

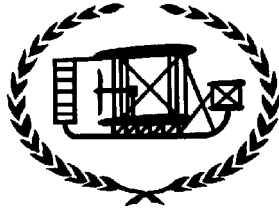
AIR POWER

History

FALL 2004 - Volume 51, Number 3

The Effects of Aerial and Satellite Imagery on the 1973 Yom Kippur War <i>Dino A. Brugioni</i>	4
Signal Aircraft Warning Battalions in the Southwest Pacific in World War II <i>Braxton Eisel</i>	14
Fighting Machines for the Air Service, AEF <i>Theodore M. Hamady</i>	24
Flight to Korea, June 25, 1950 <i>James A. Scheib</i>	38
<hr/>	
History Mystery	43
Review Essay: Roger G. Miller	44
Book Reviews	46
<i>World History of Warfare</i> by I. Archer, J.R. Ferris, H.H. Herwig, and T.H.E. Travers Reviewed by Stéphane Lefebvre	46
<i>Warthog and the Close Air Support Debate</i> by Douglas N. Campbell Reviewed by Darrel Whitcomb	46
<i>From Autogiro to Gyroplane: The Amazing Survival of an Aviation Technology</i> by Bruce H. Charnov Reviewed by I. B. Holley, Jr.	47
<i>Anatomy of a Reform: The Expeditionary Aerospace Force</i> by Richard G. Davis Reviewed by Robert A. Morris	48
<i>To the End of the Solar System: The Story of the Nuclear Rocket</i> by James A. Dewar Reviewed by Rick W. Sturdevant	48
<i>The Indochinese Experience of the French and the Americans: Nationalism and Communism in Cambodia, Laos, and Vietnam</i> by Arthur J. Dommen Reviewed by John L. Cirafici	49
<i>100 Years of Air Power and Aviation</i> by Robin Higham Reviewed by Kenneth P. Werrell	50
<i>The Royal Air Force in Texas: Training British Pilots in Terrell During World War II</i> by Tom Killebrew Reviewed by Scott D. Murdock	52
<i>Mastering the Ultimate High Ground: Next Steps in the Military Uses of Space</i> by Benjamin S. Lambeth Reviewed by Rick W. Sturdevant	53
<i>Choosing War: The Lost Chance for Peace and the Escalation of War in Vietnam</i> by Frederik Logevall Reviewed by Stéphane Lefebvre	53
<i>Stand Well Clear</i> by D. K. Tooker Reviewed by William A. Nardo	54
<i>Heroic Flights: The First 100 Years of Aviation</i> by John Frayn Turner Reviewed by John Braddon	54
<i>Vulcan the Fire God—The Inside Story of the Avro Vulcan</i> by Power Point Communications Reviewed by Larry Richmond	54
<i>Imagining Flight: Aviation and the Popular Culture</i> by Bowdoin Van Riper Reviewed by William A. Nardo	54
Books Received	56
Coming Up	58
Letters, Notices, News, Reunions	60
Foundation Notes	63

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Dino Brugioni, one of the Nation's premier photo interpreter's, leads off this issue with the previously untold story of America's aerial reconnaissance in monitoring the aftermath of the 1973 Yom Kippur War. He demonstrates how this remarkable element of air power contributed to peace and improved relations between Egypt and Israel.

"Brick" Eisel, who served as a ground controller in ground and airborne radar systems, explores the role of signal aircraft warning battalions in the southwest Pacific during World War II. Eisel's interest in the subject was motivated by the fact that his uncle, Jake Herring—featured in the article—served as a radar technician during the war.

In June 1917, two months after the United States entered World War I, Major Raynal Bolling, a military aviator and former corporate lawyer, led a special commission to investigate European developments in aviation. After an intense three-month-long tour of facilities in France, Italy, and England, the Bolling mission recommended that Allied aircraft should be built under license in the U.S. until American designs became available. However, as author Ted Hamady notes in "Fighting Machines for the Air Service, AEF," U.S. industry was unable to build and ship the aircraft soon enough before they were deemed obsolete.

On June 25, 1950, James Scheib took off from Johnson Air Base, near Tokyo. Aboard his SB-17G was Col. William Wright, USA, the chief of staff, Korean Military Advisory Group; they were headed for Kimpo AB, South Korea. Was this the first combat mission flown by the United States Air Force?

There are fourteen reviews of new air power books—dealing with air and space operations, theory, analysis, and more. Also, be sure to check out the new books received and to read Roger Miller's review essay on the latest biography of the legendary Billy Mitchell.

The departments section is chock full of news, starting with our introduction of Col. George Williams as the Foundation's new executive director (see page 63). The other big news is that Foundation's trustees have established an annual \$1,000 prize for the year's best book on air power. To qualify, authors must have an Air Force affiliation, the books must have been published during the previous year, and been reviewed in *Air Power History*. The finalists were:

Robert F. Dorr, *Air Force One*

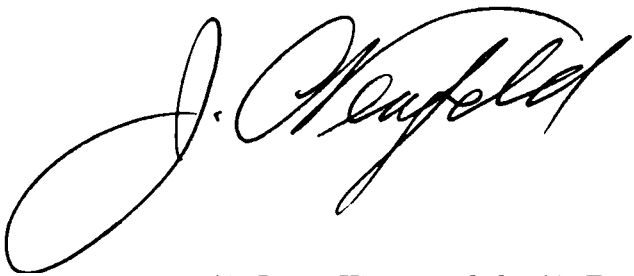
John W. Huston, *American Airpower Comes of Age: General Henry H. "Hap" Arnold's World War II Diaries*

Phillip S. Meilinger, *Airmen and Air Theory: A Review of the Sources*

David N. Spiers, *Air Power for Patton's Army: The XIXth Tactical Air Command in the Second World War*

Jerry L. Thigpen's, *The Praetorian STARShip: The Untold Story of the Combat Talon*.

This award's committee of judges was chaired by John Kreis, an author and research staff member at the Institute for Defense Analyses and included Alfred Hurley, former head of the Air Force Academy's history department and former chancellor of North Texas State University; Col. Robert Vickers, USAF (Ret.); and Donald Baucom, the former chief historian of the Ballistic Missile Defense Agency. To find out who won, turn to page 61.



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THE EFFECTS OF AERIAL AND SATELLITE IMAGERY ON THE 1973 YOM KIPPUR WAR



Dino A. Brugioni

(Overleaf) The SR-71. (All photos courtesy of the author.)

THE EGYPTIANS, PROBABLY WITH SOVIET HELP, BEGAN PLAYING A SHELL GAME WITH THE MISSILE SITES

The origins of the Yom Kippur War of October 1973 may be traced to the Suez Crisis in 1956, when President Dwight D. Eisenhower authorized U-2 flights over the Middle East. By the onset of the June 1967 Six-Day War, the United States had acquired a significant amount of aerial and satellite imagery over “targets” in that area.

The CIA’s National Photographic Interpretation Center (NPIC) had an experienced and dedicated complement of imagery intelligence officers, capable of melding the imagery derived with collateral information to produce accurate and timely intelligence reporting.

After the Six-Day War, the NPIC published a special detailed Middle East edition of a KH-4 satellite mission. The mission reflected the extensive damage the Israelis had inflicted on their Arab foes. A total of 246 destroyed aircraft were imaged in three countries—202 in Egypt, 26 in Syria, and 18 in Jordan.¹

The few surviving combat aircraft were later seen at Aswan, Luxor, and smaller airfields in southern Egypt—beyond the range of the Israeli aircraft. Both the Egyptians and Syrians realized they were extremely vulnerable to Israeli air strikes and turned to the Soviet Union for help. The Soviets replaced the aircraft destroyed on a more than one-to-one basis. New aircraft included large numbers of MiG-21s, SU-7s, and replacements for the IL-28 bombers lost during the war. At main Arab airfields, we noted the construction of hangarettes, which would complicate our efforts to provide good air-order-of-battle counts.

Four high flying MiG-25 Foxbats were identified near one of the hangarettes. From various sources, it was known that they were piloted by Soviets. Attachés noted camera ports on one of the Foxbats in flight, indicating that the Soviets were probably conducting reconnaissance missions for the Egyptians. Pat Ashburn, one of our interpreters familiar with Israeli airfields, found something very interesting. At several Israeli airfields, obvious targets for MiG-25 reconnaissance, there was always an armed Phantom fighter on alert. On several occasions, we learned that when there was a MiG-25 recon flight, the Phantoms would be gone. We later learned the Israelis had desperately tried to intercept the MiG-25 with zoom climbs and firing air-to-air missiles. None, however, were successful.

The greatest Soviet contribution to the Arabs, however, was a massive effort to install an elaborate air defense network consisting of SA-2, SA-3, and SA-6 surface-to-air missiles. The Israelis were

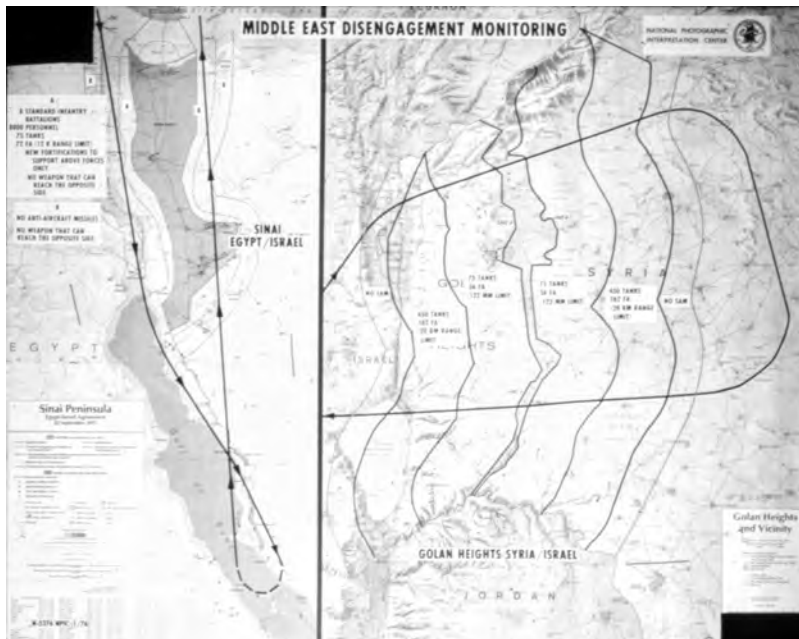
extremely interested in what was happening in Egypt, but when they sent out their reconnaissance aircraft, they were met with a volley of SAMs. Along with the latest anti-aircraft weapons, an impressive aerial umbrella had been established along the Suez Canal.

To make the Israeli reconnaissance efforts more difficult, the Egyptians, probably with Soviet help, began playing a shell game with the missile sites. One day an SA-2 missile site would be observed, the next day its equipment had been moved out. The following day SA-3 equipment would be installed. Our reporting of this activity caused confusion in the intelligence community and also with Secretary of State William Rogers, who was advocating his Middle East peace plan. John Hicks, NPIC’s Executive Officer, asked me to prepare a briefing for the Secretary. The NPIC auditorium was the site of the briefing and through photos and maps we were able to show how the sites were being changed and how difficult it was to have an up-to-the-minute situation report on the sites. Secretary Rogers was extremely pleased with our effort; Hicks later sent me this note, “Your personal direction and organization of the effort to serve the needs of the Secretary of State on Monday 14 September ’70 were notably effective. Many NPICers participated and contributed to the useful efforts, but your particular leadership was a key contribution in meeting the secretary’s need.” Secretary Rogers said that the Israelis had lost a number of their best reconnaissance pilots.

Another effort at the NPIC concerned the amount of new military equipment the Soviets were providing their clients to replace and upgrade that destroyed during the 1967 war. The old T-34 tanks were replaced with T-54, T-55 and T-62 tanks. New BRDM armored-personnel-carriers, along with some of the newer artillery pieces, were spotted being unloaded at the port of Alexandria and later deployed along the Canal. The latest Soviet bridging equipment was also seen along with hundreds of new cargo trucks.

The intelligence community estimated that there were at least 30,000 Soviet technicians in Egypt before they were expelled by Egypt’s President Anwar Sadat in July 1972. The Soviets had been involved in every aspect of Egypt military activity from command and control to the training of Egyptian conscripts. The ouster of the Soviets came as a surprise to the U.S. intelligence community. We had observed, however, there was a notable slowdown of Soviet military shipments. Sadat, in his biography, asserted that no war could

During World War II, Dino A. Brugioni flew on sixty-six bombing and a number of reconnaissance missions over Europe. After the war, he received BA and MA degrees in foreign affairs from George Washington University. He joined the CIA in 1948 and in 1955 was selected as one of the founders of the National Photographic Interpretation Center. As a senior officer at the Center, he was involved in the exploitation of U-2, SR-71, and satellite imagery in strategic and crisis situations. He has written five books, more than eighty articles, and has helped with and appeared in dozens of television programs dealing with the application of aerial and spatial imagery to history, intelligence, and environmental problems.



A map of the Middle East, depicting aircraft routes.

