

AIR POWER *History*

FALL 2001 - Volume 48, Number 3



Coalition Air Warfare in the Korean War

1950-1953



October 17-18, 2001

Andrews AFB, Maryland, Officer's Open Mess

Presented by the Air Force Historical Foundation and the U.S. Air Force History Office in conjunction with the Historical Foundations and History Offices of the U.S. Army, U.S. Navy and U.S. Marine Corps

AIR POWER

FALL 2001 - Volume 48, Number 3

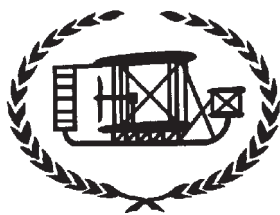
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(301) 981-3574 Fax

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AIR POWER *History*

The Journal of the
Air Force Historical Foundation
Fall 2001 Volume 48 Number 3

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Brian S. Gunderson

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Jacob Neufeld

Technical Editor

Robert F. Dorr

Book Review Editor

Michael L. Grumelli

Layout and Typesetting

Richard I. Wolf

Advertising

Mark D. Mandeles

Circulation

Richard I. Wolf

Air Power History (ISSN 1044-016X)
is produced in March, June, September,
and December by the Air Force Historical
Foundation.

Prospective contributors should consult the
GUIDELINES FOR CONTRIBUTORS at
the back of this journal. Unsolicited manu-
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Address **Letters to the Editor** to:

Air Power History
P.O. Box 10328
Rockville, MD 20849-0328
e-mail: neufeldj@starpower.net

Correspondence regarding missed issues
or changes of address should be addressed
to the **Circulation Office**:

Air Power History
P.O. Box 151150
Alexandria, Virginia 22315
Telephone: (703) 923-0848
Fax: (703) 923-0848
e-mail: airpowerhistory@yahoo.com

Advertising

Mark Mandeles
8910 Autumn Leaf Ct.
Fairfax, VA 22301
(703) 426-5147; fax 426-5149
e-mail: mandelm@erols.com

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Periodicals postage paid at Lexington, VA
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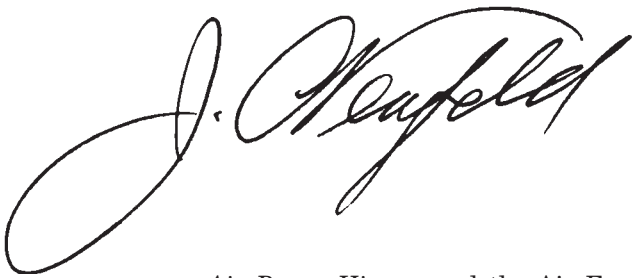
Roger D. Launius, Chief Historian at the National Aeronautics and Space Administration (NASA), leads off the Fall 2001 issue with a study that tackles the intriguing question: to what degree was NASA's Project Apollo shaped by reconnaissance and intelligence information of the Soviet space program? In the second article, "VLR!: VII Fighter Command Operations from Iwo Jima, April–August 1945," John A. Russ shows how the VII Fighter Command overcame tremendous obstacles to mount a successful very-long range escort and counterair campaign that helped to complete the destruction of Japanese air power at the close of World War II. Thomas Wildenberg's "An Eagle with Wings of Gold," details the remarkable military career of Bill Taylor who flew for the Royal Navy and Royal Air Force as well as for the U.S. Navy and Marine Corps during World War II. Also, we are pleased to present Part IV—Letters L–R—of Brig. Gen. Brian S. Gunderson's series on wartime "Slanguage," defining Royal Air Force terms in American English.

The fifth article is a critical review of the newly-released feature film, *Pearl Harbor*, by the noted film historian Lawrence Suid. Readers will be especially interested in Dr. Suid's assessment of the subject's treatment by Hollywood over the years, the inaccuracies in depicting the Doolittle Raid, and the film's impact on Japanese audiences.

Finally, Lionel D. Alford, Jr. throws down the gauntlet in his *Readers' Forum*: "Opportunities and Perils in the Command of Space." Noting our growing reliance on space systems, Alford challenges the conventional wisdom of hardening space satellites rather than focusing on battlefield space. Among his proposals is that the U.S. Air Force become the Aerospace Force; he has even rewritten the lyrics to the official song!

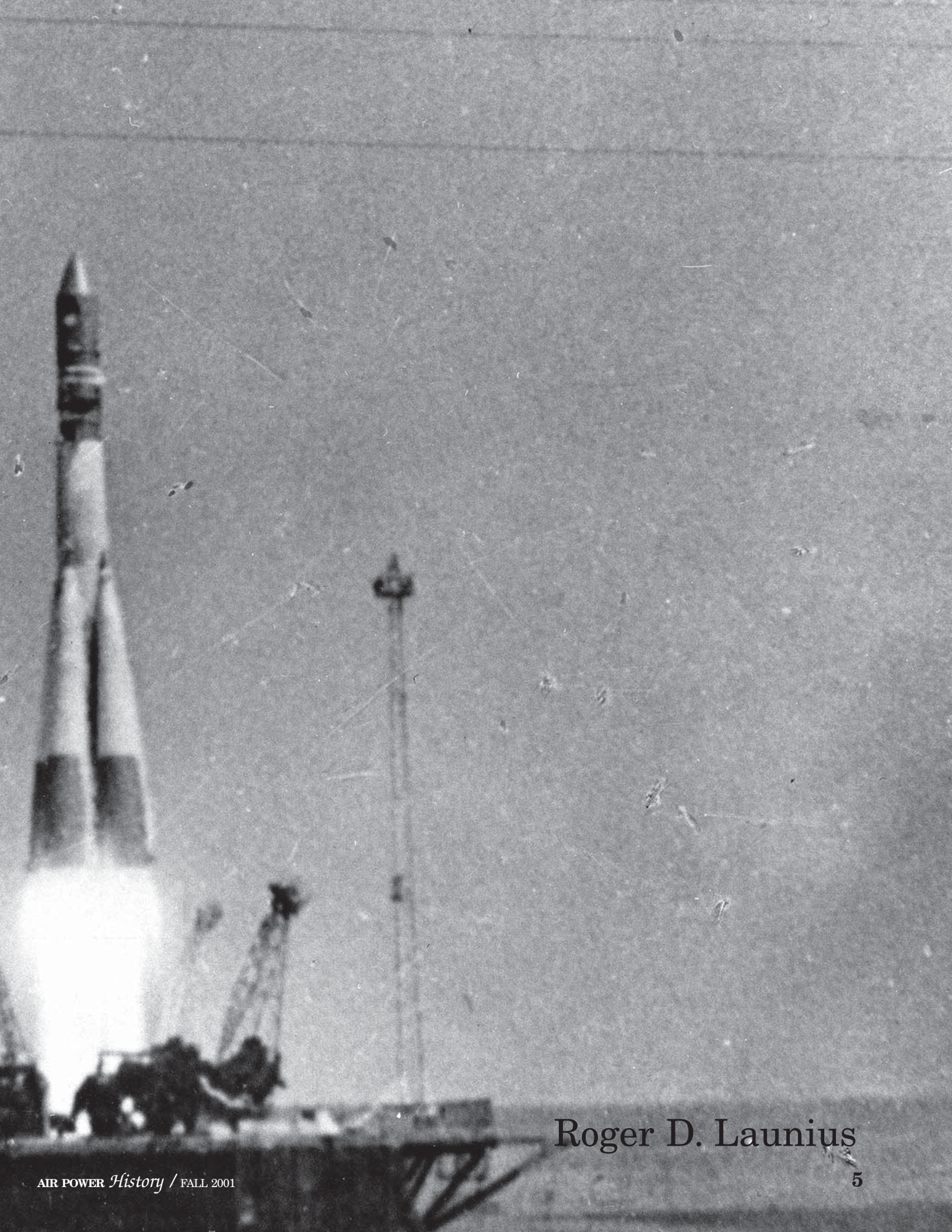
There are book reviews on such disparate subjects as fighter aces, aircraft designers, the U.S. Air Force Academy Library's Gimbel Collection of lighter-than-air flight materials, aircraft carrier development in the interwar period, the SAGE air defense computer, and a memoir on the "GI Generation." A new list of "Books Received," appears on pages 54 and 55. Prospective reviewers are invited to contact Michael Grumelli, our book review editor. The usual departments include upcoming events, the History Mystery, letters, news, notices, and reunions. We note with sadness the passing of two individuals who made lasting impacts on the history of air power: James Parton, the celebrated writer and publisher, and Brigadier General Richard T. Kight, the "father of air rescue."

Your attention is directed especially to page 64, which contains a registration form for the "Coalition Air Warfare in the Korean War" symposium. By the time you read this, there will be only one month left to sign up for this major tribute and reassessment of the Korean War. The symposium will be held on October 17 and 18, 2001, at the Andrews AFB, Maryland, Officers' Open Mess. Don't miss this event.



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NASA LOOKS TO THE EAST: AMERICAN INTELLIGENCE ESTIMATES OF SOVIET CAPABILITIES AND PROJECT APOLLO



Roger D. Launius

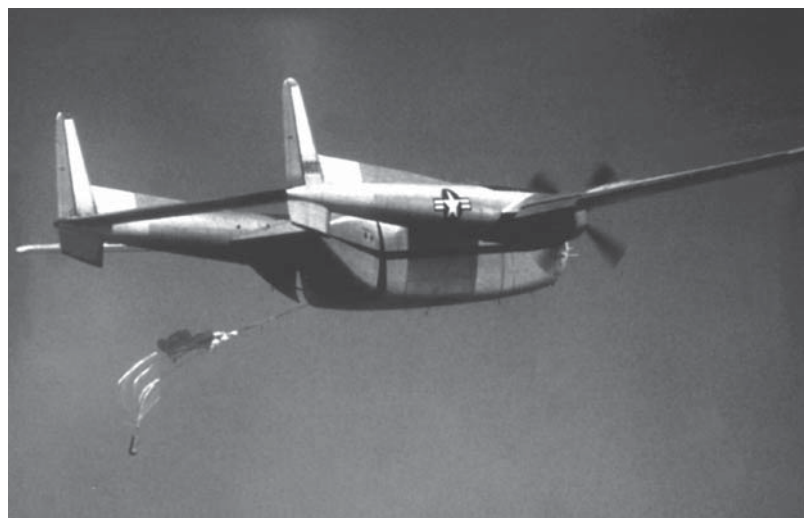
(Overleaf) A 1961 launch of Soviet Vostok 1.
(All photos and digitization courtesy of the author.)

From the point that the Sputnik crisis began in October 1957, the United States' efforts in space were intrinsically tied to the efforts of their rocketry and space flight counterparts in the Soviet Union.¹ The degree to which the American program used reconnaissance and intelligence information to help shape its efforts, however, has been understudied and unappreciated. The recently declassified intelligence estimates of Soviet capabilities for space flight, as well as other sources of information about the Soviet program, helped to focus throughout the 1960s the structure, pace, and direction of Project Apollo.

(Right) A CORONA satellite heads in to the sky.



(Below) A C-119 Flying Boxcar snags a descending CORONA satellite.



NASA may have inserted into its Moon project efforts that officials believed would be highly popular by stealing the thunder of what they thought the Soviets were doing, based on the intelligence materials that they saw. This is something that the Soviets routinely did, beating the U.S. in a robotic Moon flight, in the first human to fly in space, in the first spacewalk, in the first mission with two cosmonauts, and in the first woman in space. Historians have known for some time about the way in which the Soviets used their space program to best the American effort. What has not been known is that the U.S. also changed the timing of some of its missions in part to exploit their propaganda value and to preempt the Soviets.

Second, NASA officials used the intelligence assessments about Soviet capability to lobby for support for the expensive Apollo program in the face of political pressure in the latter half of the 1960s to end the program. Historians have known about other aspects of this campaign to build support, especially the public aspects of it reflected in such magazines as *Life*. But newly available materials suggest that both Presidents Lyndon Johnson and Richard Nixon were anxious to see Apollo through to completion despite considerable pressure inside both administrations to terminate the project.²

The Parameters of Spaceflight Intelligence

Since before the end of World War II, the American intelligence community had been seeking to uncover the Soviet Union's technological capabilities. The long shadow of the successful surprise attack on Pearl Harbor in 1941 had prompted U.S. intelligence organizations to expand their reconnaissance efforts so as never to be caught unaware again. Using sources and methods ranging from review and analysis of public records to covert agents to aerial and later satellite reconnaissance missions, these government entities gathered extensive information on the USSR. Begun in the 1950s, the effort to develop a reconnaissance satellite ushered in a new era of intelligence gathering with its first successful flight on August 18, 1960. This highly classified reconnaissance vehicle—CORONA—acquired 3,000 feet of film, with coverage of over 1,650,000 square miles of the Soviet Union and revolutionized how the U.S. collected and used foreign intelligence. The intelligence community now received regular, periodic imagery that offered a synoptic view of much of the Earth's surface. The community, henceforth,

Roger D. Launius, NASA's chief historian, graduated from Graceland College and received his Ph.D. from Louisiana State University. He has written or edited several books on aerospace history, including Reconsidering Sputnik: Forty Years Since the Soviet Satellite (2000); Innovation and the Development of Flight (1999); NASA & the Exploration of Space (1998); Frontiers of Space Exploration (1998); Spaceflight and the Myth of Presidential Leadership (1997); and NASA: A History of the U.S. Civil Space Program (1994). He has also published several works on nineteenth century American religious and political history including, Joseph Smith III: Pragmatic Prophet (1988), which won the prestigious Evans Award for biography; and Alexander William Doniphan: Portrait of a Missouri Moderate (1997).

Table 1
Selected National Intelligence Estimates Assessing
Soviet Space Flight Capabilities

Title	Date	Number
Soviet Capabilities and Probable Programs in the Guided Missile Field	October 5, 1954	NIE 11-6-54
Soviet Guided Missile Capabilities and Probable Programs	December 20, 1955	NIE 11-12-55
Soviet Gross Capabilities for Attack on the US and Key Overseas Installations and Forces through Mid-1959	March 6, 1956	NIE 11-4-56
Soviet Capabilities and Probable Programs in the Guided Missile Field	March 12, 1957	NIE 11-5-57
The Soviet ICBM Program	December 10, 1957	SNIE 11-10-57
Soviet Capabilities in Guided Missiles and Space Vehicles	August 19, 1958	NIE 11-5-58
Soviet Capabilities in Guided Missiles and Space Vehicles	November 3, 1959	NIE-5-59
Main Trends in Soviet Capabilities and Policies, 1960-1965	February 9, 1960	NIE 11-4-60
Soviet Capabilities in Guided Missiles and Space Vehicles	May 3, 1960	NIE 11-5-60
Soviet Capabilities in Guided Missiles and Space Vehicles	April 25, 1961	NIE 11-5-61
Trends in Soviet Science and Technology	May 28, 1962	NIE 11-6-62
The Soviet Space Program	October 5, 1954	NIE 11-1-62
Soviet Capabilities and Intentions to Orbit Nuclear Weapons	July 15, 1963	NIE 11-9-63
Main Trends in Soviet Capabilities and Policies	April 14, 1965	NIE 11-4-65
The Soviet Space Program	March 2, 1967	NIE 11-1-67

had both a high volume and a continuous flow of data from satellite imagery. These data would become the hard evidence essential in assessing Soviet spaceflight capabilities during the Apollo era of the 1960s and the core information upon which NASA officials built responses to Soviet efforts in space. CORONA also marked some important milestones. It was the first imaging reconnaissance satellite, the first source of mapping imagery from space, the first source of stereo imagery from space, the first space program to suc-

ceed with multiple reentry vehicles, and the first space reconnaissance program to fly 100 missions.³

NASA received its intelligence information about Soviet activities through three principal avenues. The first, and more formal, were the National Intelligence Estimates (NIE) issued by the CIA concerning Soviet space and guided missile capabilities. More than 350 NIEs are presently available for research at the National Archives, but most of them have nothing to do with Soviet space capabilities.⁴ Beginning in 1954, however, the CIA started issuing a periodic NIE focused on Soviet missile capabilities, "Soviet Capabilities and Probable Programs in the Guided Missile Field" (NIE 11-6-54, October 5, 1954), and issued a second by the same title, NIE 11-5-57, on March 12, 1957. A departure from this format came in 1958, with the publication of "Soviet Capabilities in Guided Missiles and Space Vehicles" (NIE 11-5-58) on August 19, 1958. This report was the first to address directly the issue of the space race between the United States and the Soviet Union. Additional reports in this series appeared through 1961.⁵

Because of the heightened importance of the space race, the CIA issued in 1962 and in 1967 NIEs entitled, "The Soviet Space Program," providing detailed information on the state of the Soviet effort and prognostications for future directions.⁶ Other NIEs issued throughout the 1960s also contained information on the Soviet space program. "Trends in Soviet Science and Technology," "Soviet Capabilities and Intentions to Orbit Nuclear Weapons," and "Main Trends in Soviet Capabilities and Policies" all discussed the civil space race to some degree.⁷ The major NIEs are listed in Table 1.

NASA's associate administrator for Defense Affairs served as the official liaison to the Department of Defense and the CIA, and received copies of these NIEs.⁸ He then passed them on to the NASA administrator between 1961 and 1968, James E. Webb, and his successor, Thomas O. Paine, who served between late 1968 and 1970.⁹ On several occasions they parceled out these NIEs to other key NASA officials for review and preparation of responses. For instance, in early 1969, Paine directed his senior staff to review the estimates and to prepare to discuss them at a senior management meeting. Paine asked one aide to prepare a matrix comparing "(a) the projections of the USSR program with (b) the NASA program projected in the fiscal year (FY) 1970 Budget and (c) alternative NASA possible programs in each area."¹⁰

NASA also obtained intelligence information about the Soviet space program through specialized briefings and reports that the CIA prepared at the agency's request. In July 1965, for example, Webb sent a brief letter to Admiral W. F. Raborn, director of the CIA, thanking him for making available intelligence data on the Soviet space program. "For the past several years, your staff has

been most attentive to the needs of NASA for information on the Soviet aeronautics and space program," he wrote. "Appropriate briefings on current intelligence have made it possible for our top management continuously to compare the NASA program with that the Soviets."¹¹

Finally, NASA and CIA technical personnel and intelligence analysts conducted several joint reviews of intelligence data gathered concerning the Soviet space program. In July 1965 NASA and CIA representatives agreed to create a series of joint panels on aerospace technology, with the intention of developing an in-depth understanding of Soviet capabilities. The panels included:

- Manned Space Flight
- Launch Vehicles
- Launch and Test Facilities
- Scientific and Technical Satellites
- Lunar and Planetary Probes
- Aeronautics
- Advanced Research and Technology
- Tracking, Data Acquisition, and Reduction

Between two and seven NASA representatives served on these panels, and the participants read like a who's who in the agency's history. They included, among others, such luminaries as Werner von Braun, Robert Gilruth, Max Faget, Chris Kraft, Rocco Petrone, Oran Nicks, and Jim McDivitt.¹²

Because of these interrelationships throughout the 1960s, high-level NASA officials had access to considerable intelligence of what the Soviets were doing in space and the opportunity to respond to it. This interaction begs several questions:

- Did intelligence about the Soviet program significantly reshape American efforts in space?
- Did the Project Apollo schedule or parameters change in any way because of what NASA officials believed the Soviet Union would do in space?
- How did NASA officials use intelligence data to consolidate support for NASA programs, especially the Apollo effort, and land an American on the Moon?
- Did NASA officials distort intelligence information to create the image of a greater challenge from the Soviets than actually existed?

The Timing of the Apollo Landing and the Soviet Lunar Program

Certainly, the American effort to land on the Moon served as an enormously effective response to a Cold War crisis with the Soviet Union. When Apollo 11 landed on the Moon, in July 1969, few recalled at the time that it had accomplished the political goals for which it had been created. President John F. Kennedy had been dealing with a Cold War crisis in 1961, brought on by several separate factors—the Soviets' orbiting of Yuri



Gagarin and the disastrous Bay of Pigs invasion only two of them—that Apollo was designed to combat. At the time of the Apollo 11 landing, Mission Control in Houston flashed the words of President Kennedy announcing the Apollo commitment on its big screen. Those phrases were followed with these: "TASK ACCOMPLISHED, July 1969." Probably, no greater understatement could have been made. Any assessment of Apollo that does not recognize the accomplishment of landing an American on the Moon and safely returning before the end of the 1960s is incomplete and inaccurate, for that was the primary goal of the undertaking.¹³ At its core, therefore, Apollo directly responded to a perceived challenge from the Soviet Union.

While the United States engaged in a public race to the Moon in the 1960s, Soviet leaders denied that they were trying to get there at all. Indeed, they castigated U.S. officials for heightening Cold War tensions with Apollo, while they claimed peaceful intentions in a measured space exploration effort. The American public largely accepted these arguments and public opinion polls at the time revealed a hesitancy to "race" the Soviets to the Moon, as shown in Table 2. At no time did even 50 percent of the American public support the program, and opposition was always greater than support except for one brief period in 1965.¹⁴

However, the intelligence data NASA and other government agencies possessed suggested that the Soviet Union had every intention of engaging in a "race" to the Moon. In 1960 the CIA concluded that the Soviet Union fully understood the prestige associated with space accomplishments.¹⁵ Just a month before President John F. Kennedy's announced his commitment to land a man on the Moon by the end of the decade, a CIA intelligence estimate concluded: "Contingent upon successes with manned earth satellites and the development of large booster vehicles, the Soviets are believed capable of a manned circumlunar flight with reasons chance of success in 1966; of recoverable manned lunar satellites in 1967; and

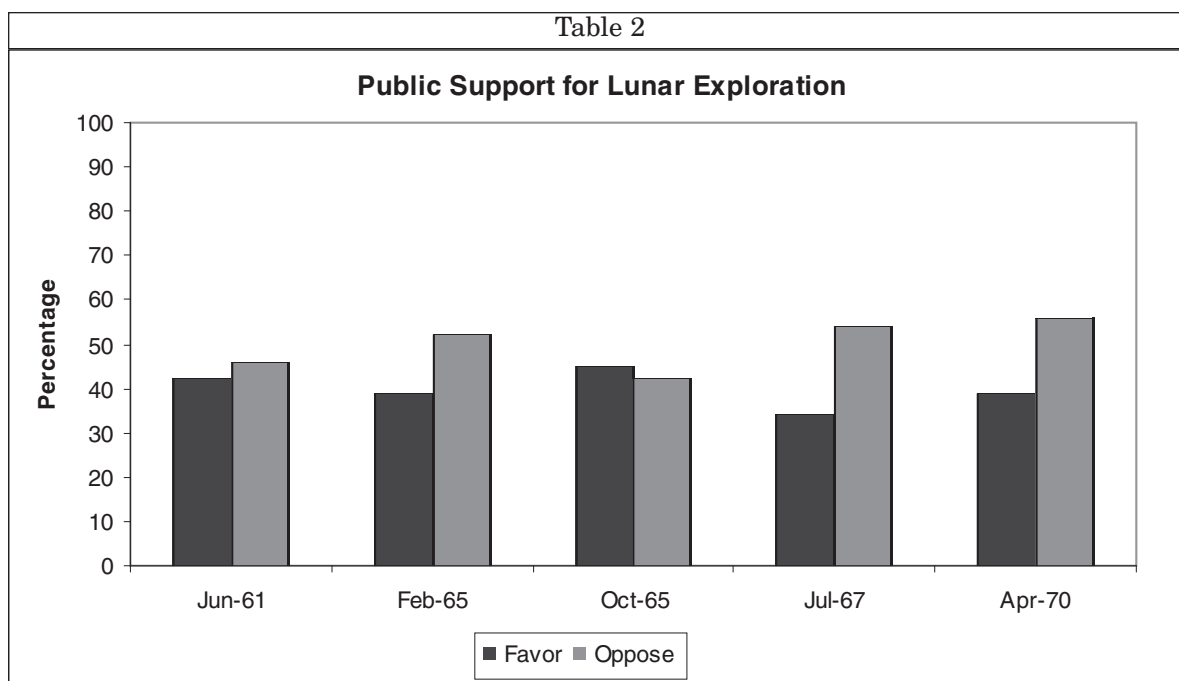
DID INTELLIGENCE ABOUT THE SOVIET PROGRAM SIGNIFICANTLY RESHAPE AMERICAN EFFORTS IN SPACE?

INTELLIGENCE DATA NASA AND OTHER GOVERNMENT AGENCIES POSSESSED SUGGESTED THAT THE SOVIET UNION HAD EVERY INTENTION OF ENGAGING IN A "RACE" TO THE MOON

ORGANIZATIONS, SPECULATED THAT THE SOVIET UNION WOULD ATTEMPT A MAJOR SPACE SPECTACULAR DURING THE FIFTIETH ANNIVERSARY OF THE BOLSHEVIK REVOLUTION

JAMES WEBB SUGGESTED THAT THE PRESIDENT COMMIT TO A LANDING BY THE END OF THE DECADE

Table 2



of lunar landings and return to earth by about 1970.¹⁶

Later reports from the CIA were even more dramatic in their conclusions. In a comprehensive review of the Soviet space program published in 1962, analysts concluded:

Some Soviet statements indicate that a program for a manned lunar landing is under way in the USSR....The top Soviet leaders have not committed themselves publicly to a lunar race with the US, and it is highly unlikely that they will do so. However, the prestige attached to the first manned lunar landing, its probable political impact, and its importance for future advances in space, would probably lead the Soviet leadership to compete unless the cost were considered prohibitive or the US seemed to have an insurmountable lead....we cannot say definitely at this time that the Soviets aim to achieve a manned lunar landing ahead of or in close competition with the US, but we believe the chances are better than even that this is a Soviet objective. Given their ability to concentrate human and material resources on priority objectives, we estimate that with a strong national effort the Soviets could accomplish a manned lunar landing in the period 1967-1969.¹⁷

One specific instance concerning the Soviet program tangentially affected early planning for the timing of the first Apollo landing. Many people in NASA, and in other government organizations, speculated that the Soviet Union would attempt a major space spectacular during the fiftieth anniversary of the Bolshevik Revolution in the fall of 1967. It was a realistic scenario for policy makers in the spring of 1961. Soviet leaders had taken the opportunity of the revolution's fortieth anniversary to launch Sputnik 1, and had engaged in a series of space stunts thereafter, sprung upon

the West at opportune times. Why not undertake a Moon mission and scoop the Americans again in 1967? The question arose in both congressional hearings and in formal reviews of what NASA could do with the lunar landing schedule.¹⁸

Because of this concern the reviews on the feasibility of Apollo, conducted in April and early May 1961, considered a Moon landing by 1967. Clearly, the President wanted to beat the Soviets. In a press conference on April 21, he announced, "If we can get to the moon before the Russians, then we should."¹⁹ Hugh L. Dryden, NASA Deputy Administrator specifically addressed this issue in his technical evaluation.²⁰ Wernher von Braun, director of NASA's George C. Marshall Space Flight Center at Huntsville, Alabama, and head of the big booster program needed for the lunar effort, told the vice president that "we have a sporting chance of sending a 3-man crew around the moon ahead of the Soviets" and "an excellent chance of beating the Soviets to the first landing of a crew on the moon (including return capability, of course)." He added that "with an all-out crash program" the U.S. could achieve a landing by 1967 or 1968.²¹

Notwithstanding these estimates, NASA leaders recommended against committing to such an early deadline.²² Based on NASA's experience in space flight, James Webb suggested that the President commit to a landing by the end of the decade, giving the agency another two years to solve any problems that might arise. The White House accepted this proposal and the ringing announcement, "I believe this Nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to earth," entered the American vocabulary.²³ Sustained by this commitment, the nation's leaders assigned Apollo to the "highest national priority category for research and development and for achieving operational capability."²⁴



Vostok 1 on the launch pad.

**SOVIET
ROCKET
ENGINEERS,
INCLUDING
SERGEI P.
KOROLEV
AND
VALENTIN P.
GLUSHKO,
DESIGNED
HARDWARE
TO TRAVEL
TO THE
MOON**

To Race or Not to Race?

