", *The New York Times*, Mar. 16, 1991, A-4.

2. For greater detail on the ALCE mission, see John L. Cirafici, *Airhead Operations: Where AMC Delivers* (Maxwell AFB, Ala.: Air University Press, 1995).

3. The 5th MAPS returned to RAF Mildenhall on Mar. 16, 1991. They were replaced by aerial porters drawn from the Air Force Reserve's 512 MAW (Associate),

Dover AFB, Del., and the 514 MAW (Associate), McGuire AFB, New Jersey; from the 166th MAPS, West Virginia Air National Guard; and from the 436th Aerial Port Squadron, Dover AFB.

4. For an account of U.S. Marine Corps operations at the airport and in the KTO, see Lt. Col. Charles H. Cureton, *U.S. Marines in the Persian Gulf, 1990-1991. With the 1st Marine Division in Desert Shield and Desert Storm*, (Washington, D.C.: History and Museum Division Headquarters, USMC, 1993).



# Slanguage

Brian S. Gunderson

## Part II: Letters C-D

| ROYAL AIR<br>FORCE TERM   | U.S. ARMY AIR FORCES<br>EQUIVALENT/<br>DEFINITION                                                                                   |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| CLOUDY JOE                | A WEATHER OFFICER                                                                                                                   |
| COACH                     | A BUS                                                                                                                               |
| CODSWALLOP                | WEAK BEER PRODUCED<br>BY A MAN NAMED COD                                                                                            |
| COLLECT A GONG            | BE AWARDED A MEDAL                                                                                                                  |
| COMPLETELY<br>CHEESED OFF | NO HOPE AT ALL                                                                                                                      |
| CONE                      | A CONCENTRATION OF<br>SEARCHLIGHT BEAMS<br>ON A BOMBER                                                                              |
| CONK OUT                  | AN AIRCRAFT ENGINE<br>THAT QUIT OR FAILED                                                                                           |
| COOKIE                    | A 4000-LB BOMB                                                                                                                      |
| COOP                      | THE COCKPIT CANOPY                                                                                                                  |
| COPPED IT                 | SHOT DOWN OR HIT BY<br>ENEMY AIRCRAFT                                                                                               |
| COPPER                    | A POLICEMAN                                                                                                                         |
| COR                       | AN EXPRESSION OF<br>SURPRISE                                                                                                        |
| CORKER                    | TOP-NOTCH, A-1                                                                                                                      |
| CORKSCREW                 | A VIOLENT, SUDDEN<br>DIVING AND CLIMBING<br>TURN TAKEN BY A<br>BOMBER PILOT TO<br>EVADE AN ENEMY<br>FIGHTER ATTACK<br>FROM THE REAR |
| COWBOY'S BREAKFAST        | BACON AND BEANS                                                                                                                     |
| CRABBING ALONG            | FLYING LOW OVER THE<br>GROUND OR WATER                                                                                              |
| CRACK DOWN<br>ON THE DECK | MAKE A HARD, PAN-<br>CAKE LANDING                                                                                                   |
| CRAM ON                   | PUT THE BRAKES ON                                                                                                                   |
| CRATE                     | AN AIRCRAFT                                                                                                                         |

### ROYAL AIR FORCE TERM

### U.S. ARMY AIR FORCES EQUIVALENT/ DEFINITION

|                   |                                                                                                                |
|-------------------|----------------------------------------------------------------------------------------------------------------|
| CRISPS            | POTATO CHIPS                                                                                                   |
| CROSSBOW          | COUNTERMEASURES<br>USED AGAINST GER-<br>MAN V-TYPE WEAPONS                                                     |
| CROWBAR HOTEL     | A BRIG, JAIL, CON-<br>FINEMENT OR DETEN-<br>TION CENTER                                                        |
| CRUMPS            | FLAK BURSTS                                                                                                    |
| CRUMPET           | A GIRL                                                                                                         |
| CUCUMBER          | AN AERIAL MINE<br>DROPPED BY RAF ON<br>"GARDENING"<br>MISSIONS                                                 |
| CUPPA             | A CUP OF TEA<br>OR COFFEE                                                                                      |
| CURTAINS          | KILLED                                                                                                         |
| CUT OUT           | AIRCRAFT ENGINE<br>THAT STOPS IN FLIGHT                                                                        |
| CUT THE LIP       | SHUT UP, BE QUIET                                                                                              |
| CUT UP, BE        | BE DEPRESSED, BITTER<br>OR SADDENED                                                                            |
| DART              | A CIGARETTE                                                                                                    |
| DEAD BEATS        | NON-FLYING RAF<br>PERSONNEL                                                                                    |
| DEAD MAN'S HANDLE | DEVICE USED TO<br>ROTATE REAR TURRET<br>OF A BOMBER TO<br>ACCESS AN INJURED<br>OR DEAD TAIL GUNNER             |
| DEAD RECKONING    | CALCULATING THE<br>POSITION OF AN AIR-<br>CRAFT USING COURSES<br>FLOWN, AIRSPEED<br>FLOWN AND FORECAST<br>WIND |
| DECK, ON THE      | FLYING LOW JUST<br>ABOVE GROUND OR<br>WATER LEVEL                                                              |
| DECK-LEVEL DICERS | RAF BOMBERS THAT<br>FLEW COMBAT MIS-<br>SIONS AT VERY LOW<br>LEVELS AGAINST HIGH<br>PRIORITY ENEMY<br>TARGETS  |
| DEFFY             | AN RAF BOULTON PAUL<br>DEFIANT FIGHTER<br>AIRCRAFT                                                             |
| DEMOB             | BE DISCHARGED FROM<br>THE ARMED FORCES                                                                         |