THE BAR-LEV LINE... EXTENDED SOME 160 KILOMETERS FROM PORT TAUFIG TO EL QANTARA

A CIA ANALYST, WHO SPECIALIZED IN THE AREA, HAD WRITTEN A REPORT THAT AN EGYPTIAN ATTACK WAS IMMINENT.... THE ANALYST WAS TRANSFERRED

be fought while the Soviet experts were in Egypt. Another, and probably better reason, according to Sadat, was that the Soviet experts “had begun to feel that it enjoyed a privileged position in Egypt—so much so that the Soviet ambassador had assumed a position comparable to that of the British High Commissioner in the days of British occupation of Egypt.”²

After the 1967 war, we also watched the Israelis build the Bar-Lev Line along the east bank of the Suez Canal. The line was an enormously fortified artificial sand barrier that ranged from 30 to 60 feet high and about 30 feet wide. Millions of sandbags and miles of concertina wire were also employed along the Canal. We saw hundreds of large galvanize pipe sections being brought from Israel to the Line. Covered with sand, they would form living quarters, command posts, and tunnels to other parts of the line. The Line extended some 160 kilometers from Port Taufig to El Qantara. It was interspersed with 18 major, and a number of minor fortified positions. The areas between the outposts were equipped with artillery, tanks, and direct-fire positions. The Israel military felt that armored forces could be deployed quickly to whichever point of the line was threatened.

On the Egyptian side of the Canal, we began to see large and tall pyramid-shaped mounds, some 30-feet higher than the Israelis, and built at regular intervals from Port Said to Suez. The mounds overlooked installations along the Bar-Lev Line and also could be Egyptian crossing points of the Canal. Although originally these would serve as observation posts, they could also serve as Sagger anti-tank-missile launch points. On one occasion we saw a tank atop one of these mounds. Sadat visited one of these mounds and reported that “from the top I can see Sinai very clearly.”

It was during this period that Sadat began making a number of public statements proclaiming an imminent outbreak of hostilities. Skir-

mishes along the Canal would go on intermittently but were beginning to escalate both in time, place, and intensity. There were conflicting feelings in the intelligence community as to whether there would be war or not. Sadat, however, continued making claims to regain Egyptian sovereignty over the occupied Sinai.

Each year Egyptian forces were mobilized and with the new Soviet-provided equipment conducted massive military maneuvers and operations along the Canal with the apparent intent to cross it. On several occasions, the Israelis had mobilized their forces at considerable expense, only to find that the Egyptians forces had returned to their garrisons. The Israelis, it appeared, became conditioned to the Egyptian maneuvers.

In May 1973 satellite photography, we observed a large Egyptian exercise in the desert with a mockup, in the sand, of the Suez Canal and Israeli defenses along the Bar-Lev Line. We saw units arrayed in formations as if for a review or inspection. There were several armored units with SA-6 missiles indicating that the SA-6 missile units would be following the armored units into battle and be their protection. A CIA analyst, who specialized in the area, had written a report that an Egyptian attack was imminent. When Egyptian units customarily went back to their garrisons, the analyst was transferred. Sadat would later write:

I had no intention of starting a war in May, but as part of my strategic deception plan I launched a mass media campaign, then took various civil defense measures which led the Israelis to believe that war was imminent. In the days when war seemed likely to break out there was full Israeli mobilization, while we enjoyed perfect military calm. I did the same thing in August—and the Israeli reaction was the same.³

John Hicks became the Director of the NPIC, upon the retirement of the first director, Arthur C. Lundahl, in June 1973. Hicks delegated to me, as the Executive Officer of the Imagery Exploitation Group, the responsibility for approving imagery-derived cables, briefing boards, and notes.

In September 1973, in a newly recovered satellite system, strips of experimental bonus color film had been attached to the end of the conventional black and white film. Unfortunately, the color film was expended over Syria and the Golan Heights. The color film was processed with the black and white one and was nearly useless. Eastman Kodak attempted to process one of the colors that might give us better resolution. While there was no firm concrete photographic evidence that the Yom Kippur War would begin on October 6, 1973, there was photographic evidence to show war preparations were underway. Crack Egyptian armored divisions from the Cairo and Dashur areas were being deployed along the Canal along with hundreds of artillery pieces, bridging equipment, and SAM batteries. There was more than ordinary activity at ammunition dumps and at logistical



President Gerald R. Ford follows along as Secretary of State Henry Kissinger briefs congressional leaders on peace agreement, September 4, 1975.

**ON...
OCTOBER 4...
HICKS WAS
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TARGETS**

sites. Syrian tanks and artillery had moved up from their rear positions and were deployed closer to the "Purple Line." We did not locate the FROG battalion.

On the evening of October 4, I took several photo interpreters, along with prints from the satellite photography, to meet with Mr. Hicks. Hicks was also shown some clandestine reports suggesting that an Egyptian and Syrian mobilization was in progress. CIA's William Colby mentions these reports in his book.⁴ Portions of those reports substantiated what we were seeing on the photography. Hicks asked if we had put anything on paper. I gave Hicks a copy of what we had prepared. Hicks said he would stop by and meet with officials of the Office of Strategic Research who had the primary reporting responsibility on the area. The U.S. Defense attaches in Tel Aviv were briefed on our information. They, in turn, passed off our information to the Israelis. We were later told that the Israelis, at the highest level, believed that it would be just another exercise. Ray Cline, Under Secretary of State for Intelligence and Research, would later remark, "Our difficulty was partly that we were brainwashed by the Israelis, who brainwashed themselves."

On October 6, Yom Kippur, the Jewish Day of Atonement, Egyptian and Syrian forces launched a massive attack on Israeli forces along the Canal and on the Golan Heights. At 2 p.m., more than 200 Egyptian airplanes flew over the Suez Canal and attacked Israeli command centers along the Bar-Lev Line. The Israeli units along the Line were caught unaware of the Egyptian air attack. Using experience gained in the construction of the Aswan Dam, the Egyptians used powerful water pumps that created breaches in the sand barrier.

In his book, *Crisis*⁵, Henry Kissinger describes the confusion as to what was happening along the Canal and on the Golan Heights. The Washington Special Action Group (WASAG) began meeting on

October 6. The WASAG was chaired by National Security Adviser, Kissinger, and comprised the Deputy Secretaries of State and Defense, the Director of Central Intelligence, and the Chairman of the Joint Chiefs of Staff. Kissinger was in New York, and, in his absence, Brent Scowcroft would chair it. President Richard M. Nixon was in Key Biscayne preoccupied with the resignation of Vice President Spiro Agnew.

William E. Colby had become CIA director on September 4, 1973. There was an increasing need for more current intelligence on the prospect of war. A photo satellite was in orbit, but there was some trepidation about bringing it back too soon. Although a neophyte on aerial reconnaissance, Colby knew the value of photographic intelligence. He called on John Hicks for advice. Hicks' group and division chiefs recommended unanimously that the SR-71 be deployed. The recommendation was passed on to Colby and the Air Force was agreeable to deploying the SR-71. NPIC was familiar with the SR-71 capabilities from numerous previous missions. It was assumed that the SR-71 would be deployed to England or West Germany but both countries refused to grant access to their bases. The decision was made to fly the missions from Griffiss Air Force Base, near Rome, N.Y. From Griffiss, the Air Force determined that the SR-71 would have to be refueled three times to the Middle East targets and three times back. When several high-ranking Air Force officers were informed of this, they were not pleased. They feared that because of fuel or mechanical problems, the SR-71 might have to land at a foreign base. If that happened, one said, "It would be an international crisis of the first magnitude." However, a three-man photo interpretation team, very knowledgeable on Israel, Egypt, and Syria, was dispatched from NPIC to Weisbaden, West Germany, to interpret the film. When no nation would grant the U.S. a base, the team took the next plane back to Washington.

Two U.S. Naval carrier battle groups, the Independence and the Roosevelt, and an amphibious force were in the Mediterranean. NPIC, meanwhile, was ordered to report immediately the Navy's highest priority targets—the Soviet supplied submarines in Alexandria, Egypt, along with the OSA and KOMAR guided missile boats, based in Egypt and Syria. The Navy was also concerned with the Soviet Mediterranean Fleet, which consisted of some 75 ships, including about a dozen submarines. Concern was also expressed as to what was happening at Sevastopol, the headquarters of the Black Sea Fleet.

The first SR-71 mission over the Middle East, named Giant Reach, was flown on October 12, 1973. The film was processed at Rochester, New York, and a plane was on standby to fly the film to the NPIC for analysis. We worked through the night and noted the damage which the Egyptians had inflicted on the Israelis on the Bar-Lev Line and beyond was substantial. Most of the fortified positions had been destroyed. It was also obvious that the Egyptians had used flame-throwers for



The SR-71.

THE ISRAELIS HAD REPORTED THAT THEY HAD LOST 49 AIRCRAFT, INCLUDING 14 PHANTOMS PRIMARILY FROM THE SA-6

EACH SIDE HAD LOST OVER 400 TANKS

many of the command and living bunkers had been burned. The Egyptians had crossed the Canal in five places. Egyptian assault boats were seen all along the Canal. Rope ladders and ropes could be seen on top of the sand barriers. Craters from aerial bombardments and artillery fire had literally torn great holes in the fortified positions. An Israeli tank brigade stationed behind the Bar-Lev Line had come forward to be met by Egyptian soldiers firing Russian supplied Sagger wire guided missiles along with rocket propelled grenades. NPIC's analysis indicated most, if not all of the tanks had been destroyed.

The Egyptians had moved their mobile SA-2, SA-3 and SA-6 missile batteries into the Sinai. The SA-6s were wrecking havoc on the Israeli Air Force. By Tuesday October 9, the Israelis had reported that they had lost 49 aircraft, including 14 Phantoms primarily from the SA-6.⁶ Two Egyptian armies were now firmly across the Canal. About 800 Egyptian tanks were arrayed near the Gidi and Mitla passes and down into the Sinai. A major tank battle had begun and over 1,600 Israeli and Egyptian tanks were involved and the fighting ranged over a large area. We could easily identify the battle lines since the Israeli tank forces consisted of Super Shermans, Pattons, AMX, and Centurion Tanks. The Egyptians possessed Soviet tanks

We worked through the night and the next morning I carried a three-part situation board to CIA headquarters at Langley, Va., that showed the position of every Israeli and Egyptian tank from which a battle line was drawn. In addition, individual briefing boards were prepared to complement the situation board. I met with representatives of the Office of Strategic Research who had prepared an intelligence report derived from all other sources. At 8 o'clock we proceeded to Mr. Colby's office. He was a good listener and was always intrigued with not only the demarcation of

the battle lines but also our reporting of the number of damaged tanks. Usually Colby would then leave for a 10 o'clock meeting of the WASAG. WASAG meetings were frequently held in the White House Situation Room, and according to Colby, the map was prominently displayed.

The flight path of the first SR-71 mission, especially in the turns, deprived us of useful coverage. William Willner, an NPIC analyst, provided an explanation on how the following missions could be flown for maximum photographic coverage. Mr. Hicks called the Chairman of COMIREX (Committee on Imagery Reconnaissance and Exploitation) who in turn, contacted the Strategic Air Command. Willner was dispatched to Offutt Air Force Base at Omaha. SAC officials didn't particularly care to have an NPIC analyst tell them how to fly their missions. Willner had taken photographic examples with him and did convince the SAC reconnaissance officials how the particular cameras on the SR-71 would benefit our interpretation efforts.

Kissinger was clamoring for information on the number of Israeli tanks destroyed. It was relatively easy to pick out the destroyed tanks by either fire or if a tank was severely damaged. But we could not determine the tanks that had been damaged by missiles. NPIC photo interpretation experts Connie Zimmnick, Ralph Symmes, Bill Horn, Frank Douglas, and I met with Hicks and explained our problem. He agreed with our idea that if a tank had not moved in two days to count it as destroyed. Each photo interpreter was given a degree square of the Sinai to interpret and would plot not only the movement but also the tanks that were destroyed. We counted 264 Egyptian tanks that had been destroyed in one battle. As we continued to count on subsequent missions, each side had lost over 400 tanks. Israeli reports to Kissinger indicated they had lost 500 tanks, 400 on the Sinai front. It was difficult to get accurate tank counts on the Golan Heights because Iraq and Jordan had sent tank units equipped with Centurion tanks to help the Syrians.

It was known that the Israelis had flown many aerial photographic missions over the battle areas. The Israelis were using F-4 Phantoms, TA-4H Skyhawk and Teledyne Ryan 147 drones for reconnaissance. The U.S. Air Force had helped the Israelis construct a photographic laboratory with equipment to process the film obtained by the Phantoms. The Department of Defense sent two U.S. Army captains, Alfred J. Lipphardt and Jerry Gorman, to Israel to view the film taken by the Israelis to augment the U.S. tank count of destroyed Egyptian, Syrian and Israeli tanks. Lipphardt, was detailed to the NPIC and was familiar with how the Center functioned and how they were interpreting the SR-71 and satellite photography. He complained to an Israeli lieutenant colonel that he was sent to perform a function. He was very agitated and said that he was going home to report to U.S. officials his frustration of not being allowed to view the Israeli reconnaissance



President Ford points to relief map as Henry Kissinger briefs congressional leaders on peace agreement, September 4, 1975.