Of course, the public comments of Soviet leaders in the early 1960s belied their secretive actions, for Soviet rocket design bureaus and scientific institutions worked around the clock in the first half of the decade to beat the Americans to the Moon. Senior Soviet rocket engineers, including Sergei P. Korolev and Valentin P. Glushko, designed hardware to travel to the Moon and oversaw an ever increasingly sophisticated human space flight program that envisioned planting the Soviet hammer and sickle on Earth's nearest neighbor.²⁵

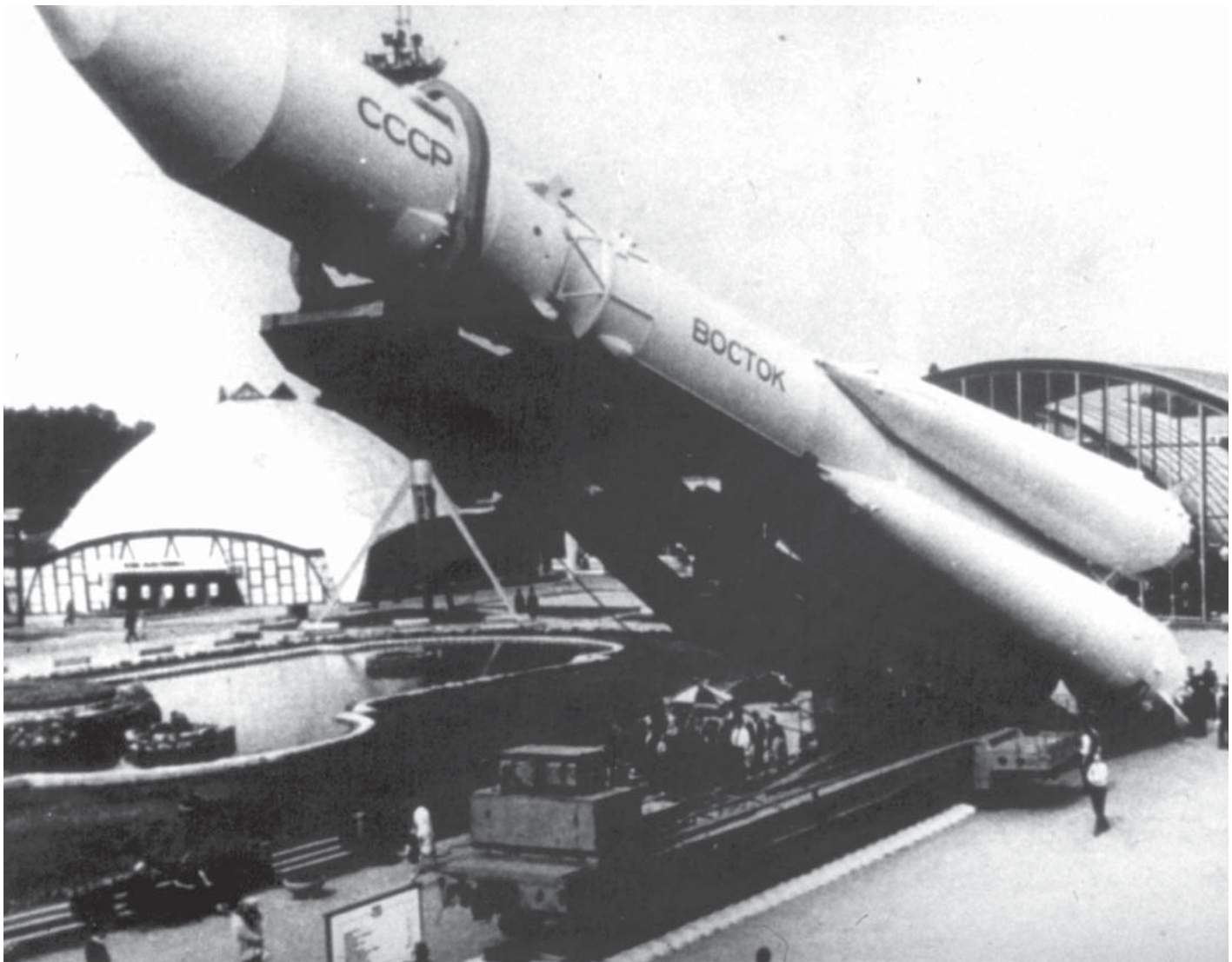
Despite very significant Soviet successes in space during the decade, they failed to reach the Moon for two interrelated factors. First, the Soviet Union was not as technologically advanced as the United States and, despite illusions to the contrary in the West, did not have the base necessary to carry out successfully the most complex undertaking ever attempted by humankind. Even so, they came within perhaps 80-85 percent of attaining their objectives. The N-1 Moon rocket, however, kept exploding, indicative of technical challenges posed. Second, the Soviet Union's space program did not compare favorably to NASA's top-down management structure. This ensured that pro-

gram management, so critical to any large-scale technological endeavor, never achieved the primacy necessary to ensure full success. Individual space technology leaders warred among themselves, and vied for funding with Soviet leaders. The Soviet lunar program never had a James Webb to bring order, and the closest anyone could come to commanding that type of unity was Sergei Korolev. After he died in January 1966, the Soviet lunar program took a nosedive. Others tried to hold it together until the early 1970s, but eventually with American success and repeated Soviet failures, it was canceled.

By 1965, the U.S. intelligence community realized these fatal flaws in the Soviet effort and began to back away from their earlier conclusion that the Soviet Union was racing the U.S. to the Moon. In 1967, an NIE noted that as early as 1965 the CIA has estimated that "The Soviet manned lunar landing program was probably not intended to be competitive with the Apollo program as then projected, i.e., aimed at the 1968-1969 time period." CIA analysts, however, still believed that the Soviet Union would attempt a circumlunar flight before the U.S., noting that it "Would pay important dividend in terms of prestige, and could be a means to offset some of the propaganda value of the US Apollo program."²⁶

NASA asked the intelligence community to redouble efforts to obtain and review data for evidence of a circumlunar flight. Throughout much of the 1960s, NASA asked, and U.S. intelligence sought to intercept telemetry and other data from Soviet spacecraft. NASA hoped to learn not only more about the intentions of the Soviet Union in their space program, but also the scientific technical details of what they found in their lunar effort.²⁷ According to George E. Mueller, Associate Administrator for Manned Space Flight, NASA cooperated in a program, "to intercept and exploit signals from Soviet spacecraft. We have assisted in this effort by using our JPL [Jet Propulsion Lab] Project Galaxy to compute look angles and to provide recommendations for the operation of collection stations." Mueller, however, noted that the operation had been less revealing than expected because "it is doubted that the collection, processing, and analysis of space intelligence data enjoys high enough priority to properly exploit Soviet lunar and planetary missions over the next several months."²⁸

In one instance it appeared that NASA may have altered its Apollo effort in response to concerns about what the Soviet Union was doing. The USSR had been trying to reach the Moon for several months with a mysterious spacecraft dubbed Zond throughout 1968. Launched on September 15, 1968, Zond took photographs of both the Earth and the Moon. Although it flew without cosmonauts aboard, it was capable of carrying them. An attitude control failure put the spacecraft into a ballistic return that would have killed any cosmonauts aboard, but NASA officials wondered if the Soviets were planning a circumlunar flight. They



A Soviet R7 launcher.

Table 3

Pros Mission Readiness	Cons Mission Readiness
<p>The CSM has been designed and developed to perform a lunar orbit mission and has performed very well on four unmanned and one manned flights.</p> <p>We have learned all that we need in earth orbital operation except repetition of performance already demonstrated.</p> <p>The extensive qualification and endurance-type sub-system ground testing conducted over the past 18 months on the CSM equipment has contributed to a high level of system maturity, as demonstrated by the Apollo 7 flight.</p> <p>Performance of Apollo 7 systems has been thoroughly reviewed, and no indication has been evidences of design deficiency.</p> <p>Detailed analysis of Apollo 4 and Apollo 6 launch vehicle anomalies, followed by design modifications and rigorous ground testing gives us high confidence in successful performance of the Apollo 8 launch vehicle.</p> <p>By design all subsystems affecting crew survival...are redundant and can suffer significant degradation without crew or mission loss.</p> <p>Excellent consumables and performance margins exist for the first CSM lunar mission because of the reduction in performance requirements represented by omitting the weight of the lunar module.</p>	<p>Marginal design conditions in the Block II CSM may not have been uncovered with only one manned flight.</p> <p>The life of the crew depends on the successful operation of the Service Propulsion System during the Transearth Injection maneuver.</p> <p>The three days endurance level required of backup systems in the event of an abort from a lunar orbit mission is greater than from an earth orbit mission.</p>



Image of the N-1 launch complex taken from a CORONA satellite.

THE FALL OF THE SOVIET UNION... REVEALED THE TRUE EXTENT OF SOVIET EFFORTS TO RACE THE U.S. TO THE MOON.

had reason to be worried. In the aftermath of the tragic Apollo 204 capsule fire in January 1967, NASA's goal of reaching the Moon even by the end of the decade was in jeopardy. It took almost twenty months after the fire, until October 1968, before astronauts were launched into orbit aboard an Apollo spacecraft.²⁹

On November 11, the Soviet Union launched Zond 6, and it also successfully circumnavigated the Moon before returning to Earth. This time the reentry went well, but a gasket failed and the spacecraft depressurized during descent in Kazakhstan. But NASA leaders had seen enough. It was clear that the Soviets were seeking to best them on a circumlunar flight. By coincidence on the day of the Zond 6 launch, the Apollo program manager, Air Force General Samuel C. Phillips, sent a memorandum to the NASA administrator recommending that NASA get off the dime and fly the very next Apollo mission to the Moon. He recognized that it was a bold strategy, but it would regain American momentum in the race. Phillips outlined a series of pros and cons for this decision, never mentioning the Soviet Zond effort but clearly alluding to demonstrated Soviet capabilities, as demonstrated in Table 3.³⁰

On November 18, 1968, the NASA administrator accepted the Phillips memorandum and made possible the dramatic mission of Apollo 8 on

December 21-27, 1968, perhaps the most significant single flight of the entire program. Certainly, only the actual landing of Apollo 11, in July 1969, holds greater symbolic importance in the space race.

The fall of the Soviet Union and the end of the Cold War in the 1990s, revealed the true extent of Soviet efforts to race the U.S. to the Moon. The American public then realized that the Soviet Union had lunar landers, spacecraft, and rockets constructed and waiting for use on the trip to the Moon. But, while the Soviet capability remained only a prospect, the United States carried out its mission. In doing so, the U.S. not only reclaimed its pride in its technological and scientific "superiority," but also, in the public mind, defined the terms of space exploration thereafter.³¹

NASA Overestimates of Soviet Capabilities

Many times NASA officials used the intelligence estimates to sustain their case for an aggressive effort to complete Apollo by the end of the 1960s. In some instances these public statements aroused within the administration charges of NASA complicity in overestimating Soviet capabilities as a means of ensuring the agency's budget. The most serious incident took place in the fall of 1968, when James Webb battled over budgetary issues and lost. The NASA budget had started a downward trend from a peak in 1965 of \$5.2 billion and would not bottom out until 1974. NASA's fiscal year (FY) 1968 budget of \$4.6 billion was reduced to \$3.99 billion in FY 1969. Out-year projections looked even more bleak and the NASA administrator went on the offensive. Although Webb previously cooperated with the White House, he was forced into announcing his retirement effective October 7, 1968. Thus, he risked little in publicly complaining about the lack of American resolve to continue aggressive space flight funding.³²

Webb complained about the reductions in NASA's funding, and argued that it may have already allowed the Soviet Union to retake the lead in the space race. He tagged his concern to the circumlunar flight of Zond 5, which began on September 15, 1968, and emphasized a downward trend for the American effort in space while the Soviets were pressing forward with major initiatives. His specified serious consequences for the Johnson administration's decision to cut NASA's budget:

- Laying off 40,000 construction workers meant the break-up of key design and engineering teams.
- The rate of successful U.S. space launchings had fallen sharply: 30 in 1966; 26 in 1967; and 11 to date in 1968.
- As soon as the Apollo requirements were met, NASA would terminate production of both the Saturn IB and Saturn V boosters.
- The development of a nuclear rocket engine depended upon FY 1970 budget decisions.

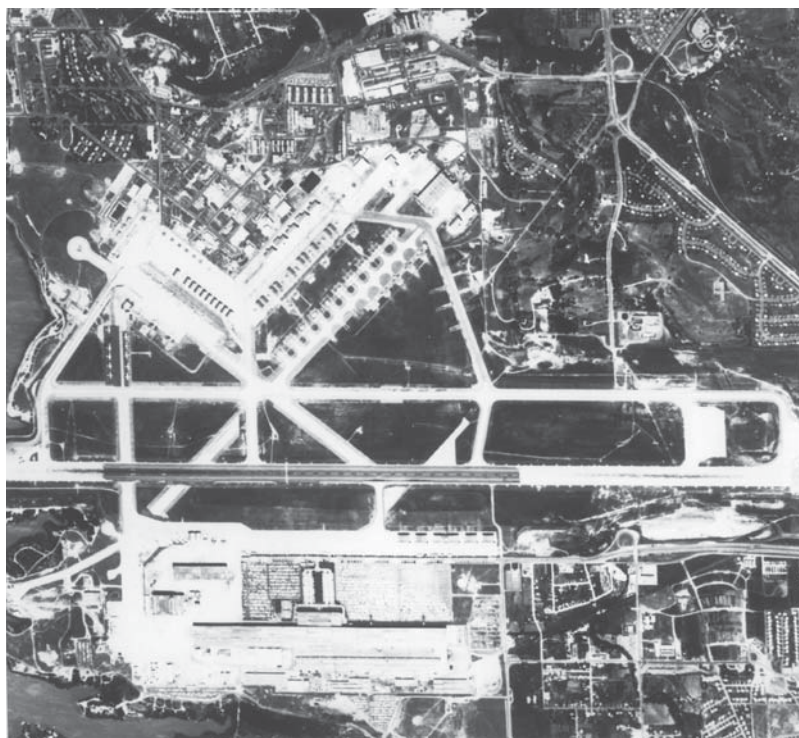


Image of Carswell AFB taken from a CORONA satellite.

NASA OFFICIALS USED THE INTELLIGENCE ESTIMATES TO SUSTAIN THEIR CASE FOR AN AGGRESSIVE EFFORT TO COMPLETE APOLLO

WEBB EXAGGERATED THE IMPORTANCE OF ZOND 5 AND THE OVERALL STATE OF THE SOVIET SPACE EFFORT

- Planetary programs would be limited to two probes to Mars in 1969, two Mars orbiters for 1971, and the development of two Mars landers for 1973.³³

Webb contrasted these reductions to a vigorous Soviet program. He noted:

- The Soviets continue to build and demonstrate their power in astronautics and to master space.
- The Soviet space program continued to expand in size and scope as indicated by the steady increase in successful space launches.
- The Soviets were nearing the end of a long developmental period in aerospace technology that will enable them to advance significantly in space and aeronautics.³⁴

Webb concluded that the Soviets were about to demonstrate a “capability that could change the basic structure and balance of power in the world.”³⁵

Donald Hornig, the President’s Science Advisor, fired off an angry letter to President Johnson about the “NASA Distortion of Where the U.S. Stands in Space.” Hornig charged that Webb exaggerated the importance of Zond 5 and the overall state of the Soviet space effort, while minimizing the accomplishments and capabilities of the U.S. program. These “unconscionable statements” were “undoubtedly motivated by their [NASA’s] budgetary programs.” He countered Webb’s “doomsday” pronouncements with his own rosier analysis:

In the manned lunar landing program, for example, we have successfully flown the Saturn V launch

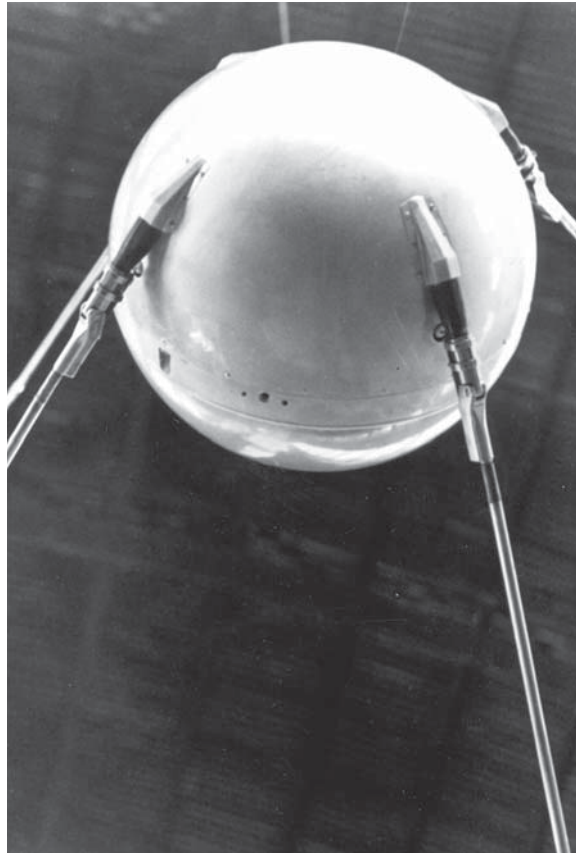
vehicle twice, the first flight in November 1967, while the equivalent Soviet vehicle has yet to fly. We expect the first Soviet launch in the next few months. Our best estimate of their capability indicates that before a manned lunar landing can be attempted it will be necessary to rendezvous and dock the payloads from two vehicles of the type they have not yet launched. I conclude from this and other supporting evidence that we are at least one year ahead of the Soviets in this area—and not behind.

Hornig told the President that he would discuss the matter with Webb to obtain a retraction. Next, he proposed to have the National Aeronautics and Space Council, a coordination organization under his nominal control, investigate and prepare an analysis as an official statement. In the lower left corner of the letter was a set of decision options. Johnson checked “Drop the matter.”³⁶ But Hornig did not. On September 30, he and the Space Council sent to the President a report on the relative position of the Soviet and American space programs.³⁷

Johnson immediately fired back a note to Hornig that took him to task for the attack on Webb. The President said, “It is hard for me to believe that Jim Webb would make ‘unconscionable statements’ or be ‘motivated’ entirely by budgetary problems.” Webb was right to be concerned about the NASA budget and fully understood the national commitment to completing Apollo on schedule. “I wanted him to succeed,” he wrote, “and it was only with great reluctance that for the past two years I have taken action to meet the overall fiscal requirements laid down by a determined group in the Congress by accepting cuts made in the House Appropriations Committee.” Johnson then told Hornig that if he persisted in attacking Webb and NASA and the Soviets triumphed, as Webb had warned, “This would inevitably bring into question the judgment of your group in a way that might impair its usefulness.”³⁸

Even as Johnson was piqued at Hornig for attacking Webb, Webb’s statements clearly irritated him as well. The President went back to Webb and asked him about his public disagreement over the administration’s budget. He asked him for the basis of his charges and clearly challenged his loyalty to the Johnson administration. On October 1, only a week before his scheduled departure from NASA, and again on October 5 Webb responded to Johnson with detailed memoranda outlining his position on NASA, budgets, and the Soviet space effort. He again expressed concern about the downward trend in spending for space exploration in the U.S. and the perceived upward trend in the Soviet Union. He closed by quoting his comments to the American Astronautical Society in July 1968, indicating that these trends “will have many serious effects on the U.S. position in aeronautics and space.” Webb did not budge from that belief to the end of his federal

NASA OFFICIALS USED INTELLIGENCE, AND OTHER DATA ABOUT THE SOVIET UNION'S EFFORTS SELECTIVELY, AND SOMETIMES INAPPROPRIATELY, TO BUTTRESS THEIR ARGUMENTS



career, but ultimately he was proven wrong about the Soviets' capability in space.³⁹

Conclusion

So what? That is, of course, the central question of all historical studies. In this case, I posed a series of four questions at the outset of this presentation.

- Did intelligence about the Soviet program lead to any significant reshaping of American efforts in space?

- Did the schedule or parameters of Project Apollo change in any way because of what NASA officials believed the Soviet Union would do in space?
- How did NASA officials use intelligence data to consolidate support for NASA programs, especially the Apollo effort, and land an American on the Moon?
- Did NASA officials distort intelligence information to create the image of a greater challenge from the Soviets than actually existed?

Although any comments are at best preliminary it seems that in answer to questions one and two the timing of the initial landing decision for 1967, and later the 1968 circumlunar flight of Apollo 8, was directly affected by the information NASA leaders had about Soviet activities in space. It seems obvious, in answer to questions three and four, that NASA officials used intelligence, and other data about the Soviet Union's efforts selectively, and sometimes inappropriately, to buttress their arguments. Using Zond 5 and other information about Soviet intentions served the deliberate purpose of bolstering NASA complaints about reductions in the space exploration budget. These complaints made trouble for the Johnson administration but they neither persuaded public opinion to support more aggressive spending nor squelched the White House's budget reductions. What NASA leaders said was not incorrect, but it presented a distorted view of the space race. Donald Hornig was probably correct in alleging that Webb had made "egregious" distortions of the record. Yet, Webb was also right about noting downward trends in the U.S. and upward trends in the Soviet Union.

This preliminary discussion may not tell us anything significant. However, it offers an opportunity to fill in some of the gaps in the historical record of a space adventure conducted on a scale never before seen and unlikely to be seen again in the twenty-first century. ■

NOTES

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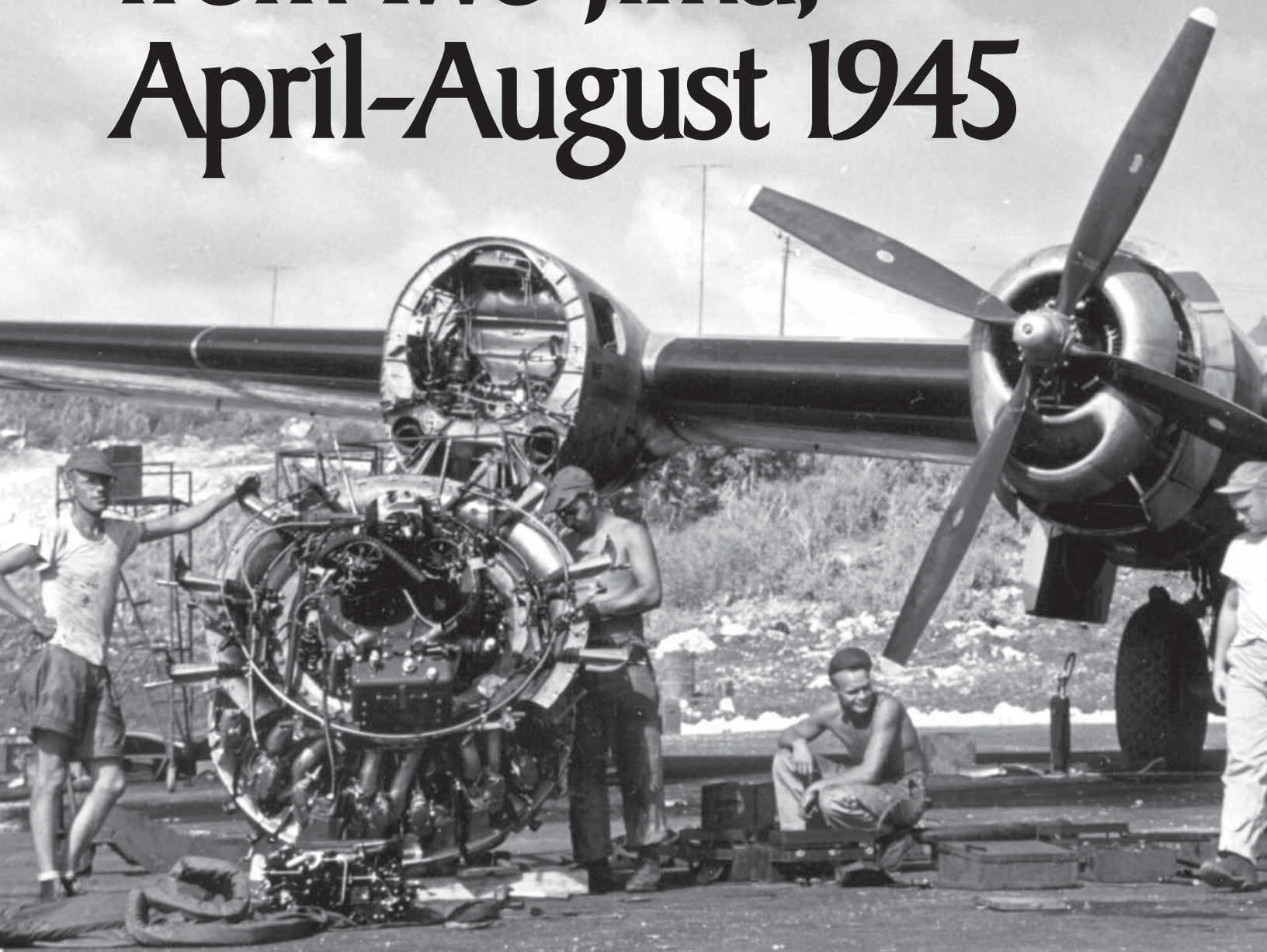
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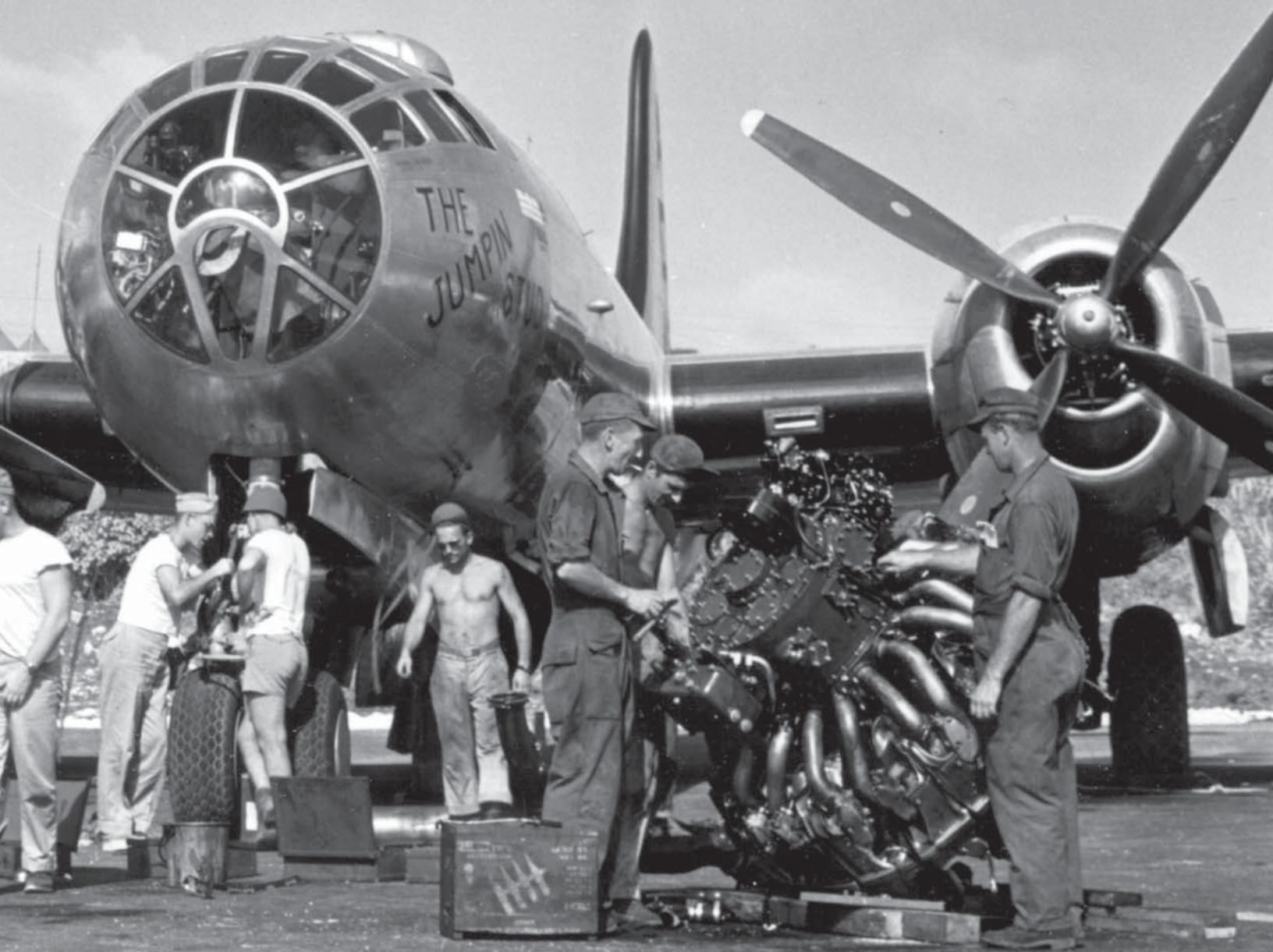
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 6. "The Soviet Space Program," Dec. 5, 1962 (NIE 11-1-62); "The Soviet Space Program," Mar. 2, 1967 (NIE 11-1-67), NASA Historical Reference Collection.
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 38. Memo, Lyndon B. Johnson to Dr. Hornig, [Sep. 30, 1968], NASA Historical Reference Collection.
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VLR!: VII Fighter Command Operations from Iwo Jima, April-August 1945





John A. Russ

(Overleaf) Engine change for a B-29 Superfortress. The B-29s were based in the Marianas and supported by the fighters on Iwo Jima.