**ROYAL AIR  
FORCE TERM****U.S. ARMY AIR FORCES  
EQUIVALENT/  
DEFINITION**

|              |                                                                                                         |
|--------------|---------------------------------------------------------------------------------------------------------|
| DEVIL DODGER | A MILITARY CHAPLAIN,<br>A PADRE                                                                         |
| DICEY        | RISKY, DANGEROUS,<br>HAZARDOUS, CHANCY                                                                  |
| DICKEY       | THE RUMBLE SEAT OF<br>A ROADSTER CAR                                                                    |
| DIGGER       | A MILITARY JAIL, A<br>BRIG, A DETENTION<br>CENTER, ALSO A TERM<br>FOR AN AUSTRALIAN<br>OR NEW ZEALANDER |
| DIGS         | RENTED ROOM(S) IN A<br>HOUSE, AN APARTMENT                                                              |
| DIM VIEW     | DISPLEASED                                                                                              |
| DING         | CRITICIZE                                                                                               |
| DING-DONG    | A NOISY PARTY                                                                                           |
| DO A BUNK    | GO ABSENT WITHOUT<br>LEAVE, (AWOL)                                                                      |
| DODGED OUT   | LEFT A FORMATION (AS<br>AN AIRCRAFT)                                                                    |
| DODGY        | CHANCY, DANGEROUS<br>OR MUSHY, LOOSE AIR-<br>CRAFT CONTROLS                                             |
| DOG COLLAR   | A CLERICAL COLLAR                                                                                       |
| DOG ENDS     | CIGARETTE BUTTS                                                                                         |

The author, below at left,  
during training in Regina,  
Saskatchewan.

**ROYAL AIR  
FORCE TERM****U.S. ARMY AIR FORCES  
EQUIVALENT/  
DEFINITION**

|                   |                                                                                   |
|-------------------|-----------------------------------------------------------------------------------|
| DOG FIGHT         | AERIAL SCRAP<br>BETWEEN FIGHTER<br>AIRCRAFT                                       |
| DOGGO             | QUIET                                                                             |
| DOGGY WEATHER     | BAD OR DETERIORAT-<br>ING WEATHER                                                 |
| DOG'S BODY        | AN ERRAND BOY,<br>A GOFER                                                         |
| DON THE CLOBBER   | PUT ON ONE'S FLYING<br>EQUIPMENT/CLOTHING                                         |
| DONE A BUNK       | LEFT THE FORMATION<br>OF FIGHTER OR<br>BOMBER AIRCRAFT                            |
| DOODLE BUGS       | GERMAN V-1 BUZZ<br>BOMBS                                                          |
| DO PORRIDGE       | SERVE TIME IN JAIL<br>OR DISCIPLINARY<br>BARRACKS                                 |
| DOWN IN THE DRINK | AIRCRAFT THAT<br>DITCHED IN THE<br>OCEAN/SEA                                      |
| DRAUGHTS          | A GAME OF CHECKERS                                                                |
| DRAWING PINS      | THUMB TACKS                                                                       |
| DRIVING THE TRAIN | LEADING MORE THAN<br>ONE SQUADRON OF<br>AIRCRAFT INTO AERIAL<br>BATTLE            |
| DROP A CLANGER    | MAKE A MISTAKE, BE<br>TACTLESS, BE<br>INDISCREET                                  |
| DUD, A            | UNFIT FLYING<br>WEATHER                                                           |
| DUFF GEN          | BAD, UNRELIABLE OR<br>INCORRECT<br>INFORMATION                                    |
| DUG-OUT           | A WORLD WAR I VET-<br>ERAN TAKEN INTO A<br>MILITARY SERVICE IN<br>THE EARLY 1940s |
| DÜPPEL            | GERMAN EQUIVALENT<br>OF CHAFF, WINDOW OR<br>RADIO/RADAR COUNT-<br>ERMEASURES      |
| DUST BIN          | TAIL/REAR GUNNER'S<br>POSITION IN BOMBER<br>AIRCRAFT                              |
| DUST UP           | HEATED ACTION IN<br>COMBAT                                                        |

## Book Reviews

**America's Struggle with Chemical-Biological Warfare.** By Albert J. Mauroni. Westport, Ct.: Praeger, 2000. Photographs. Notes. Index. Pp. 293. \$65.00 ISBN 0-275-96756-5

Mauroni begins his volume with a Desert Shield "what if" scenario that describes all the nastiness that would have accrued to the U.S. without the protection afforded by years of preparation by the Chemical Corps. It is difficult to discount the role good chemical and biological warfare (CBW) protection played in the Persian Gulf conflict, but the author has a larger agenda that plays out in the subsequent chapters of his book. Albert Mauroni is an apologist for CBW (with a big emphasis on the "C," as discussed below).