THE SOVIET UNION BEGAN A MASSIVE AIRLIFT OF MILITARY EQUIPMENT TO EGYPT AND SYRIA

A SOVIET MERCHANT SHIP TRANSITED THE BOSPHORUS AND WAS SUSPECTED OF CARRYING NUCLEAR WEAPONS

film. He then said to the colonel, "If you are not going to allow me to view the film here, then give me some copies of the film to take back with me." The colonel pointed to a number of boxes of film that the Israelis undoubtedly had viewed and said, "Take what you want." Lipphardt took a large box filled with cans of film and was on the first flight back to the United States. Lipphardt informed us he was on his way back with Israeli film. At NPIC, it was given a separate code name and we began our analysis. We were able to refine our counts of destroyed Egyptian, Israeli, and Syrian tanks. Combining the Israeli photography with that of the SR-71, we made a new three-part situation briefing board. After the crisis was over, the Israeli film was sent to the Department of Defense where it mysteriously disappeared.

The Soviet Union began a massive airlift of military equipment to Egypt and Syria. Most of the critical items for Egypt were unloaded at Cairo West Airfield. NPIC made briefing boards of the Antonov 22 transports seen there. Kissinger asked repeatedly if we saw any indication of Soviet airborne troops in Damascus since a number of the Antonov transports had landed there. We didn't.

On October 14, the U.S. Air Force began Operation Nickel Glass, a major airlift of military supplies to Israel. C-5As, C-141, and C-130 transports began bringing military supplies from the Azores and Germany. Most of the unloading was done at Lod Airfield but also at captured Al Arish airfield. We made a number of briefing boards on this activity. Secretary of Defense James Schlesinger called Colby to recover all the briefing boards that had been disseminated. We were not to show that the U.S. was aiding the Israelis, yet many countries had spotted and reported the U.S. aerial armada.

It was during this period that a Soviet merchant ship transited the Bosphorus and was suspected of carrying nuclear weapons. The ship was

followed to Alexandria and became a prime target for all reconnaissance systems. When we did see the ship, its hatches were closed. Kissinger would report to the Earl of Comer, the British Ambassador to the United States, "We had information that a Soviet ship carrying nuclear weapons passed through the Bosphorus and came back without them."⁷ Later reports of the ship surfaced in the Washington Post and when Kissinger was queried about them he said, "There was no confirmed evidence about nuclear weapons arriving in Egypt."⁸ In our eyes, however, the report ratcheted up the crisis on the possible use of nuclear weapons. Kissinger had asked to see our map again of the October 12 battle lines. There were demands at the UN that a cease-fire be established along the October 13 lines, but the Israelis opposed a cease-fire at the time.

On the Golan Heights, the Israeli and Syrian front lines were separated by a small strip of no-man's land often referred to as the "Purple Line." The line had been established between Israel and Syria after the 1967 cease-fire. The Israelis had constructed a series of 20 feet deep defensive trenches. Defensive positions overlooked the ditches. Further up the heights, a series of earthen ramps allowed the Israelis the advantageous position to confront any invading forces.

On the Syrian side, the Syrians had constructed defenses to block any penetrations through the "Purple Line." Old T-34 tanks were dug into positions where only the turret could be seen. There was a heavy concentration of 57 and 85mm anti-tank guns. The Syrians maintained a fully mobilized army stretching from the cease fire line to Damascus. In addition to over 600 tanks and 100 artillery batteries, the Soviets had supplied the Syrians with FROG battlefield missiles with a range of up to 50 miles that could reach some Israeli cities. Units were equipped with both the rocket-propelled grenades (RPG) and Sagger anti-tank missiles. When the battle started, the Syrians had penetrated to Mount Harmon but couldn't hold their positions. Along the winding roads leading to the Heights we could see convoys of Israeli tank transporters, vehicles, and personnel moving toward the Heights.

The Israelis first laid one pontoon bridge and then another over the Canal, north of the Great Bitter Lake. On October 16, the Israelis began crossing the Canal. By October 18, a sizable armored force was both north and south of the pontoon bridges. The continued Israeli armor movements to the south were exerting pressure for a cease-fire. As the situation grew more dangerous, Leonid Brezhnev on October 19 invited Nixon to send Kissinger to Moscow. Nixon agreed.

On October 20, a political firestorm blazed in Washington, D.C. Called the "Saturday Night Massacre," it involved the firing of special prosecutor Archibald Cox, followed by the resignations of Attorney General Elliot Richardson and his deputy (and acting FBI Director) William French Buckley.



CIA Director William Colby shakes the author's hand, November 7, 1974

BREZHNEV WROTE A LETTER TO NIXON, DEMANDING THAT THE U.S. JOIN WITH THE SOVIETS TO PUT FORCES IN EGYPT TO STOP THE FIGHTING. IF NOT, THE SOVIETS WOULD GO IN UNILATERALLY

NIXON PLACED U.S. ARMED FORCES ON DEFCON 3

We were told that Kissinger would be departing for Moscow on the 20th. Kissinger asked that all the briefing boards he had requested be sized to fit into an attaché case. Later, he asked that the briefing boards be attached with tape, like an accordion. The boards were arranged in chronological sequence. In his book Kissinger writes: "We learned also from our own sources that Moscow had alerted seven of its eleven airborne divisions."⁹ Although the Soviets had only seven operational airborne divisions, they became targets for satellite reconnaissance.

On October 22, the House of Representatives began impeachment proceedings against President Nixon. A cease-fire had been negotiated and would begin at 1900 hours and would be along the battle lines of that day. On his return trip from the Soviet Union Kissinger had stopped in Israel and would be leaving for the U.S. that evening. He would tell Golda Meir, "If the forces moved at night while I am flying there would be no protests from Washington. Nothing can happen until tomorrow," Meir replied: "If they don't stop, we won't."¹⁰ A recovered satellite mission confirmed that Israeli forces were in Suez, a violation of the cease-fire. They had also cut the Cairo-Suez road. The mission confirmed that Israeli forces had the Egyptian Third Army pinned against the West Bank of the Canal. An Israeli armored column was spotted on the road leading toward Cairo. From the same satellite, we noted the Israelis were only 18 miles from Damascus and the Syrian army had been routed.

We also saw considerable Soviet transport activity at Cairo West airfield. One of the An-22 transports was unloading Scud missiles. The Scud missiles and the report of the Soviet ship carrying nuclear weapons raised the possibility of a nuclear exchange between the Israelis and Egyptians. We had seen the Israeli development of the Jericho missile and the CIA had given the Israelis credit

for having nuclear weapons. We were seeing activity at the Jericho missile base. All of the Soviet equipment being unloaded was carefully noted and counted. On that mission, we imaged two Soviet airborne divisions in the Soviet Union and noted activity at both. We prepared both regular-sized and about ten attaché-sized briefing boards for Kissinger. I showed them to Hicks before delivering them to Colby, who took them to a WASAG meeting.

On one occasion, I asked Colby if the President had seen all of the materials that we had prepared. Colby replied that all information for the President went through Gen. Alexander Haig, who had replaced Robert Halderman as White House chief of staff.

The Soviets were getting good information on the situation from successive launches of their photo satellites, but also probably from MiG-25 flights. On October 24, Brezhnev wrote a letter to Nixon, demanding that the U.S. join with the Soviets to put forces in Egypt to stop the fighting. If not, the Soviets would go in unilaterally. The CIA had reported that the Soviet airlift had stopped on October 24, and the Agency was concerned that the Soviets might now transport their airborne units to Egypt. Reacting to Brezhnev's letter, Nixon placed U.S. armed forces on Defcon 3 status (increased readiness without the determination that war is likely). Hicks asked that we prepare contingency SR-71 flight tracks of targets in the Soviet Union that would be involved in air and sea lifts from the Soviet Union to Egypt. We received an urgent call from the XVIII Airborne Corps for the latest photographs of Egypt's airfields.

Anwar Sadat did not want the Soviets back in Egypt and backed the U.S. position for an international force, which excluded forces from the five permanent members of the Security Council. The UN forces would not only monitor the cease-fire, but also permit convoys of food, water, and medical supplies to reach the besieged Third Army. The Soviets had backed down. The U.S. domestic situation, including the Saturday Night Massacre, Agnew's resignation, the selection of Gerald Ford as vice president, and the beginning of the Nixon impeachment process, however, left a lot to be desired.

The Yom Kippur War lasted for eighteen days and traumatized both the Israelis and Egyptians. It was also a hectic time at NPIC. I lived through the trying days of the Cuban Missile Crisis but I must confess there were times when tensions during the Yom Kippur War matched or surpassed the Cuban crisis.

Subsequent SR-71 missions revealed the Sinai to be a large killing field. Both armies lay in tatters. In both the Sinai and Golan Heights were large graveyards of tanks, armored personnel carriers, and hundreds of supporting vehicles. We would later see the Israelis arrive with tank transporters to reclaim their damaged tanks and then those of the Egyptians. Large mounds of war sup-



U-2 FLIGHTS BEGAN UNDER THE CODENAME, OLIVE HARVEST

THERE WAS AGREEMENT BY BOTH ISRAELI AND EGYPTIAN PHOTO INTERPRETER OFFICIALS OF OUR ANALYSIS

plies were gathered and stored just inside the Israeli border for future disposition.

I met Marshal Dmitry Yasov, a former Soviet Defense Minister, at an October 2002 Cuban celebration of the fortieth anniversary of the Cuban Missile Crisis in Havana. I asked him about the Yom Kippur War. He waved his hand insolently about the fighting abilities of the Egyptian and Syrian armies. He said, "We gave you a large package of our military secrets." Captured by the Israelis were complete SA-2, SA-3, and SA-6 surface-to-air missiles, T-62 tanks, MiG-21s, BMPs, Soviet radar and communication equipment, and some of the latest Soviet ground forces equipment. A bonanza of marking information was obtained from the captured military pieces and ammunition and on the factories that produced them.

Although there was a cease-fire, the Israelis and Egyptian forces were close enough that sporadic fighting broke out. There was concern as to what was happening to the Egyptian and Syrian armies. An SR-71 mission showed where their forces were scattered.

Hicks had his group and division chiefs prepare recommendations as to how the cease-fire could be monitored. While Kissinger and other international leaders demanded a separation between the Israeli and Arab armies, NPIC originally recommended a five-mile separation between the forces. We further recommended that the U-2 be used to track compliance. The U-2 would enter Egyptian airspace at Port Said and fly down the Canal to the Red Sea and turn back over the Israeli forces. We felt confident that we could monitor a cease-fire. When it was proposed to the Israelis, they accepted, but the Egyptians refused charging that the U.S. could not be trusted because it favored the Israelis.

When Hicks learned of the Egyptian rejection, he held more executive meetings. I was very vocal and proposed giving both the Israelis and

Egyptians copies of the U-2 films along with a report describing what we were seeing. When Hicks advanced this proposal at Langley, a ranking Agency officer and Air Force officials were adamantly opposed. They suspected that by giving away copies of the film, it would undoubtedly fall into Soviet hands and compromise our reconnaissance capabilities. A quick check of NPIC experts indicated that a newer and superior camera was being developed and, therefore, the U-2 film would not give away our newest secrets.

As part of the disengagement agreements between Israel, Egypt, and Syria, U-2 flights began under the codename, Olive Harvest. Advanced notice would be given of the approximate time the U-2 would be overhead. Depending on the weather, missions would be flown about every ten days. Procedures were developed to warn the Egyptians and Israelis—through U.S. attachés—of violations of the cease-fire detected on the film. Much to our surprise, there was agreement by both Israeli and Egyptian photo interpreter officials of our analysis, and confidence began to grow between the two countries.

But still much work had to be done to "draw lines in the sand," as Kissinger would state, to clearly delineate the demarcation lines. SR-71 flights continued and provided the basic information for drawing those lines. When Kissinger was shown the poor maps of the Sinai on which the lines were to be drawn, he supposedly remarked, "Who in the hell made these maps, Moses?" Hicks wondered if we could not do a better job using the aerial photography in our possession to make a terrain model, rather than the maps. The NPIC model shop made a large model and when it was shown to Kissinger, he was both surprised and pleased with out effort. In January 1974, Kissinger met with Sadat and the first disengagement of forces agreement was signed. He took the model with him to meet with the Israeli and Egyptian



John Hicks, NPIC Director

THE EGYPTIANS AND ISRAELIS WERE PLEASED WITH THE NPIC'S EFFORT

leaders. Demarcation lines were noted on the model. Pins with tiny ribbons were attached to the model to establish demarcation lines. After reaching an agreement with both sides, Kissinger returned to the White House with the model and on September 4, 1975, briefed President Ford and congressional leaders on the Israeli-Egyptian-Syrian agreement.

A United Nations Truce Supervision Organization began negotiations between the Israelis and Egyptians. The Sinai II agreements called for the U-2 overflights to continue "following the same procedures already in place." Film copies of each mission were sent simultaneously to Egypt, Israel, and the UN peacekeeping commanders. Both the Egyptians and Israelis were pleased with the NPIC's effort, and ultimately agreed that we did

not have to provide them copies of the film. Both parties regarded the overflights as a useful, independent source of data to confirm or deny other sources of information.