THERE WERE TWO CRITICAL SHORTCOMINGS OF THE MARIANAS BASES

FIRST WAS THE LACK OF A SUITABLE DIVERT FIELD FOR BATTLE DAMAGED OR FUEL-DEFICIENT AIRCRAFT

SECOND, AND MORE CRITICAL, WAS THE LACK OF FIGHTER ESCORT

On April 7, 1945, 119 P-51 Mustangs of the VII Fighter Command lifted off from Iwo Jima on the first Very Long Range (VLR) mission by land-based fighter aircraft against the Japanese mainland. Off the coast of Honshu they rendezvoused with more than 100 B-29 Superfortresses for an attack on the Nakajima aircraft plant in Tokyo. The B-29s had been taking heavy losses to Japanese fighters on these Empire strikes, but the 110 to 125 who came up to greet them this day were in for a surprise.

VII Fighter command pilots described the Japanese, who attacked singly during the bomb run and immediately after, as easy targets for the Mustangs that broke off in pairs to engage them.¹ One P-51 pilot, Maj. James B. Tapp (later to become the first ace from his Mustang group) recorded three kills on the mission; another pilot, Capt. Robert W. Moore, got two within 45 seconds. Lieutenant E. L. Bright described his banner day (one kill and two probables) this way: "I saw about 50 fighters. The ones I saw were just sitting ducks. You just drove up behind them and pulled the trigger."² Combined, the American fighters and bombers accounted for 71 Japanese aircraft destroyed, along with 30 probably destroyed of the 44 that were damaged. Sergeant Burdell Hanson, who viewed the action from the gunner's position in a B-29, noted: "The Mustangs were knocking Japs down all over the sky. For a while there during the fight there were Japs parachuting down all around us. I'll never forget it."³

The history of the Seventh Air Force, *One Damned Island After Another*, claims that this mission "was one of the few combat air actions of the Pacific where it could be said honestly that the men who did the fighting were motivated by revenge."⁴ Three years and four months previously, the 14th Pursuit Wing of the Hawaiian Air Force, predecessors of the VII Fighter Command, had been decimated by the surprise Japanese attack on Pearl Harbor. Fighter pilots who were able to get airborne on December 7, 1941, managed to shoot down twelve of the attackers,⁵ but it would be a long time before they were again in a position to directly attack the enemy. In the interim, units of the VII Fighter Command fought the war mainly from the sidelines.

Within ten days of the attack on Pearl Harbor, the 14th Pursuit Wing became part of the newly created 7th Interceptor Command, which consolidated all Hawaiian Islands defense units. In May 1942, the unit was redesignated the VII Fighter Command, constituting the fighter arm of Seventh Air Force, and its defensive responsibilities expanded to include Midway and the Canton and Christmas Islands.⁶ During the assault on the

Marshalls by Seventh Air Force bombers that began in late 1943, VII Fighter Command pioneered the use of long range fighter escort in the Pacific theater. Medium bombers attacking the island chain were being harassed by Japanese fighters who would begin their attacks after the bombing run and break off at the point they estimated to be the maximum range of Seventh Air Force fighters. The Seventh eventually fitted some of its P-40s with belly tanks, and on January 26, 1944, sent them out to wait above the clouds for the pursuing Japanese. They shot down ten enemy fighters in three minutes, effectively ending interception of the bombers over the Marshalls.⁷

By March 1944, VII Fighter Command was back on Oahu for regrouping, reinforcement, aircraft transition, and general reorganization in preparation for the Marianas campaign.⁸ Its strength was increased from four squadrons to three complete fighter groups of three squadrons each.⁹ It was during the Marianas operations that the command began their transition from a static defensive unit in the rear to the spearhead of the attacks on Japan. VII Fighter Command participated in the seizure and consolidation of that island group and, more importantly, gained valuable experience in long-range operations, escorting B-24 Liberators on strikes to Iwo Jima and Truk from its base in Saipan.¹⁰

From the beginning, the nature of war in the Central Pacific had been different from any other. The operational objectives had not been to gain land masses or capture cities. Rather, each island objective seized became an airfield from which the next jump forward could be supported.¹¹ For the B-29 Superfortresses of the XXI Bomber Command, the Marianas represented the beginning of the war's final phase. From bases on Guam, Tinian, and Saipan, the heavy bombers were finally within range of Japan proper. Beginning on Thanksgiving Day 1944, the Superforts' massive bomb loads would be directed at Japan's industrial centers.

There were two critical shortcomings of the Marianas bases that would have to be solved before the full destructive power of the bombers could be realized. First was the lack of a suitable divert field for battle damaged or fuel-deficient aircraft if they could not make the 1,500-mile over-water return trip. Second, and more critical, was the lack of fighter escort. Occasionally the bombers would run into a cloud of as many as 300 Japanese fighters over their target area and have to fend off as many as 600 individual attacks during the 45 minutes, or longer, they were over Japan. While the enemy's air arm was in decline, a new threat had emerged that threatened for

Maj. John A. Russ, USAF, is Chief of Strategy, Twelfth Air Force at Davis-Monthan AFB, Arizona. A graduate of the Air Force Academy, Maj. Russ also earned an MBA from Texas Tech University, a Master of Military Operational Art and Science from the Air University, and graduated from the School of Advanced Warfighting. A pilot, he has logged more than 2,500 hours in T-37, F-111, and A-10 aircraft, including Operations Northern Watch and Southern Watch.

These B-29s were essential to carry the war to the Japanese homeland.

HALFWAY BETWEEN SAIPAN AND HONSHU, IWO JIMA WAS THE SITE OF TWO CRUDE JAPANESE AIRFIELDS AND A THIRD IN THE EARLY STAGES OF CONSTRUCTION



awhile to halt to B-29 operations—the *Kamikaze*. *Kamikaze* pilots seemed unstoppable as they flung their aircraft in suicide missions against targets in the air or on the surface. Even if hit repeatedly by the bomber's gunners, they were often able to maintain enough control of their aircraft to crash into a vulnerable Superfort.¹² A small, volcanic island a little more than five miles long and barely two miles across was the answer to both of these problems.

Situated about halfway between Saipan and Honshu, Iwo Jima was the site of two crude Japanese airfields and a third in the early stages of construction. Air planners hoped to eventually base as many as 150 B-29s on Iwo Jima, after neutralizing the surrounding islands and building up the runways and facilities to bomber specifications.¹³ This effort was not completed by the end of the war, but after the U.S. Marines took it, Iwo would serve as an emergency divert field for the bombers and allow basing VII Fighter Command's P-51s within range of Japan. Central Pacific forces under Admiral Chester Nimitz landed on February 20, but it was not until March 16, after weeks of fierce fighting that resulted in more than 24,000 American casualties and 20,000 Japanese dead, that the island was declared secure.¹⁴ VII Fighter Command was tasked to move to the island during the assault phase of the amphibious operation, support the engaged ground forces, provide air defense, and be ready as soon as possible to begin escorting XXI Bomber Command to the Empire.¹⁵

Besides the immediate problem of moving 6,200 men, over 400 fighter aircraft, and air defense warning and fighter direction equipment over 4,500 miles from Oahu to Iwo, the command would

have to battle the factors that had been plaguing the forward-deployed air units since the beginning of the war. The long intratheater distances and even longer lines of communication and supply from the United States meant that equipment spent a lot of time "in the pipeline." Since the Pacific theater was secondary in the grand scheme of the war, the amount of supplies entering that pipeline was always conditioned by the needs of the European theater, meaning that Army Air Forces allocations were kept near the absolute minimum required for safe operations. Further, the primitive islands of the Pacific were not only lacking in production facilities and skilled labor but also in diversion or recreation opportunities for those stationed there. Morale was an early casualty of the primitive living conditions and far-too-infrequent rotations.¹⁶

Fortunately, the VII Fighter Command was still too fresh to these forward operations to have lost its morale and, besides, such mundane concerns paled by comparison to the tremendous challenges they would have to overcome in mounting effective VLR operations. Foremost among these were the physical, mental, and technical stresses of routinely operating fighter aircraft over unprecedented distances over water. Navigation and pilot rescue were two of the greatest technical challenges initially faced, and ingeniously tackled, by Fighter Command. Weather, more specifically its unpredictability and unforgiving nature, was to be the biggest threat to operations. Communications, intelligence, and maintenance round out the list of major headaches that would continue to menace operations. While each of these areas, besides the distance problem, are common to all air operations, it is useful to show how the particular

VII FIGHTER COMMAND WAS TASKED TO MOVE TO THE ISLAND DURING THE ASSAULT

This P-38 pilot walked away unharmed from this crash landing after being shot down by a Japanese fighter.



AN EXTENSIVE NETWORK OF AIR SEA RESCUE STATIONS WAS SET UP

nature of this operation exacerbated them, and the initial solutions worked out by the command.

Earlier in the war, VII Fighter Command P-40s and P-47s had some long range experience in both the Marshalls and Marianas campaigns, but the 15th and 21st Fighter Groups, the first of the units deployed to Iwo Jima, were equipped with P-51D Mustangs. Although used extensively in the ETO, the command had only started receiving them in December and there was no precedent for flying

Aviation mechanics like these, rebuilding P-47s from wreckage were critical to the fighter operations on Iwo Jima.



these aircraft to their maximum range over water.¹⁷ In preparation for the upcoming VLR operations, the groups flew a training mission on March 30, escorting B-29s from Iwo Jima to Saipan and back. That route corresponded closely to the 1,500 mile round trip to Japan and provided the fighter pilots valuable experience in escort formations, using the B-29s for homing and navigation information, and physically coping with the stress and anxiety of a seven and a half hour over-water flight in the cramped cockpit of an aircraft with notoriously poor ditching characteristics.¹⁸

Since it was likely that battle damage or increased fuel consumption in combat would preclude a number of P-51s from completing the return trip to Iwo Jima, an extensive network of Air Sea Rescue (ASR) stations was set up along the route. The equipment supporting ASR duties included B-29 "Super Dumbo" aircraft to locate and coordinate pickup of downed pilots, B-17s with deployable motor boats, P-51 "Josephines" with specially-fitted deployable life rafts, destroyers, other surface vessels, and submarines.¹⁹ The command eventually established seven standard routes to Japan and designated for each five ASR stations along the return route of the fighters.²⁰ The first station, and by far the busiest, was located at the "rally point", a location close to the enemy coast where the fighters rendezvoused with their navigation B-29s at the completion of the mission. Here the distressed airman would find a surfaced submarine covered by a Super Dumbo and a four-ship fighter escort. One hundred miles further on was a second station manned by a submarine and Super Dumbo, then a third sub at the midway point, and a destroyer at each of the two remaining stations.²¹ Finally, for those pilots who

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almost made it, but ran out of gas at the last minute, Fighter Command had amphibious vehicles waiting on the beaches of Iwo.²² The system was constantly improved as operational experience was gained and, by June, a very adequate system was in place.

Navigating to the nearest ASR facility, or to Japan and Iwo Jima for that matter, was another technical problem that would require some ingenuity on the part of VII Fighter Command planners. Because precision navigation equipment was not practical in a single-seat fighter, B-29s with special crews were assigned as “navigator” aircraft and the command’s fighters were fitted with the AN/ARA-8 homing radio. After takeoff, the fighters would rejoin as groups over Iwo Jima, and then proceed about 40 miles north, to Kita Jima, where they would link up with a navigator B-29 waiting to lead them to the drop off point near the coast of Japan.²³ After the mission over Japan, the homing radio—nicknamed “Uncle Dog” because the correct course to the parent station was found by flying halfway between the “U” and “D” tones²⁴—would allow the fighters to find the navigator B-29, now holding at the rally point and transmitting a continuous tone on one of the P-51s preset radio frequencies. Each ASR station was capable of broadcasting the homing tone if needed, and it was continuously broadcast from a station on Iwo which was usable by the fighters once they arrived within about 150 miles.

The greatest barrier to effective VLR operations was one that no amount of technical ingenuity could fully overcome: the unpredictable frontal weather of the Western Pacific. Throughout the campaign, weather accounted for more than half of the aborted missions and the official command history called it “undoubtedly the most important single deterring and restricting factor.”²⁵ Hazardous weather fronts formed along an east-west line between Iwo Jima and Japan where high pressure systems moving south and southeast from the Asian mainland clashed with warmer air over the Pacific. These fronts were frequently quite broad and contained embedded thunderstorms, turbulence, and icing conditions—all extremely hazardous to the single-seat P-51s. During the initial months of the campaign, these fronts usually formed just south of Iwo Jima, causing low ceilings and poor visibility that could make landings hazardous, if not impossible. In late spring and early summer, as high pressure systems moving off Siberia and across Japan became weaker and less frequent, the fronts generally formed across the fighters’ route of flight to Japan. As the fronts migrated further north throughout the summer, bad weather frequently obscured targets and forced the fighters to attack at lower altitudes.²⁶

Fighter pilots departing on VLR missions received the most current forecast thirty minutes before takeoff but, with the limited forecasting tools available, this amounted to little more than an educated guess.²⁷ Attempting to get a more accurate picture of what the fighters would really

be facing, the command tried various permutations of weather reconnaissance flights sent out ahead of the fighter groups, eventually obtaining B-24 aircraft specifically for this role. One would take off the night before to reach a position off the coast of Japan around dawn. While flying its return trip to Iwo above any weather, another would launch and fly the route below the clouds. Additionally, one of the navigator B-29s would be launched about 100 miles ahead of the fighters to provide continuous reports on the current conditions ahead.²⁸ To deal with bad weather on recovery, VII Fighter Command established in early April the only operational Ground Controlled Approach capability in the combat theater.²⁹ Notwithstanding all these efforts, at times Mother Nature could still find a way to imperil unsuspecting P-51s.

Communications, like navigation, was a challenge because the fighters spent most of their flying time over open ocean. The single VHF radio on the P-51 had a range of approximately 150 miles, or line-of-sight to the horizon. An incident on May 17th illustrates how the risks exacerbated each other. While the 21st Fighter Group was out sweeping the skies over Atsugi, dense fog moved in over Iwo Jima. Repeated attempts to contact the fighters and divert them to Okinawa failed. By the time contact was made, the P-51s had jettisoned their drop tanks and were committed to a landing at Iwo. Were it not for a timely break in the fog the entire group might have been lost.³⁰ Afterward, the command kept a series of B-24s spread out along the route of flight to act as radio relays whenever the fighters were out of radio range with the base.

Since VII Fighter Command was soon flying almost daily missions over the Empire, they had reasonably good intelligence about Japan’s capabilities and the continuing decline of its air force. What they lacked was up-to-date target intelligence, particularly photographs. By late June, the enemy was using camouflage and decoys and moving its aircraft around so much that recent photos were essential if the P-51s were to find aircraft to strafe. Pilots were sometimes unable to find targets or, worse yet, spent too much time flying low, in range of anti-aircraft guns, trying to find them.³¹ It was not until August 8, a week before the war’s end, that adequate photo reconnaissance assets arrived on Iwo Jima.³²

Harsh conditions on Iwo would make aircraft maintenance a challenge throughout the campaign. Extreme humidity and constantly blowing volcanic dust wreaked havoc on fighter engines and flight controls. Water, moisture, and dirt frequently clogged carburetor impact tubes and damaged radiators, while corrosion attacked fuselages, flight control surfaces and cables, and electrical equipment. Spark plugs proved particularly troublesome, even though they were constantly checked and changed after every other mission. To achieve the range required on VLR missions, the engine was operated for very long periods at minimum power settings, leading to lead fouling of the

This damaged P-51 just made it back to Iwo Jima.

HUNDREDS OF JAPANESE EMERGED FROM CAVES ON THE NORTHERN END OF THE ISLAND AND ATTACKED THE BIVOUAC NEAR AIRFIELD NO. 1

14 B-29s WERE SHOT DOWN BY ENEMY AIRCRAFT ON UNESCORTED MISSIONS, BUT NO JAPANESE PILOT COULD CLAIM A BOMBER KILL ON ESCORTED MISSIONS



plugs.³³ All of these factors increased the potential for engine failure. Runways were nearly as hard to maintain as the aircraft. Underground sulfur steam caused soft spots to develop and tropical storms eroded the soil. Coupled with the fact that most takeoffs and landings were accompanied by great clouds of dust or by water rushing across the runway, it is no wonder that accidents were common. In fact, nearly as many aircraft were lost to accidents as were lost in combat—103 versus 114.³⁴

VII Fighter command had to contend with these adverse conditions, and many more, as they began operations from Iwo Jima on March 10, six days before the island was declared secure. By the end of the month, two fighter groups, the 15th and 21st, along with the 548th and 549th Night Fighter Squadrons were operating on Iwo and preparing for the upcoming VLR taskings.³⁵ Even before they got to attack the enemy in the skies over Japan, however, they found themselves in a battle right in their own front yard. On the night of March 27, hundreds of Japanese who had survived the invasion emerged from caves on the northern end of the island and attacked the bivouac near Airfield No. 1, where newly-arrived VII Fighter Command crews and support personnel were sleeping. In the morning, after a bitter and confusing fight that lasted most of the night, 333 Japanese bodies lay sprawled over the northeast corner of the island. Forty-four Americans had been killed, along with 88 wounded.³⁶

Following the initial VLR escort mission on April 7, another was flown on April 12, again to the Nakajima factory. During this mission the fighters scored 15 air-to-air kills, 6 aircraft probably destroyed, and 3 damaged. Friendly losses were 4

P-51s.³⁷ On the third and last escort mission in April, poor weather in the target area prevented the fighters from finding the bombers, who had passed up the primary target for their radar backup attack. For the month of April, 14 B-29s were shot down by enemy aircraft on unescorted missions, but no Japanese pilot could claim a bomber kill on escorted missions.³⁸ A study by Army Air Forces headquarters, Pacific Ocean Area, concluded, "It is clearly apparent that in the first month the provision of escort for very heavy bombers has proven markedly successful."³⁹ The report predicted that results would continue to improve as the fighter pilots became more experienced at escort, coordination improved, facilities at Iwo Jima developed, and additional fighter groups joined Fighter Command.

However, even at this early stage of the campaign, the escort mission was already fading in importance. Japanese resistance to daylight raids declined as the enemy began hoarding aircraft in anticipation of an Allied invasion. Also, B-29s started putting more emphasis on night incendiary attacks as cloud cover increasingly obscured targets during the day.⁴⁰ This allowed Fighter Command to concentrate on a much more efficient means of attacking enemy air power—fighter sweeps and strikes against airfields. The first independent mission, flown on April 16, was plagued by weather problems and no estimate of damage could be made.⁴¹ Attacks on April 19 and 22, however, proved the efficacy of independent fighter missions. Of the 56 Japanese fighters encountered in the air, 32 were destroyed and three more damaged. The P-51s achieved such complete surprise with their low level strafing runs that the initial wave over the Kanoya airfield received a green

IN MAY, THE THREAT OF JAPANESE AIR ATTACK ON IWO JIMA DECREASED TO THE POINT THAT VLR ESCORT REPLACED AIR DEFENSE AS THE PRIMARY FIGHTER COMMAND MISSION

THE P-51s COULD STILL CLAIM 238 DESTROYED OR DAMAGED JAPANESE AIRCRAFT AT A COST OF ONLY 29 OF THEIR OWN

light from the tower (clearance to land) on their approach. In addition to the air-to-air victories, 30 aircraft were destroyed and 70 damaged by ground attack.⁴²

Strikes and sweeps proved more effective because much less coordination was required and, not tied to the bomber stream, the fighters were free to search out and destroy Japanese aircraft wherever they could be found.⁴³ The command would generally designate a combat group of three 16-aircraft squadrons to carry out airfield attacks. One squadron remained in a high cover position to protect the strikers from the enemy air threat. Meanwhile, a second squadron would plan its attack to ensure that all major anti-aircraft artillery sites were under fire as the third squadron came through on its strafing runs.⁴⁴ Destruction of Japanese aircraft on the ground proved to be the best method of protecting the B-29s.

Any mission over Japan, however, was always a dangerous proposition. A typical Consolidated Mission Report, like this one from May 17, noted the grim costs of taking the war to the enemy:

The P-51s left the target area at 1410, and climbed towards the RP [Rally Point] which was reached at 1425. 4 planes and pilots were lost during the mission. 2 pilots are known to have reached the RP, but they did not return to base. They are considered missing. 1 pilot was last seen at low altitude in the vicinity of Oise, but he did not return to base, and he is considered missing. On return to base one pilot, because of a coolant leak, was forced to parachute midway between two Air Sea Rescue positions. His parachute was observed to be pulling him face down in the water, and it is believed he drowned. Remaining fighters landed at base from 1700-1730. One fighter, with hydraulic system shot away, crashed upon landing, the pilot suffering minor injuries. One fighter was holed in the left wingtip by flak.⁴⁵

During the initial month of VLR operations, Japanese aircraft and air defenses were not the only distractions faced by VII Fighter Command as they struggled to establish "normal" operations at Iwo Jima. On April 24, a B-29 went out of control during an emergency landing, destroying four P-51s and damaging five. The next day the command saw its headquarters destroyed when a flare landed in a stack of demolition tubes and the resultant fire spread to the ammunition dump. There also remained a security threat from the numerous Japanese who had "gone to ground" during the seizure of the island. On the 28th, five enemy soldiers were discovered in the vicinity of the central airfield.⁴⁶ Nonetheless, the unit made a good account of itself on its initial missions. Its 867 VLR sorties accounted for 192 enemy aircraft destroyed or damaged at a cost of 21 P-51s.⁴⁷

In May, the threat of Japanese air attack on Iwo Jima decreased to the point that VLR escort replaced air defense as the primary Fighter Command mission.⁴⁸ Combat power continued to

increase on Iwo Jima as a third airfield became operational and a third fighter group, the 506th, began flying VLR operations. Enemy resistance to strikes varied from nil to very aggressive. During the first escort for a B-29 incendiary raid, on May 29 against Yokohama, it was intense. Around 150 Zekes came up to meet the massive strike force and, while 58 were destroyed, probably destroyed, or damaged, they managed to shoot down five B-29s and damage 175 more.⁴⁹ For the month, the command flew 741 VLR sorties on two escort and five strike missions. The tally was 234 Japanese aircraft destroyed or damaged at a cost of 11 P-51s.⁵⁰

Weather had its greatest impact on operations during June, canceling seven missions and rendering five of the eleven flown non-effective.⁵¹ In fact, the most costly mission ever flown over the Pacific was caused by weather.⁵² On June 1, 148 P-51s were launched on an escort mission to Osaka. En route to the rendezvous the fighters encountered a solid overcast up to 23,000 feet. Reports from the weather ship led them to believe that they would only be in the clouds for a brief period so the formation plunged into the front. Inside they found an intense, unforecasted thunderstorm with severe turbulence and icing. They were in the thick of it when the decision was finally made to turn around and, before they broke clear, 27 aircraft had either collided or lost control. Twenty-four pilots were killed.⁵³

On the positive side in June, pilots were gaining experience with VLR operations and developing more fuel efficient techniques for operating their fighters. The extra gas allowed more time over target and an extension of attacks to the airfields north and east of Tokyo where the bulk of the remaining Japanese air strength was concentrated.⁵⁴ A June 23 raid on these targets was the most destructive day of the campaign for the VII Fighter Command with 91 enemy aircraft destroyed or damaged. For the month only 632 of 1381 sorties were effective, but the P-51s could still claim 238 destroyed or damaged Japanese aircraft at a cost of only 29 of their own.⁵⁵ Of course, this ratio would have been even better had it not been for the weather-related disaster on the first.

Throughout the summer, Japanese air power continued to decline. Pilots were finding more dummy aircraft on the airfields, greater attempts at dispersion and camouflage, and a significant decrease in both the number and the aggressiveness of enemy aircraft opposing the attacks.⁵⁶ What few aircraft the Japanese still possessed were hidden in revetments or under trees as much as two miles from the airfield and these aircraft, when located and strafed, often had been drained of gasoline and would not burn. It was becoming obvious that the Japanese were hoarding their aircraft for the coming invasion.⁵⁷ Letters from the VII's commander, Brig. Gen. Ernest Moore, to his commanders in early July lamented the lack of opposition and requested greater leeway in target selection.⁵⁸ In one, he stated, "Our game of hide

The North American P-51 was the workhorse of fighter operations out of Iwo Jima.



FIGHTERS BEGAN STRIKING TARGETS OF OPPORTU- NITY ON A LARGE SCALE IN JULY

and seek with the Jap air force still continues, and the seeking becomes increasingly difficult...I hope they will at least give us a little competition, because it is not very encouraging to fly that far in hopes of combat, and not get it."⁵⁹ As a result, fighters began striking targets of opportunity on a large scale in July.⁶⁰

While the threat was decreasing, VII Fighter Command's combat capability continued to increase. The 414th Fighter Group arrived on July 7 with three squadrons of P-47Ns. Henceforth, the command could plan for daily two-group strikes or occasional massive four-group attacks on the Empire.⁶¹ During the period July 4 to July 10, P-51s flew VLR strikes every day. With the weather finally improving, a total of 17 VLR missions, all strike, were flown in July.⁶² Japanese opposition occasionally flared and on July 8, seven aircraft were lost. The last serious opposition occurred on July 16, which was also the last mission where the command achieved significant results. After that there was practically no aerial opposition and most of the enemy's aircraft were removed from the airfields at Nagoya, Osaka, Kobe, and Tokyo and widely dispersed throughout the country.⁶³

During the last month of the war, a concerted effort was made to provide maximum coverage of the remaining Japanese aircraft reserve. Between July 16 and August 14, the tempo of operations increased with the command flying sixteen VLR strike missions.⁶⁴ Forty-one airfields in Osaka, Nagoya, Kobe, and Tokyo were struck, putting an additional 168 enemy aircraft out of commission. The Japanese took desperate measures to defend what few aircraft they possessed. Pilots attacking airfields encountered little air resistance but they

did find barrage balloons and kites obstructing their route, land mines detonating in their path, and all caliber weapons available firing at them. At Tokorozawa airfield, the Japanese stretched a 50-foot high cable across the field.⁶⁵ Consequently, pilots attacked many secondary targets, scoring hits on gun positions, radar towers, locomotives, freight trains, ammunition dumps, shipping, docks, and warehouses.⁶⁶ The final VLR mission was a massive four-group effort flown on August 14, the last day of the war.

Had the war continued beyond the middle of August, VII Fighter Command would have continued to bring increasing combat power to bear on the enemy. One squadron of P-47Ns had just begun operations at the beginning of August and another was on the way. The P-47 was the aircraft that General Moore had always wanted for the VLR mission. Its greater fuel and payload capacity allowed it to carry rockets, 500-pound bombs, and parachute-retarded fragmentation bombs, along with its eight .50 caliber machine guns. The P-51s had also been fitted with rocket launchers that would allow them to attack pinpoint targets that remained after the B-29's area bombing.⁶⁷ The end of the war in Europe, in May, had finally eased the manning and ammunition shortages that had hindered operations earlier. In short, Fighter Command had overcome the tremendous difficulties of VLR operations and was ready to support the planned invasion with ever-increasing offensive capability.