In Mauroni's view, there is no moral distinction between waging war with conventional weapons and doing so with CB weapons. Mauroni urges that CB weapons employment be seen as "not inherently an immoral act," which is in stark contrast to the feelings of most nations. One tack the author takes to prove his point is noting that CB agents are in many cases merely incapacitants and, therefore, "safer" than conventional weapons; i.e., less likely to result in serious collateral casualties. This is a point that may be made about other classes of weapons as well. A soldier armed with a laser-sighted rifle is legally prohibited from using the laser to blind an opponent but is permitted to use it to aim a bullet to his enemy's head. This observation has so far failed to change world opinion about the use of lasers to dazzle enemies on the battlefield. Similarly, the existence of non-lethal CB weapons has not been sufficiently convincing a reason to remove the restrictions on the use of CB agents in warfare.

The author even belies his own point by arguing that "[w]ar, by definition, is not about humanity but against it," and pontificating that those who try to wage humane war are signaling their willingness to lose. In fact, history has shown that unbridled warfare creates more problems than it solves, often because of a loss of military discipline. For instance, Richard Overy in his book, *Why the Allies Won*, estimates that the undiscipline stemming from encouraging savage warfare on the Eastern Front in World War II resulted in Germany's loss of nearly half a million troops to imprisonment or execution. Whether engaging in CBW would have a similar effect is an open question. What is certain is that drawing on morality-based arguments to prove a point and then condemning with a broad brush those who would even consider wartime morality is unconvincing.

Interestingly, the author downplays the significance of BW in comparison to CW. Many people think biological agents are the bigger threat (and perhaps outstrip even nuclear weapons in their potential for dev-

astation), as there are so many viruses that perpetuate themselves in deadly fashion until they stop of their own accord. The evils of Ebola and other exotic diseases are familiar, but it is easy to forget that a rogue strain of the modest Spanish influenza killed forty million people in 1918-1919. One cannot help but wonder whether Mauroni's infatuation with CW is due to the realities of his work, first as a chemical officer and now as a Defense consultant on CBW. As he notes in the book, the CBW community may ignore the biological threat because it is just too difficult to detect and counter.

To be fair, though, Mauroni eventually accords BW reverential treatment similar to that he bestows on CW. He expresses regret that the Biological Weapons Convention was signed in 1972, as the U.S. abandoned weapons that the USSR still had in its arsenal. And, despite downplaying the BW threat, Mauroni is in favor of the controversial anthrax vaccination program, designed to protect U.S. military forces from that very danger.

Although convinced of the importance of CW, Mauroni never tries to make the case that chemical weapons alone will win a war. Quite the contrary, he argues that CW allows the employing nation to take advantage of its opponent's inability to deal with the threat and resulting reduced efficiency in combat. For example, Iraq used mustard gas and nerve agents against Iran in their 1980s conflict. The attacks were aimed merely at making the conventional combat situation more difficult for Iran, which they did. They also resulted in Iraq's increasingly skillful employment of chemical weapons. Mauroni would predict similar outcomes in future near-peer conflicts.

When faced with a much stronger opponent in the form of the U.S., however, Iraq refrained from using chemical weapons at all. The problem for Chemical Corps devotees is that we do not know whether it refrained from engaging in CW because of the great CBW protection afforded U.S. combatants, or because it feared American retaliation with nuclear weapons.

There are some interesting examples in the book of interservice rivalry. The competition between the Army—the lead service for CBW—and the other branches of service led to inefficiencies in design and procurement of CBW equipment. As usual, the Air Force demanded higher-specifications than the other services for its equipment—legitimately, in this case, due to the critical eyesight needs of aviators.

Additional issues Mauroni discusses are contractor vulnerability and the decontamination of human remains. How we treat the bodies of our KIAs is an important subject. The expanding role of contractors in our warfighting has raised many questions; protecting vital contracted labor from CBW is certainly one of them.

For the casual reader the book sags in

the middle, weighed down with detailed examinations of CBW equipment—detectors, gas masks, and decontamination agents, among others. Only the truly dedicated would find the intricacies of the specifications and the procurement of these items entertaining. Still, for a decidedly different take on CBW, Mauroni's book is the place to turn. It is a rare opportunity to read the gospel of a true believer in CBW.