There would be much more diplomatic activity between the U.S., Egypt, Israel, and Syria. The confidence placed in American impartiality in its analysis of the film contributed to the negotiations that led to the Camp David Accords. The painstaking and complex work accomplished by NPIC also contributed greatly to the success of the mission.

Much credit must also go to the SR-71 pilots. Because of the national security secrecy at the time, little has been written about the magnificent flying abilities of these pilots. They were told "that they would be on their own" if they were forced to land on a foreign field for some mechanical problem or inability to refuel. They also knew that if an SA-2 radar locked on them on (and they were) they could increase their speed and outrun the missiles. But little was known about how the SA-5 batteries in Syria would react. Fortunately, no SA-5 missiles were fired during the war.

Three SR-71 flights were flown roundtrip from Griffiss AFB, one mission took off from Griffiss and landed at Seymour Johnson, while five roundtrip flights were made from Seymour Johnson. Although the flights to Seymour Johnson added a few hours of getting the film to the processing site, the time constraints were not as pressing. The U-2 pilots who flew the monotonous and time-consuming missions each week or so over the designated areas also deserve considerable credit. ■

The SR-71 flights provided the most valuable information during this trying period. The flying in the Yom Kippur War represents some of the finest performances in the annals of U.S. wartime military aviation. I think it most appropriate to list their names in order of their flights:

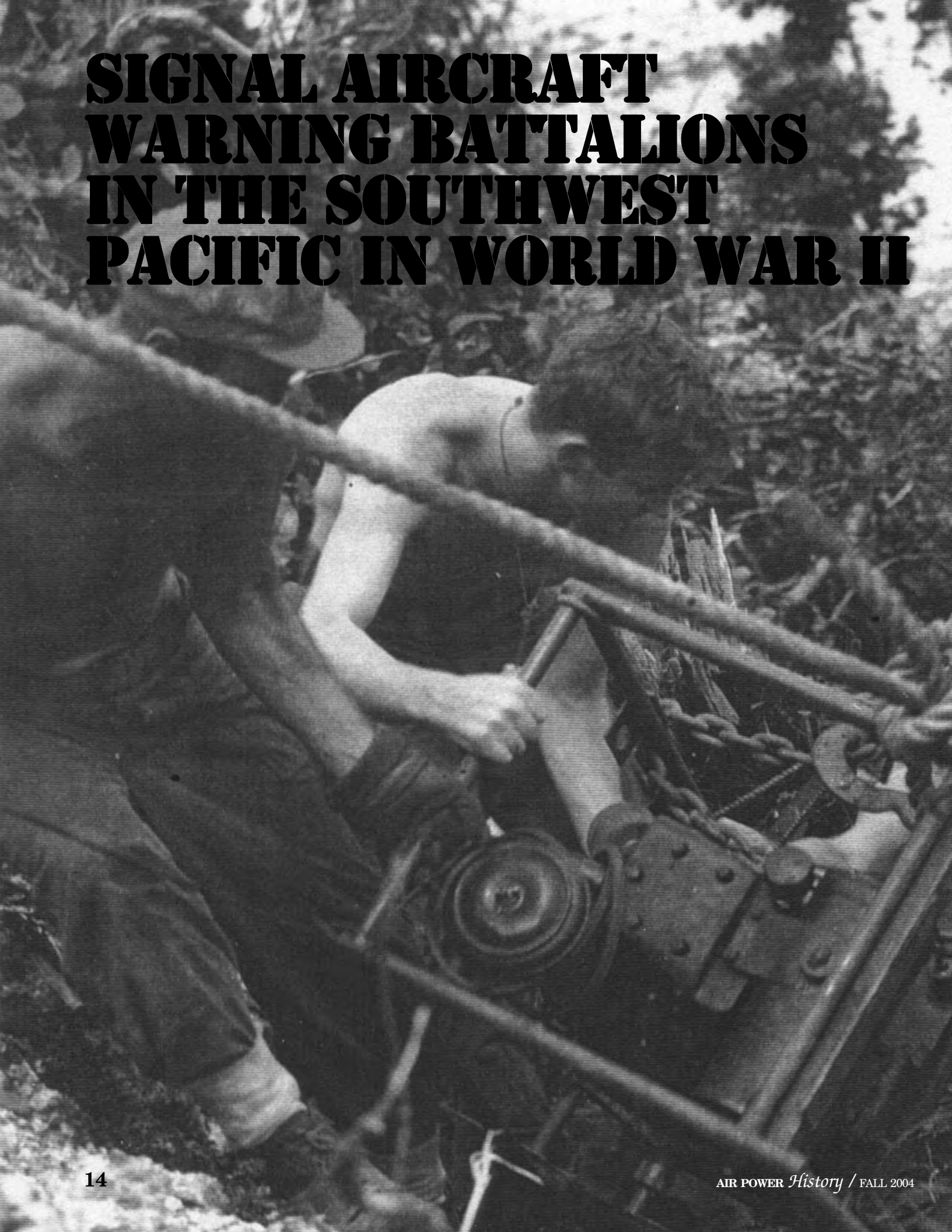
- Jim Shelton and Gary Coleman
- Eldon Joersz and John Fuller
- Bob Helt and Larry Elliott
- Jim Wilson and Bruce Douglas
- Jim Sullivan and Noel Widdifield
- Pat Bledsoe and Reg Blackwell
- Harold Adams and Bill Machorek
- Ty Judkins and John Morgan
- Lee Ransom and Mark Gersten

NOTES

1. CIA/NPIC, Photographic Interpretation Report, "KH-4 Mission 1042-1, 17-22 June 1967, Middle East Edition," June 1967, declassified.
2. Anwar El-Sadat, *In Search of Identity*, (New York: Harper and Row, 1977), p. 230-31.
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4. William Colby, *Honorable Men: My Life in the CIA*, (New York: Simon and Schuster, 1978), p. 366
5. Henry Kissinger, *Crisis*, (New York: Simon and Schuster), pp. 13-84.

6. *Ibid.*, p. 145.
7. National Security Archives, Memcom between Kissinger and the Earl of Cromer, British Ambassador 31 October 1973, Source SB-70-73, Pol UK-US.
8. *Ibid.*
9. Kissinger, p. 304.
10. National Security Archives, Memcom between Meir and Kissinger Oct. 1973 1:35-2:15 P.M. Source: RG59, SN70-73 Pol 7 U.S./Kissinger.

SIGNAL AIRCRAFT WARNING BATTALIONS IN THE SOUTHWEST PACIFIC IN WORLD WAR II





Braxton Eisel

(Overleaf) Dragging the two-stroke generator up the beach. (Photo courtesy of NARA.)

Air Force units are usually composed of the traditional flights, squadrons, groups and wings. During World War II, the U.S. Army Air Forces (AAF) also included platoons, companies and battalions. Some of the largest and most important of these “Army” units were the Signal Aircraft Warning (SAW) battalions, which used the new technology of radar to provide early warning and air defense.

These battalions served in all theaters and developed somewhat differently depending on the tactical considerations of the specific theater. This article looks at the evolution and use of SAW units associated with the Fifth Force during World War II.

Uneasy Alliance

It was only in 1937 that the first successful Signal Corps use of radar to detect aircraft was demonstrated at Ft. Monmouth, New Jersey.¹ The Signal Corps was responsible for developing, procuring, and fielding all U.S. Army electronics. Radar was just one more developing technology under their purview. At the onset of World War II, the Army Air Corps* was just beginning to come to grips with the concepts of radar and early warning. It also was grappling with the Signal Corps for control of the equipment and personnel associated with these concepts.

But even in the years preceding this historic event, the Air Service had struggled to gain control over aviation-related communication and other electronic equipment and personnel.² The AAF argued that only airmen could know what specific equipment was needed for aviation. Radar was just one more bone of contention between the two organizations.

However, by the outbreak of the war, the Signal Corps and the AAF had established an uneasy working arrangement. The Signal Corps would develop, procure, and logistically support the technical equipment needed to conduct radar early warning. It would also train the personnel to operate the equipment and extract the information the new technology provided.³ The AAF would simultaneously form units that could use and act on the provided tactical information.⁴

* At the outset of World War II, the flying service was named the U.S. Army Air Corps. The Army Air Forces (AAF) formal name change was not adopted until June 1941 but for the purposes of this article, the “Air Forces” term is used.

The Signal Corps, still a part of the larger ground Army, organized its tactical radar units into platoons – usually forty to fifty men, led by a lieutenant; companies included two to four platoons and were led by a captain; while battalions, numbering two to four companies, were led by a major or lieutenant colonel.⁵ These standard Army formations had to be integrated into the AAF organizations that used squadrons, groups, and wings.

Initially, the AAF used fighter control squadrons (FCS), complete with pursuit pilots, to process the tactical information provided by SAW battalions to intercept unknown radar tracks. The pilot controllers would use very high frequency (VHF) radios to scramble friendly fighters and place them in the most advantageous position to identify and, if necessary, shoot down the “bogey.” This technique was, and is, called ground controlled intercept (GCI).⁶

The fighter control squadrons were a direct result of the experience of Gen. Carl A. “Tooe” Spaatz and other American observers of the Battle of Britain, during the summer of 1940. There AAF leaders saw how the Royal Air Force used pilots as controllers to successfully direct fighter squadrons to defend the British homeland against a numerically superior enemy. The lessons learned were brought back and placed into practice, albeit somewhat differently than the RAF model. The RAF owned all facets of the airborne radar system, including the research facilities, radars and operating personnel, and the end-users—the interceptors.⁷ The U.S. violated the basic tenet of war fighting in that the responsibility of radar for early warning and for intercepting the enemy was split between two commands, the Signal Corps and the AAF. Eventually, this situation would be rectified, but not until nearly the end of the war.

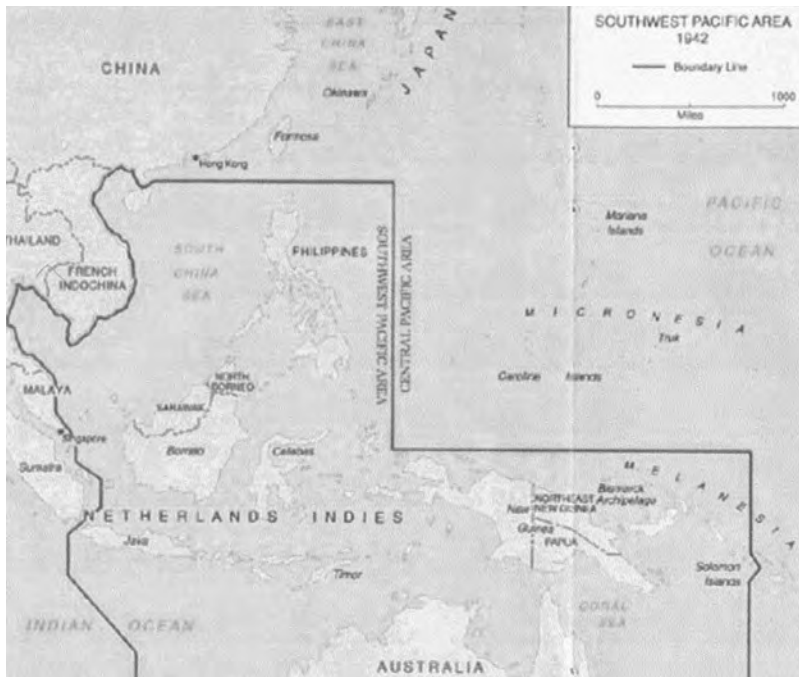
Unfortunately, the first example of this “marriage” was tragically unsuccessful. On December 7, 1941, a Signal Corps operator working at a remote site on Opana Point detected a large formation of aircraft approaching from the north of Oahu, Hawaii. Only recently trained in the complexities of the SCR-270B radar set, Private Joe Lockard picked up a large plot of blips. Following his instructions, he telephoned the information to the radar information center at Ft. Shafter, Honolulu.⁸

There, a young P-40 pilot, never trained in early warning procedures or in appropriate tactical response to such warnings, made the now-famous command of “Well, don’t worry about it.”⁹ Thus, the last chance of challenging the outcome of the attack on Pearl Harbor was lost. The first engagement of the American war did use radar, but not effectively.

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THE SIGNAL CORPS AND THE AAF HAD ESTABLISHED AN UNEASY WORKING ARRANGEMENT

AAF LEADERS SAW HOW THE ROYAL AIR FORCE USED PILOTS AS CONTROLLERS



Map of the Southwest Pacific. (Courtesy U.S. Army.)

EARLY WARNING RADARS THEN IN THE U.S. INVENTORY WERE THE LARGE, BULKY SCR-268/270

THE -602 WAS A U.S.-PRODUCED VERSION OF A BRITISH LIGHT-WEIGHT MOBILE RADAR

On the Job Training

The Signal Corps, stretched like every other U.S. military function, expanded rapidly to meet the demands for radars and the men to operate them. A huge electronics training base was set up at Drew Field, near Tampa, Florida. Here the vast majority of radar men undertook their training in electronics, field living operations and even in some cases, basic training.¹⁰

The only operational early warning radars then in the U.S. inventory were the large, bulky SCR-268/270 long-range radars. These could provide excellent long-range coverage but as stated, were difficult to move in a hurry since they consisted of 66 tons of equipment. What was needed was a lightweight, smaller radar set that could go ashore on the first day of any offensive invasion or be situated quickly as the tactical situation dictated for a defensive campaign.