With so many cumulative influences eroding Japan's will and ability to wage war in August 1945, it is difficult to determine the decisiveness of VII Fighter Command's efforts. There is no doubt, however, that what they did accomplish was

THE P-47 WAS THE AIRCRAFT THAT GENERAL MOORE HAD ALWAYS WANTED FOR THE VLR MISSION

THE COST OF THE CAMPAIGN TO FIGHTER COMMAND WAS 157 AIRCRAFT AND 91 PILOTS

remarkable given the conditions and limitations under which they operated. Overall, 41 of 51 VLR missions were effective and the 4,172 effective sorties destroyed or damaged 1,062 aircraft, 254 surface vessels, 134 locomotives, 355 railroad cars, 246 buildings and hangars, 16 radio/radar stations, 10 oil tanks, and 13 trucks.⁶⁸ Perhaps the biggest contribution of Iwo Jima and VII Fighter Command was recovering and servicing B-29s that could not make it back to the Marianas. In five months of operations, about 2400 made emergency landings at Iwo.⁶⁹ The cost of the campaign to Fighter Command was 157 aircraft and 91 pilots.⁷⁰ Had it not been for the effective ASR network, an additional 57 pilots would almost certainly have been lost at sea.⁷¹

After spending most of the war defending rear area air bases and training replacement pilots

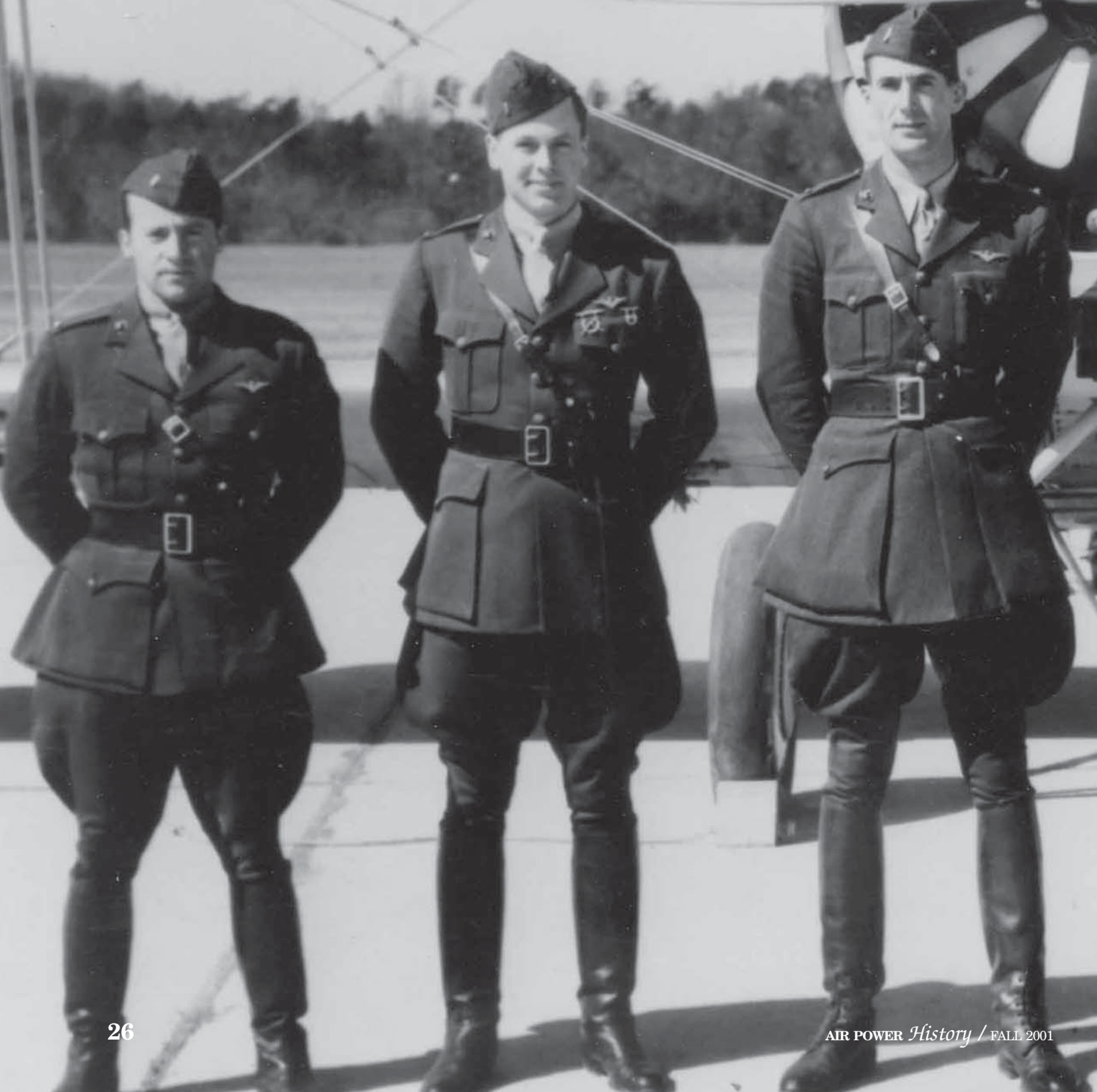
for other commands, during the spring and summer of 1945 VII Fighter Command was in a position to strike directly at the Japanese Empire and offensively contribute to its defeat. It overcame tremendous challenges to establish an effective VLR capability for the Iwo Jima campaign. As the Seventh Air Force history points out, "Each long range mission successfully carried out would have had the stature of a legend if it had been a single mission rather than part of a continuing series of missions."⁷² These efforts hastened the defeat of Japanese air power and would have facilitated the planned invasion of mainland Japan, had the war continued. That VII Fighter Command not only carried out these missions effectively, but by the end had almost made them routine, is one of the great success stories of the war in the Pacific. ■

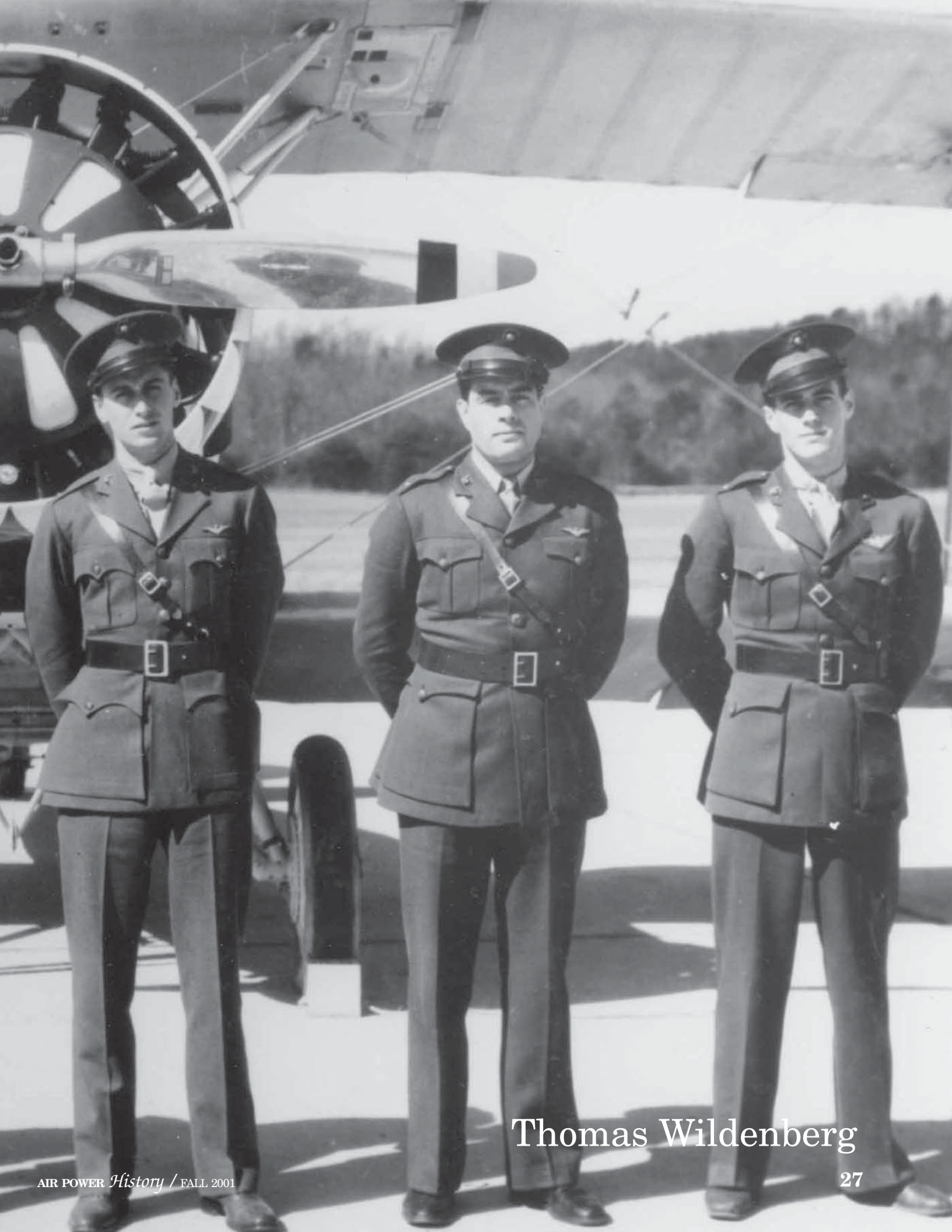
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AN EAGLE WITH WINGS OF GOLD: THE REMARKABLE CAREER OF BILL TAYLOR





Thomas Wildenberg

(Overleaf) Lt. Taylor U.S.M.C. (third from right) along with other reserve officers standing in front of a Curtiss F8C-4 on Brown Field, Quantico Virginia sometime in 1933. (NASM)

Lt. Taylor of the Royal Naval Volunteer Reserve. (Photo courtesy Ms. Connie Miller.



On October 8, 1940, Flt. Lt. William E. G. Taylor, Royal Air Force Volunteer Reserve, arrived at Northolt Airdrome west of London for a press conference announcing the formation of the Eagle Squadron—the first British fighter squadron in World War II composed entirely of Americans.¹ Formerly a lieutenant in the Royal Navy Fleet Air Arm, Taylor had just returned from a mission in the United States, to procure carrier fighters and recruit pilots for the Royal Navy.² While in Washington, he met Charles and Robert “Bobby” Sweeny, who were recruiting American pilots to fly for the Royal Air Force (RAF).³ The Sweenys convinced Taylor to join the new organization and the three of them sailed to England that fall. Upon his arrival, Taylor immediately petitioned the British Air Council for a commission in the RAF, while simultaneously resigning from the Royal Navy.⁴ This was not the first, nor the last time that Bill Taylor would resign from one service to fly with another.

Erwin Gibson Taylor was born on July 4, 1905, at Fort Leavenworth, Kansas, where his father, an officer in the United States Army, was then posted. When he was four, the family moved to the Philippines where his father was sent to help quell the native insurgents who were fighting for the islands’ independence from American rule. While in the Philippines, the family lived in the jungle in a house built on stilts. Taylor remembered little else about life in the islands save for a particularly gruesome incident that left an indelible image on the youngster’s impressionable mind. As he emerged from the house one morning, he found the sentry assigned to protect the family lying at the foot of the stairs with his head cut off.⁵

Willie or William, as he was called by the family, grew up in many places as the family followed their father from one military post to another. While Taylor was in high school he applied for and obtained an appointment to the United States Naval Academy. As Taylor recalled years later, “I was headed for Annapolis and the Naval Academy. But I went down to South America on a freighter and was injured”⁶ He never explained what he was doing on a freighter bound for South America, but the escapade cost him the opportunity to attend the Naval Academy. Instead, he enrolled in the Guggenheim School of Aeronautical Engineering at New York University. While attending classes, Taylor met two naval officers, who were actively recruiting fledgling aviators for the Navy.⁷ Enticed by the opportunity to fly, Taylor quit school at the end of the second semester to join the U.S. Navy. He enlisted on July 3, 1926, and was sent to Naval Air Station (NAS) Hampton Roads for flight training.⁸ He successfully completed the course of instruction in March 1927 and returned home in Queens, New York, to await his appointment as an ensign in the Naval Reserve and the official letter from Washington that designated him Naval Aviator No. 4407.⁹

Taylor spent the next six weeks wondering whether or not the Navy Department would assign him to active duty. When his orders finally arrived, the young aviator was thrilled to learn that he had been assigned to join the Red Rippers of Fighting Squadron Five (VF-5), one of the “hottest” in the fleet and the only fighter squadron then equipped with a full complement of aircraft.¹⁰ When Taylor arrived in Hampton Roads, he found the squadron was flying the lat-

Thomas Wildenberg is an independent historian scholar who has written extensively about the U.S. Navy during the interwar period, the development of naval aviation, and logistics at sea. He is the author of Gray Steel & Black Oil: Fast Tankers and Replenishment at Sea in the USN, 1912-1992, Destined for Glory: Dive Bombing, Midway and Carrier Air Power, and All the Factors of Victory: Admiral Joseph Mason Reeves and the Origins of Carrier Airpower. Mr. Wildenberg has served successive terms as Ramsey Fellow and Adjunct Ramsey Fellow for Naval Aviation History at the Smithsonian Institution’s National Air and Space Museum. In 1998, he was the first recipient of the Edward S. Miller Naval War College Research Fellowship and received an honorable mention in the Ernest J. Eller Prize in Naval History in 1994.

Ensign "Bill" Taylor (3d from right) with the other pilots of Fighting Five taken at North Island on May 5, 1928. (NASM.)



**TAYLOR
RESIGNED
FROM THE
NAVAL
RESERVE
AND WAS
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IN THE
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MARINE
CORPS
RESERVES**

est model Curtiss Hawk fighter, designated F6C-3. The Hawks were among the first aircraft capable of dive bombing, a technique that VF-5 had developed only a few months before Taylor's arrival in July. That fall, VF-5 was ordered to conduct the first experimental dive bombing practice against a moving target. Taylor was too junior to participate in the exercise, although he took his regular place in the routine practices leading up to the experimental bombing directed against a large barrel towed by the destroyer *Putnam*.¹¹

On March 3, 1928, Taylor, along with the rest of the squadron and their aircraft, boarded the newly commissioned *Lexington*, which was to transport them to their new assignment on the West Coast with the battle fleet's aircraft squadrons.¹² The ship sailed from Hampton Roads on March 8, transited the Panama Canal on the 25th, and arrived in San Diego harbor on April 6.¹³ The squadron's entire complement of twenty-three aircraft were flown off the ship that day and proceeded to NAS North Island, where they would be based when not aboard the *Lexington*.¹⁴ VF-5 arrived too late to participate in the annual fleet cruise, depriving Taylor of the opportunity to become carrier qualified. By the time the *Lexington* and *Langley* returned from Hawaii, Taylor's tour as a naval reservist was up and he was released from active duty.¹⁵

Through a friend, he met the Chief of Marine Corps Aviation, Maj. Edwin H. Brainard, who offered him a commission in the U.S. Marine Corps.¹⁶ Taylor promptly resigned from the Naval Reserve and was commissioned a second lieutenant in the Volunteer Marine Corps Reserves.¹⁷ At the time, he was one of only 146 aviators in the Marine Corps. He served as an instructor at

Pensacola, Florida, until September 1929, when he was promoted to a first lieutenant and assigned to command the Marine Corps Reserve Aviation Unit at Squantum, Massachusetts.¹⁸ He served there until July 5, 1932, when he was ordered to report to the Aircraft Squadrons East Coast Expeditionary Barracks, Quantico, Virginia, as a squadron officer and student in advanced flight training.

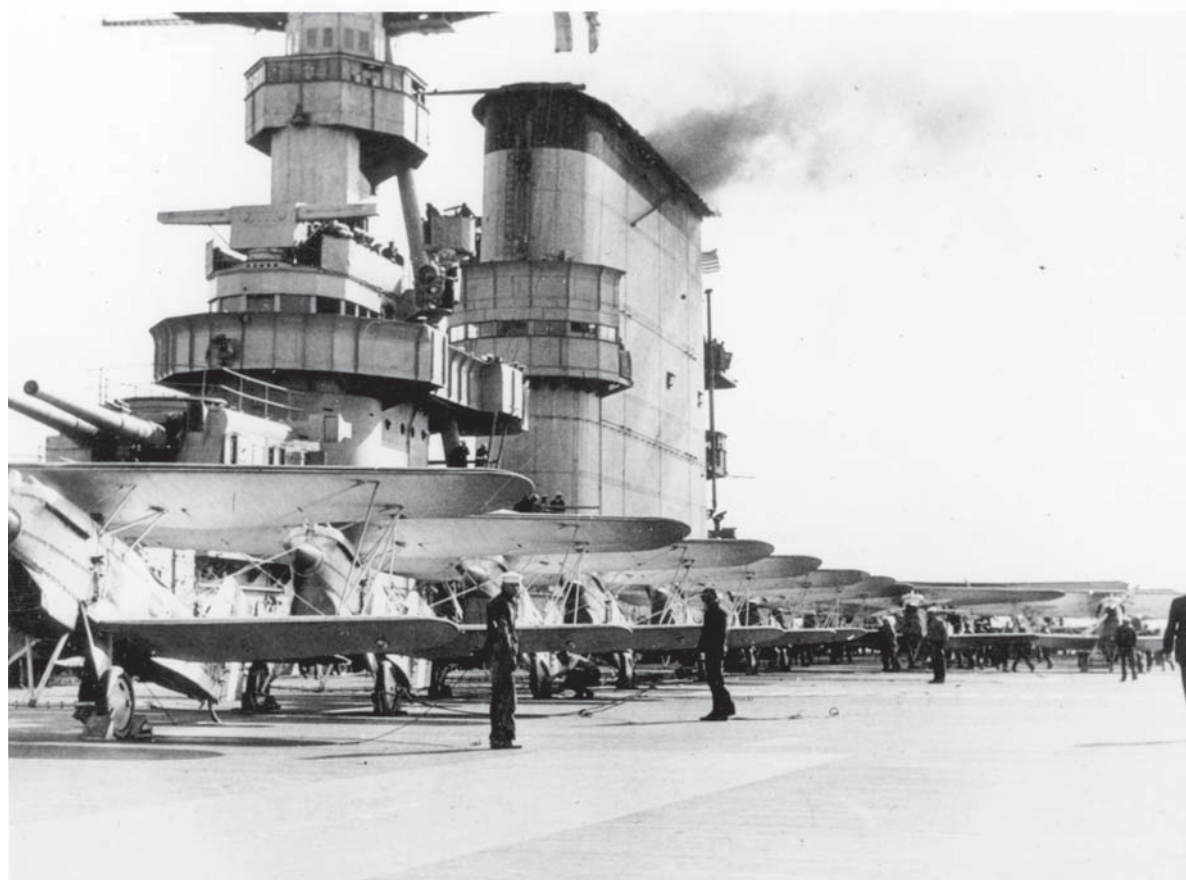
In March 1933, Taylor was assigned to command another Marine Corps Reserve Aviation Unit, this time at Gross Isle, Michigan, where his job consisted of visiting colleges to urge the students of the graduating class to join the Marine Corps. He remained at that post until June when he was ordered to inactive status in conjunction with a reduction of the reserves, caused by deep budget cutting mandated by Congress.

Nevertheless, Taylor managed to obtain a job with United Airlines as a copilot on their New York to Chicago route, flying the new Boeing 247s that were just entering United's fleet.¹⁹ When Taylor started flying the 247, it represented the state-of-the-art in aircraft design. The low wing, all metal monoplane, was the first commercial airliner equipped with a retractable undercarriage and NACA cowlings for efficient streamlining of its engines. These features allowed the plane to cruise at the unprecedented speed of 160 miles per hour—50 percent greater than its predecessor, the Ford Trimotor. Despite its impressive performance, the 247, carried only ten travelers in its cramped passenger cabin.

The Chicago-New York run was the busiest segment of United's transcontinental route. Flying by commercial airliner was an expensive proposition in those days and the flights were patronized almost exclusively by the "rich and

**TAYLOR
MANAGED TO
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A COPILOT**

Curtiss F6C-3 fighters of VF-5 lined up on Lexington's flight deck preparing to take off for the Naval Air Station on North Island, San Diego. (NASM.)



**ON
SEPTEMBER
14, 1939,
TAYLOR WAS
INDUCTED
INTO THE
ROYAL NAVY**

famous." Taylor flew with United Airlines until 1936, when he purchased a travel agency in New York City. At this time, he changed his name to William Erwin Gibson Taylor so that his legal first name would match the sobriquet adopted by his friends and family.²⁰

How and why Taylor got into the travel business remains unclear. His scrap books are filled with pictures of movie stars and celebrities, leaving the impression that he was a socialite—a decided asset in such a venture. He knew many famous people, including Charles Lindbergh, according to the stories he told his close friends.²¹ While on a visit to Cape Cod one day, he borrowed the famous aviator's plane to visit a lady friend on Long Island. After a short flight across Long Island Sound, Taylor landed in a cow pasture, where he left the plane for the night. When he returned in the morning he discovered, to his chagrin, that cows had eaten portions of the fabric wing coverings.

In August 1939, Taylor traveled to London on holiday. Whether he went there with other intentions is not known, but with war clouds gathering over Europe, he decided to reenter the military. Seeking to join the RAF, Taylor went to the American embassy in hopes that the assistant naval attaché for air could help.²² Taylor was sent to see a British admiral, who was charged with recruiting aviators for the Royal Navy. Taylor was subsequently offered a commission as a sub-lieu-

tenant in the Royal Navy Reserve Volunteers so that he could fly for the Fleet Air Arm.²³ Still in the U.S. Marines Corps Reserves, Taylor had to await word from Washington confirming his resignation from the Marines before he could accept a British commission.

On September 14, 1939,²⁴ Taylor was inducted into the Royal Navy at HMS *Daedalus*, and immediately began a refresher course in flight training there. Next he was sent to fighter school before being ordered to the Mediterranean aboard HMS *Argus*, where he qualified for carrier duty. He then returned to the British Isles, to fly Gloster Sea Gladiators, with 804 Squadron at Hanston in the Orkney Islands.²⁵ In April 1940, the squadron embarked in HMS *Glorious* to provide fighter cover in support of the British Army landings in Norway.²⁶ Taylor saw combat for the first time on April 27, when his flight (Blue Section of 804 squadron) intercepted and damaged a Heinkel 111 while flying combat air patrol over the fleet. This was a remarkable feat for the obsolete Gladiator, a 530-hp biplane, whose top speed of 253 mph was 8 mph slower than the Heinkel 111E.²⁷ Time after time the Gladiators would climb to engage a target, only to see it give "a startled puff of brown smoke" from its engines and accelerate away to safety.²⁸

Taylor saw more action in the late afternoon of May 1, when Blue Section drove off two more Heinkel 111s and broke up a second wave of

**TAYLOR SAW
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ING COMBAT
AIR PATROL
OVER THE
FLEET**

(Near right) Taylor engaged in gunnery practice while in training at Hampton Roads.

(Far right) Flight Lt. William E.G. Taylor of the Royal Air Force Volunteer Reserve shown here wearing the shoulder patch of the Eagle Squadron. (Both photos from Taylor scrap book courtesy Ms. Connie Miller.)

DURING [HIS] TRIP HE MET THE SWEENEY BROTHERS, LEADING TO HIS APPOINTMENT TO COMMAND NUMBER 71 SQUADRON, THE ALL-AMERICAN EAGLE SQUADRON

LEIGH-MALLORY TOLD HIM THAT...AT AGE THIRTY-SIX, HE WAS TOO OLD TO COMMAND A FIGHTER SQUADRON



Junker 87s that were attempting to dive bomb *Glorious*.²⁹ Taylor's squadron made two trips to Norway aboard the *Glorious* before they were disembarked to make room for a squadron of RAF Hurricanes that were evacuated from Norway and flown out to the carrier. Had his squadron remained with the ship, Taylor might have been killed, for during the return voyage *Glorious* was caught and sunk by the German battle cruiser *Scharnhorst*. Only 43 of the 1,515 men on board survived, most of the others—officers and men of the Royal Navy, Marines, and Fleet Air Arm—perished in the icy waters of the Atlantic awaiting rescue.³⁰

That summer, Taylor was sent to the United States to assist the British Purchasing Mission in its efforts to obtain the latest U.S. carrier aircraft that were urgently needed to replace the severe losses incurred by the Fleet Air Arm during the Norwegian campaign.³¹ It was during this trip that he met the Sweeney brothers, leading to his appointment to command Number 71 Squadron, the all-American Eagle Squadron that the RAF established at the Church Fenton Air Station near York, 180 miles north of London.³²

When Taylor arrived at the station on October 4, 1940, he was surprised to learn that Squadron Leader Walter Churchill, a seasoned combat veteran with eight kills under his belt, had preceded him.³³ The assignment of two commanders—Taylor as figurehead and Churchill as the man in charge—was not workable. Taylor bowed out with a temporary transfer to 242 Squadron for indoctrination in Spitfires.

Upon his return to 71 Squadron, now at Kirton-in-Lindsey, Churchill was still in charge.³⁴

Taylor was furious and sought out Lord Balfour at the Air Ministry to complain that he had been double crossed. He reminded the British Under Secretary of State for Air that he, as well as the press, had been told he was to have been given command of the squadron. Taylor said that he wanted sole command of the Eagle Squadron or be allowed to return to the Royal Navy. The situation was resolved at the end of January, when Churchill went on sick leave and Taylor took over.³⁵

Under Taylor, the squadron reached operational status on February 1, 1941. For the next six weeks the squadron's Hurricane fighters patrolled the skies without meeting the enemy.³⁶ In April, it was relocated to Martlesham Heath, 65 miles northeast of London and with Number 11 Group assigned flying fighter cover for British ships operating in the English Channel and the North Sea. Taylor termed this assignment "pretty humdrum."³⁷

Evaluations of Taylor's leadership during this period vary. Some Eagles claimed that another pilot, Peter Peterson, was the real flying commander before its move to Martlesham Heath.³⁸ Taylor claimed he was simply keeping the unit out of combat until it was fully manned. Whatever the real reasons, the squadron's reputation had not lived up to expectations. Not surprisingly, Taylor was called to group headquarters, where Air Vice Marshall T. L. Leigh-Mallory, told him that he had exceeded the allowable number of operational hours and that, at age thirty-six, he was too old to command a fighter squadron.³⁹ Although offered a promotion to wing commander of a fighter training unit, Taylor

WHILE STATIONED ON OAHU, HE WAS LOANED TO THE ARMY INTERCEPTOR COMMAND

UNDER TAYLOR, PROJECT AFIRM CONVERTED THE F4U-1 INTO THE F4U-2, THE NAVY'S FIRST RADAR EQUIPPED FIGHTER

opted to return to the U.S. Navy, which had been asking for his return.

In mid-August 1941, Taylor returned to the United States via the American Clipper from Lisbon and immediately made his way to Washington, where he reported for duty, having accepted a commission as a lieutenant commander in the Naval Reserve.⁴⁰ Within a week, he was on his way to Norfolk, Virginia, on temporary duty from the Bureau of Aeronautics to brief various fleet air detachments on his knowledge of radar interception and fighter direction.⁴¹

While in Norfolk, Taylor also briefed the pilots on the *Yorktown*. The ship was equipped with one of the first CXAM air search radars, but nobody aboard knew how to exploit it. Taylor "unloaded all he could," recalls Bill Leonard, a former VF-42 pilot aboard *Yorktown*.⁴² He had us rehearse the proper fighter control vocabulary in the ready room before sending us off to practice radar intercepts in the air off Bermuda. According to Leonard's recollections, Taylor, impressed the heck out of us. He was a colorful guy with an impeccable uniform, that added an aura of authenticity to him.

After spending ten days on the *Yorktown*, Taylor briefly rode the *Ranger* before travelling to Hawaii, where he was assigned to Adm. Husband E. Kimmel's staff. While stationed on Oahu, he was loaned to the Army Interceptor Command to assist in setting up the Air Defense Information Center, then being established at Fort Shafter several miles east of Pearl Harbor.⁴³ They were still trying to pull the last threads together when the Japanese attacked on December 7th.

Several weeks after the attack, Taylor was called before the Roberts investigative commission, to testify on the status of the early warning system on the morning of the attack. "It was not ready by any means," he stated in response to a question raised by the commission's chairman, Associate Justice of the Supreme Court Owen J. Roberts, "[not] for air warning, [but] for air interception."⁴⁴

Taylor remained in Hawaii until February 1942, when he was recalled by the Bureau of Aeronautics to work on a special program to provide the Navy's carriers with radar-equipped night fighters. He was sent to MIT's Radiation Laboratory for duty as officer assistant for Project Roger for six weeks. He then took command of Project Afirm at NAS Quonset Point, R. I., established on April 18, to develop tactics and equipment for the Navy's first night fighting squadrons.⁴⁵ Taylor's task was to adapt the new 3-cm AI radar set (XAIA), being developed at the Radiation Laboratory, for the F4U Corsair.

Under Taylor, Project Afirm converted the F4U-1 into the F4U-2, the Navy's first radar equipped fighter, and organized and trained its first night fighting squadrons. The initial step in this process was undertaken at the Naval Aircraft Factory at Philadelphia, where the starboard wing was modified to support a faired

radar nacelle containing an 18-inch rotating scanning dish and the outboard gun removed to permit the installation of a wave-guide to the fuselage mounted receiver/transmitter.⁴⁶ The latter were installed at Quonset Point by Taylor's own people.

On April 10, 1943, VF(N)-75 squadron was established under Project Afirm's auspices, and led by Cmdr. William "Gus" J. Widhelm.⁴⁷ A detachment of six pilots and planes was ordered to the South Pacific on August 1. The squadron arrived at Munda, New Georgia, on September 23, and made its first combat air patrol on October 2. During the next four months the detachment shot down seven enemy aircraft.

In the meantime, Project Afirm was split into two units. One was transferred to NAS Patuxent River, Maryland, to work exclusively with matériel, while the other, the Night Fighter Training Unit (NFTU) under Taylor's command, remained at Quonset Point to concentrate on training. NFTU was superseded by the Night Attack and Combat Training Unit (NACTU) on November 9, 1944. By then Taylor, who had been promoted to commander in July 1943, controlled 270 aircraft and was training 360 pilots.⁴⁸

Taylor remained in command of the unit until November 30, 1944, when he was relieved and ordered to the Pacific as technical advisor on the staff of the Commander Carrier Division Seven. There he coordinated the night fighter detachments assigned to the *Enterprise* and *Saratoga* that had been designated to serve as night carriers within the Fifth Fleet's TF-58. Taylor served in this capacity until April 1945, when he was named as the air officer to the staff of Commander Naval Forces Northwest African Waters. From there he went on to command NAS Port Lyautey, French Morocco, with additional duty as Commander of the Moroccan Task Group. While at Port Lyautey, Taylor hosted one of the first nuclear capable bombing units deployed on foreign soil, Detachment A of the Army Air Forces 368th Bombardment Squadron.