Major Gary Brown, USAF, 422d ABS/JA

U U U U U U

**The Writing of Official Military History.** By Robin Higham, Ed. [Contributions in Military Studies, Number 171]. Westport, Ct: Greenwood Press, 1999. Notes. Appendix. Index. Pp. xii, 182. \$55.00 ISBN: 0-313-30863-2.

For many years, official military histories, that is, accounts of wars produced by teams of government historians, were regarded as "the first chop" on synthesizing information past the original documentation. Official history programs have expanded past that activity and into archives, museums, reinterpretive analysis, and even employment of private contract writers. Thirty years ago, now emeritus professor Robin Higham gathered and edited several guides to official histories that remain the standard works in the field. His newest collection by no means supplants that earlier work, but rather provides somewhat eclectic yet informingly disparate additions to our body of knowledge. Most of the essays were not written for this volume specifically, lack historiographical context or even common framework. Nevertheless, the nine essays do provide an idea of the daunting task of official historians striving to provide accurate, useful, and objective evaluations in an environment of academic criticism, information security, political sensitivity, and, often, official disinterest.

Higham himself provides two of the essays concerning the objectives and methodology of military historiography as well as a "demicentenary review" of official history and the Anglo-French Norway campaign of 1940. There are accounts of the role of the combat historian, the legendary Navy's historian Dudley W. Knox and his association with President Franklin D. Roosevelt, Italian service historians and the Fascist war effort, a comparison between British and German official studies of the Russo-Japanese War, and an appendix on medical histories. The most provocative essays concern an unapologetic defense of the East German military history effort by its last director and a critique of revisionistic attacks on World War I as "ritual murder." Why an edited version of

the Library of Congress's description of its General Tooley Spaatz collection as "The Making of Air History" is included, when an air historian could have been commissioned to write a more comprehensive and informative overview of the whole very active and influential official program remains a mystery. The contributors, however, ably reflect public and private sectors that have profited for over a century of "official history."

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U U U U U U

**Training to Fly: Military Flight Training 1907-1945.** By Rebecca Hancock Cameron. Washington, D.C.:Air Force History and Museums Program, 1999. Photographs. Notes. Glossary. Bibliography. Index. Pp. xiv, 677. \$58.00

This volume is surely the definitive history of flight training by the predecessor organizations of the U.S. Air Force, from the earliest years of manned flight through the end of World War II. The theme of the work is how the flight training process fostered institution-building, professionalization, and program development, enabling the air arm to meet successfully the demands of global warfare in World War II. The author begins by examining, in Part I, the initial, individualistic era of flight, from 1907 until the entry of the United States into World War I in 1917. Although the Army did not acquire its first aircraft until 1909, it had established an Aeronautical Division within the Signal Corps two years before. The earliest military aviators received their training from the Wright brothers themselves and were granted certificates issued by the Federation Aeronautique Internationale through the Aero Club of America. The rating of Military Aviator was only established later in 1912. The author relies appropriately on primary, first person sources, such as Chandler, Foulois, and Lahm, to recount this era. Particularly interesting are the chapters in Part II describing the design, creation, and execution in the United States and in Europe of the training programs required to build from virtually nothing the U.S. Air Service. The author has deeply mined primary source records in the National Archives for this period.

Part III covers the post-World War I retrenchment, the creation of the Air Corps in 1926, of Randolph Field in 1931, and of the GHQ Air Force in 1935. The institutionalization of flight training, curriculum and program design, and of tactical and crew training within the GHQ Air Force are addressed in detail. The achievement of professionalization in this period created the platform from which the air arm could assert, with authority, its claim to institutional autonomy. The 1939 to 1941 rearmament

is recounted in Part IV, with detailed attention to individual pilot and aircrew production, and operational training in the various doctrinal specialties of pursuit, attack (later light bombardment), heavy bombardment, dive bombing, and observation (later reconnaissance). The enormous complexity of frantic, tremendous extrapolation from the tiny interwar Air Corps to the Army Air Forces of World War II is distilled in interesting narrative from the huge volume of war records. The final section of the book, Part V, is entitled "Training for War," and describes the selection and training of pilots, navigators, bombardiers, and gunners through the individual, crew, and unit phases to deployment in the theater tactical air forces. In all, an extremely thorough examination, with reliance on primary sources, of the evolution of flight training to the eve of the creation of the U.S. Air Force.

*Arnold J. Grossman, American Airlines, Inc.*

U U U U U U

**Norstad: Cold War NATO Supreme Commander—Airman, Strategist, Diplomat.** By Robert S. Jordan. New York: St. Martin's, 2000. Photographs. Notes. Appendices. Bibliography. Index. Pp. 238. \$45.00 ISBN:0-312-22670-5

Lauris Norstad was one of the most important and powerful airmen in American history who capped his career as Supreme Allied Commander Europe (SACEUR) from 1956 to 1962. A diplomat as well as a military commander, Norstad was the paradigmatic diplomat-warrior of the modern era. Robert S. Jordan, a prolific author and NATO expert, tells Norstad's story with unusual insight.