Jake Herring, a radar technician with the rank of T4 (a corporal with specialist technical training), who was assigned to a SAW battalion in the Southwest Pacific, remembers that after his induction into the Army in September 1942, he went through six weeks of rushed basic training at Drew before beginning his radar training.

In a baritone, rich with the coastal accent of North Carolina, Herring recounted, "We did our basic training there at Drew Field, then I was sent to Kansas City, Missouri, for a month of radio school. I was immediately sent back to Drew to begin radar training. We went through our course, learning to operate the SCR-602 mobile radar set."¹¹

The -602 was a U.S.-produced version of a British lightweight (LW) mobile radar set. It was designed to provide forward radar coverage for a sector, reporting its findings to a control center or filter center located further back from the front.¹²

The -602 had a range of up to 100 miles in optimum conditions, although 60-70 miles was more common. More importantly, the set weighed only two tons.¹³ It was used in conjunction with other LW sites and the larger and less mobile SCR-268/270 long-range radar to build a graphic representation or "picture" for air battle commanders.

At the filter center, operators would track the overall picture of a developing air battle on a plexiglass plotting board and controllers would make adjustments to the number and placements of Allied fighters to deal with the approaching aircraft. Again, the concepts were based heavily upon earlier British experiences.¹⁴

Not coincidentally, the AAF developed Drew Field as a night fighter training base. Many radar warriors, both airborne and ground-based, learned and practiced their skills in mock maneuvers on the flat scrubby fields and in the dark, humid skies of central Florida.¹⁵

Herring continued his reminiscence:

After graduating from my course, we were sent out for a month-long field exercise. We set up six platoons, each with a -602 radar reporting back to the control center. Each platoon, by the way, was a self-contained unit. We had two cooks, two medics, two truck drivers, and five four-man radar teams. We could load all our gear into two 2-½ ton trucks and a jeep and move out in just a few hours.

Each team had four basic duties: one guy would work as a plotter, one as a radio operator, one as a guard—nobody was allowed into the tent if we were working—and one man as a radar operator. We would switch off duties about once an hour to keep "fresh" and not miss anything on the radar scope.¹⁶

In addition to the LW and heavy long-range radars, a Signal Aircraft Warning company (later battalion), had ground observer platoons. These included a specially trained signalman, who would go into areas where radars could not be sited because of topographical limitations or more commonly because the infantry was engaged in combat. Using portable VHF radios and field telephones, these soldiers would "voice-tell" their observations of aircraft sightings back to the filter center. Their reports were incorporated into the picture to fill out any gaps in radar coverage.¹⁷

As experience with using the electronic realm to guide missions increased, the ground observers were also used later in the war to direct radar-guided ground attack aircraft. A strike squadron would be vectored to a target area by a controller using radar; once over the area, the ground observers would call in corrections for subsequent bomb drops.¹⁸

With all these personnel needed to meet the Signal Corps mission requirements of operating radar equipment and detecting aircraft, an SAW battalion could easily number more than a thousand officers and men, all designed to get the infor-

(Right) Biak Island, note east-west runway. U.S. troops and Herring's GCI platoon were to the south of the runway, the Japanese to the north. (Photo courtesy of NARA.)

(Below) Jake Herring (c) on New Britain, 1944. (Photo courtesy of Jake Herring.)



SAW UNITS WOULD WORK UNDER THE OPERATIONAL ORDERS OF THE AIR FORCES

mation to the controller assigned to the fighter control squadron.¹⁹

The much smaller fighter control squadron (FCS) consisted initially of fighter pilots and enlisted radio operators. Later in the war, specialist officer radar controllers replaced some of the pilots guiding aircraft. In addition, the missions controlled via radar increased from strictly vectoring fighters into intercept position to controlling bombing strikes, providing navigational vectors to lost aircraft, controlling air-sea rescue missions, and weather reporting and warning, among others.²⁰

By the time Jake Herring reported for duty at Drew Field, the Signal Corps and AAF had reached a more reasonable accommodation. In September 1942, the two organizations agreed to put the Signal Aircraft Warning units under Air Forces operational control. While the Signal Corps continued as the supplier of equipment and troops to operate it, the SAW units would work under the

operational orders of the Air Forces. This arrangement continued throughout the war.²¹

Fifth Air Force Experiences

On December 9, 1941, the 8th Fighter Control Squadron (FCS) was activated at Mitchell Field, New York, and immediately assigned for deployment to the Pacific. By June 1942, it was based at Milne Bay, New Guinea, as part of Fifth Air Force's V Fighter Command.²²

In the shoe-string days of the early Southwest Pacific campaigns, the 8th FCS used a hodge-podge of Australian and U.S. radar equipment and an equally assorted collection of fighter aircraft to defend the hard-pressed troops of the New Guinea fighting.²³

The SAW units supporting the 8th were likewise challenged to support the air defense requirements of the theater. Trained personnel and replacement parts for existing radar sets were in extremely short supply and used a mix of U.S. and Australian parts and troops to function.²⁴

By November 1943, however, the Allied forces in the area were strong enough to press ahead with operations to drive the Japanese from outside the New Guinea archipelago. Based at Finchhaven, the SAW battalions and 8th FCS first went on the offensive in support of the invasion of New Britain. By isolating or destroying the major Japanese port at Rabaul on that island, the Allies could continue to drive north, eventually towards the Philippines. Reaching that ultimate goal would be difficult.

Finchhaven, New Guinea, became "radar central" for the Southwest Pacific. New personnel destined for existing battalions and newly assigned battalions arrived at the jungle town to be incorporated into the theater.²⁵

When not assigned to a combat operation, the radar men would conduct training. In addition to the technical practice needed to correctly interpret the data on a radar scope, the troops had to practice setting up and breaking down their sites. Units would spend a planned week out in the field, having simulated a combat assault. Then they would emplace their equipment, calibrating the radar for true north, making sure the equipment stayed dry



(Right) Engineers building causeway to speed unloading of transport ships. (Photo courtesy of Jake Herring.)

(Below) The beach on Biak Island. (Photo courtesy of NARA.)



in the unrelenting humidity of the jungle, and always, always seeking the best and highest place to site the antenna.²⁶

The reason for the quest for height was due to line of sight consideration. If an SCR-602 was situated on a flat plain, an aircraft approaching at 1,000 feet would not be detected until it was within 15 miles. Putting the radar on a 400-ft. hill made the detection range jump to 50 miles. Higher flying aircraft could be detected at even longer ranges.²⁷

Another consideration for radar placement is the need to avoid close by obstructions like buildings or trees. These obstructions would reflect the electromagnetic energy emitted from the transmitter and reflect it back in massive doses causing “clutter” on the radar scope. Clutter was simply an area on the scope that could not be used for detecting aircraft because of the high level of background reflections.²⁸

Not infrequently, these week-long jaunts lasted longer. The torrential thunderstorms common to

the area could and did change a rough dirt road into a raging stream. Often the troops were cut off and had to be resupplied with C-rations and fuel from air drops until the remote jungle track dried out enough to support truck movement.²⁹

For the first campaign not conducted on New Guinea, the SAWs went in with the infantry. On D+1 for the invasion of New Britain, the first LW radar platoon went ashore. Assisting the 1st Marine Division, and under fire from the Japanese, the radar proved its worth by picking up Japanese aircraft sortieing from Rabaul. With the approximately minutes of advanced warning thus provided, the Allies were able to gain air superiority over the battlefield in relatively short time.³⁰

Jake Herring related his experience from this invasion:

We set up our radar on a small island just off the main invasion beach called Duke Island. One day a “Betty” bomber came over at tree-top level surprising everybody. He sprayed everything in sight with machine gun fire and dropped a bomb on a barge anchored out in the bay. He zoomed off without being shot at.

That night we had a Major King, one of the better officers we had as far as I was concerned, killed by a Japanese infiltrator. We found the major’s body the next morning with his head severed by a bayonet or a machete.”³¹

Herring remained on New Britain until April 1944.³²

By the time of the next planned Allied advance to the island of Biak, the integration of Signal Corps SAW battalions and Air Force FCS was nearly seamless. Indeed, retired CMSgt. Joe Newman, a Signal Corps radio maintenance man assigned to the 8th FCS, spent his entire tour in the Pacific under the administrative and operational control of that Air Force squadron. Even though he wore the distinctive Signal Corps emblem on his garrison hat and the aiguillette on his seldom-worn Class A uniform, he worked daily in the FCS filter center. At the end of the war, Newman found out he had been transferred to the Army Air Forces, but

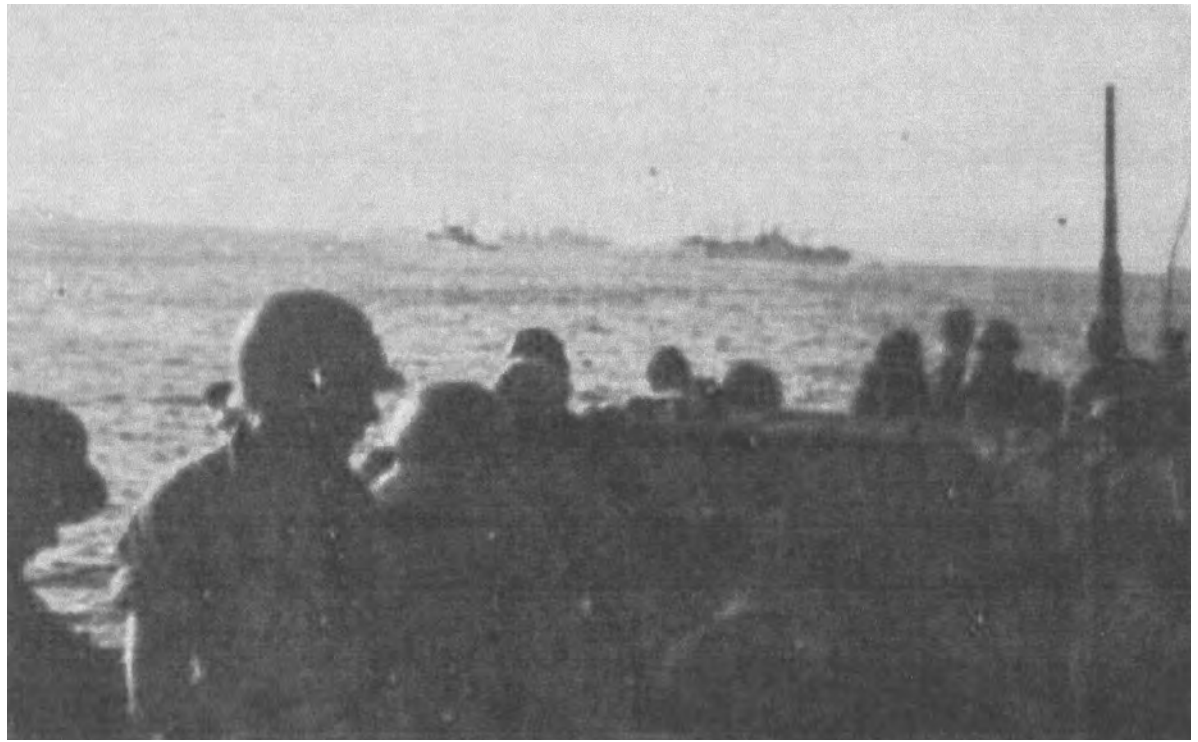
PUTTING THE RADAR ON A 400-FT. HILL MADE THE DETECTION RANGE JUMP TO 50 MILES



(Right) Aboard LST (landing ship tank) en route to invasion of Biak Island, July 1944. (Photo courtesy of Jake Herring.)

(Below) "Turning and burning," the SCR-602 radar tent conducting operations. (Photo courtesy of NARA.)

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...GAVE OFF
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EXHAUST
FLAME**



was never informed. (The Chief went on to have a 30-year USAF career.)³³

In April 1944, after a refitting period back at Finchhaven, Herring's 596th SAW battalion sailed aboard an LST (landing ship tank) to support the invasion of Biak. Landing at the neighboring islet of Los Negros, Herring's unit ran ashore under Japanese fire.³⁴

As the battle progressed, the U.S. troops were on the south side of an east-west oriented Japanese runway, just up from the beach and the defending

troops were on the north side of the runway. So close were the opposing forces that Herring recalls that the radar could not operate at night because the little two-cylinder gasoline generator, that powered the radar, gave off a blue exhaust flame at night. Like a magnet for rifle fire, the blue flickering drew danger onto the radar site. So at night the radar men shut down operations and manned defensive fighting positions.³⁵

One of the advantages of the self-contained aspect of the LW units was the ability to conduct air intercept operations on its own. As mentioned previously, the LW sites reported back to a master filter center. However when the radar units were first getting established, each site could work intercepts in its own smaller area. A controller would be attached to the LW platoon and run fighters onto targets within the limited coverage of the LWs. Not nearly as efficient as the fully integrated LW and heavy SCR-271 designed operations, it was nevertheless better than nothing.³⁶

As the war progressed, the pace of recapturing islands increased. In July 1944, Noumfour Island in the Dutch East Indies was slated for seizure from the Japanese.