Taylor's military career ended in 1951, when he was forced into retirement on permanent disability due to chronic hepatitis contracted from a Yellow Fever shot. After leaving the Navy, Taylor was the terminal manager for Braniff International Airlines in Panama. In 1955, he joined Scandinavian Airlines System as vice president for air political affairs, with work involving landing rights in the United States. He retired from this position in 1970. Taylor never married and had no immediate family.

In the 1980s, his flying career briefly achieved celebrity status, when his role as the first commanding officer of the Eagle Squadron was publicized in several newspapers articles and a book about the famed squadron. However, Taylor's passing went unnoticed when he died in 1992, and his accomplishments would have been forgotten had it not been for his scrapbooks, which remained in the hands of his executor until they

were brought to the author's attention in 1999. These precious artifacts of a bygone era were

subsequently donated to the National Air and Space Museum where they can be found today. ■

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Slangage

Brian S. Gunderson

Part IV: Letters L-R

ROYAL AIR FORCE TERM	U.S. ARMY AIR FORCES EQUIVALENT/ DEFINITION
LOO	A LAVATORY/TOILET
LOOKSEE	AERIAL RECONNAIS- SANCE
LOOSEOFF	TEST FIRE AIRCRAFT GUN
LORRY	A TRUCK
LOSE YOUR WOOL	LOSE YOUR COOL, BE UPSET
LOW WRACK	LOW CLOUD
MAC/MACINTOSH	A RAINCOAT
MAGGIE	NICKNAME FOR WWII RAF MILES MASTER AIR- CRAFT
MAKE A REASONABLE FIST OF IT	DO A GOOD JOB
MASTER BOMBER	A PILOT CONTROLLING AN RAF BOMBER RAID
MAY DAY	EMERGENCY SOS CALL BY RADIO CODE CALL OR BY VOICE TRANSMIS- SION
MEAT DISCS/DISKS	MILITARY DOG TAGS, IDENTIFICATION TAGS
MEAT WAGON	A MILITARY AMBULANCE
MESSERS	NICKNAME FOR GERMAN LUFTWAFFE MESSERSCHMITT FIGHTER AIRCRAFT
MET MAN	A WEATHER OFFICER
MICKY MOUSE	A BOMB DROPPING MECHANISM

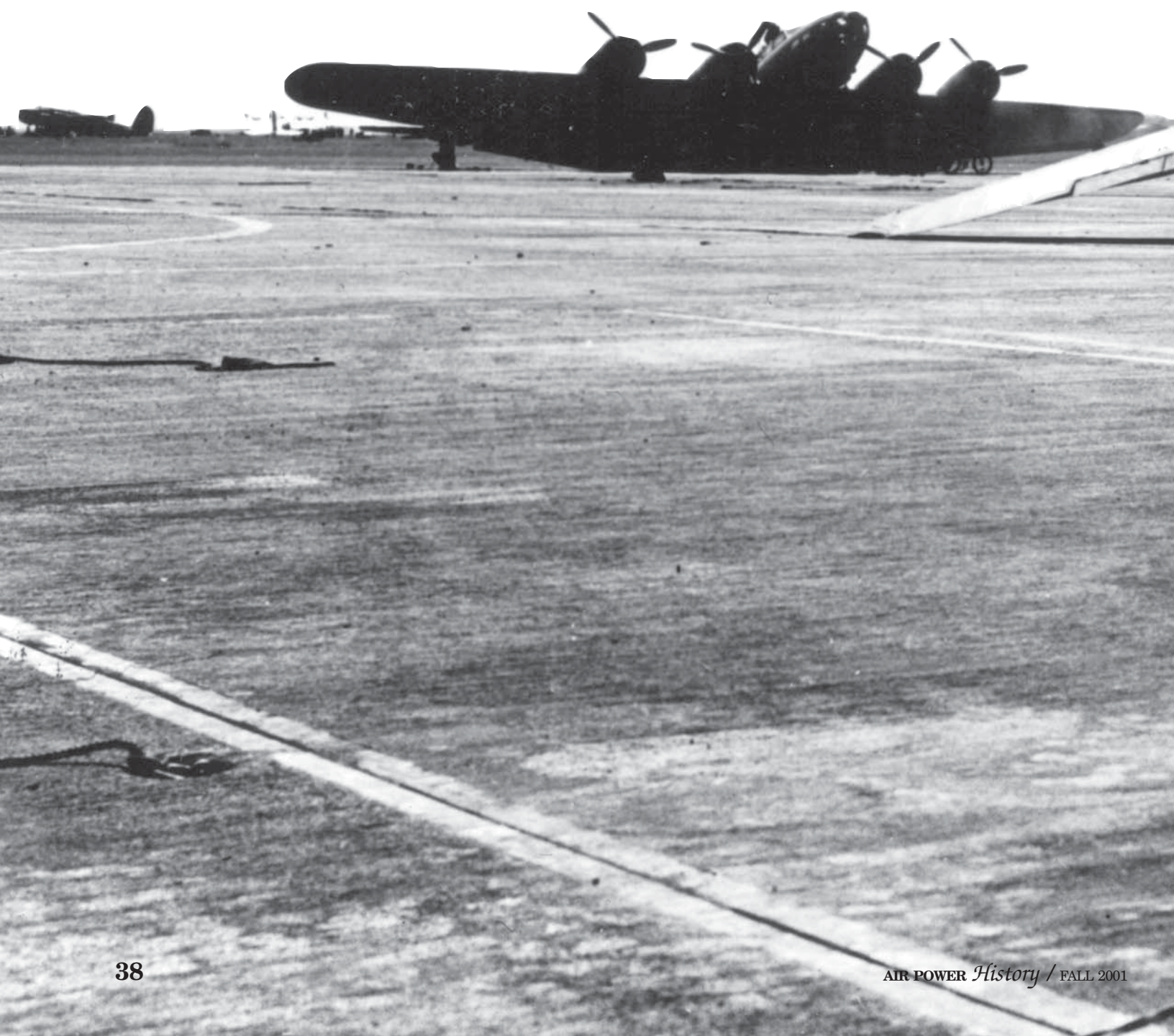
ROYAL AIR FORCE TERM	U.S. ARMY AIR FORCES EQUIVALENT/ DEFINITION
MINDER	AN INDIVIDUAL ASSIGNED TO ENSURE THAT A REPORTER/PHO- TOGRAPHER/ NEWSMAN VISITING AN AIRFIELD DID NOT STRAY INTO RESTRICTED AREAS
MINERAL WATER	A SOFT DRINK, A SODA
M.O.	A MEDICAL OFFICER, DOCTOR, PHYSICIAN
MONICA	AIRBORNE TAIL WARN- ING RADAR FITTED INTO RAF BOMBERS IN 1943, DESIGNED TO PICK UP ENEMY FIGHTERS HOM- ING IN ON RAF BOMBERS
MORSE-BASHING	WIRELESS/RADIO OPER- ATORS PRACTICING MORSE CODE SIG- NALLING
MOSSIE/MOZZIE	NICKNAME FOR RAF DE HAVILLAND MOSQUITO TWIN-ENGINE FIGHTER BOMBER
MR. FIREWORKS	AN RAF ARMAMENT OFFICER
MUCK-UP	MESS UP, BUNGLE
NAAFI/NAFFY/NARFY	NAVY, ARMY, AIR FORCE INSTITUTE, CANTEEN, FOOD WAGON
NACELLE	AN ENGINE COWLING
NATTER	CONSTANT TALKING-A DRONING, AIMLESS CON- VERSATION
NAVY	AN AIRCREW NAVIGATOR
NICKED	ARRESTED
NICKELLING/NICKELS	DROPPING PSYCHOLOGI- CAL/PROPAGANDA WAR- FARE LEAFLETS, NEWSLETTERS FROM ALLIED AIRCRAFT OVER GERMANY AND OCCU- PIED EUROPEAN COUN- TRIES
NIGGARDLY	MEAN, SPITEFUL
NIGGLING	ANGRY
NO BALL	CODE NAME FOR GER- MAN V-1 ROCKET SITE
NOGGIN	A GLASS OF BEER

ROYAL AIR FORCE TERM	U.S. ARMY AIR FORCES EQUIVALENT/ DEFINITION	ROYAL AIR FORCE TERM	U.S. ARMY AIR FORCES EQUIVALENT/ DEFINITION
NO JOY	NO CONTACT MADE BY RAF FIGHTERS WITH ENEMY AIRCRAFT	ORGANIZE	TO OBTAIN DEVIOUSLY
NO ODDS	MAKES NO DIFFERENCE	OTHER HALF	A SECOND DRINK, ANOTHER HALF PINT OF ALE OR BEER
NOSEGAY	A CIGARETTE	OVER THE MOON	OVERJOYED, ELATED
NOSH	A SNACK, A MEAL	PACKED UP	QUIT(E.G. AIRCRAFT ENGINE STOPPED)
NOUGHT FEET	ON THE DECK, FLYING AT TREETOP HEIGHT	PACKET	A LOT OF TROUBLE
NUMBER UP	MISSING IN ACTION(MIA),KILLED IN ACTION (KIA)	PADRE	A MILITARY CHAPLAIN
NURSERY TARGET	AN EASY TARGET ASSIGNED TO A NEW CREW GOING OUT ON ITS FIRST OR SECOND MISSION	PALLIASES	COARSE PALLET-TYPE PILLOWS
O.B.E.	A BRITISH DECORATION, OFFICER OF THE ORDER OF THE BRITISH EMPIRE	PAMPHLETEERING	DROPPING PROPAGANDA LEAFLETS FROM AIR- CRAFT
OBOE	A BLIND BOMBING AND TARGET MARKING SYS- TEM CONTROLLED FROM THE GROUND RADAR STATIONS	PANCAKE	LAND AN AIRCRAFT
O.C.	OFFICER COMMANDING	PANIC BOWLER	A MILITARY ISSUE STEEL HELMET TO BE USED DURING ENEMY AIR RAIDS
OFFICE	THE AIRCRAFT COCKPIT	PANZER CAN OPENER	RAF FIGHTER BOMBER ATTACKS AGAINST GER- MAN TANKS
OLD LADY OF THREADNEEDLE ST.	THE BANK OF ENGLAND	PAPER FACTORY	AIR MINISTRY IN LON- DON
OLEO	SHOCK ABSORBING AIR- CRAFT LANDING GEAR	PARADE STATE	ROLL CALL
ON ONE'S KNEES	TOO TIRED TO STAND	PARKING PAN	DISPERSAL PAD, AIR- CRAFT HARDSTAND
ON THE CLOCK	ON THE AIRSPEED INDICATOR	PASSION KILLER	IN A BLACKOUT
ON THE FIZZER	PUT ON CHARGE, FACE DISCIPLINARY ACTION	PASS OUT	GRADUATE (E.G. FROM FLYING SCHOOL)
ON THE HOOKS	ON DISCIPLINARY CHARGE (SIMILAR TO ON THE FIZZER)	PAY ONE'S WAY	PAY ONE'S SHARE, DUTCH TREAT
ON TOP LINE	AIRCRAFT CERTIFIED SERVICEABLE, READY FOR FLIGHT/COMBAT	PECKISH	FEELING HUNGRY, NEED A SNACK
ON TOP SIDE	IN THE AIR, AIRBORNE	PEEL OFF	BREAK FORMATION
OO-ER	COMMON PHRASE MEANING GOSH, GEE	PEG, ON THE	FACING A DISCIPLINARY CHARGE
OPEN THE TAPS	ACCELERATE	PENCILS	INCENDIARY BOMBS
OPPO, AN	A PAL/MATE/FRIEND	PENGUINS	NON-FLYING ADMINIS- TRATIVE PERSONNEL
		PENNY DREADFUL	A CHEAP, PULP MAGA- ZINE OR BOOK

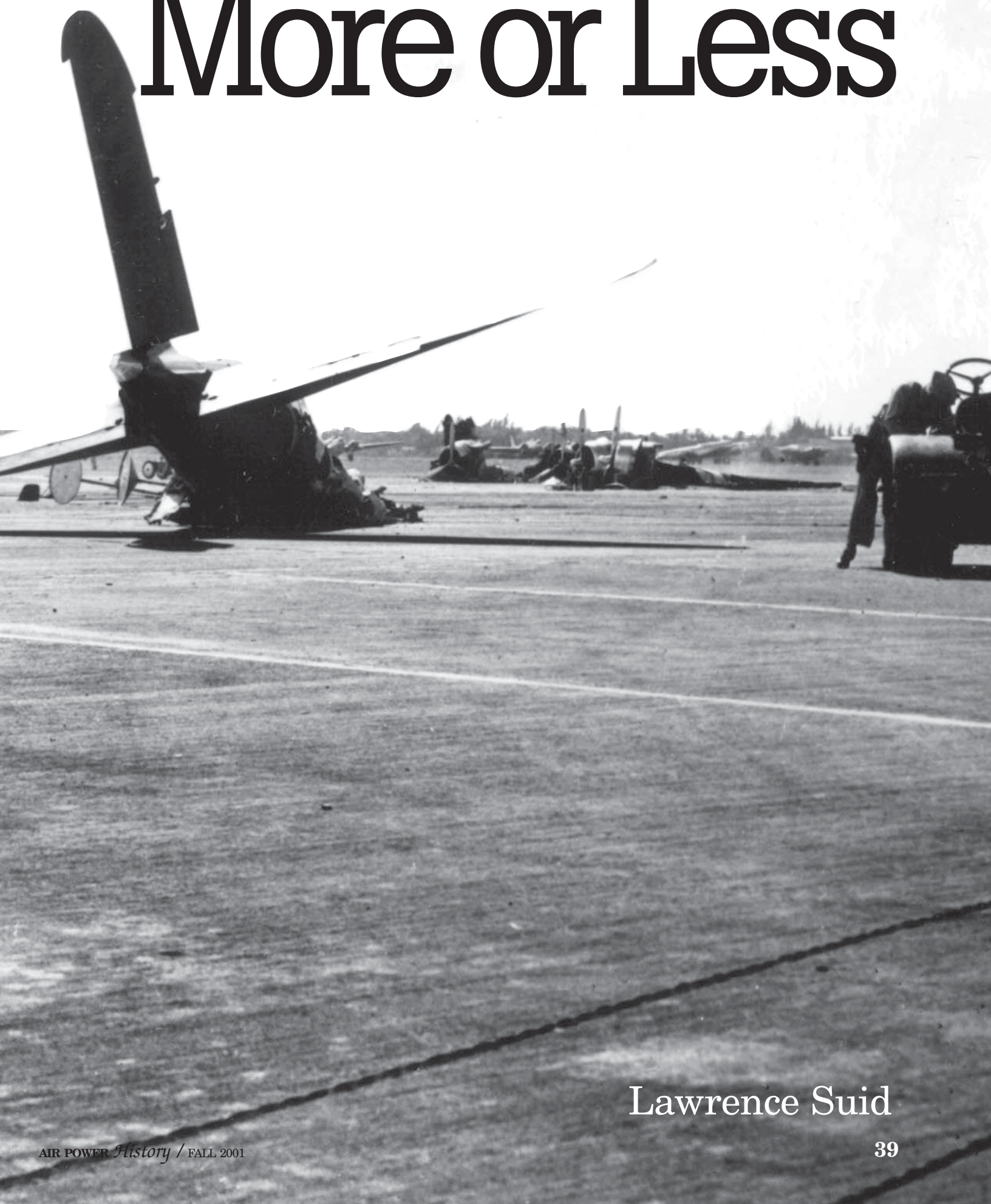
ROYAL AIR FORCE TERM	U.S. ARMY AIR FORCES EQUIVALENT/ DEFINITION	ROYAL AIR FORCE TERM	U.S. ARMY AIR FORCES EQUIVALENT/ DEFINITION
PERCY PRUNE	A LEGENDARY PILOT IN R.A.F. FLYING SAFETY CARTOONS USED TO ILLUSTRATE MISTAKES PILOT SHOULD AVOID WHILE FLYING	PONGO	AN OFFICER IN THE BRITISH ARMY OR MARINES
PERSPEX	SHATTERPROOF PLEXI-GLASS USED IN AIR-CRAFT COCKPIT WIND-SCREENS, WINDOWS, TURRETS, ETC.	PONG PROBLEM	BODY ODOR, TOO LONG BETWEEN SHOWERS OR BATHS
PETROL	GASOLINE	POOP OFF	OPEN FIRE WITH AIR-CRAFT GUNS
PFF	PATHFINDER FORCES	POPPET	A GIRL
PICTURES	MOVIES	POPSIE/POPSY	A GIRL
PIECE OF CAKE	AN EASY MISSION, A CINCH	PORT	TO LEFT, LEFT SIDE
PIGEONS	AIRMEN	POSH	UPPER CLASS, RITZY, ELEGANT, HIGH CLASS
PILLAR BOX	A POSTAL/MAIL BOX	POST	MAIL
PINTA	A PINT OF BEER	PRANGED	CRASHED AND DAMAGED OR DESTROYED AN AIRCRAFT OR GROUND VEHICLE
PIT	A BED, A COT	PREGGERS	PREGNANT
PLAY PUSSY	HIDE AN AIRCRAFT IN CLOUDS BEFORE SURPRISING ENEMY AIRCRAFT	PRESS-ON TYPE	AN AMBITIOUS, AGGRESSIVE INDIVIDUAL
P.L.E.	PRUDENT LEVEL OF ENDURANCE IN FLIGHT, POINT OF NO RETURN	PUG AWAY	KEEP FIRING ONE'S AIRCRAFT GUNS AT AN ENEMY AIRCRAFT
PLEEP	A SQUEAK, LIKE A HIGH NOTE KLAXON	PUKKA GEN	GOOD, ACCURATE INFORMATION
PLONK	CHEAP WINE	PULLOVER	A SWEATER
PLOUGHMAN'S LUNCH	LUNCH SERVED IN A BRITISH PUB CONSISTING OF BREAD OR ROLL, A PIECE OF BUTTER, CHEESE, AND SOUR PICKLES OR ONIONS, AND/OR A PIECE OF APPLE	PULPIT	AN AIRCRAFT COCKPIT
PLUMBERS	AIRCRAFT ARMORERS	PUSH OFF	TO TAKE OFF AN AIRCRAFT
PLYWOOD WONDER	NICKNAME FOR A DE HAVILLAND MOSQUITO AIRCRAFT	PUT ON THE SWANK	PUT ON AIRS, SHOW OFF
POMMIES	A TERM USED BY AUSTRALIAN SERVICEMEN FOR BRITISH SERVICEMEN IN BRITISH ARMY, NAVY AND AIR FORCE (RAF)	PUT UP A BLACK	A SERIOUS ERROR/MISTAKE BY AN OFFICER
		Q SITES	FAKE AIRFIELDS CONSTRUCTED IN ENGLAND DURING WORLD WAR II DESIGNED TO LURE GERMAN BOMBERS TO WASTE THEIR BOMBS ON USELESS TARGETS
		QUAGS	QUAGLINOS RESTAURANT IN CENTRAL LONDON; A FAVORITE PLACE FOR RAF OFFICER FLIERS ON LEAVE

ROYAL AIR FORCE TERM	U.S. ARMY AIR FORCES EQUIVALENT/ DEFINITION	ROYAL AIR FORCE TERM	U.S. ARMY AIR FORCES EQUIVALENT/ DEFINITION
QUEEN BEE	SENIOR RAF WOMENS ROYAL AIR FORCE (WRAF) OFFICER ON A RAF AIR STATION	RIGGER	AN AIRCRAFT FABRIC REPAIRMAN, AIRFRAME MECHANIC
QUEUE	A LINE OF PEOPLE IN WORLD WAR II WAITING FOR RATIONS, A BUS, A MOVIE, ETC.	RIGHT WHEEL	MAKE A RIGHT TURN
QUICK SQUIRT	A SHORT BURST FROM AN AIRCRAFT GUN OR AN ANTIAIRCRAFT GUN OR AN ANTI AIRCRAFT GUN BATTERY	RINGS	RANK DESIGNATION IN BRAID ON RAF OFFI- CER'S UNIFORM-E.G. ONE THIN RING FOR A PILOT OFFICER (2d LT.); TWO MEDIUM RINGS EITHER SIDE OF A THIN RING FOR A SQUADRON LEADER (MAJOR) AND FOUR MEDIUM RINGS FOR A GROUP CAPTAIN (COLONEL)
QUID	A BRITISH POUND NOTE EQUAL TO 20 SHILLINGS (APPROXIMATELY \$5.00 IN EARLY 1940'S)	ROCK APES	MEMBERS OF RAF REGI- MENT WHO WERE ASSIGNED GUARD DUTIES AROUND RAF AIRFIELDS OR OTHER SPECIAL AREAS REQUIR- ING SECURITY
RAFFISH	A RAKE, A ROUÉ, A SMOOTHIE	RODEO	AN RAF FIGHTER SWEEP OVER ENEMY TERRI- TORY
RAMROD	A SHORT-RANGE RAF FIGHTER-ESCORTED DAYLIGHT BOMBER RAID AGAINST AXIS TARGETS	ROMAN CANDLE	A FLARE
RANGER	AN RAF FIGHTER SWEEP AGAINST ENEMY FIGHTER AIRCRAFT AND AIRFIELDS	ROPEY	CARELESS, UNRELIABLE
RANG THE BELL	OBTAINED GOOD RESULTS	ROPEY AIRCRAFT	AN OLD OR INFERIOR AIRCRAFT PRONE TO MANY MALFUNCTIONS
RANKER	AN OFFICER WHO HAS RISEN FROM ENLISTED RANKS	ROTOR	AN AIRCRAFT DISTRIBU- TOR
RASHER	A SLICE OF BACON	ROUNABOUT	A TRAFFIC CIRCLE AT MAJOR ROAD INTERSEC- TIONS IN ENGLAND
RAT HOLE	TAIL GUNNER'S POSI- TION IN RAF BOMBER AIRCRAFT	ROUNDERS	BRITISH NAME FOR SOFTBALL GAME PLAYED IN U.S.A.
RATING	SAILOR, ORDINARY SEA- MAN	ROYAL ROCKET	A SEVERE VERBAL REP- RIMAND BY A SENIOR OFFICER/NON-COMMIS- SIONED OFFICER
RAZZLES	AIR DROPPED INCENDI- ARY BOMBS	R/T CHATTER	RADIO TELEPHONE/INTERCOM DISCUSSION
RECEIVED A GOOD ROLICKING ROCKET	WAS DISCIPLINED BY A SUPERIOR, WAS CHEWED OUT	RUN UP	A BOMB RUN OVER TAR- GET
REJIGGED	A DAMAGED AIRCRAFT THAT HAS BEEN REPAIRED		
RHUBARB MISSION	AN RAF LOW-LEVEL SIN- GLE FIGHTER ATTACK USING BAD WEATHER AS A COVER AGAINST TAR- GETS OF OPPORTUNITY IN WESTERN EUROPE		

Pearl Harbor:



More or Less



Lawrence Suid

(Overleaf) Wreckage from a B-17C at Hickam Field, after the Japanese bombing of December 7, 1941.

TORA! TORA! TORA! SUCCEEDED AS HISTORY, BUT FAILED AS DRAMA AND SO DID NOT MAKE MONEY

PEARL HARBOR IS A FICTIONAL TALE CRAFTED FROM A KALEIDOSCOPE OF REAL LIFE PERSONAL EXPERIENCES

The Japanese sneak attack on Pearl Harbor inflicted a traumatic defeat on the U.S. Navy and U.S. Army Air Corps. It had an even more traumatic impact on the American public because Hollywood and the armed services had conspired for more than two years before December 7, 1941, to produce a series of preparedness motion pictures that lulled people into believing the military was protecting the nation from any external threat. Pearl Harbor gave lie to the propaganda messages embedded into such films as *Flight Command*, *I Wanted Wings*, and *Dive Bomber*.

Once the war began, however, the motion picture industry immediately began repairing the damage to the American psyche by creating movies showing how the United States was winning the war against Germany and Japan. One of the first of these, *Air Force*, in 1943, showed how the Air Corps was going to lead the way to victory against Japan. Drawing on the historical record, *Air Force* began its story with the flight of twelve B-17s that left San Francisco on the evening of December 6, heading to the Philippines by way of Hawaii. Arriving in the midst of the Japanese attack on Pearl Harbor the next morning, the bombers landed wherever they could find a relatively safe airfield.

Through the eyes of the fliers, the film then showed, albeit briefly, the destruction the Japanese had wrought on Hawaii. In particular, it showed the suffering of the civilians and the losses the military had suffered. At the same time, as propaganda, the film portrayed fifth columnists attacking one of the B-17s, and later an officer at Hickam Field described how saboteurs, driving down the flightline, had destroyed the planes lined up wing tip to wing tip. Not true, of course, but the images undoubtedly produced the intended anger within audiences.

Apart from John Ford's 1942 documentary, *December 7*, mostly a recreation of the surprise attack filmed on a studio back lot, Hollywood did not again portray Pearl Harbor until after World War II. *December 7* appears very briefly in the 1949 film, *Task Force*, an epic rendering of naval aviation and in the 1953 film, *From Here to Eternity*, which well captured the initial shock of the attack among the soldiers at Schofield

Barracks. The 1965 potboiler, *In Harm's Way*, next portrayed the attack in a short sequence that lays the framework for the portrayal of how the Navy turned the tide in the Pacific.

Finally, and with exceptional historical accuracy for a Hollywood movie, *Tora! Tora! Tora!* told the story of the attack from the perspective of both the attacker and the attacked. Within the limits of the special effects artistry of 1970, the Twentieth Century Fox epic rendered the actual attack with surprising believability. More important, it provided audiences with a good understanding of why the Japanese embarked upon the attack and what actually happened in the early morning of December 7. Why would the Navy and the Pentagon provide full assistance to a film that portrayed an ignominious defeat? Director Richard Fleischer explained that *Tora! Tora! Tora!* satisfied the Navy's need to show a successful aircraft carrier operation. It just did not happen to show an American sortie. The movie did lack one crucial ingredient required in any Hollywood feature film: good drama. The characters never came to life, remaining actors simply reading their lines. In working so hard to tell an accurate story and recreate the actual attack with visual authenticity, the filmmakers forgot Hollywood's prime directive: a movie must entertain to bring audiences into the theater. As a result, *Tora! Tora! Tora!* succeeded as history, but failed as drama and so did not make money, the goal of all motion pictures. Nevertheless, the film remains one of the few Hollywood epics that can be used to teach the history of a major event.

Why then make *Pearl Harbor*? Before he began shooting in Hawaii in April 2000, director Michael Bay explained, "You will see what happened at Pearl Harbor like you have never seen it in any other movie. Our goal is to stage the event with utmost realism." He said that he wanted his film to become one "by which all other films are measured," dismissing *Tora! Tora! Tora!* as "more of a documentary." Perhaps one of the trailers for the movie described it more honestly: "*Pearl Harbor* is a fictional tale crafted from a kaleidoscope of real life personal experiences of those living through this terrifying tragedy." The operative word remains "fictional." If the movie had retained its

Lawrence Suid is a military historian. His first book, *Guts & Glory*, remains the definitive study of the relationship between the film industry and the armed services. The University Press of Kentucky is publishing a revised, expanded edition of the book in 2001, which carries the story through Pearl Harbor. Dr. Suid's most recent book, *Sailing on the Silver Screen*, focused on the symbiotic relationship between the U.S. Navy and the motion picture industry. He has also written *The Army's Nuclear Power Program: The Evolution of a Support Agency*, *A History of Armed Forces Radio and Television Service*, and edited Volume four of *Film & Propaganda: A Documentary History*. In addition, he has written essays for *The Oxford Companion to American Military History*, *The Marines*, *To Die Gallantly: The Battle of the Atlantic*, *The Twentieth Century: Mirrors of the Mind*, and *American History/American Film*. He received a B.A. from Western Reserve University, a Master's degree in Russian history from Duke University, a Master's degree in Fine Arts (Film) from Brandeis University, and a Ph.D. in American Studies from Case Western Reserve University. Dr. Suid lives in Greenbelt, Maryland. He has appeared on the History Channel, CNN, C-Span, CBS's "Saturday Night with Connie Chung," and ABC's "20/20."

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OF DRAMATIC
LICENSE

THE TWO FIC-
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PROBLEMS

original working title, *Tennessee*, the filmmakers might well have escaped much of the criticism that *Pearl Harbor* has received from historians, media critics, and Pearl Harbor survivors. Bay and producer Jerry Bruckheimer could have legitimately said they were simply using the Japanese attack on Hawaii as the stage on which to play out a love story. However, the very title *Pearl Harbor* implies that audiences will be viewing a reasonably accurate account of what happened on December 7, 1941.