"Larry" Norstad graduated from West Point in 1930, joined the Air Corps, and for the next decade served as a bomber pilot and staff officer. Despite his youth, he caught "Hap" Arnold's attention, and was one of his principal staff officers throughout World War II. In addition, Norstad flew combat in North Africa, became the operations chief for the Mediterranean Allied Air Forces, and was chief of staff of the Twentieth Air Force during the strategic bombing campaign against Japan. After the war, Norstad saw duty on the Air Staff in Washington, D.C., commanded the United States Air Forces Europe, and in 1956 was elevated to the position of SACEUR.

Jordan focuses on the six years that Norstad led NATO, when the Cold War was at its height and massive retaliation with nuclear weapons delivered by air was our national strategy. As tactical nuclear weapons and ballistic missiles became available, a major controversy arose within NATO as to where in the theater these weapons should be deployed and who should control them.

The British had their own nuclear weapons, as well as a "special relationship"

Cornell Ad

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with the United States; France aspired to nuclear status and resented American and British primacy within NATO; and West Germany, the obvious battleground if war did break out, was ever fearful of NATO's commitment to her security. It was Norstad's task to assuage French pride, maintain British allegiance, reassure the Germans, and not provoke the Soviets—while simultaneously deterring them from aggression. Jordan demonstrates that Norstad fulfilled these varied tasks with skill and delicacy.

The highlight of Norstad's tenure as SACEUR, and the event that occupies one-third of the book, was the reemergence of the Berlin crisis. West Berlin, an island in the middle of Soviet-occupied East Germany, was a lightning rod for tension throughout the Cold War. In 1948, the Soviets had blockaded the land routes into the city, resulting in the highly successful Berlin Airlift that saved the city from Soviet domination. Beginning in late 1958, the Soviets began pressuring Berlin once again. The crisis ebbed and flowed over the next four years, culminating in the building of the Berlin Wall. During those four years NATO was under intense strain.

The reader may feel a bit overwhelmed by Jordan's detailed account of the crisis, but

this is actually a wonderful case study that illustrates the enormous complexity a theater commander must often face, in both the military and diplomatic spheres.

Therein lay a problem. The military had been heavily involved in American politics since the beginning of the republic, and this involvement intensified after World War II, when many senior military officers served in cabinet positions, as ambassadors, and, of course, as President. During his long tenure as SACEUR, Norstad was expected to be a politician as well as an airman. He worked not only with his military counterparts, but dealt frequently and routinely with prime ministers, presidents, and foreign secretaries. President John F. Kennedy, and his secretary of defense, Robert S. McNamara, were troubled by the power and influence Norstad wielded in NATO, and decided to do something about it.

The proximate cause of the rift between Norstad and the Kennedy administration was the issue of flexible response. Although Norstad had long advocated an increase in NATO's conventional strength, he thought Kennedy's calls for a major conventional build-up in Europe were excessive. Throughout the Cold War some NATO allies felt uneasy over the depth of America's com-

mitment to European defense. To them, a massive conventional build-up was a signal that the U.S. was unwilling to continue providing a nuclear shield to Europe. In this view, for deterrence to succeed the Soviets could never be allowed to doubt the U.S. would respond to an attack on NATO with *nuclear*—not conventional—weapons. In addition, Norstad disagreed with Kennedy's calculated strategy of gradual escalation during the Berlin crisis. Norstad, along with Konrad Adenauer in West Germany, thought this approach “lacked firmness” and sent the wrong signal to the Soviets. Norstad no doubt felt some vindication when the policy of gradual escalation failed so miserably in Vietnam in the years that followed.

In truth, the real problem was that Norstad considered himself an international commander first and an American general second. He believed it his duty to pass on the American President's views to NATO and serve as an honest broker in any negotiations that would follow. To Norstad, it was not appropriate to follow the orders of a single NATO country—even if that country was his own. This belief did not sit well with Kennedy or McNamara. Because they wanted a more pliant and less politically visible SACEUR, Norstad was nudged into retire-

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AMU Ad

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ment in 1962.

This book is a first-rate piece of scholarship that contains compelling insights and lessons. There is much talk today regarding the alleged politicization of the American military, and it is often said that military involvement in politics is contrary to the American tradition. Although even a cursory review of U.S. history would cast doubt on that contention, there is no question that our political leaders have grown increasingly uneasy with senior military officers straying into the political arena. Norstad was one of the first to fall because of these new concerns. Jordan has done an outstanding job not only of telling the story of an important airman, but of a key milestone in the history of American civil-military affairs.