Herring's battalion went in with the Army's 503d Parachute Regiment. It was during this operation that Herring first saw the fruit of his labors. A plot was picked up on the SCR-602 radar and the Air Force controller attached to the LW platoon vectored a P-61 nightfighter on the track. Continuing the intercept, the controller guided the Black Widow until the radar operator on the big black-painted fighter picked up the bogey. He, in turn, provided vectors to the pilot until the pilot visually sighted the target. Confirming it was a "bandit," actually a Japanese "Betty" twin-engined medium bomber; the pilot proceeded to "torch" the



(Right) M2 .50 caliber machine gun training, New Guinea, 1944. Herring is on the right.

(Below) Unloading LST onto beach. (Both photos courtesy of Jake Herring.)



SUBSTANTIAL NUMBERS OF TROOPS WERE INVOLVED IN AIR WARNING AND DEFENSE MISSIONS

bomber with the P-61's four 20mm cannons and four .50 caliber machine guns.³⁷

As it happened, the intercept took place over the radar site allowing Herring and his mates to spill out of the radar tent and watch the streaks of light racing from the fighter to the victim. Then they saw a big flash, and then many streamers of flames float down from the sky. The fighter pilot radioed, "Splash one bandit."³⁸

Jake Herring's battalion, the 596th SAW, was one of only many that served in the Southwest

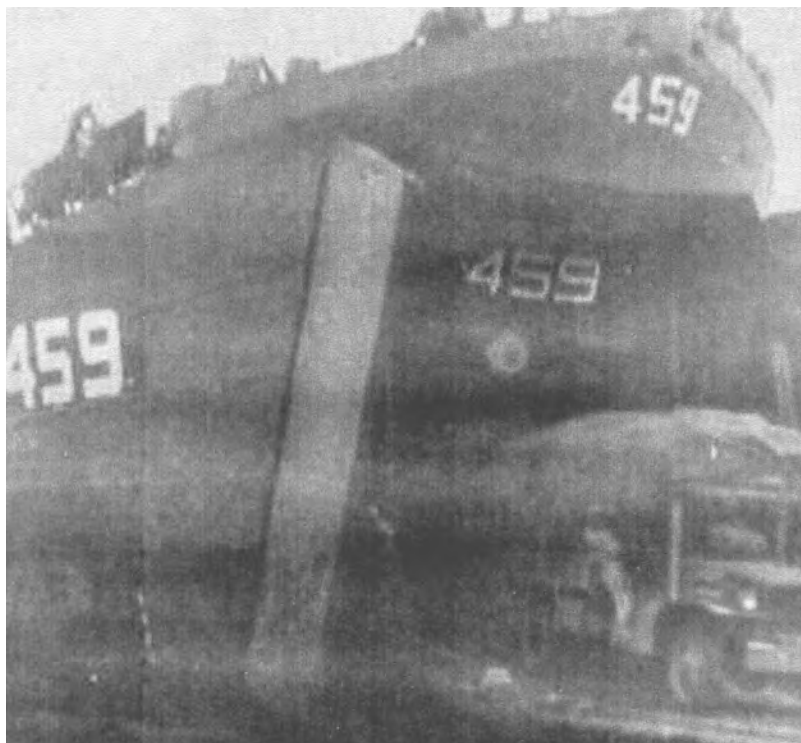
Pacific Theater. The author found references in the U.S. National Archives at College Park of eleven separate SAW battalions during V Fighter Command operations. With an average of 1,000 officers and men in each, it is apparent that substantial numbers of troops were involved in air warning and defense missions.

Despite all the Signal Corps troops involved, there were very few Army Air Forces-owned personnel in ground control of radar and fighter aircraft operations. For most of V Fighter Command's operations, the 8th Fighter Control Squadron did yeoman's work for the theater.

The 8th FCS sent detachments of enlisted aircraft plotters and rated pilots to operations and sites throughout the Southwest Pacific. Initially, the pilots learned their jobs under fire. They did the best they could, while learning how best to employ radar in guiding interceptors onto targets. The Air Force believed that only a pilot could properly translate the obscure oscilloscope tracings into a verbal "picture" that an airborne fighter could understand.³⁹

As time progressed, many combat tour-expired fighter pilots were recycled into controller positions. Even this pool of resources was insufficient to meet the expanding mission demands and "pure" controllers were eventually trained and sent into combat. Freshly minted second lieutenants would attend radar and controller school back in the States and come to New Guinea for some seasoning. These controllers went on to become the backbone of the FCS units. In March 1942, the 8th had 6 flying officers and 83 enlisted troops.⁴⁰ By February 1944, the 8th FCS had four flying officers assigned, 11 non-flying officer controllers and 231 enlisted.⁴¹

Like the SAWs, FCS personnel often fought under fire. In July 1942, the 8th was still based at





(Top) Drying out the vacuum tube electronics.

(Above) Northrop P-61 "Black Widow" night fighter. (Both photos courtesy of NARA.)

SGT. BROWN... WAS AWARDED THE BRONZE STAR

Milne Bay, New Guinea. In August, Japanese troops landed from barges, only six miles from the headquarters. The squadron endured mortar and artillery fire for several days. Due to a shortage of combat troops, the men of the 8th Fighter Control Squadron were pressed into service as infantry, bolstering an Australian infantry brigade. Several tense days in fighting positions ensued, but the Japanese threat was eliminated before the airman cum-infantry had to be used.⁴²

In a more serious example, a Sgt. Brown, 8th FCS radio operator, was awarded the Bronze Star for Valor for combat action during the invasion of Biak. Coming ashore on D-Day, Sgt. Brown killed several Japanese soldiers during an enemy infantry charge against the U.S. forces. Sgt. Brown later crawled out under intense enemy fire to rescue a wounded U.S. soldier.⁴³

The airmen of the 8th faced more than ground threats. A combat report dated March 4, 1944 from the commanding officer of the 8th FCS to the commanding general, Fifth Air Force, described a Japanese bombing attack on Gusap, New Guinea and results:

Weather: 4/10s cloud cover, vis 8 miles, cloud base 3,000

First radar contact: 1230L, last contact 1340L
16 a/c scrambled, 42 a/c returning from mission
4 'Tonys' sighted, 3 destroyed, 0 friendly aircraft missing *

Several H/E bombs dropped; 2 A-20s damaged, 3 A-20s slightly damaged

No warnings given – enemy a/c came in low and timing of returning mission covered plot board with tracks.⁴⁴

Finally, the 8th's combat reports also include a Bronze Star citation for Capt. Lloyd Brooks, who served as a ground control intercept officer aboard a U.S. Navy destroyer supporting the December, 1944 invasion of Ormoc Bay, the Philippines. Capt. Brooks was directing a flight of fighters to intercept a group of enemy tracks. Despite the picture-perfect intercept, one of the attackers broke through and performed a kamikaze attack on the destroyer. Capt. Brooks continued controlling until the ship lost power and eventually sank.⁴⁵

These examples are but dramatic interludes in the work-a-day business of providing early warning and ground controlled intercept of enemy aircraft. The 8th FCS, and later squadrons like the 1st, 35th, 49th and 56th, working with the Signal Aircraft Warning battalions expanded the roles that radar could play. By war's end, GCI had expanded to include both the SAWs and the FCS to become Fifth Air Force's primary means of command and control (C2) for tactical operations. Indeed, V Fighter Command had been designated primary agency for all matters concerning air warning and defense. As such, V Fighter was the sole source for using SAW BNs and FCS.⁴⁶

The Allied advance into the Philippines was perhaps the culmination of the progress made in combining the SAWs and the FCS into a smoothly running air warning and effective air defense machine. Many radar sites spread throughout the islands as the campaign progressed covered virtually every square mile of territory. Radar supplies and replacements shipped from Signal Corps depots from the ZI (Zone of the Interior) arrived into Air Force supply dumps and were distributed as Air Force assets. The signalmen of the SAW battalions drew rations and pay from the Air Force. Battalion commanding officers took orders directly from V Fighter Command that in turn relied on the Signal Corps officers to lend advice on how best to

* "Tony" was the Allied code name for the Imperial Japanese Army Air Force's Ki-63 single engine fighter/bomber.

**IN JUNE 1945,
THE SAWS
TRANS-
FERRED TO
THE AAF.**

place and use the equipment. Ground controllers and signalmen worked side by side in operations tents and at radar scopes, directing Allied aircraft in myriad missions.⁴⁷

This unity was a far cry from the early divided concept between the Signal Corps and the Army Air Forces. As a fitting finale, in June 1945, the Signal Aircraft Warning Battalions officially transferred from the Signal Corps to the Army Air Forces.⁴⁸

Legacy

The legacy of these pioneer radar units lives on in today's USAF ground tactical air control

squadrons (ACS). The ACSs in the active duty and Air National Guard are constituted much like their World War II predecessors and served in those original roles in Korea, Vietnam, the Cold War, and both conflicts in Iraq. They are designed to be self-contained, self-sufficient squadrons capable of providing early warning, air defense, and ground controlled intercept. The ACS's personnel include their own operators, communicators, radar and computer technicians, medics, vehicle maintainers, and cooks. A true legacy—the progeny of the Signal Aircraft Warning Battalions and Fighter Control Squadrons are still providing service to today's Air Force. ■

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Fighting Machines for



the Air Service, AEF



Theodore M. Hamady

(Overleaf) French squadrons were rapidly being equipped with the SPAD XIII pursuit when the first American-trained pursuit squadrons were preparing for combat operations. The robust SPAD XIII could outrun all opponents in level flight or in a dive, but pilots found its 220 hp inline Hispano-Suiza engine trouble-prone. American squadrons began to transition to the SPAD XIII in July 1918 when sufficient numbers became available. (Photo courtesy of Canada Aviation Museum.)

(Right) Newton Diehl Baker, U.S. secretary of war from 1916 to 1921, was criticized by a Republican-controlled Congress after the war for failures in U.S. wartime production efforts, particularly in the area of military aviation. (Photo courtesy of NASM.)

We didn't know what a fighting machine was.
— Col. Benjamin D. Foulois, U.S. Air Service¹

America's successful record of manpower mobilization during the First World War far outpaced the mobilization of American industry. Throughout the war, the American Expeditionary Forces (AEF) in France remained largely dependent on its allies for the provision of tanks, artillery, machineguns, fighting planes, and many other necessities of modern warfare.

Postwar congressional and public scrutiny focused on the wartime production record of the U.S. aviation industry, for this industry and its proponents had raised the nation's expectations with visions of fleets of American-built fighting planes that would soon take to the air. Frederick Rentschler, president of Pratt & Whitney Aircraft Company during the 1920s, explained:

Immediately after our entry into the war, it was determined that one of our great contributions was to be in the air, and all generally accepted the idea that our great automotive companies, within a few months' time, could duplicate anything in quantity, and as Howard Coffin [president of Hudson Motor Car Company and chairman of the Air Production Board] put it, "darken the skies over Europe."²

These heady expectations would not be realized, however. American factories failed to produce and ship a single pursuit plane to fight in France. The much-modified British D.H. 4 bomber, the single type of fighting plane to be built and shipped from U.S. factories, was obsolescent by the time it reached France.³

What follows is a chronicle of the events that led to the humiliating failure of America's aviation production efforts in World War I. Fortunately, the appropriate lessons were learned, and would be applied with great success in a future war.

The Aviation Section of the Signal Corps, U.S. Army, possessed 26 qualified pilots and 142 airplanes when war with Germany was declared on April 6, 1917. These meager assets, dispersed across the United States, the Philippine Islands, and the Panama Canal Zone, were supported by a domestic aviation industry that managed to deliver only 83 of the 366 airplanes ordered by the U.S. Army during 1916.

Prior to the declaration of war, American aviation factories had not produced a single modern combat plane capable of fighting and surviving on



the Western Front. American aeronautical engineers and air officers had little concept of the function and design of modern combat aircraft. American air observers were not privy to developments in military aviation overseas, as Col. Samuel Reber, former chief of the Aviation Section, Signal Corps, observed:

In that fog of war, no blanket was thicker than the one every army hung over its aircraft plans, and on no other single point was it so eager to learn the enemy's. Either could only examine the construction of enemy planes in use at the time, from the examples which fell in their lines; and foreign military attachés, who were never allowed permanently at the front, might, on visits, see the planes of the various armies at the aerodromes. But the new types that were in the process of manufacture were for no eyes except those of the experts in one's own army.⁴

Implementing President Wilson's policy of strict neutrality, Secretary of War, Newton D. Baker, compounded the difficulties involved in acquiring vital intelligence regarding rapidly changing developments in military aviation.

Perhaps an even greater shortcoming of the Aviation Section, at the beginning of the war, was its lack of doctrine. Michael Doubler has defined doctrine as "the fundamental, authoritative principles armies use to guide their mission accomplishment," and from doctrine, "an army derives its tac-

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Theodore M. Hamady retired in 2001 as head of an international marketing company that specialized in aviation and marine products and services. At present, he is writing a history of the Nieuport 28 pursuit plane and is co-curating an exhibit featuring the aviation art of Clayton Knight and William John Heaslip. He holds degrees in history and business from the University of Michigan. A flying enthusiast from boyhood, Mr. Hamady is a pilot and collector of aviation art, literature, and artifacts. He has contributed articles to several journals, including Air Power History, Air Force Magazine, Air & Space, Windsock, and Over the Front. For the past fifteen years he has volunteered as a research historian at the Smithsonian Institution's National Air and Space Museum.