In the face of continuing criticism that they had not done so, Bruckheimer and Bay maintained that they had captured the essence of the story and captured it well. However, "essence" remains a very subjective term that may to conceal a plethora of sins. In the case of *Pearl Harbor*, the sins include distortions of fact, fabrications of fact, and implausibilities that far exceed the limits of dramatic license. One day, someone may write a book detailing each inaccuracy and explaining the historic reality. Here, a few examples will have to suffice.

Bay acknowledged that he moved up the war message from the chief of naval operations, Admiral Harold Stark, to Admiral Husband Kimmel from November 27, to after the Japanese attack on December 7, in order to create dramatic irony. In doing so, he has joined, intentionally or otherwise, the crusade to rehabilitate Kimmel's reputation. If *Pearl Harbor* had accurately portrayed history and Kimmel had received the warning on November 27, then the admiral would legitimately deserve criticism for not being prepared for a possible attack. In Bay's cinematic interpretation, Kimmel becomes the victim of Washington's incompetence in not providing him with sufficient warning of a possible attack.

In the actual attack, Japanese planes torpedoed the *Oklahoma* before bombers hit the *Arizona*. In the movie, a Japanese bomb cinematically spirals down on the *Arizona*, mortally wounding the battleship before torpedoes strike the *Oklahoma*. The forty-minute sequence, the film's *raison d'être*, never rises above the level of a computer video game, with explosions randomly going off among modern destroyers and computer generated warships. Nor do the filmmakers divide the attack into two waves, as actually happened.

Then there is the separation of the cinematic battleships by fifty yards, instead of being moored to railing, as was the case on December 7. Bay ignored history because he liked the visual images of Japanese torpedo planes flying between the ships at deck level. This is not only absurd, but the sequence vitiates the bravery of Dorie Miller, the first black man to receive the Navy Cross, for manning a machine gun and shooting down two enemy planes. In fact, Miller did not shoot down any planes as was portrayed. He actually shot at the ships across the way, attempting to hit the Japanese planes as they skimmed a few feet above the water.

The portrayal of President Franklin D. Roosevelt lacks credibility entirely, although both

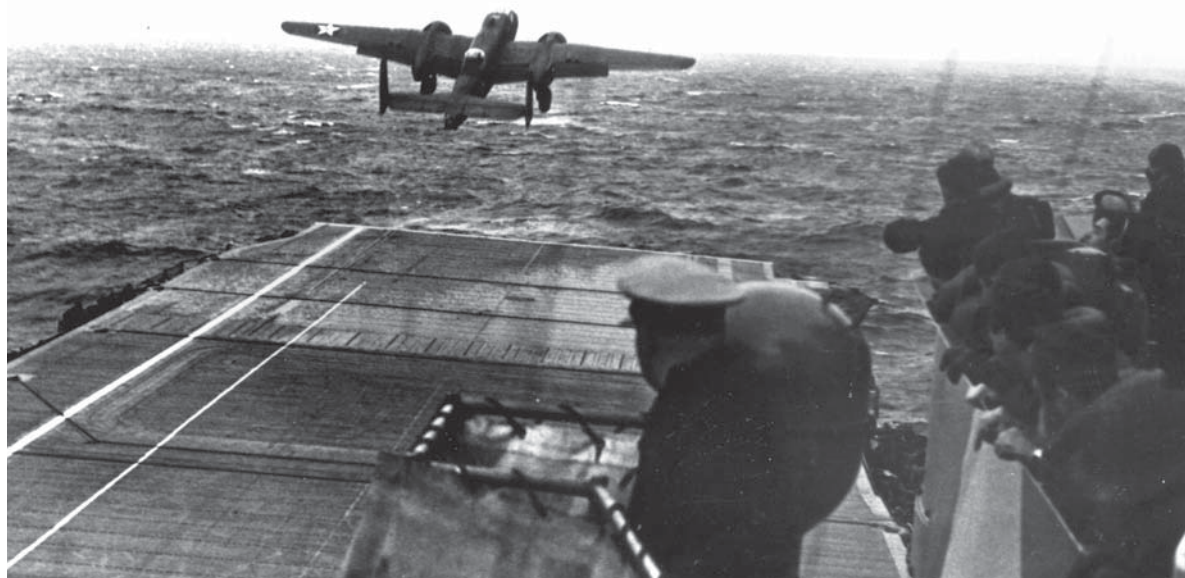
Bay and John Voigt, who played the President, claimed to have read widely in order to portray events accurately. FDR smoked using his signature cigarette holder, although the rest of the film remains smoke free. Although the actor claimed he had watched an interview with a butler who had been in the room when Roosevelt received the news of the attack, the filmmakers cannot even get that right. Instead, Bay creates a scene in which FDR receives news of the attack in some huge, unidentified hall rather than in the White House study playing with his stamp collection, which he was actually doing at the time. Moreover, Voigt paraphrases part of the war message to the Congress, even though the actual words would have taken up no more screen time. And of course, FDR never could have levitated out of his wheelchair and stood unaided, as shown in the movie.

In fact, *Pearl Harbor* goes wrong from the opening sequence in 1923. The crop-dusting Stearman, which the heroes as young boys managed to get airborne, actually did not fly until 1929. While taking a routine flight physical, young Army Air Corps pilots, Ben Affleck as "Rafe," and Josh Hartnett as "Danny," meet Kate Beckinsale as "Evelyn," a Navy nurse. Even though the Pentagon historical advisor, Jack Green, told director Bay that Army personnel would never go to a Navy hospital for any kind of examinations, Bay insisted that Evelyn and her friends must be Navy nurses.

But then, if the film had any commitment to accuracy, Rafe would never have been in the Army Air Corps in the first place since he was dyslexic. Nor would one of the heroes' friends have become a flier since he had a serious stutter. In 1941, only the best men became Army pilots. Later, when flying in the Eagle Squadron in England, Rafe somehow managed to write long, beautiful love letters to Evelyn and read her many responses.

The very existence of the two fictional heroes as Doolittle raiders remains at the heart of the film's historical problems. Jimmy Doolittle selected only volunteers from the one existing B-25 bomber group and all the crews had trained together. By inserting Rafe and Danny and two of their friends as their co-pilots into the mission, Bay and Bruckheimer effectively erased from history four truly brave men. The remaining survivors of the attack on Japan in April 1942, simply laughed when they learned that fighter pilots were to take part in the cinematic mission, recognizing *Pearl Harbor* for what it was, pure Hollywood. In fact, after reading the script, the survivors expressed grave concern about the portrayal of Doolittle himself. The character whom screenwriter Randall Wallace created bore virtually no resemblance to aviation pioneer and hero Jimmy Doolittle. As written, the colonel, whom Alec Baldwin played in the movie, was to appear as a profane and ignorant blowhard. In one scene, he was even to ask a mission planner, who was calculating fuel consumption with a slide rule, what was the device he was using, although Doolittle had a Doctor of Science degree in aeronautical engineering from MIT.

Takeoff of the Doolittle Raid on April 18, 1942, the first step in an effort to bring the war to the Japanese.



THEY FEARED IT MIGHT CREATE A CONTROVERSY SIMILAR TO WHAT HAPPENED WITH THE ORIGINAL *ENOLA GAY* EXHIBIT

THE COMPLETED FILM DOES CONTAIN A MORE POSITIVE REPRESENTATION OF DOOLITTLE'S CHARACTER.

BRUCKHEIMER AND BAY EXPLAINED THAT THEY SIMPLY WANTED TO GIVE THEIR MOVIE AN UP-BEAT, PATRIOTIC ENDING

Later, he was to make fun of his copilot's crossing himself before the takeoff although Lt. Richard Cole had, in fact, not prayed before the launch. Once the survivors expressed their unhappiness with the portrayal, Pentagon officials advised the filmmakers that a false rendering of Doolittle would anger the survivors. Worse, they feared it might create a controversy similar to what happened with the original *Enola Gay* exhibit at the Smithsonian Institution in 1995. Ultimately, Bay and Bruckheimer sought advice from Col. C. V. Glines, Doolittle's biographer, and the Doolittle family. As a result, the completed film does contain a more positive representation of Doolittle's character. Nevertheless, the film gets very little right about the Doolittle raid.

Why include the attack on Japan in *Pearl Harbor* anyway since it has virtually nothing to do with Pearl Harbor? Without any question, the men who flew the mission deserve a movie which accurately portrayed their training and courage in carrying out one of the most audacious feats in all of military history. And they receive it in the 1944 film *Thirty Seconds over Tokyo*, based on the book of the same name by Ted Lawson, one of the pilots who attacked Japan. In addition, *Purple Heart*, the same year, told a fictionalized story of the bravery of eight of the Doolittle fliers whom the Japanese captured, tortured, tried as war criminals in a sham trial, and then executed.

On their part, Bruckheimer and Bay explained that they simply wanted to give their movie an up-beat, patriotic ending. The attack on Japan offered that potential as well as providing a few more explosions, which had become the key to Bay's directorial success in such movies as *The Rock* and *Armageddon*. In recreating the raid, however, the filmmakers got perhaps one thing right. Doolittle did tell his men that if his plane was damaged over Japan, rather than bailing out and being captured, he would crash into the most

inviting target he could find. According to Colonel Glines, Doolittle did say that to his men before their takeoff.

Otherwise, the filmmakers managed to transport the same mountain first to a fighter base on Long Island, commanded by Jimmy Doolittle, an assignment he never held, and then to Eglin Field in Florida, where it served as the cinematic background to the raiders' training base. Later, aboard the *Hornet*, Doolittle answers a flier's question as to whether any bomber had taken off from a carrier before with a flat, "No." In fact, before the Navy and the Air Corps gave the plan the final approval, two B-25s did take off from the *Hornet* at sea off Norfolk, Virginia.

As the task forces nears the launch point, the movie also has Doolittle telling his men that he has decided to lead the raid, despite objections from Washington. In fact, while "Hap" Arnold initially opposed Doolittle's going along, in a showdown in the War Department in March, Doolittle had convinced his boss that he should fly the mission and so his motivating speech aboard ship remains a cinematic fabrication. Likewise, after a Japanese picket ship spots the American flotilla, the movie shows Doolittle making the decision to take off ten hours before the scheduled launch, when in reality, Admiral William Halsey, aboard the *Enterprise*, ordered the immediate takeoff.

Then there is the portrayal of sailors cutting off broom handles to put into the tails of the bombers in the minutes before takeoff. In fact, broom sticks, as ersatz machine guns, were put into the tails of the planes during the training at Eglin. Once launched, the bombers flew to Japan individually and did not drop their bombs while flying in formation as the film graphically portrays. Likewise, bombs should explode behind a plane after they are dropped, not before the plane reaches the target as occurred in the movie. None of the planes received significant damage from antiaircraft fire

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and no crew member died from wounds received during the attack as happened to Danny's plane in the movie. Nor did any of Doolittle's raiders crash within sight of each other once they reached China as do Rafe's and Danny's planes. But then, the planes did not explode on impact either since they crashed after running out of fuel.

Perhaps the most egregious flaw, both historically and plausibly in *Pearl Harbor*, is the portrayal of Evelyn's listening to the attack in a communications center on Pearl Harbor after convincing an officer to allow her to monitor the raid. In truth, while she knew Danny and Rafe were taking part in a secret mission, she had no way of knowing its purpose or date. The heroes themselves did not learn their target until aboard the *Hornet* at sea and only a very few people in Hawaii even knew about the raid. Roosevelt himself did not receive all the details until a few days before the launch. Moreover, Doolittle had ordered the long-range radios removed from the bombers to save weight. Even if they had remained aboard, they would have been technologically able to transmit back to Hawaii from Japan only in Morse Code, not by voice.

Of course, accuracy, plausibility, and any semblance of cinematic continuity has long disappeared by the time the planes are headed to Japan. The officer who smuggles Evelyn into the communications center—she had saved his life on December 7—tells her the launch will take place in two hours. In fact, Doolittle and his men had already taken off prematurely hours earlier after being spotted and would have completed their attack by the time she had arrived at the center. Moreover, the planes flew under radio silence and did not communicate with each other before, during, or after the attack. In the movie, however, Evelyn does hear the fliers describing the attack. In the next scene, Doolittle tells his copilot he is breaking radio silence and then wishes his men good luck in reaching China.

Do any of these inaccuracies and fabrications matter? Truth matters only to the extent that truth matters. Filmmakers have always claimed that between drama and accuracy, they will always select drama and they have sold the American people the notion that drama is incompatible with truth. However, showing President Roosevelt learning about the Japanese attack while in his study, playing with his stamp collection, seems far more dramatic than showing him receiving the news in a wheelchair in some huge, generic hall. Showing the two separate waves of Japanese attackers would have heightened the drama and created concerns about a third attack as the survivors try to bring order out of chaos. At the same time, the Japanese planes flying in formation and methodically carrying out their mission would have provided far more reality and drama than Bay's random explosions and absurd deck-level attacks between battleships.

Unfortunately, *Pearl Harbor* cannot even get the aftermath of the attack right. Bay has a mass

burial scene in Pearl Harbor after he shows President Roosevelt being informed about the idea for the Doolittle mission—which was not conceived until early January. All the Navy nurses receive Purple Hearts for no apparent reason. Worse, Roosevelt decorates Rafe in the Oval Office rather than pinning the Medal of Honor on Jimmy Doolittle as he actually did.

But then, Bay even fails to create a meaningful love story of his two heroes and their pursuit of Evelyn. If he really wanted to do it right, Danny would not have died after crash landing in China and being beaten, shot, and strung up on a cross, but would have returned to Tennessee with Rafe and Evelyn and all three would have lived together happily ever after. With that said, like *Saving Private Ryan*, which reminded Americans of the sacrifices of their men on D-Day, Pearl Harbor may well serve to honor the brave men and women who lived and died on December 7. From the Defense Department's perspective, the attention the film focused on the Pearl Harbor survivors and all veterans justified the decision to provide the filmmakers cooperation, primarily with access to Pearl Harbor and ships of the inactive fleet moored there. Nevertheless, given the factual and historical problems with the script, even after the revisions to Doolittle's character, the Pentagon may have approved assistance too quickly. Both Bruckheimer and Bay later acknowledged they would not have made the movie if they could not have shot on location in Hawaii. With that leverage, the Navy may well have been able to obtain significant changes in the script that would have made Pearl Harbor more accurate and so would have provided a better understanding of what actually happened on December 7.

On its part, the Air Force provided no assistance to the production apart from some information. Nevertheless, the service's public affairs office in Los Angeles believed the Air Force had received a benefit from the film. As with *Tora! Tora! Tora!* before it, *Pearl Harbor* demonstrated the "lethality of air power," albeit primarily at the hands of the Japanese. However, the film did briefly show how the Royal Air Force had defended England against the Nazi onslaught during the Battle of Britain. And, the Doolittle raid did show how air power carried the fight to Japan, even though Doolittle's planes did little actual damage to the Japanese war machine.

The film may have one other benefit. It reminded younger viewers that on a quiet Sunday morning long ago and far away, those friendly people who sell play stations, video recorders, cameras, and cars to the United States once launched a sneak attack on American territory and its people, who were then at peace with their attackers. On the other hand, the film makes no mention of the three Doolittle raiders, whom the Japanese executed following a show trial. After all, Disney had to think of the ramifications of that truth on the box office in Japan. ■

READERS' FORUM

Opportunities and Perils in the Command of Space

Lionel D. Alford, Jr.

THE HISTORICAL PARALLELS BETWEEN AIR AND SPACE ARE UNCANNY

TODAY, SPACE SYSTEMS ARE UNDERGOING AN OPERATIONAL DEVELOPMENT IN MANY WAYS PARALLEL TO THE GROWTH OF EARLY AVIATION

When the United States Air Force gained its independence on September 18, 1947, the event was as much about how to use the atmosphere to wage war as it was about the new technologies that made war in the air possible.¹ After all, the Air Force never held a monopoly on the use of the atmosphere to wage war and today, the Army, Navy, and Marines still maintain powerful air arms. What made the Air Force unique was its use of the atmosphere and aviation technology to wage strategic warfare. Today, the United States faces a similar question about space. Space provides an arena analogous to the one that confronted policymakers in 1947. Technologies that make possible war in and from space shape perceptions about how to use space to wage war, and as importantly, how to organize forces to wage war from space. The question before policymakers today is: Should the United States create an independent space force, or should the Air Force fully embrace the mission and responsibility of space warfare? Senator Bob Smith wrote: "Ultimately—if the Air Force cannot or will not embrace space power and if the Special Operations Command model does not translate—we in Congress will have to establish an entirely new service."² Right now, without changes to the current way we do business, we will see the establishment of a Space Force—separate from the Air Force.³

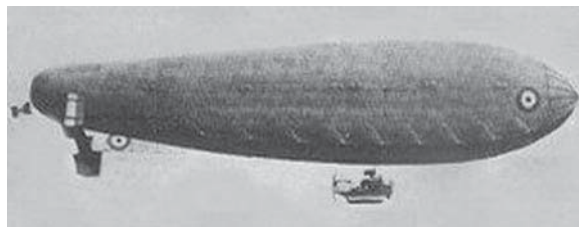
The historical parallels between air and space are uncanny. In the First World War, aircraft were rushed into service as eyes for the ground commander.⁴ Those aircraft included the mighty Zeppelin, observation balloons, and a small but growing force of heavier-than-air craft—the airplane. Reconnaissance was the mainstay and the sole purpose for aircraft at the

beginning of World War I. Only when airplanes could carry weapons did they gain a direct offensive role. Before this, they were more mobile but simply less effective observers and artillery directors than their lighter-than-air brothers.⁵ Yet, after aircraft gained the ability to attack, their inherent maneuverability allowed them to target and destroy observation balloons and Zeppelins. Airplanes took command of the skies and appropriated the reconnaissance mission. Later, when technology introduced radio communications to cockpits, airplanes also took away the artillery direction mission from the lighter-than-air craft. Before the end of the war, airplanes dominated the airspace over the battlefield, and by the Second World War, airplanes had become a significant element of military power.

Today, space systems are undergoing an operational development in many ways parallel to the growth of early aviation. The initial role of space platforms is reconnaissance and communications. This observation and signal role is encapsulated in the description of space as the modern high ground. Space systems enable the ground, air, and naval commander to see and communicate with allies and observe enemy forces, but current space assets are similar to balloons and Zeppelins. They are simply platforms, almost immovable and certainly not capable of offensive "fire and maneuver." U.S. Space Command, just like the early Army Signal Corps has taken the role of the Air Service, while the spacecraft analogue to the aircraft has not yet made its appearance. When it does, the ability to attack and maneuver will change the high ground of space, and current space platforms will become as obsolete as balloons and Zeppelins.

The history of aviation provides another significant parallel between space and the development of aircraft technology. The Wright brothers' first aircraft was a powered glider that took off from an assisted launch platform and landed on skids. The first aircraft was reusable but without its launch facility, could not take off again. In the intervening years most airplanes still require a launch and recovery facility—a runway—but vast improvements in landing gear and airplane capabilities have significantly improved the Wright brothers' initial design. Today's space vehicles also use a launch platform and are recovered via a means different than their launch. All current operational space vehicles take off with an assisted launch and recover in unpowered flight as a glider or via parachute. They blast off in hyper-

(Right and far right) In World War I, these airships were used in a variety of roles.





(Above) The experimental X-15 probed the boundaries of high-speed flight.

THE RACE FOR ATTACK AND MANEUVER IN SPACE IS A DOUBLE-EDGED SWORD

sonic glory and return in ignominious dependence on the vagrancies of the air.

The race for attack and maneuver in space is a double-edged sword: on one side stands the illusive domain of hypersonic flight and on the other is the realm of zero speed flight. The Air Force and the National Aeronautics and Space Administration (NASA) have nearly reached the point of hypersonic flight, but not quite—the X-15 is a museum piece. On the other hand, the Air Force “fears to tread” in the realm of zero speed. Spacecraft have shared these two domains since the dawn of the space age, and in space, the realm of zero speed flight merges with the realm of zero power flight. Zero speed and zero power equate to helicopters, vertical takeoff and landing (VTOL), and gliders; in these disciplines the Air Force has all but given up.

The United States Air Force Test Pilot School (USAFTPS) is not the center for helicopter, VTOL, or turboprop aviation developmental training, rather the United States Navy Test Pilot School is. And, while the USAFTPS trains its students in gliders, in the recent past, the Air Force

has developed no helicopters, no gliders, no zero speed aircraft, and few other low speed aircraft. In fact, until recently, the policy of Air Force Materiel Command's Aeronautical Systems Center was to halt helicopter development and eliminate its helicopter fleet. Fortunately, cooler heads prevailed. Search and Rescue and Special Operations Forces fought to restore helicopter and zero speed development. The HH-60G and the Navy's CV-22 Tiltrotor brought back zero speed aircraft development to its Air Force roots. The Short Takeoff and Vertical Landing (STOVL) Joint Strike Fighter may enable the Air Force to spring back. But the jury is still out on zero speed flight. Because spacecraft historically split the realms of low and high speed flight, the Air Force must explore the return-to-base part as well as the “fire and maneuver” part, and for a while the two may be extremely different. In fact, now, more than ever, space access and recovery systems remain in the low/zero speed realm, for example, the Roton⁶ uses a helicopter reentry and the space lifeboat⁷ uses a paraglider concept. In retrospect, the Air Force should have never given up on the X-15 (air-launched, hypersonic dash, glider landing); briefly, Air Force pilots reached out, touched the face of space, and glided home again. To command space, a space force must master the high speed and the low speed regimes.

We stand at a crossroads, knowing that a Space Force will eventually come into being. But will the Space Force arise from the U.S. Space Command or from the Air Force? My concern is that if we follow the model of history, the Space Force will arise from the U.S. Space Command and the Air Force will forever be sealed away in the earth's atmosphere. However, in the case of the Space Force, the past is similar, but it is not exactly the same.

U.S. Space Command is historically analogous to the Signal Corps, and the Air Force is historically analogous to the Air Corps. The Signal Corps saw aircraft as a means to improve battlefield communications and observation—the new high ground. Thus, the United States entered World War I with the world's largest fleet of balloons and dirigibles. Unfortunately, by then balloons and dirigibles were largely obsolete. Moreover, the U.S. did not possess a single battle-worthy aircraft and had to borrow airplanes from other countries to permit our heavier-than-air arm to participate.⁸ Although the Wright brothers invented the aircraft, no American-built airplane participated in World War I.

The Army Air Forces (AAF) made nearly the same mistake in World War II. At the beginning of the war, the AAF did not possess a state-of-the-art fighter aircraft, but did own the world's best bomber. The leaders of the AAF held a vision of strategic warfare that drove their planning and acquisitions. They saw the atmosphere and aircraft as more than improved communications and observation—they envisioned a new method of warfare. Through that vision, strategic bombing

An experimental rotary rocket.



WE STAND AT A CROSSROADS, KNOWING THAT A SPACE FORCE WILL EVENTUALLY COME INTO BEING



The Space Shuttle heads for space.

TODAY WE ASK: SHOULD SPACE POWER BE PLACED IN THE HANDS OF AN AEROSPACE FORCE OR REMAIN IN THE U.S. SPACE COMMAND?

changed war forever. Fire and maneuver, the hallmarks of offense, characterized the difference between the approach of the Signal Corps and the AAF. The Signal Corps exploited the high ground without an offensive vision, while the AAF captured the high ground and took the fight to the enemy. The AAF's approach succeeded, and their vision won them the right to form the U.S. Air Force.

Today, U.S. Space Command approaches space in ways similar to the Signal Corps' approach. It treats space as the high ground of observation and communications. Few onlookers envision the future of Star Wars-type battles that many aviators foresee. To policymakers, space fire and maneuver is the Space Defense Initiative (SDI)* and other advanced static defenses. These leaders no more imagine the future of hypersonic spacecraft than the balloonist recognized the inexorable coming of the airplane. However, the historical parallel here is uncanny. Just as the Wright Flyer was inevitable in 1903, fully powered takeoff and landing hypersonic spacecraft are certain within this century. The Air Force, industry, and NASA will develop a hypersonic technology capable of transiting space and eventually attaining

* Ballistic Missile Defense (BMD), Airborne Laser, and many other programs were born out of the SDI. I use the term here to refer to all major U.S. space defense and offense programs.

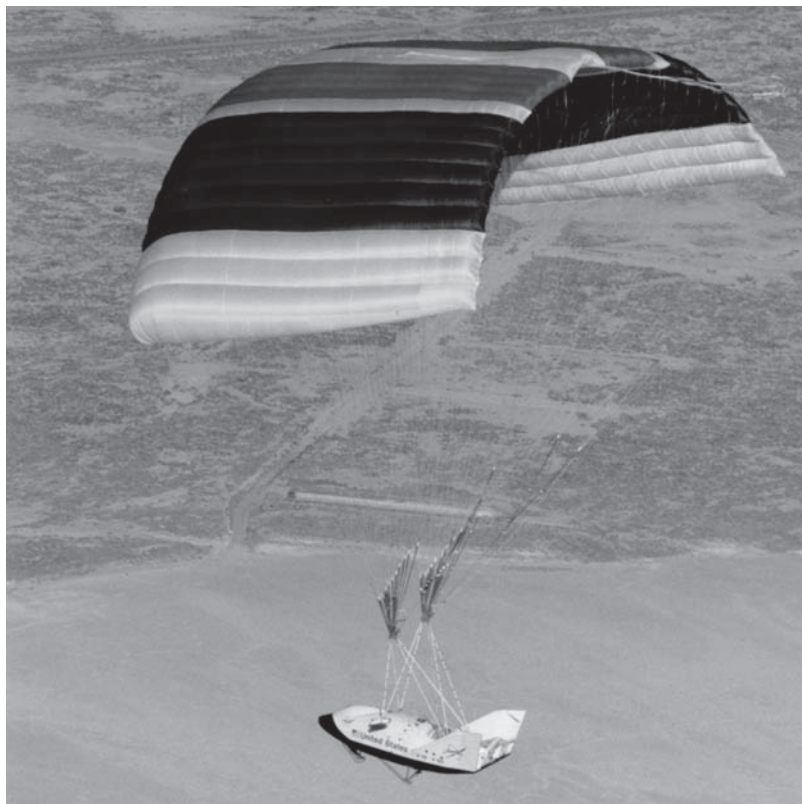
high orbit. These spacecraft will fill the void between the space shuttle and aircraft, and for this reason alone, the Air Force is manned and prepared to fully accept this mission. On the other hand, U.S. Space Command plies its trade in launch, observation, and maintenance, but is neither adequately staffed nor prepared to accept the earth-based hypersonic mission. In a reversal of historic roles, U.S. Space Command, the keeper of the space environment, is comparable to the Signal Corps, while the Air Force, the keeper of the air environment, is comparable to the Air Corps.

Although U.S. Space Command is not prepared to assume the hypersonic spacecraft mission, they possess the mission and mindset of a Space Force; the Air Force does not. Senator Bob Smith wrote, "as I look at the way the Air Force is organized, trained, and equipped, I do not see it building the material, cultural, and organizational foundations of a service dedicated to space power. Indeed, in some respects it is moving backward."⁹ Unlike Space Command, the Air Force does not think of itself as an Aerospace Force. Unlike Space Command, the Air Force has not trained its people in air and space warfare. Unlike Space Command, many in the DoD and United States government do not view the Air Force as an air and space force. And this is where the policy and shortsightedness of an organization may cause policymakers to drive it in a direction where it should not go.

In 1947, the question was: should air power be placed in the hands of the Air Force or remain in the Army? Today we ask: should space power be placed in the hands of an Aerospace Force or remain in the U.S. Space Command? We will live a long time with our ultimate decision.

I believe that the Air Force should incorporate air and space forces. But, how do we convince policymakers and the public that the Air Force is prepared to accept and carry out this role? I propose the following steps:

1. The Air Force should adopt the name of the Aerospace Force. The lack of institutional identification with space hampers our ability to speak authoritatively about space.
2. The Aerospace Force should develop a new uniform or an accoutrement that displays its alignment with space; perhaps a black uniform with sky-blue piping on the shirt and a sky-blue stripe on the pants. Or the change might be as simple as adding a space pocket badge. The change need not be radical, but it should be eye-catching and unique.
3. The Aerospace Force must recapture the realm of zero speed flight. For too long this realm has been in the hands of the Navy and the Army. The Aerospace Force must accept the full responsibilities for every inch of the aerospace from ground to infinity and from zero velocity to light speed.
4. The Aerospace Force must reestablish its leadership role in hypersonic and space-based research and development. On October 12, 1961, the Air Force renamed the Test Pilot School, the



(Above) The X-38 is only the latest in a long line of experimental aircraft.

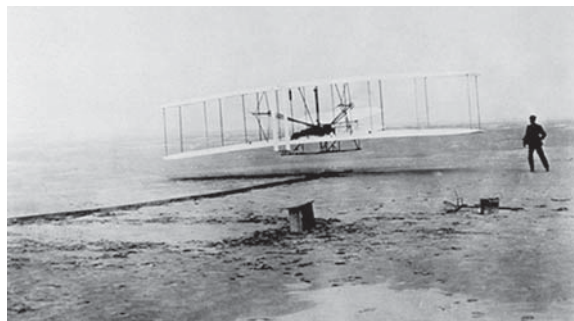
(Right) Aircraft developments all stem from the successful flights like this of the Wright Brothers.