*Phillip S. Meilinger, Science Applications International Corporation, McLean, Virginia*

U U U U U U

**Challenge to Apollo: The Soviet Union and the Space Race, 1945-1974.** By Asif A. Siddiqi. Washington, D.C.: National Aero-

navics and Space Administration, 2000. Glossary. Photographs. Illustrations. Bibliographic Essay. Tables. Appendices. Index. Pp. xvi, 1011. \$83.00 ISBN: 0-16-061305-1

After many years, we finally have a definitive, English-language history covering the first three decades of the Soviet Union's space program. Sixteen years in the making, Asif Siddiqi's amazingly detailed *Challenge to Apollo* provides a kaleidoscopic view of the technical and political evolution of Soviet missile and space projects, particularly those dealing with piloted flight. A forewarning to the faint-hearted or easily frustrated reader is necessary, however, because this weighty tome contains over 850 tightly composed, meticulously footnoted pages of narrative. To say that it answers every question about the early Soviet space program would be an exaggeration, but this book is definitely a veritable gold mine of factual information and scholarly analysis.

Siddiqi has organized his narrative around three basic themes. The first deals with the institutional framework and the four primary constituencies—engineers, artillery officers, defense industrialists, and the Communist Party—that were fundamental to establishment of a Soviet ballistic missile program during the fifteen years fol-

lowing the end of World War II. Those four groups colluded to create the R-7 ICBM, which one visionary, Sergey Pavlovich Korolev, used to launch the first artificial Earth satellite on October 4, 1957. Driven by their pursuit of powerful new weapons, the Soviets soon gained the capability to launch a human being, Yuri Gagarin, into space. Consideration of the post-Gagarin era leads Siddiqi to his second theme: the Soviet effort to beat the U.S. in landing the first person on the Moon. Acrimony, fragmentation, and funding problems throughout USSR space and rocket programs during the mid-1960s, combined with Korolev's untimely death, led to a series of devastating failures and, ultimately, a dramatic reorientation toward space stations and long-duration flight. The third theme in this path-breaking volume addresses how the Soviets handled technological innovation in their space endeavors. Careful examination both confirms and contradicts the a priori notion that Soviet technology was characterized by evolutionary rather than revolutionary changes.

During the course of his research to flesh out these themes, Siddiqi plumbed an astounding variety of primary and secondary sources in Russian and English, as well as French and German. By his own

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reckoning, he explored eight different types of material: primary documents published as collected works by Russian historians with access to archives; official histories from Soviet-era space organizations; biographies of major participants; oral histories and memoirs; articles and books by historians of the Soviet space program; English-language sources; declassified documents; and interviews and correspondence. His bibliographic essay is a startling tour de force in itself, but the way he managed to extract and combine information from such a vast array of difficult-to-translate material is simply astounding.

One comes away from *Challenge to Apollo* with a much richer understanding of the complexity of the individuals and organizations that contributed to the successes and failures of the Soviet space program. In addition, one gains a deeper appreciation for not only what the Soviets actually accomplished in space prior to 1974, but what they sought to achieve. Here, first and foremost, is the tragic story of a colossus inextricably bound by a web of its own weaving and, secondarily, the triumphant tale of a phoenix rising from the ashes of its self-destruction. No serious scholar of space history should ignore this seminal work.

Dr. Rick W. Sturdevant, Deputy Director of History, HQ Air Force Space Command

U U U U U U

**A Military History of Canada: From Champlain to Kosovo.** by Desmond Morton. Toronto: McClelland and Stewart, 1999; 4th Edition. Maps. Photographs. Bibliography. Index. Pp. 338. \$18.95 ISBN:0-7710-6514-0

First published in 1985, Desmond Morton's fourth edition of *A Military History of Canada* brings readers right up to the realities of shrinking post-Cold War defense budgets and peacemaking in Kosovo. Over the past fifteen years Morton's original thesis has remained unassailable. In this, as in the first edition, he reminds readers that "A leading military historian has called Canadians 'an unmilitary people,' a description that most Canadians find flattering." Morton does not agree and feels that war has been a pivotal influence in Canada's past and present. True, he admits, there has been little military activity in Canada, particularly in the last century, but he argues that wars have led to the creation of Canada and to the country's growth into an independent nation and occasionally influential player on the world stage. Morton believes that the influence of war has been felt in all aspects of Canadian life: "it is hard to find an institution, from the family to trade unionism, whose history was not transformed by either world war."

With this broad canvas, Morton sets out to offer a quick and expansive history of Canada, seen from a military perspective, for a period covering the last four and a half centuries. The reader gets a bit of everything as Morton, an accomplished military, political and social historian, very capably weaves together military and political issues with the social developments with which they were always linked. Morton provides sufficient detail that readers will be convinced that Canada's military policies, and in some cases actions, have been firmly linked to political needs: tight budgets, fear of imperial implications, and an overwhelming desire for domestic political stability are recurring themes. At the same time they will get a taste of what Canadian soldiers, sailors and aviators accomplished.

As is almost invariably the case this one volume treatment of a broad topic tends to be brief in both context and analysis. Morton is not, however, shy about offering opinion and does this, frequently, with a word or a phrase which makes the reading of the book an agreeable undertaking.