(Near right) Among the first three U.S. military aviators, Benjamin D. Foulois participated in the Mexican Punitive Expedition as commander of the First Aero Squadron. Promoted in 1917 to the rank of brigadier general as Chief of the Air Service, AEF, Foulois was under great pressure to equip and field the first American squadrons to support American troops. Major General Foulois was Chief of the Air Corps when he retired in 1935 after 37 years of service. (Photo courtesy of NARA.)



(Far right) Lt. Col. George O. Squier (USMA 1887), was Chief of the Aviation Section, U.S. Signal Corps, from May 20, 1916, to February 19, 1917. Promoted several months later to Chief Signal Officer of the Army, Brigadier General Squier, pictured here as a major general, remained in an influential position regarding air matters, and served as a member of the Aircraft Board. On May 20, 1918, an Executive Order relieved the Chief Signal Officer of all duties connected with the Army's aerial activities and created the Division of Military Aeronautics, which was absorbed four days later into the Army Air Service. (Photo courtesy of NASM.)



THE ARMY AVIATION SECTION WAS CLEARLY A START-UP ORGANIZATION

tics, procedures, organization, equipment and training.”⁵ Once war was declared, the Aviation Section of the Signal Corps, reorganized in May 1918 as the Army Air Service, began to define its doctrine and organize the elements derived from it. The Army Aviation Section was clearly a start-up organization.

Organization and planning began in April 1917, with the creation of the Joint Army and Navy Technical Board. The board was charged with the responsibility for standardizing the designs and general specifications of aircraft to be procured by each of the services. Composed of three Army and three Navy aviation officers, the board reported jointly to the secretaries of the War Department and of the Navy. Among the Army officers was Maj. Benjamin D. Foulois, who would become Chief of the Air Service, AEF, eight months later, with the temporary rank of brigadier general.

The Chief of the Aviation Section of the U.S. Signal Corps, Brig. Gen. George O. Squier, gave an indication of the board's scope and authority, when he declared that he “would not buy a stick of wood which this technical board of Army and Navy officers did not recommend.”⁶

The Joint Technical Board began work without benefit of a policy directive that would have provided a basis for planning for numbers or proportions of observation, pursuit (as fighters were then called), and bombing aircraft. With little information about how to proceed, the board was receptive to the ideas and proposals being offered by its new allies.

As British, French, and Italian military missions converged on Washington, D.C., a cable arrived from Premier Alexandre Ribot of France. The cable, directed to the Joint Technical Board for review, read:

Two thousand planes should be constructed each month as well as 4,000 engines by the American fac-

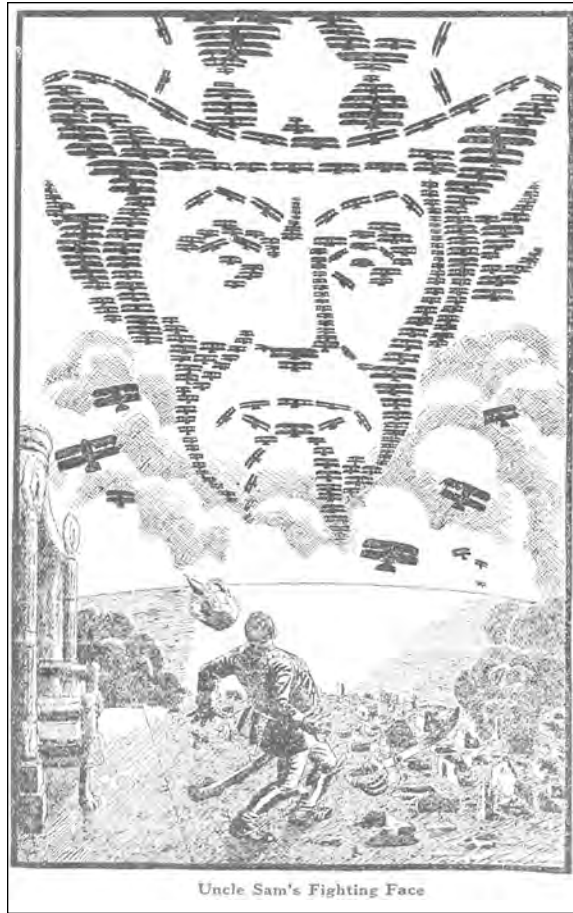
*ories. That is to say, in the first six months of 1918, 16,500 planes of the latest type, and 30,000 engines will have to be built. The French Government is anxious to know if the American Government accepts this proposition, which would allow the allies to win the supremacy of the air.*⁷

Incredibly, Ribot's cable became the basis for establishing target numbers (but not types) of American combat aircraft and engines, with the requisite number of pilots and mechanics. With Ribot's cable in hand, Major Foulois prepared the personnel and equipment requirements and appropriations legislation needed to meet the targets. Brigadier General Squier presented the plan to the secretaries of the War Department and of the Navy and quickly received their approval, followed by the approval of the General Staff. On July 14, 1917, amid a barrage of favorable press publicity, the House of Representatives voted on the enormous \$640 million aeronautics appropriations bill. The House passed the bill, authorizing a sum greater than the cost of the Panama Canal, without a single dissenting vote.

American and Allied media trumpeted the passage of the bill, and painted a fanciful picture of the accomplishments of American industry and aviators once the program got under way. A typical editorial, appearing in the *New York American*, boasted: “Fifty thousand American aviators in fifty thousand flying machines, each dropping one hundred dynamite bombs on German soil, would do the work.”⁸

Official Washington also heralded the coming triumph of America's new air arm. Brigadier General Squier, who was also a member of the Air Production Board chaired by Howard E. Coffin, spoke of “winged cavalry sweeping across the German lines and smothering their trenches with a storm of lead, which would put the ‘Yankee

(Near right) "Uncle Sam's Fighting Face." This editorial cartoon appeared in the *N.Y. American*; it reflected widespread expectations for U.S. military aviation when war was declared on Germany in April 1917. (From the *N.Y. American*, reproduced in *Aerial Age Weekly*.)



(Far right) Lt. Gen. Ernst von Hoepfner (1860–1922), chief of the Imperial German Air Force (*Luftstreitkräfte*), instituted the "Amerika Program" in order to meet the expected onslaught of American airpower. German pursuit forces were greatly expanded as a result, and Germany deployed the vaunted Fokker D.VII pursuit aircraft by mid-1918. (Photo courtesy of the author.)



punch'... into the war, ... sweep the Germans from the sky, [and] ... blind the Prussian cannon." Squier continued: "The time will be ripe to release the enormous flock of flying fighters to raid and destroy military camps, ammunition depots, and military establishments of all kinds."⁹

These expectations seemed reasonable at the time because America, the most technologically advanced nation in the world, had pioneered mass production. Its vast automotive industry appeared fully capable of producing thousands of fighting planes. Writing in *National Geographic* magazine, Maj. Joseph Tulasne, chief of the French Aviation

(Below) Maj. Joseph Tulasne (third from left in front row), chief of the French Mission to the United States, poses with members of his mission on the steps of the National Geographic Society's headquarters in Washington, DC. (Photo from *National Geographic*.)



Mission to the United States, proclaimed in a more restrained manner: "In America, the European types of airplanes and motors will be built, at first, to aid the English and French factories, in order that the Allies may have the largest possible number of battle planes at the earliest possible moment. Then the new airplanes, more powerful and better armed, will be built to be used during the summer of 1918. The unlimited resources of American industry will make it possible to carry out these two building programs." Tulasne continued, "The Allies are anxiously awaiting the aid of the American air fleet. If this fleet comes in time for the 1918 battle, it will be the deciding factor."¹⁰

Lt. Gen. Ernst von Hoepfner, commander of the German Air Force (*Luftstreitkräfte*), observed that "the entry of America in the war was hailed in both countries [Britain and France] as offering the medium for the achievement of overwhelming air superiority through the use of her vast resources. The columns of the hostile press were filled with fantastic statements," he said. "In a short time, thousands of American planes were expected to swarm over Germany and force us to sue for peace."¹¹

Although skeptical of the claims of America's industrial prowess, Lt. General von Hoepfner would not risk being unprepared for the onslaught of American air power. His "Amerika Program," promulgated in June 1917, proposed doubling the number of pursuit squadrons, creating new training schools, and increasing aircraft production. This last proposition would prove difficult because raw materials were in short supply in Germany. Lt. General von Hoepfner also directed that aviation technical superiority be maintained, and it was this

(Near right) Maj. Raynal Bolling, prewar military flyer and chief counsel for the U.S. Steel Corporation, undertook a grueling three-month mission to Europe to report on the state of aviation affairs in France, England, and Italy. His commission's recommendations for aircraft types to be built in the United States were largely overtaken by the rapid changes in combat aviation technology in Europe. Promoted to colonel in August 1917, Bolling was killed in France in 1918 when he inadvertently crossed the front lines and was shot while attempting to evade capture. (Photo courtesy of NARA.)



SQUIER WAS URGED TO SEND A TECHNICAL MISSION TO EUROPE

momentous decision that ultimately led to the fielding of the Fokker D.VII, perhaps the finest pursuit of the war.

The immediate order of business in Washington was how to spend the funds appropriated to build the U.S. Air Service. Despite an influx of foreign military advisors, aeronautical engineers, brokers, and commission agents for foreign manufacturers, American aviation authorities soon realized that this group was not current with the latest developments in military aircraft overseas. As a result, Brigadier General Squier was urged to send a technical mission to Europe, to determine the best types of foreign designs to be built in the United States.

Maj. Raynal C. Bolling, an Aviation Section Reserve pilot who was also chief counsel for U.S. Steel Corporation, was named to head the commis-

sion, which included automobile and engine engineers, metallurgists, a banker, an efficiency expert, and an aluminum castings expert. In addition, ninety-eight men from the automobile industry were directed to visit foreign factories, to learn manufacturing procedures in order to effect an efficient technology transfer once they returned to the United States.

The Bolling Mission sailed from New York on June 17, 1917, and landed at Liverpool, England, on June 26, in the thirty-fourth month of the war. The Bolling Mission soon found that aviation developments were proceeding at a frenetic pace, with Bolling reporting that the situation "must be watched daily in the light of developments which are taking place with rapidity unequalled in any other branch of the military service."¹² Nowhere was this situation more apparent than in the ongoing development of pursuit planes. The mission of pursuit aviation — to establish and maintain air superiority — underscored the critical importance of selecting the finest pursuit plane to equip the Air Service, AEF.

Following their arrival in Europe, members of the Bolling Mission began a whirlwind tour of England, France, and Italy, and then returned to France. They conferred with aviation authorities and manufacturers in each country about royalty payments and the training of U.S. pilots and mechanics in Europe, and investigated existing and contemplated airplane designs and the capacity of European factories to build them.

On July 30, 1917, Major Bolling cabled the following recommendations to Washington: "Believe necessary [to] build both best fixed [engine] fighter and best rotary engine fighter now developed. These are SPAD with 200 [hp] Hispano and SPAD with 200 [Bolling erred, the Gnome was 160 hp] Gnome Monosoupape [single valve]. Both may be superceded next year, but this is only a guess. Think Hispano 200 will probably be superceded after December 1918 by new, undeveloped engine."¹³ It is clear that Bolling's focus was on the status of engine development.

Maj. Raynal Bolling and members of his commission on a visit to the Pomilio Factory in Italy in 1917. Bolling found the Italian aviation authorities particularly keen on providing training and material to the American Air Service. (Photo from *Aerial Age Weekly*.)



The Morane-Saulnier A-1 monoplane pursuit, equipped with the Gnome 9N rotary engine, showed great promise when first tested; its maneuverability, speed, and rate of climb were superior to that of the Nieuport 28. After it suffered several fatal crashes due to wing failure, however, its planned use as a first-line fighter ceased. (Photo courtesy of NASM.)

**BOLLING'S
PROJECTED
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THE U.S. AIR
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FRENCH
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On August 15, 1917, newly promoted Colonel Bolling provided Brigadier General Squier with a comprehensive report, relating the activities and achievements of his Aeronautical Commission. Bolling discussed a wide range of issues, including resolution of the problem of royalty payments and the need to coordinate aircraft production from Europe rather than the United States, to minimize complications and achieve greater cooperation with the Allies.

Bolling noted the willingness of Britain, France, and Italy to train U.S. aviators and mechanics, and the need for the United States to provide its allies with quantities of raw, semi-finished, and finished goods and materials. He reported that while the aeronautical industry in England was fully mobilized to meet the Royal Flying Corps' extensive program for 1918, French industry, however, possessed both the capacity and the experience to supply American aviation requirements.