Aerospace Pilot School¹⁰ and adopted a curriculum designed to train future astronauts and space research aviators. A decade later the name reverted to the Test Pilot School.¹¹ The Aerospace Force must recapture its role in space test and evaluation, and the place to start is in training. Likewise, the Aerospace Force should expand its research and development into space. Space must balance the air in aerospace.

*Off we go into the twilight splendor,
Blasting off, up toward the sun;
Here they come zooming to meet our thunder,
Orbiting high, give 'er the gun! (Give 'er the gun now!)
Down we dive, spouting our flame from under,
Off with one helluva roar!
We live in fame or go down in flame. Hey!
Nothing'll stop the Aerospace Force!*

5. The Aerospace Force should stop thinking in terms of "if" it will become a space force and begin thinking in terms of "when" the change will occur.

Space is not the final frontier, but at the beginning of the twenty-first century, we stand before this frontier. We see satellites, spacecraft and space systems, and aerospace vehicles transiting from earth to the heavens. We have the opportunity to reach out and grasp the golden ring that is aerospace. The actions we take today will determine whether we remain a relevant force in both the air and space. If history is a guide, the Air Force should become our nation's Aerospace Force. ■



Lt. Col. Lionel D. Alford, Jr. is the Chief, Airframe, Propulsion, Avionics, and Electronic Warfare Test and Evaluation Team at Air Force Materiel Command, Wright-Patterson AFB, Ohio. He is an Air Force experimental test pilot with over 3,600 hours in more than forty different aircraft and is a member of the Society of Experimental Test Pilots. Lt. Col. Alford has served in worldwide military operations as a member of three different operational combat squadrons. He is a graduate of the Air Ground Operations School, the Combat Aircrew Training School, the All Weather Aerial Delivery Training School, Defense Systems Management College, Air Command and Staff College, Air War College, and the USAF Test Pilot School. He has been an instructor on three aircraft types and the senior evaluator in one. He holds a master's degree in mechanical engineering from Boston University and a bachelor's degree in chemistry from Pacific Lutheran University.

NOTES

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2. Smith, Senator Bob. "The Challenge of Space Power," *Airpower Journal*, Spring 1999, p. 38.
3. Smith, James M.. *USAF Culture and Cohesion: Building an Air and Space Force for the 21st Century*. USAF Academy, Colo.: USAF Institute for National Security Studies, 1998; Smith, "The Challenge of Space Power," p. 34.
4. Kennett, Lee B. *The First Air War, 1914-1918*. New York: The Free Press, 1991, p. 30.
5. *Ibid.*, p. 23.
6. Binnie, Brian. *Preliminary Flight Test of the Roton ATV*. Lancaster, Calif.: Society of Experimental Test

- Pilots Symposium Proceedings, 1999, p. 194.
7. Reed, Donald and Altman, Scott. "Flight Test Update of the X-38 Experimental Crew Return Vehicle." Unpublished. Society of Experimental Test Pilots Symposium Proceedings, 1999, p. 155. NASA Public Affairs Office, "X-38 Atmospheric Vehicle Completes First Unpiloted Flight Test," Release 98-10, NASA Dryden Flight Test Center, Edwards AFB, Calif., 1998.
8. Kennett, p. 215.
9. Smith, Bob, "The Challenge of Space Power," p. 34.
10. *The United States Test Pilot School, 50 Years and Beyond — The United States Test Pilot School: Its Origins, Its History, and Its Future*, 1994, p. 244.
11. *Ibid.*, p. 246.

Aces in Command: Fighter Pilots as Combat Leaders. By Walter J. Boyne. Dulles, Va.: Brassey's, Illustrations. Appendices. Bibliography. Index. Pp. xv, 249. \$26.95 ISBN 1-57488-310-0.

Using the biographies of four aces who also commanded squadrons or wings, Walter Boyne, the former director of the Smithsonian's Air and Space Museum, explores the essence of the ace as well as the attributes of successful, combat leadership. While many books have looked at aces, this is the first study of aces as commanders.

For his studies, Boyne chooses Eddie Rickenbacker, America's ace of aces during World War I and the commander of the 94th Pursuit Squadron; Hubert Zemke, the pugnacious commander of the 56th Fighter Group during World II, one of the top scoring fighter outfits in the European Theater; Frederick Blesse, a high-scoring Korean War ace, and later the commander of the 366th Tactical Fighter Wing in Vietnam; and last but certainly not least, Robin Olds, a pilot who achieved 13 victories in World War II, and then went on to score an additional four in Vietnam while also commanding the Air Force's top MiG killing outfit of the period, the 8th Tactical Fighter Wing.

As aces, these men all scored above beyond the five kills required for that title. All were highly aggressive individualists who embraced danger on every mission. All were also athletes of one sort or another during their youths: Rickenbacker drove race cars, Zemke boxed, Blesse golfed, and Olds played football. While Boyne stops short of defining universal characteristics of the ace, his biographies do enable him to conclude that aces are both born and made and that the key elements to their success were the "warrior gene, hard work, and dedication to the mission." He also points out that the greatest fighter pilots are not necessarily the ones who shoot down the most planes, but the ones who make their organizations more effective, and thus do more damage to the enemy.

Each of the men featured in this volume achieved the latter goal by striving to teach other pilots what they themselves had mastered: the art of the aerial kill. As combat leaders, they excelled because they had the ability to explain complex aerial maneuvers and technology to others and the charisma and combat prowess to back up their lessons with real life experience. In short, each possessed a rare combination of talents: a warrior ethos, charisma, and superb teaching skills.

Unfortunately, the talents that made them great combat leaders did not easily transfer to post-war careers. In the case of Olds and Zemke, their outspokenness and rugged individuality tended to ruffle feathers in the peacetime military bureaucracy. Fighter pilot excesses also hurt careers. Blesse's womanizing sealed his fate quite

early and Old's drinking caused him problems. Only Rickenbacker managed to run a large peacetime bureaucracy with any degree of success. His stewardship of Eastern Airlines made it a very profitable airline for many years, although he later made some poor judgements in regard to equipment that ultimately forced him to retire.

While there are many lessons for today's services in examining how combat leaders transition from war to peacetime assignments, Boyne chooses not to dwell too much on this issue, preferring instead to focus on their achievements in combat. In this regard, his book excels. Not only does he capture the personalities of the aces of whom he writes but as a former Air Force pilot himself, he has knack for explaining the technology and tactics of aerial warfare. Military pilots, aviation enthusiasts, and air power historians alike will find much of interest in this compelling volume.

Dr. John Sherwood is the author of Fast Movers: Jet Pilots and the Vietnam Experience (New York: Free Press, 2000), and a historian with the Naval Historical Center.



Mustang Designer Edgar Schmued and the P-51. By Ray Wagner. Washington, D.C.: Smithsonian Institution Press, 1990. Photographs. Notes. Appendix. Index. Pp. 226. \$19.95 ISBN 1-66098-994-7.

From the title, a prospective reader might get the idea that this book is only a biography of Edgar Schmued, the designer of the world famous North American P-51 Mustang, one of the best known aircraft, if not the most famous, of World War II, a conflict that produced many famous aircraft. Fortunately, *Mustang Designer* is more than that. It is also about Schmued's contributions to the design of several of America's best known jet fighters, especially the F-86 Sabre and the F-5 Freedom Fighter, the "inexpensive" and "low tech" jet sold all over the Free World in the 1960s (and known also to thousands of U.S. Air Force pilots as the T-38 Talon, an aircraft still used for advanced jet flight training). Additionally, this book is also great aeronautical history, covering the development of American fighter aircraft first in the transition from fabric-covered biplanes of World War I to the all-metal monoplanes of the 1930s, the increased development and production of fighters during World War II, and finally to the supersonic jet aircraft of 1950s and 1960s. Each of these stories, in itself, has the potential to be an interesting book. The author weaves these themes around Schmued's life into an interesting book for both the general and technical reader.

Wagner, a retired history teacher, is currently an archivist for the San Diego Aerospace Museum. He used tapes and a manuscript, produced by Schmued; and original documents, held by the museum and the Air Force Historical Research Agency, to produce a well written and generally understood biography and aviation history. Through reading of whatever engineering books his father could afford, Schmued taught himself about engineering. He first worked as an engineer in post-World War I Germany and produced a number of inventions. Because of Germany's economic difficulties and political instability, Schmued immigrated to the United States. He first worked for an aircraft company in New Jersey, but ultimately went to work for North American Aviation in California in the 1930s. At that time fighter aircraft were changing from the wood, fabric, and wire biplanes of World War I to the all-metal monoplanes that would characterize the frontline fighters of 1939. In 1940, Schmued first began work on the airframe design that, when married with the British Rolls-Royce Merlin engine, would become the famous P-51 Mustang. After 1945, Schmued greatly assisted in the postwar development of several well-known American jet fighters through the 1950s and into the 1960s. After Schmued's death on June 1, 1985, the flight of an F-86 and six P-51s for the memorial formation, flown on June 15, 1985, was a fitting testament to his aviation legacy.

Given the presence of at least two major themes, one might think that Wagner wanted to produce a biography of the man who designed several famous American aircraft, but could not find sufficient material to do so. As a result, he chose to tell story of this self-taught German engineer within the greater story of the historical development of fighter aircraft as their designs changed and advanced from the 1930s through the 1960s. Regardless, Wagner still produced a very good historical work that would find a welcome place on the shelf of anyone interested in aviation history. I personally found the author's approach beneficial in understanding how many of America's best known fighters developed during a time of great technological change and international conflict. In addition to its historical significance, the book reads very well in terms of pacing and on a technical level. Additionally, it is worth purchasing if only because of the numerous well reproduced photographs.

Lt. Col. Robert B. Kane, USAF, Air War College, Maxwell AFB, Alabama



The Genesis of Flight: The Aeronautical History Collection of Colonel

Richard Gimbel. By Tom D. Crouch, *et al.* Colorado Springs, Colo.: The Friends of the United States Air Force Academy Library in association with University of Washington Press, 2000. Illustrations. Appendices. Bibliography. Index. Pp. 345 plus CD-Rom. \$60.00 ISBN: 0-295-97811-2

This book is a work of art. It is purportedly a catalog of the Gimbel Collection of aeronautical history that is located at the Air Force Academy in Colorado Springs. In truth, it is far more than that.

Richard Gimbel, a member of the family that established the chain of department stores of that name, was born to wealth. Fortunately, he was also extremely intelligent, well educated, inquisitive, and energetic. This combination led him into the field of collecting. Initially, he satisfied his literary tastes, amassing large and valuable collections of the works of Thomas Paine, Charles Dickens, and Edgar Allen Poe. As a result of his service as colonel in the Army Air Forces during World War II, Gimbel began to collect aeronautical books, manuscripts, prints, and memorabilia. Realizing that any collector needs to focus, so as not to be overwhelmed by material, Gimbel concentrated on lighter-than-air flight and aeronautics up to 1914.

The result was perhaps the most extensive and valuable collection of its kind in the world. Upon his death in 1970, Gimbel willed it to the Air Force Academy, which built a special room to display this magnificent collection in its Cadet Library.

Regrettably, the richness and scope of this collection has been unappreciated over the past three decades, largely because few knew of its existence. *The Genesis of Flight* will remedy that situation.

After an outstanding introductory essay by Tom Crouch that gives a masterful overview of the prehistory of flight, a number of early aviation experts examined the Gimbel Collection and selected representative samples from six categories: books, manuscripts, prints, seals, numismatics, and "other holdings." Each item selected is displayed in a color photograph along with a description of its importance. The photos are beautifully done, and the descriptions are excellent. Attempting to select the 350 or so representative items from the 20,000 in the collection was no doubt difficult.

Yet, the items chosen for display serve as a history lesson of dreams of flight from all over the world. The oldest items are cylindrical seals from ancient Mesopotamia, dating from 2700 B.C. The oldest printed book in the collection is from 1489 and relates a mythical tale of Alexander the Great traveling the heavens in a chariot drawn by winged griffins. For the next four centuries man dreamed, fantasized, and soberly speculated on flight. These thoughts and visions are represented in works by Samuel Johnson, Francesco Lana de Terzi,

and Alfred Tennyson, etchings by Charles Le Brun, and novels by Cyrano de Bergerac. Also displayed are manuscripts such as the handwritten first draft of *The Argonauts of the Air* by H. G. Wells, and original letters written by aviation pioneers like Otto Lilienthal, Graf Zeppelin, and the Wright Brothers. The section on aeronautical prints is especially impressive. Reproduced in color, they depict the earliest balloon ascents and disasters, as well as early attempts at manned gliders, ornithopters and aircraft.

Besides the sheer beauty of *The Genesis of Flight*, the authors have also succeeded in educating the reader on the great technical challenges faced by early aeronauts and then airmen. Early balloons were flimsy and dangerous affairs, often catching on fire or ripping open with disastrous results for the passengers. Heavier-than-air flight presented special problems: the two most significant being the need for a powerful and reliable, yet very light, motor; and a method for maintaining directional control. The book details many of the failed attempts to solve these two problems, and culminates with the solutions devised by the Wright Brothers in 1903.

One of the more enjoyable parts of the book is the inclusion and description of items, such as novels by Jules Verne, Wells, and the Tom Swift series, as well as whimsical magazine covers, posters and sheet music—one of which poses the immortal question: "Won't You Come Up and Spoon in Coey's Balloon?" One interesting insight provided is that the famous Brazilian aeronaut, Alberto Santos-Dumont, was so air-minded he ate his meals from a table and chair suspended from the ceiling of his apartment. Dedication is to be admired.

This is an unusual type of book to review. Pretty coffee-table books, especially ones that are largely catalogs, seldom are useful for more than occasional desultory scanning. *The Genesis of Flight* is far different, and it is difficult to avoid superlatives when describing this outstanding effort. It is a true treasure. One can only hope it will enlighten more people to the size, importance and richness of the Air Force Academy's Gimbel Collection, prompting them to see and use it in person.

Col. Phillip S. Meilinger, USAF (Ret.), is the deputy director of the AEROSPACENTER at Science Applications International Corporation in McLean, Virginia.



American and British Aircraft Carrier Development, 1919-1941. By Thomas C. Hone, Norman Friedman, and Mark D. Mandeles. Annapolis Md.: Naval Institute

Press, 1999. Notes. Photographs. Bibliography. Index. Pp. 248. \$37.95 ISBN: 1-55750-382-6

Naval aviators have tended to overstate the conservatism of "battleship admirals" during the 1920s and 1930s, nourishing the myth that the senior ranks of the navy were dominated by a "gun club" that stubbornly resisted all developments in naval aviation. Hone, Friedman, and Mandeles take issue with this accepted wisdom, pointing out that the admirals "spread their bets," nurturing naval aviation even while seeking to maintain the proven naval weapon system of the period, the battleship (p. 4). Focusing on the two leading navies of the interwar period, the Royal Navy and the U.S. Navy, the authors examine and compare how each navy adapted to and incorporated naval aviation during the interwar period. The authors situate their study within the broader debate over military innovation and revolutions in military affairs.

The study tackles the subject of innovation and naval air power by approaching the issue at three levels: the institutional level, the organizational level, and the individual level. This conceptual framework constitutes one of the monograph's main strengths, clearly laying out both how and why the two navies diverged in the development of carrier aviation. Institutionally, the study examines the "rules" that governed behavior, ranging from formal contracts, regulations, and laws to informal codes of behavior. At the organizational level, the authors examine the organizations involved in the development of naval aviation, ranging from naval bureaus and schools to government agencies, political parties, and interest groups. Lastly, the authors assert that the individual could and did shape both institutional assumptions and organizational behavior.

Hone, Friedman, and Mandeles analyze the development of carrier aviation in the U.S. Navy before turning to an examination of the Royal Navy's Fleet Air Arm. Chapter 1 "The Early Years," provides a good overview of the infancy of naval aviation in the U.S. Navy, drawing heavily on George van Deurs, *Wings for the Fleet* (Annapolis: Naval Institute Press, 1966) and Clarke Reynolds, *Admiral John H. Towers: The Struggle for Naval Air Supremacy* (Annapolis: Naval Institute Press, 1991). During these early years, the institutional framework of codified experience and theory was primitive at best, with individuals such as civilian pilot Eugen Ely (first to take off and land from a ship), Lt. T. G. Ellyson (U.S. Navy's first pilot), Capt. Washington Chambers (chief aviation advisor to the secretary of the Navy), Lt. Cdr. Henry Mustin and Lt. John Towers (commander and executive officer of new aviation training center in Pensacola) playing

critical roles in experimenting, adapting, and incorporating the aircraft into the U.S. Navy. Both organizationally and institutionally, World War I accelerated this trend as the U.S. Navy observed and learned from the Royal Navy. Following the war, the Navy's General Board recommended that "a naval air service must be established, capable of accompanying and operating with the fleet in all waters of the globe." In 1920, Congress appropriated funds to convert the collier *Jupiter* into an aircraft carrier (USS *Langley*, CV-1).

In chapter two, "Great Risks, Great Achievements", the authors examine the interaction between institutions, organizations, and individuals as the U.S. Navy deliberated how aviation should be developed and incorporated during the 1920s. While paying due attention to the controversy surrounding the *Indiana* and *Ostfriesland* bombing trials (October 1920 and June/July 1921) and Billy Mitchell's campaign for an independent air force, the authors focus on the interaction between the Naval War College, the newly established Bureau of Aeronautics, and the Fleet. They contend that sustained and creative interaction between these organizations and associated individuals (William Sims at the War

College, William Moffett and Henry Mustin at the Bureau of Aeronautics, and Joseph Reeves and John Towers in the fleet) created an environment favorable to innovation. This section provides numerous examples that illustrate the synergistic benefits of cooperation across narrow organizational boundaries, as ideas war-gamed at Newport were tested in fleet exercises which in turn drove thinking at the Bureau of Aeronautics and at the War College.

Chapter three "Fleet Carriers—or Fleets of Carriers" continues this multi-tiered examination of U.S. naval carrier aviation through the 1930s. Hone, Frideman, and Mandeles contend that the U.S. Navy's failure "to develop the concept of a strategically mobile, aggressive fleet of fast carriers" during the 1930s had less to do with institutional resistance and shortsightedness than with other factors. They persuasively argue that the following factors slowed doctrinal innovation during this period: the small number of carriers; the growing range and ordnance load of seaplanes; the growing power, weight, and size of carrier aircraft; and the extreme vulnerability of carriers. Rather than lambasting the U.S. Navy for covering its bets by continued support of the battleship, the

authors hold that the navy pursued a "sensible approach to the problem of uncertainty and ...a kind of compromise among different—and opposed—views of the future of naval warfare."

Turning to the dynamics of innovation and the development of carrier aviation in the Royal Navy during the interwar years, the authors provide a significantly shorter and less detailed analysis. This somewhat unbalanced approach is surprising, as the authors note that the Royal Navy had been the only navy to actually operate carriers in the First World War. At the conclusion of that war, the Royal Navy was far in advance of any other navy in both operational experience and construction design, and both the U.S. Navy and the Japanese Imperial Navy recognized the Royal Navy's lead in carrier aviation. Readers may wish to consult Geoffrey Till's *Air Power and the Royal Navy, 1914–1945* (London: Jane's Publishing, 1979) as well as co-author Norman Friedman's *British Carrier Aviation* (London: Conway Maritime Press, 1988) for an expanded treatment of this point. Nonetheless, Hone, Friedman, and Mandeles provide an excellent overview and summary of how and why the Royal Navy's Fleet Air Arm fell from its premier position

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in 1918 to a distant third place at the outset of the Second World War. They again challenge accepted wisdom, noting that while the formation of the Royal Air Force had a major detrimental impact on the Royal Navy's aviation community, air-mindedness did not entirely disappear in the Royal Navy. The Fleet Air Arm's failure to fully exploit naval aviation's promise and potential "can be laid largely to the absence of interacting organizations that would have allowed the proper level of assessment of professional technical advice within the Royal Navy." In short, the Royal Navy failed to establish the sort of cooperative, synergistic feedback loop that characterized the relationship between individuals, organizations, and institutions in the U.S. Navy during that period.

The book concludes with a thoughtful "Analysis" section summarizing and further developing the authors' findings. The section provides an excellent comparative summary of how individuals, organizations, and institutions in the United States and Great Britain interacted to create a more or less favorable environment for the development of carrier aviation during the interwar years. Far from being merely a matter of "vision," the authors contend that innova-

tion depends on having both organizations and procedures in place that turn ideas into programs and then realistically test the products of those programs.

Hone, Friedman, and Mandeles' study is a valuable addition to the bookshelves of those interested in the issues of technology, innovation, aviation history, or naval history. While largely based on secondary sources, the study moves past narrative histories of aviation in the U.S. Navy and Royal Navy as it skillfully plumbs the essentials necessary for innovation in general. Its clear organization, thoughtful analysis, and broader perspective will interest and inform both students of the past and those concerned with innovation in the present day.

Dr. Douglas Peifer, Dept. of International Security and Military Studies, Air Command and Staff College, Maxwell AFB, Alabama.



From Whirlwind to MITRE: The R&D Story of the SAGE Air Defense Computer. By Kent C. Redmond and Thomas

M. Smith. Cambridge, Mass.: The MIT Press, 2000. Tables. Diagrams. Illustrations. Photographs. Notes. Bibliography. Index. Pp. vii, 535. \$49.95 ISBN: 0-262-18201-7

For a quarter century, from the late 1950s to the early 1980s, the remarkably complex Semi-Automatic Ground Environment (SAGE) system continuously surveyed continental air space to detect, identify, and destroy any enemy aircraft attempting to attack North America. The first military command and control system to employ digital computers, SAGE became a prototype for all subsequent on-line, real-time systems—military and civilian—and a laboratory for the development of many of the computer programming concepts that would revolutionize the software industry. Many features now taken for granted were first realized in SAGE: automated acquisition in real time of digital data from a large number and wide variety of sources; digital transmission over telephone lines; centralized data processing with remote input-output and display devices; parallel processing in a geographically dispersed network of computers; on-line, nearly instantaneous access to a common data base for many simultaneous users; and dynamic, comput-

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er-driven displays. When fully deployed in 1963, the system encompassed the entire United States and included twenty-four SAGE Direction Centers and three SAGE Combat Centers, each linked through long-distance telephone lines to over 100 inter-operating air defense elements.

In their recent book, titled *From Whirlwind to MITRE*, senior historians Kent Redmond and Thomas Smith provide an organizational and social history of the Air Force-sponsored development of SAGE technology during the 1950s. Their story begins with a December 1947 letter signed by Air Force Vice Chief of Staff General Hoyt Vandenberg to Vannevar Bush, chairman of the newly created Defense Research and Development Board, deploring the nation's lack of an air warning system. It proceeds in short order to the distribution among influential officials, in autumn 1948, of a report written by Jay Forrester and his Project Whirlwind associates at MIT, who touted possible application of the digital computer to military needs. Redmond and Smith have culled an impressive quantity of primary documents from the MITRE archives and have drawn otherwise unobtainable insights from numerous interviews with project participants. The result is an

intricately detailed and amazingly complex explanation of the research and development process that led to fielding in 1958 the heart of the SAGE system—the AN/FSQ-7.

While the technical aspects of developing the AN/FSQ-7, the first computer with an internal memory consisting of magnetic cores, receive considerable attention, the authors concentrate more on the roles and relationships among key individuals and institutions—military and civilian—involved with the project. Names like Jay Forrester, George Valley, F. Wheeler Loomis, Colonel Albert R. Shiely, Norman Taylor, and Jerrold Zacharias take on appropriate levels of significance as the story unfolds. Entities such as the Ad Hoc Panel on Air Defense, MIT Radiation Laboratory, Air Defense System Engineering Committee, Lincoln Laboratory, Air Force Cambridge Research Center, University of Michigan, and the SAGE Test Committee fit into their proper places in the puzzle. In the end, Redmond and Smith render understandable the procession in 1959 of a majority of the professional staff from Lincoln Laboratory's Division 6 into The MITRE Corporation, a new systems engineering venture that involved SAGE weapons integration.

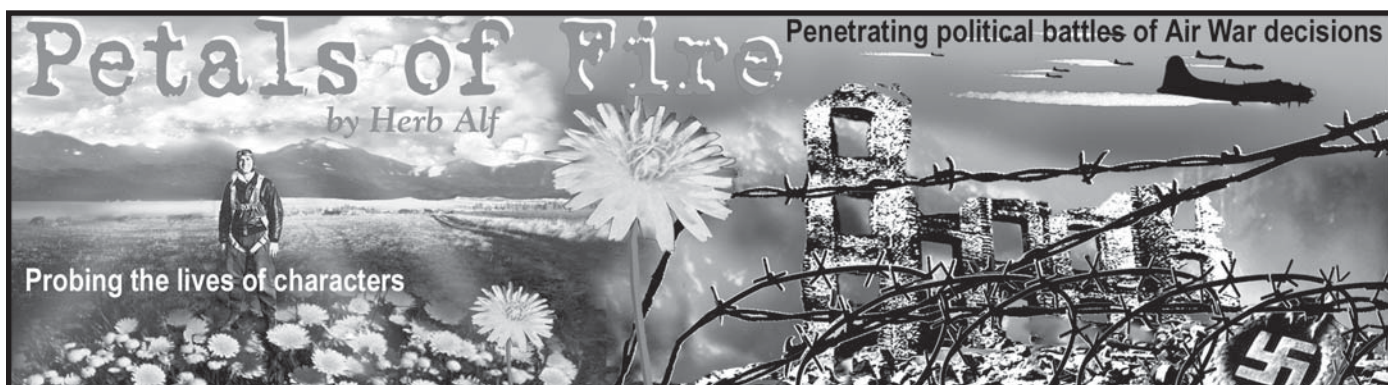
Anyone interested in the history of air defense or electronic computing should acquire this book. It is a scholarly milepost in the effort to trace the roots of America's computer industry as well as the importance of large-scale R&D programs in the preservation of our national security. One can only hope that an equally good history of SAGE air defense operations and system evolution, one carrying the story forward from 1958 to 1983, will soon appear.

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



The GI Generation: A Memoir. By Frank F. Mathias. Lexington: The University Press of Kentucky, 2000. Pp. xiii, 267. \$25.00 ISBN: 0-8131-2157-4

Frank Mathias, an historian and retired college professor from the University of Dayton, presents a very appealing portrayal of his early life, growing up in Northeastern Kentucky. It is a tale of life in two Kentucky towns, his mother's Maysville, an Ohio River town of 7,000 and his father's



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-Richard G. Davis, Air Force History Support Office, Washington, D.C.

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Carlisle, a rural farm community of roughly 1,500 whose only industry was a walnut crushing enterprise that employed ten women. With relatives living at both locations, Mathias's summer visits to Maysville not only renewed his association with relatives, but also garnered new acquaintances and an array of new experiences, many provided by the mighty Ohio River.

Mathias's conception of his *GI Generation* focuses upon the men born between 1910 and 1927, some of whom could recall the roaring twenties and all of whom experienced the Great Depression. It was these men who had learned of their fathers' horrendous Great War—fought “to make the world safe for democracy”—who would fight and die in World War II. This book is not about war, but about the childhoods of some of the men who fought in it.

Born in 1925, Mathias was brought up Roman Catholic, a distinct minority denomination in his home town. Only eighty Carlisle citizens belonged to the Catholic parish; it was too small to support a parochial school. The author's elementary and high school education was fostered by the public school system. When Mathias entered high school, he realized that his education did not compare well with that of his friends from larger city schools. Carlisle had no town library and the high school library owned only 200 books. Moreover, the high school did not offer chemistry and the mathematics curriculum did not extend beyond geometry. Although he was aware

that “better” schools ventured into trigonometry, Mathias admitted that he was a less than enthusiastic student who did not seek the extra challenge.

His father, “Lucky,” a wholesale food salesman, supplemented his son's education on day and occasional overnight work trips. “Lucky” knew the countryside, with its smattering of winding paved and dirt roads. An expert fisherman, he knew and worked remote fishing holes, while his son learned the area and its people. Food was always plentiful in depression-era Carlisle. Farm goods and private gardens provided an abundant sustenance that did not always exist in the larger cities. Money was uniformly scarce during those years and goods for service was the norm. On the plus side, the author and his teenage friends enjoyed a unique sense of freedom, adventure, and fun. Although the youths sometimes got into trouble, they gained much of life's learning experiences through sharing those moments with peers.