If there is one weakness in this work it is that the breadth of the subject leads to a lack of depth and an inability to offer sufficient explanation such that the general reader, Canadian or American, may become frustrated by the rapid fire lists of names, places and events. Canadians who sometimes have a hard time remembering the names of postwar prime ministers will find it difficult to place those, important though they were to defense matters, from the first half of the twentieth century. Trying to sort out military leaders will be even more difficult. Morton or perhaps his publishers do not make the task any easier: there could well have been a couple of pages of key appointments, but none are offered. There are some interesting photos, but these are generally people shots with only a few identifying the main actors. Morton's maps are similarly ineffective. While he does manage to include maps of most significant theaters for Canadian operations the level of detail is uneven and in some cases key locations have been missed. Of particular concern for the readers of *Air Power History*, there is a strong bias towards reporting on land campaigns and decisions concerning the army at the expense of the navy and the air force.

Counterbalancing these problems is a wonderful bibliographic document that provides a chapter by chapter essay of Morton's recommended readings. While his lists are not exhaustive, they do offer samples of some of the best materials that have been written. Readers wanting a starting point for further research will certainly be able to find much within the bibliographies of these publications.

While there are some weaknesses to this volume, it is, particularly for American readers, worth reading. Morton captures the uniqueness of the Canadian military experience, one which, though in places similar to

the American military heritage, is definitely not the same. American readers may experience a steep learning curve while being served up a fair bit of Canadian national history, but they will assuredly come away with a better perspective on their unmilitary northern neighbors.

Randall T. Wakelam, Canadian Defence College

U U U U U U

**Friendly Fire: The Accidental Shootdown of U. S. Black Hawks Over Northern Iraq.** By Scott A. Snook. Princeton, N.J.: University of Princeton Press, 2000. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendix. Bibliography. Index. Pp. xvii, 257. \$35.00 ISBN: 0-691-00506-0

Every now and then a breakthrough occurs following the advancement of a new methodology that is immediately adopted across disciplines. The release of Graham Allison's seminal work *Essence of Decisions* exemplifies the point. In 1971, Allison employed a series of organizational constructs—the Bureaucratic Model, the Rational Actor, and the Organizational Model—to highlight the critical decisions of the Kennedy administration during the historic Cuban Missile Crisis. Thereafter, social scientists, covering a host of fields, including but not limited to, sociology, psychology, history, and economics, quickly embraced this analytical approach to unearth and reexamine controversial decisions within their respective disciplines.

As with most theories, they often develop after the conclusion of a major event or phenomenon. *Friendly Fire* is a case in point. Scott Snook employs a unique and comprehensive set of organizational theories to explain the accidental shootdown of two Black Hawk helicopters over Northern Iraq in 1994.

Incidents of fratricide are a recurring horror in modern war. Nonetheless, a question begs: what makes this occurrence more particular than previous accidents? The author addressed the issue in the preface: "I was wounded by friendly fire (on 27 October 1983) from a U. S. Air Force A—7 fighter on the Island of Grenada." Having survived this incident, Snook provides a window upon which to view the events that unfolded inside the tactical area of responsibility (TAOR) over Iraq.

Consistent with case analysis, the author begins this research endeavor with a rudimentary question: How in the world could this happen? Thereafter, having sifted through mountains of documentary evidence, he attempts to confront the central issue: Following two years of exhaustive

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investigation, how is it possible that no one was held responsible for the death of twenty-six peacekeepers? This query is significant in light of the fact that the puzzle was all but complete. Accordingly, the record indicates "Eagle Flight entered the TAOR early; the F—15s were unaware; the Black Hawks squawked the wrong code; and fighters and helicopters couldn't talk to each other. Due to multiple coordination failures, Eagle Flight was not adequately integrated into the task force. In the end, this non-integration, an organizational-level failure, increased the likelihood that something bad was going to happen." In short, the breakdown of rudimentary procedures culminated in the tragic deaths that stunned the Pentagon and the American people.

Having uncovered the major problems from the investigative material, Snook seeks to find a culprit where the military and civilian courts concluded there were none. In the end, the author finds no smoking gun. It is at this point that his four theoretical accounts—the individual-level, group-level, organizational-level, and the cross-level—assume center stage to provide a vivid and highly imaginative autopsy that reveals multiple organizational dilemmas that are critical to understanding and pre-

cluding future incidents of fratricide.

While each of the chapters offer evidence that something went wrong, the reader will find chapter five—the organizational—level account—compelling if not numbing. Using this account, the author maintains that there were indeed failures that contributed to this tragedy. In particular, the author implies that Brig. Gen. Jeffrey Pilkington, co-commander of Task Force Provide Comfort, who regularly flew his own F—16 jet, was blinded by "organizational deficiency." The following analysis is instructive:

*Because F-16s periodically flew low-level missions, SOC 2 [Squadron Operations Center supporting the F-16s] faithfully briefed planned helicopter activity in the TAOR. General Pilkington was an F-16 pilot who routinely flew out of SOC 2. Therefore, every time he flew, he was dutifully informed of all helicopter operations prior to flying. Unfortunately, F-15 pilots were not. SOC 1 that supported the high flying F-15s never briefed helicopter operations because their aircraft never flew 'down in the weeds.' It was General Pilkington's intimate knowledge of OPC flight operations, from the perspective of an F-16 pilot, and not the more*

*common general insulation from life in the trenches, that effectively blinded him to the possibility that all pilots might not be receiving the same information.*

In essence, the general had instituted acceptable procedures for his and other F—16 flights, but no adjustments existed to integrate F—15 pilots into task force operations. If one considers the additional fact that at no time during Operation Provide Comfort (OPC) were F—15 pilots ever made aware of Eagle Flight Operations (UH—60s), we should be thankful that the accident was not repeated with great occurrence. The author's explanation for this and other failures is that they are examples of practical drift—"the slow, steady uncoupling of practice from written procedure."

The reader will be fascinated by Snook's efforts to build a case when the Pentagon and civilian authorities thought none existed. The conclusion is eye opening and the "lessons learned" are insightful. This is a lucid and well-argued book that is a must read for anyone seeking to comprehend the complexity of fratricide.

*Dr. John Davis, Industrial College of the Armed Forces and U.S. Institute of Peace*

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# Books Received

Burrows, William E. *The Infinite Journey: Eyewitness Accounts of NASA and the Age of Space*. New York; Discovery Books, 2000. Photographs. Index. Pp. 240. \$40.00 ISBN: 1-56331-924-1

Dillon, Neal B. *A Dying Breed: The Courage of the Mighty Eighth Air Force*. Grants Pass, Ore.: Heligate Press, 2000. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Pp. xi, 330. \$15.95 Paperback ISBN: 1-55571-529-X

Duffner, Robert W. *Science and Technology: The Making of the Air Force Research Laboratory*. Maxwell AFB, Ala.: Air University Press, 2000. Tables. Illustrations. Photographs. Notes. Appendices. Index. Pp. xix, 307 ISBN: 1-58566-085-X

Dunar, Andrew J. and Stephen P. Waring. *Power to Explore: A History of Marshall Space Flight Center, 1960–1990*. [NASA SP-4313] Washington, D.C.: NASA History Office, 1999. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. x, 706. \$49.00 GPO Order Stock No. 033-000-01221-7

*Early Aviation: The Pioneering Years through to the First World War*. [CD-ROM] Hampshire, England: Realvision Imaging Solutions, Ltd., 2000. Produced in conjunction with the Royal Aeronautical Society. Contains 400+ photographs and illustrations of early aircraft, airships, and gliders. [System requirements; Windows 95/98/NT 4+ / Internet Explorer 4+ \$19.95 ISBN: 1-903129-22-2

*The Genesis of Flight: The Aeronautical History Collection of Colonel Richard Gimbel*. Los Angeles, Calif.: Perpetua Press, 2000. [Produced for the University of Washington Press and The Friends of the United States Air Force Academy.] Diagrams. Illustrations. Photographs. Appendix. Bibliography. Index. Pp. xi, 371. ISBN: 0-295- 97811-2

Harrison, James P. *Mastering the Sky: A History of Aviation from Ancient Times to the Present*. Rockville Center, N.Y.: Sarpedon, 1996. Photographs. Notes. Bibliography. Index. Pp. xi, 351. \$16.95 Paperback ISBN: 1-885119-68-2

Higham, Robin. *Bases of Air Strategy: Building Airfields for the RAF, 1914–1945*. Shrewsbury, England: Airline Publishing, 1998. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Pp. 285. \$42.95 ISBN: 1- 84037-009-2

Joes, Anthony James. *America and Guerrilla Warfare*. Lexington: The University Press of Kentucky, 2000. Maps. Notes. Bibliography. Index. Pp. 418. \$30.00 ISBN: 0-8131-2181-7

Jordan, Robert S. *Norstad: Cold War NATO Supreme Commander—Airman, Strategist, Diplomat*. London: Macmillan Press, 2000. Maps. Diagrams. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xxi, 329. \$45.00 ISBN: 0-333-49085-1

Keeler, Albert T. *VIP Pilot; An Autobiography of a Pilot — from WW II to Korea and Vietnam to VIP Duty*. Privately printed by National Academy Press, 2000. Photographs. Pp. vi, 195. \$29.95 Paperback. Al Keeler, 20 Industry Lane, Prince Frederick, MD 20678. (800) 728-4213

*The Korean War*, Vol. I. London and Lincoln: University of Nebraska Press, 2000. [Originally published, Seoul, South Korea: Korean Institute of Military History, 1997.] Maps. Tables. Diagrams. Illustrations. Appendices. Glossary. Bibliography. Pp. xxv, 929 Paperback \$29.95 ISBN: 0-8032-7794-6

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