Mathias readily admits that he was no athlete. Neither he nor his friends played sandlot baseball, and they had no idea who Grover Cleveland Alexander was when the old man visited their high school and played catch with them afterwards. (Alexander, one of baseball's greatest pitchers won 373 games and pitched 90 shutouts from 1911 to 1930). If Mathias' had heroes they were the big bands of the era. As a freshman he tried out for the football team and after twice being run over in practice by the team's starting

fullback, Mathias opted for the band. Mathias credited his music with saving his life during the war. A saxophonist, he played in his high school band and performed gigs with a pop group at various proms and formal dances. As the war claimed more young men he got the luckiest break of his life when he auditioned for a professional big band, the “Kavaliers.” From January to August 1943, he performed overnight gigs with this group and earned invaluable experience, and for the time, fabulous money. Upon entering the Army in August 1943, his musical skill earned him assignments with various Army bands throughout his nearly three-year stay in the Army.

Scattered throughout the text are amusing stories and entertaining characters, written in an easy and flowing prose. But there are also the sobering moments when Mathias relates that the boys with whom he is playing will die a few years hence in a battle in Germany or on some remote Pacific island.

I believe that this book will endure the passage of time, both as an historical memoir and a social history. One hundred years from now, readers seeking to learn about the forms of entertainment, education, and aspirations of the *GI Generation* of young men who fought in World War II will turn to Mathias's work for many of the answers.

Dr. George M. Watson, Jr. Air Force History Support Office, Bolling AFB, Washington, DC.

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

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

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

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Books Received

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Damon, Thomas D. *Introduction to Space: The Science of Spaceflight*. Malabar, Fla.: Krieger Publishing Co., 2001. [Third Edition, Original 1989 Orbit Book Co.] Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xviii, 276. \$57.50 ISBN: 0-89464-065-8

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Elder, Donald C. and Christophe Rothmund, eds. *History of Rocketry and Astronautics: Proceedings of the Twenty-Eighth and Twenty-Ninth History Symposia of the International Academy of Astronautics, Jerusalem, Israel, 1994 and Oslo, Norway, 1995*. [AAS History Series, Vol 23; IAA History Symposia, Vol. 15] San Diego, Calif.: American Astronautical Society, 2001. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xiii, 552. \$60.00 ISBN: 0-87703-478-8

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The 41st annual **Western History Association Conference** will be held in San Diego, California. This year's theme is "The American West as Living Space." Contact:
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(505) 277-5234, Fax 277-6023
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OCTOBER 22-25

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Dr. Larry E. Tise, Symposium Director
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OCTOBER 28-NOVEMBER 1

The **Association of Old Crows'** 38th Int'l Conference and Exhibition will be held at the Omni Shoreham Hotel in Washington, DC. Contact:
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1000 North Payne St., Suite 300
Alexandria VA 22314-1696
(703) 549-1600, Fax 549-2589
e-mail: cwood@crows.org
website: <http://www.aochq.org>

NOVEMBER 8-11

The **History of Science Society** will hold its annual meeting in Denver, Colorado. Contact:

History of Science Society Executive Office
University of Washington
Box 351330
Seattle WA 98195-1330
(206) 543-9366, Fax 685-9544
e-mail: hssexec@u.washington.edu
website: http://depts.washington.edu/hssexec/hss_contact.html

NOVEMBER 12-16

The **American Astronautical Society** will hold its National Conference and 48th Annual Meeting in Los Angeles, California. Contact:

The American Astronautical Society
6352 Rolling Mill Place, Suite 102
Springfield VA 22152-2354
(703) 866-0020, Fax 866-3526
e-mail: info@astronautical.org
website: <http://www.astronautical.org>

If you wish to have your event listed, contact:

George W. Cully
230 Sycamore Creek Drive
Spingboro, OH 45066-1342
(513) 748-4737
e-mail: 71022.1100@compuserve.com

UPCOMING EVENTS 2002

JANUARY 3-6

The **American Historical Association** will hold its annual meeting in San Francisco. Contact:

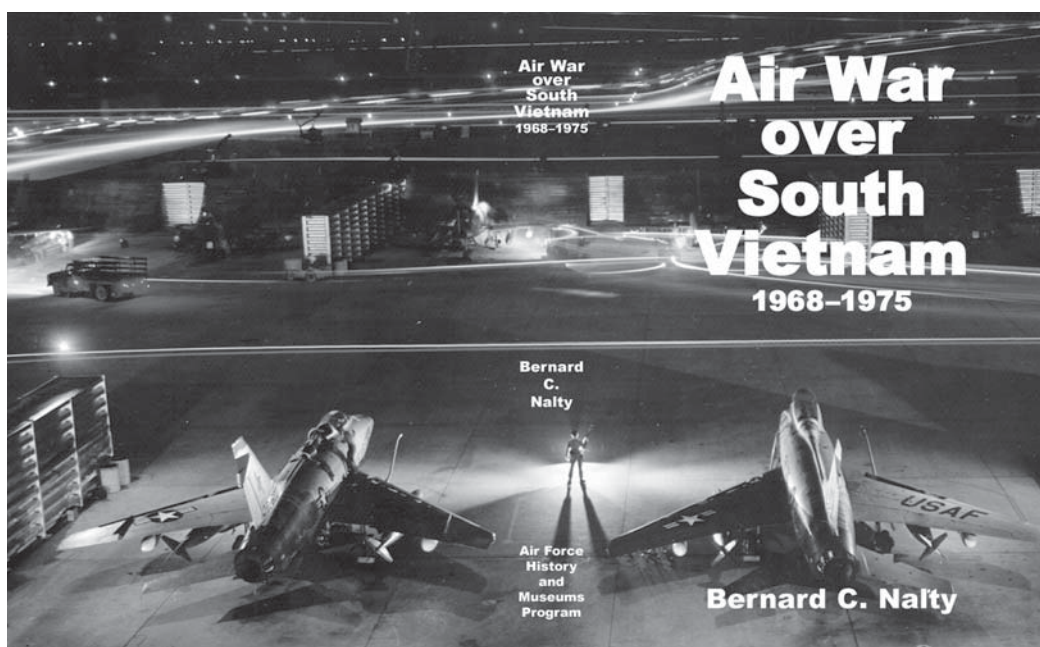
American Historical Association
400 A Street SE
Washington, DC 2003-3889
(202) 544-2422, Ext. 104; FAX (202) 544-8307
e-mail: aha@theaha.org
website: <http://www.theaha.org>

APRIL 4-7

The **Society of Military History** will hold its annual meeting in Madison, Wisconsin. Contact:

Prof. Jerry Cooper
Dept. of History
University of Missouri
St. Louis, MO 63121
(314) 516-5735, Fax (314) 516-5781
e-mail: cooperj@msx.umsl.edu

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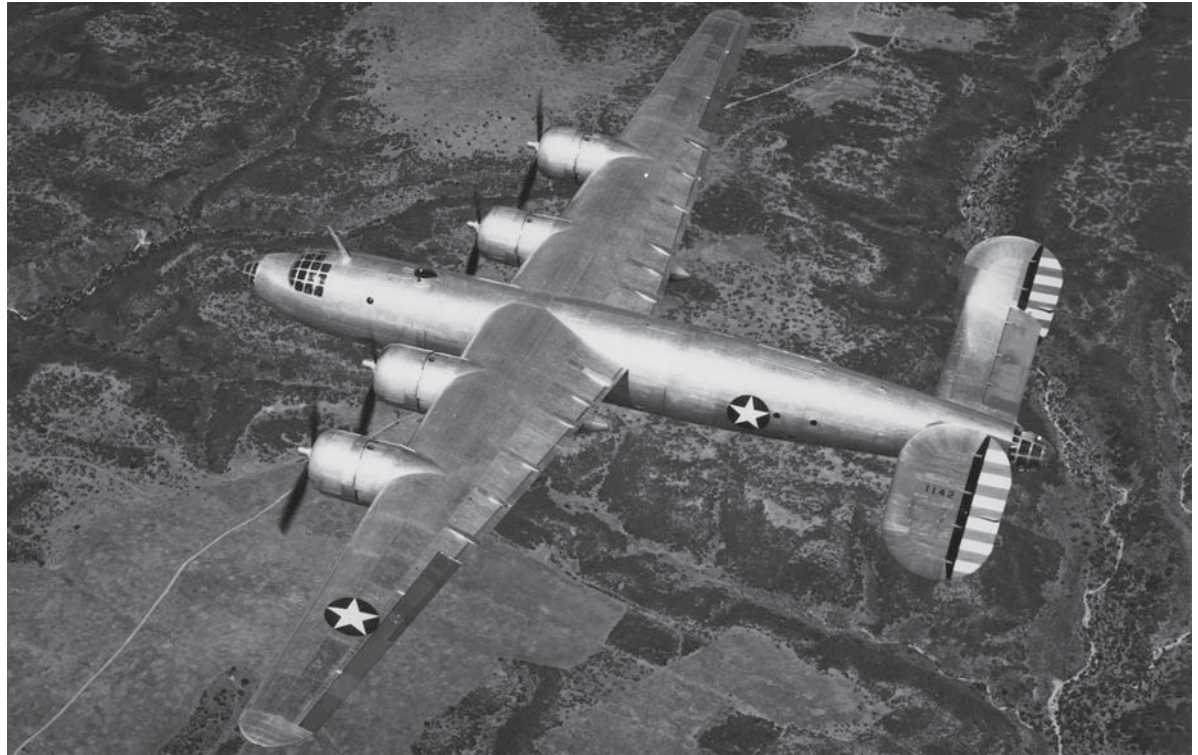
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Photos of the aircraft originate from the manufacturer but were made available by the San Diego Aerospace Museum in California.



Air Power History's discerning readers made short work of the Consolidated XB-32 Dominator, the four-engined, World War II bomber prototype that posed as the mystery plane in APH's last issue. 28 readers named the XB-32.

Consolidated developed the B-32 as a competitor to the Boeing B-29 Superfortress. The first prototype made its initial flight on September 7, 1942. Like the B-29, the B-32 was pressurized and had remotely-controlled defensive guns. Initially built with a twin tail (as shown in our photo), the B-32 went into production with a single vertical fin. Eventually, production totaled three XB-32 prototypes, 13 YB-32 service-test bombers, 40 TB-32 trainers, and 74 B-32 bombers. The aircraft were

powered by four 2,200-hp. Wright R-3350-23A Cyclone 18-cylinder air-cooled radial engines.

The B-32 suffered numerous developmental problems, many of which preceded its first flight. The B-29 also had teething troubles, but the Army Air Forces chose the B-29 for widespread service and for the final air campaign against Japan. A handful of B-32s got into combat in the final weeks of the war in the Pacific.

Sadly, no example of this bomber survives today. A B-32 had been earmarked for display at the Air Force Museum but was scrapped in August 1949.

Our "History Mystery" winner is Henry Gay of Manchester, New Hampshire. Thanks to all who joined in our "name the plane" exercise.

This Issue's Mystery Plane

Once again, we challenge our ever-astute readers. See if you can identify this month's "mystery" aircraft. But remember the rules, please.

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

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

3. A winner will be chosen at random from the postcards with the correct answer. The winner will receive a recently-published aviation book as a prize.

This feature needs your help. In that attic or basement, you have a photo of a rare or little-known aircraft. Does anyone have color slides?

Send your pictures or slides for possible use as "History Mystery" puzzlers. We will return them.



MISCAPTIONED

Your Winter 2000 issue [*Air Power History*, Vol. 47, No. 4] has recently come to my attention. You probably have received letters concerning the picture caption on page ten. [See photograph] The other man in the picture with Brereton and the Hearons sisters is not Arthur Coyle but my father, Ralph Royce. My father took the 1st Aero Squadron to France in August 1917, and put it into action in the Spring of 1918.

You can read a story in the *New York Times* of the period, telling how he led the squadron in the first official flight of U.S. fliers over the German lines, acting under orders from the AEF headquarters. Later, he was promoted to a staff job and turned the squadron over to Arthur Coyle.

When the 1st arrived in France they flew ARs, later they were given Salmson 2A2s and still later Spad 11s. My father considered the Salmson superior to the Spad. There is a rumor that, in transitioning to Spads, he wrecked five before he got one off the ground, making him in effect a German ace. The Germans never gave him a medal, whereas the French gave him a Croix de Guerre so I am not sure the story is true.

Between World War I and World War II, the Air Corps was a very small branch of the Army, so my father encountered Brereton from time to time. He didn't like him. In World War II, I served under Brereton in the Middle East. I didn't like him either, nor did anybody I knew. We called him "Screwie Looie," on the grounds that the orders coming into the field from Ninth Air Force headquarters in Cairo usually didn't make a lot of sense.

As the war moved from Africa to Europe, Brereton took the Ninth Air Force headquarters to England. Simultaneously, my father took command of the Middle East Theater and I rotated back to the U.S. By a strange quirk of fate, the job as Brereton's deputy became open shortly before D-Day and my father was in line to fill it. Although reluctant take the job, he did so on the promise that he would soon get the Ninth when Brereton's tour was over.

This did not happen, as they gave the Ninth to Hoyt Vandenberg. My father was given something called the 1st Provisional Tactical Air Force, a rag-tag collection of fighters and light bombers supporting the southern sector of the European front. I have never been



able to find much about this outfit in the historical records.

My father retired in 1946 and died in 1965 at the age of 75. I have often regretted not questioning him about his experiences among the top leaders of the Army Air Corps. One time I did mention Brereton to him. "How was it serving as Brereton's deputy?" I asked, "Was he really a screwy as we thought?" My father answered with one word, "Certifiable."

*Lt. Col. Scott Royce, USAF (Ret),
Galveston, Texas*

Colonel Royce is right, and I thank him for his correction. The photograph is taken from a larger print. The original caption in the National Archives reads: "Maj. Ralph Royce, Commander, Observation Group, Lt. Arthur Coyle, Commander, 1st Aero Squadron, and Maj. Lewis Brereton, Commander, 12th Aero Squadron, with the Hearons Sisters Theatrical Troupe, Ourches, France, May 17, 1918." I presumed that this label was from left to right and, since my interest was in Brereton, failed to double-check the identities of the other two individuals. The center figure is indeed Ralph Royce. Presumably, Coyle is on

the left. Once again we have proof that one can never be too careful in historical research, and that *Air Power History* readers play a significant role in keeping the record straight.

On the other hand, the 1st Aero Squadron in France, flew A.R. I and Spad XI aircraft, before receiving the Salmson 2A2, which, as I mentioned in the article, was perhaps the best Allied observation airplane of the war. The 1st flew Salmsons during the St. Mihiel attack and the Meuse-Argonne, and later took them to Germany for occupation duty in 1919. By all accounts the Spad was a miserable airplane, but I have not heard that Royce wrecked five. If so, he was not only a German ace, but he wrecked one-seventh of the thirty-five purchased by the Air Service!

As for the comments about "Screwie Looie," I also wish Colonel Royce had taken the opportunity to question his father on Brereton. My article covered Brereton's career to the point that he left for North Africa in mid-1942, and it seems clear that the general was controversial, but anything but screwy. I hope to have the opportunity to research his later career in the same detail in the future.

*Dr. Roger G. Miller, Air Force History
Support Office, Bolling AFB, Wash-
ington, DC*

Canada Aviation Museum

The Canada Aviation Museum has received federal government funding for a 10,000 square-meter, open-storage addition to its existing 14,000 square-meter facility. This new phase of development will provide additional display space, accommodate aircraft presently stored outdoors, and aircraft acquisitions anticipated over the next fifteen years. Located on Ottawa's Rockcliffe Airport since 1988, the museum features the entire sweep of Canada's aviation heritage. For more information, contact Ms. Christina Lucas, chief, Communications and Marketing at (613) 993-4243, e-mail: clucas@nmstc.ca or www.aviation.nmstc.ca.

Call for Papers

The Society of Military History will hold its 69th annual conference at the Monona Terrace, Madison, Wisconsin, April 4-7, 2002. The theme for the conference will be "War and Remembrance: Constructing the Military Past and Future." The program committee particularly invites proposals for papers and panels that assess the military classics, memoirs and reminiscences, military reformers, and military leadership. Proposals for papers and panels treating all aspects of military history are welcome as always.

Proposals should include a one-page abstract for each paper, outlining topic, thesis, and sources, and a brief c.v. for all participants. The program committee

intends to post the abstracts on the SMH Web site, <http://www.smh-hq.org>. The committee welcomes volunteers to serve as chairs and/or commentators. Volunteers are asked to provide a brief c.v.

Please submit proposals for papers and full panels no later than November 1, 2001. Remit to Prof. Jerry Cooper, Dept. of History, University of Missouri-St. Louis, MO. 63121. Telephone: (314) 516-5735; Fax: (314) 516-5781. E-mail: cooperj@msx.umsi.edu.

Reunions

The **USS Hollanda (CVE-97) Association** reunion will be held September 12-14, 2001, in Kansas City, Missouri. Contact:

P. Turner
222 Waterside Dr.
Wildwood, MO 63040
(314) 458-6851
e-mail: pasut@juno.com

The **Fifth Air Force, Hqs 5th Bomber Command, 5th Station Hospital, 405th Signal Co. (Avn), 80th Service Gp., 502d Tac Con Gp., and 314th Comp. Wing** reunion will be held September 12-16, 2001, in Ft. Mitchell, Kentucky. Contact:

Lou Buddo
P.O. Box 270362
St. Louis, MO

The **93d Troop Carrier Squadron's** reunion will be held September 12-16, 2001, in Missoula, Montana. Contact:

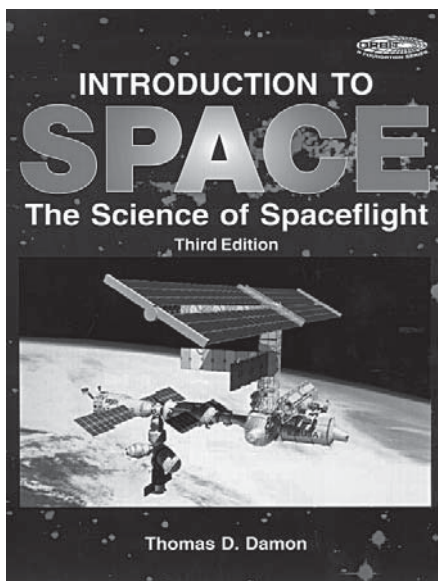
Tom Morris
456 St. George's Ct.
Satellite Beach, FL 32937-3840
(321) 773-6960
e-mail: tomruth3@aol.com

The **Air Rescue Association** reunion will be held September 17-20, 2001. Contact:

John Fluornoy
(505) 821-1145
e-mail: fluornoy@swcp.comor

The **20th Fighter Wing/20th Fighter Group Association** will meet September 26-30, 2001, in Colorado Springs, Colorado. Contact:

George Grill
P.O. Box 3260
Breckenridge, CO 80424
(970) 453-7462
e-mail: thegrills@juno.com



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The **USS Fanshaw Bay (CVE-70) and Air Group Association** will meet September 27-29, 2001, in Branson, Missouri. Contact:

D. Iossi
310 Edwards St.
Ft. Collins, CO 80524-3721
(970) 482-6237

The **13th Fighter Interceptor Squadron (ADC)** will meet September 27-30, 2001, in Panama City, Florida.

Contact:
Ed Lewis
4161 N. Longvalley Rd.
Hernando, FL 34442
(352) 637-3663
e-mail: edlew@hitter.net

The **379th Bomb Group Association** will meet October 3-6, 2001, in Harrisburg, Pennsylvania. Contact:

Armed Forces Reunions
(800) 562-7226

The **398th Bomb Group Association** will meet October 3-6, 2001, in St. Paul, Minnesota. Contact:

wally398th@world.att.net
(301) 762-2213

The **484th Bomb Group Association** [Fifteenth Air Force] will meet October 3-8, 2001, in Atlanta, Georgia. Contact:

Bud Pressel
436 Hunting Park Lane
York, PA 17402
(717) 757-1218

The **A-1 Skyraider Association** will meet October 4-6, 2001, in San Antonio, Texas. Contact:

Rocco DeFelice
(210) 659-5965
Ralph Hogatt
(210) 494-3190

The **Ninth Air Force Assn., 358th Ftr Gp/363d Tac Recon Gp., and 405th Ftr Gp.** will meet October 4-6, 2001, in

Charleston, South Carolina. Contact:

Ray Lowman
10104 Calle de Pallencia
Navarre, FL 32566
(850) 936-0069
e-mail: raylow@juno.com

The **EVREUX AB Alumni** will meet October 7-11, 2001, in Las Vegas, Nevada. Contact:

Norbert Mueller
7003 Shoal Creek Blvd.
Austin, TX 78757-4385
e-mail: evsecmueller@aol.com

The **48th FS, FIS, FTS** will meet October 10-13, 2001, in Orlando, Florida. Contact:

Joe Onesty
455 Galleon Way
Seal Beach, CA 90740
(562) 431-2901
e-mail: jonesty@juno.com

The **433d Airlift Wing (AFRC)—the Alamo Wing** will hold its fiftieth reunion at Lackland AFB, Texas, on October 12, 2001. Contact:

Mr. Tom Helm
433d AW/CCE
203 Galaxy Rd.
Kelly AFB, TX 787241-5554
website: www.alamowing.com

The **27th Air Transport Group** (310th, 311th, 312th, and 325th Ferrying Squadrons; 86th, 87th, 320th, and 321st Transport Squadrons; 519th and 520th Service Squadrons) will hold their reunion October 18-20, 2001, in Savannah, Georgia. Contact:

Fred Garcia
11903 North 77th Dr.
Peoria, AZ 85345
(623) 878-7007

The **17th Bomb Group/319th Bomb Group (WW II) and 17th/452d Bomb Wing (Korea)** will hold their reunions October 19-22, 2001, in Myrtle Beach, South Carolina. Contact:

Ted Baker
453 Hamilton Ave.
Almont, MI 48003-8620
(810) 798-8758
e-mail: baker26@eesc.com

The **National Eighth Air Force Historical Society Reunion** will be held October 24-29, 2001, in Irving, Texas. Contact:

Lawrence Goldstein
64-13 Madison St.
Ridgewood, NY 11385-4629
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In Memoriam

James Parton 1912-2001

James Parton, who founded the *American Heritage* magazine and was its president and publisher, died of a heart attack on April 20, 2001, in White River Junction, New Hampshire. He was 88.

Born on December 10, 1912, in Newburyport, Massachusetts, Mr. Parton graduated from what is now the Loomis Chaffee School in Windsor, Connecticut, and in 1934 from Harvard. Over the next three decades, he worked as aviation editor for *Time* magazine and *The New York Herald Tribune*. During World War II, he rose to the rank of lieutenant colonel in the U.S. Army Air Forces. He served as an aide to Lt. Gen. Ira C. Eaker, secretary to the General Staff, and chief historian of the Mediterranean Allied Air Forces in 1944-1945. He was decorated with the Legion of Merit, Bronze Star medal, and the European Theater ribbon with four battle stars.

In 1954, Parton and some associates created the American Heritage Publishing Company, with historian Bruce Catton as its chief editor. Catton said at the time, "Our beat is anything that ever happened in America." The successful magazine appeared every other month in hard cover, with lavish color illustrations but no advertising. The company produced books on every major period in American history, including the *American Heritage Picture History of the Civil War*, which won a Pulitzer Prize. In 1969, he sold the magazine to Forbes and then became president of the Encyclopaedia Britannica Educational Corporation. He was also assistant librarian of Congress for public education. In 1980, he edited and published the multi-volume *Impact: The Army Air Forces Confidential Picture History of World War II*.

A trustee since 1955, Mr. Parton was a staunch supporter of the Air Force Historical Foundation. In 1986, in cooperation with the Foundation, wrote a book length biography, "*Air Force Spoken Here*": *General Ira Eaker and the Command of the Air*.

His first wife, Jane Bourne, died in 1962. In addition to his daughter, Sara Parton Pelgrift, Mr. Parton is survived by his second wife, Ruth Parton; a son, James III; a sister, Nike Parton; and five grandchildren.

WW1 AERO (1900-1919)

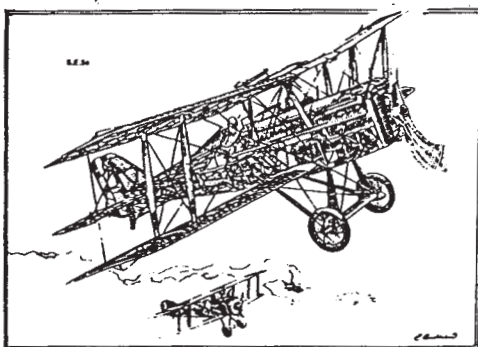
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Brigadier General Richard T. Kight 1914-2001

Brig. Gen. Richard T. Kight, USAF (Ret.), the “father of air rescue,” died June 17, 2001, of complications from emphysema; he was eighty-seven.

Born and raised on a ranch near Amarillo, Texas, General Kight loved airplanes from his youth. He began his military career in 1933, when he enlisted in the U.S. Army Air Corps. He completed flying training as an aviation cadet at Kelly Field, Texas, in 1935. An expert pilot, he and three friends formed an aerobatics team, billing themselves as “The Four Aces.” Commissioned a second lieutenant in October 1936, Kight was assigned to the 7th Bomb Group at Hamilton Field, California. He reverted to inactive reserve status in December 1936, and flew for United Air Lines until his recall to active duty at Langley Field, Virginia, in March 1938, where he served until 1941.

During World War II, he flew with the overseas wing of the Army Air Corps Ferry Command, from late 1941 until 1942. He also served as personal pilot to the late Wendell Wilkie—the former presidential aspirant, who made a world-wide goodwill tour for President Franklin D. Roosevelt. In December 1942, Kight was transferred to the China-Burma-India wing of the Air Transport Command, where he served as chief of staff and director of airlift operations over the “Hump”—the Himalayan Mountains.

General Kight returned to the United States in February 1944, to take command of Morrison Field, West Palm Beach, Florida. While at Morrison Field, he was personal pilot for Vice President Henry Wallace on a trip through Siberia and China. From 1945 to 1946, Kight commanded transport operations on Guam.

He was then assigned as commander of the Air Rescue Service, then located at West Palm Beach. Holding this command until 1952, he directed its development and expansion and introduced present day rescue techniques. He personally performed much of the testing of rescue equipment and employment techniques. Kight approved an idea of one of his officers to form the “PJs”—an elite parachute jumping group with the medical and survival skills to rescue downed pilots. Also important, he made the helicopter the primary vehicle for evacuating airmen downed in enemy territory and the wounded from the frontlines to a Mobile Army Surgical Hospital (MASH). He wrote the rescuers’ creed and coined the motto, “That Others May Live.”

His next assignment was to the Air War College at Maxwell AFB, Alabama. Upon graduation in 1953, he was assigned to Hickam AFB, Hawaii, as commander of the 1500th Air Base Wing. In 1954, he transferred to Randolph AFB, Texas, and assumed duties as inspector general for Headquarters, Combat Crew Training Air Force. He was named commander of Tyndall AFB, Florida, in June 1956, having attended and completed the F-86D All Weather Interceptor Course offered there prior to assuming command.

A command pilot qualified to fly both jet and conventional aircraft, General Kight transferred to the 34th Air Division, Kirtland AFB, New Mexico, in July 1957, as vice commander. He moved up to command the 34th Air Division the following year, maintaining his jet proficiency by flying with the Air Defense Fighter Squadrons under his command. He became vice commander of the Central Air Defense Force, Richards-Gebaur AFB, Missouri, in November 1959. In April 1960, he was promoted to the rank of brigadier general and transferred to Norton AFB, California, to command the Los Angeles Air Defense Sector. He guided the LAADS through its transition from manual operation to semi-automatic ground environment (SAGE) operation. In July 1951, Brig. Gen. Richard T. Kight became the chief of staff, Allied Air Forces Northern Europe, which coordinated and planned for the wartime employment of the Norwegian and Danish air forces in defense of NATO territory. He retired from active duty on September 1, 1967.

Among his decorations, General Kight earned the Distinguished Flying Cross twice for heroism or extraordinary achievement. He also received the Air Medal for meritorious achievement.

His wife, June, died of emphysema in 1992. He is survived by daughters Sally Kight Parker and Nancy McLaughlin.

Upcoming Symposium

The Air Force Historical Foundation and Office of the Air Force Historian are sponsoring a symposium, "Coalition Air Warfare in the Korean War," to be held October 17-18, 2001, at the Officers' Club on Andrews AFB, Maryland.

The program features six panels, as follows:

- I. Planning and Operations
- II. Air Superiority
- III. Air Support of Ground Forces
- IV. Air Interdiction and Bombardment
- V. Air Reconnaissance and Intelligence
- VI. Logistical Support of Air Operations

Among the invited speakers are Senator John Glenn, General Michael Ryan, Admiral James Holloway, and Air Vice Marshal Paddy Harbison. U.S. Army, U.S. Navy, U.S. Marine Corps, U.S. Air Force veterans, and their Korean War Allies will compare their experiences with the historical perspectives of scholars. The interplay among the groups promises to be illuminating indeed. The audience will participate in question and answer sessions. To reserve seats at this historic event, attendees are urged to complete and mail in as soon as possible the registration form below.

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