Clarifying and expanding upon his earlier recommendation to build European designs in the United States, Bolling now advised building the following aircraft: the British Bristol biplace pursuit and two French-built pursuits, the SPAD XIII with the 200 hp Hispano-Suiza engines and the SPAD XV, powered by the 160 hp Gnome rotary engine. The SPAD XV differed from the SPAD XIII, being of lighter weight and monocoque construction and powered by a rotary, instead of an inline, engine. Bolling also recommended the British Airco D.H. 4 for day bombing and reconnaissance and the Italian Caproni Triplane for night bombing.

Colonel Bolling noted the difficulties, particularly from French sources, of providing sample airplanes to the United States and the "surprising lack of data covering articles of their manufacture." He added, "In most of the airplanes and engines factories, they are entirely without complete drawings, specifications and other tabulated information which we should consider essential in the [mass production] manufacture of airplanes and engines."¹⁴

In conclusion, Bolling recommended a program for aircraft production in the United States that would begin to supply the requisite number of airplanes at the Front after July 1, 1918. It was evident to Bolling that European production would have to take up the slack until American factories could gear up. Requirements for service and training aircraft in Europe prior to July 1, 1918, would have to be met with aircraft produced in France and Italy.

On August 30, 1917, the American and French governments signed a contract, in which France agreed to provide the U.S. Air Service, AEF, with 1,500 Breguet 14 bombers and reconnaissance planes, 2,000 SPAD XIII fighters equipped with 200 hp Hispano-Suiza engines, and 1,500 SPAD XV or Nieuport 28 pursuits, both pursuits being equipped with 160 hp Gnome 9N rotary engines. Several prototypes of the Nieuport 28 were being tested at the time, but the SPAD XV was soon



dropped from contention after failing to meet performance requirements.

Under the terms of the contract, French pursuit aircraft would commence delivery in January 1918, and be completed by June 1918. The contract also provided for the substitution of later types of aircraft if new designs were deemed superior to designs specified in the contract. For its part, the U.S. government agreed to provide a large quantity of machine tools and raw materials, for delivery to a French port no later than November 1, 1917.

Bolling's projected requirements for the U.S. Air Service were clearly influenced by the French government's for its own *Aviation Militaire*. French projections for pursuits in service by January 1918 foresaw a mix of SPAD XIII's equipped with 200 hp Hispano-Suiza engines, Nieuport 28s with 160 hp Gnome 9N rotary engines, and existing Nieuport 27s, powered by the 120 hp Le Rhone rotary engine. Although the Nieuport 27 was still in service, French authorities had concluded that it was now inferior to current German pursuit planes, and it was already in the process of being replaced by French pursuit squadrons. That French report also noted the importance of re-equipping its bombing and observation squadrons, stating, "it is indispensable that the greatest efforts be made to increase to the extreme limits, the fabrication of the Breguet [14] and the Salmson [2]."¹⁵

The critical quest for a winning pursuit plane design remained unfulfilled, for during the fall of 1917 the Morane-Saulnier A-1, another Gnome 160 hp rotary-powered aircraft, appeared on the scene. Early tests of this monoplane pursuit promised excellent maneuverability, speed, and rate of climb. Further tests of the Morane-Saulnier A-1 and the Nieuport 28 would determine which of these Gnome-powered pursuits would prevail and equip French squadrons along with the 200 hp SPAD XIII.

By mid-August 1917, Colonel Bolling's mission was fulfilled, and he was directed by Gen. John Joseph Pershing to remain in Paris to take command of aviation matters in the European Zone of the Interior, and continue monitoring aviation activities there. Most of the former members of the mission returned to the United States or to other duties in France or England, but Bolling retained the services of several officers, including Maj. Edgar S. Gorrell. Gorrell, who would later direct the Technical Section of the U.S. Air Service, would prove to be a highly influential Air Service officer in the months ahead.

Major, later Colonel, Edgar Staley Gorrell graduated in 1912 from West Point. He served as a military aviator with the First Aero Squadron during the Mexican Punitive Expedition in 1916, and the following year went to Europe as a member of the Bolling Commission. Gorrell was instrumental in the policy determination to equip American squadrons with pursuits built in Europe, rather than in the United States. After serving as technical director of the U.S. Air Service, Col. Gorrell compiled the history of the Air Service in the months immediately following the Armistice. (Photo courtesy of NASM.)



IT WAS CLEAR ... THAT ENGINE DEVELOPMENT AND PERFORMANCE WERE DRIVING AIRFRAME DESIGN

GORRELL... BELIEVED... U.S. INDUSTRY COULD BUILD SUITABLE PURSUIT DESIGNS AND GET THEM TO THE FRONT IN TIME

Bolling had predicted earlier that it would take a year for the 200 hp Hispano-Suiza engine to be replaced by a more powerful engine, but Bolling and Gorrell were now concerned that it might be superseded sooner. They were also aware that a 300 hp scaled-up, ungeared version of the Hispano-Suiza engine was on the drawing board. Washington was informed of these facts by cable on August 14, 1917.

On September 24, 1917, Washington informed Bolling that the U.S. pursuit-building program now included 1,500 SPAD XIIIIs, powered by the 200 hp Hispano-Suiza engine. Bolling was also informed of a program to build 1,500 SPAD XIIIIs powered by the newly developed V-8 Liberty engine. This program, which had been initiated without Bolling's knowledge, proved unsuccessful, as did another attempt to marry the Liberty engine to the successful British Bristol F.2B biplane pursuit airframe. Largely politically motivated by a desire to standardize on the American Liberty engine, this effort resulted in several fatal crashes during testing: the up-rated, 400 hp, V-12 Liberty engine was much too heavy for the redesigned Bristol airframe.¹⁶

It was clear, both in the United States and in Europe, that engine development and performance were driving airframe design. The program to initially equip the Air Service, AEF, with foreign fighting planes seemed reasonably well in hand by the late summer of 1917. The Air Service, however, would be heavily reliant on French production capabilities, as well as on the ability of American industry to meet its own obligations after tooling up. For a number of reasons, the aviation equipment program for the Air Service, AEF, would unravel during the months that followed.

In October 15, 1917, Major Gorrell, in his capacity as technical advisor to Colonel Bolling, recommended that "the United States be requested to build no more pursuit aeroplanes of the types proposed at that date to be shipped to Europe for use on the Western Front."¹⁷ Gorrell's recommendation, a stunning reversal of policy, was prompted by several considerations, including the delay in provision of drawings for the 200 hp Hispano-Suiza engine, and the resulting delay in getting the engine under production in the United States. Considering the timeframe required to get completed pursuit aircraft from factories in the United States to the Front, Gorrell concluded, "the United States could not build this [200 hp Hispano-Suiza-equipped] SPAD pursuit airplane in time for it to arrive in Europe before its effectiveness had practically ceased."¹⁸

The principal factor motivating Gorrell's October 1917 recommendation was his judgment that the 200 hp Hispano-Suiza engine would soon become obsolete. Testifying in 1919 before a House subcommittee investigating war expenditures, Gorrell explained:

The German pursuit machine developed, and their two-place [reconnaissance] fighting machines were always above the French and made the 200-horsepower SPAD a worthless machine because of its lack of performance. Consequently the Allies had to get a better machine and they got that by increasing the horsepower of the 200 engine to 220 horsepower. The 220-horsepower engine ... was a failure for a long time, but afterwards they got it so it would run for an appreciable length of time.¹⁹

Gorrell's recommendation was approved and effectively became policy for the remainder of the war, although this was not what Gorrell intended at the time. He believed that with sufficient foreknowledge, U.S. industry could build suitable pursuit designs and get them to the Front in time. Major Gorrell had the new 300 hp Hispano-Suiza engine specifically in mind for future use.

Attempts to produce other pursuit designs in the United States for use overseas had failed and the Air Service, AEF, was now principally dependent on its French allies for pursuit planes, bombers, and observation types. The timing had critical consequences for the U.S. Air Service, AEF. During October 1917, the French accelerated their aircraft production in anticipation of the growing threat posed by the German "Amerika Program." French projections for aircraft at the Front by April 1918, initially pegged at 2,665 aircraft, were increased to 2,870 aircraft, and increased yet again, to 4,022 aircraft, with bombers and pursuits given priority.

French pursuit force projections for April 1918 now included SPAD XIIIIs equipped with 220 hp Hispano-Suiza engines and Nieuport 28s or Morane-Saulnier A-1s, "if the trials of the latter prove satisfactory."²⁰ Efforts were well under way to increase production of Breguet 14 and Salmson

The Nieuport 27, equipped with the 120 hp Le Rhone rotary engine, was the last of Nieuport's sesquiplane, or Vee-strut, pursuits. It was clearly obsolete and being withdrawn from French pursuit squadrons at the end of 1917. It might have equipped the first American pursuit squadrons to enter combat, had not the untested (in combat) Nieuport 28 been substituted at the last moment. (Photo courtesy of NASM.)

BOLLING WAS RELIEVED AS ASSISTANT CHIEF OF THE U.S. AIR SERVICE AND PLACED UNDER FOULOIS' COMMAND

2 bombing and observation planes, as well as the biplace SPAD XI that was also intended for the observation role.

In order to reach their production goals, the French sought to standardize the best aircraft and engine designs. Problems persisted with the manufacture of the 220 hp Hispano-Suiza engine, and it would take time for subcontractors to build up their production runs on the SPAD XIII. These problems were finally resolved, but the production benefits would only be realized later in 1918. Ultimately, the SPAD XIII would be produced in greater numbers than any other wartime pursuit.

Pressure was now building on Brigadier General Foulois to organize and equip the first American aviation units without delay. Foulois had prepared the original personnel and equipment projections for the U.S. Air Service, when he was a member of the Joint Army and Navy Technical Board. Newly promoted to brigadier general and installed as Chief of the Air Service, AEF, in November 1917, Foulois promptly took charge of "all matters relating to the training, organization or equipment of the Air Service in France, England [and] Italy."²¹ Foulois' approval was now required for plans and recommendations coming before the Joint Technical Board.

As part of the Foulois reorganization, Colonel Bolling was relieved as assistant chief of the U.S. Air Service and placed under Foulois' command, to act as the principal liaison officer of the Air Service, AEF, to the Allied Air Board.

Brigadier General Foulois had myriad problems, but the most pressing was the necessity to equip and quickly deploy American squadrons to support American infantry divisions that would soon enter combat. In response to a query from his new boss about the imminent supply of airplanes and engines from France, Colonel Bolling responded with some concern:

The French have recognized what I feared might happen, namely, that our air program will develop more slowly than expected because of difficulties and delays in the establishment of airdromes, parks, depots, etc., and delays in our training program. Just now these are clearly the limiting factors rather than the provision of airplanes and engines ... Monsieur Lucher, Minister of Armament, who now controls airplane and engine production, told me that quite frankly the French would not be able to deliver to us the numbers of airplanes and engines promised by the dates agreed to. While he mentioned delays in deliveries of machine tools and raw materials [from the United States under the terms of the August 30, 1917, contract], he did not conceal the fact that the cause of their decision is a large increase in their own air program.²²

France's inability to supply modern air equipment to the U.S. Air Service was caused by the rapid expansion of its own air service in response to the Amerika Program instituted by the German *Luftstreitkräfte*. Ironically, the Amerika Program



was induced by the media prospect of American-built aircraft "flooding the skies over Germany." Brigadier General Foulois commented on the damage done by this unfortunate braggadocio in a letter to Dr. Charles D. Walcott, secretary of the Smithsonian Institution in Washington, D.C.:

The greatly exaggerated publicity, from the States, of our Air Service program, and what remarkable things we would do to the Germans this Spring, has been the worst thing that I have had to combat since my arrival as the English, French, and Italian publics fully expected us to do something wonderful, and the reaction has hurt us over here very much.²³

On November 30, 1917, General Hageneau, chief of the French mission attached to the American Army Headquarters, informed Foulois of the type of equipment that would be supplied initially by the French government to the U.S. Air Service for advanced training prior to entering front-line service. The communication read: "During this period of instruction, it suffices and is even advantageous to employ only airplanes of the most recent type. The squadrons can, therefore, be equipped at first with French airplanes of the present current type whilst waiting delivery of those ordered from the US."²⁴

Hageneau's statement appeared reasonable and reassuring, but each of the types proposed — Dorand A.R.s and/or Sopwith 1-1/2 Strutters for observation and day bombing, Voisin 8s and 10s for night bombing, and Nieuport 27s for pursuit training — were obsolescent or obsolete, and all, with the exception of the Voisin 10, were then in the process of being removed from French squadrons.

General Petain had decreed in October 1917 that the Nieuport 27 pursuit was "inferior to all contemporary enemy fighters."²⁵ As Major Gorrell had observed that "we always give a flier training in the same type [of aircraft] he is going to use himself when he gets to the front," it now appeared that the first American-trained fighter squadrons would enter combat with the Nieuport 27 pursuit.²⁶

On January 5, 1918, General Pershing directed Brigadier General Foulois to expedite the development of the Air Service, AEF. Foulois promptly queried Bolling about the availability of the SPAD XIII with the 220 hp engine.

Bolling answered, "In reply to your inquiry regarding the SPAD, we are entitled under the [August 30, 1917] agreement to demand the newer [220 hp] type of Hispano-Suiza engine, and I have dictated a letter to the Under-Secretary of State

(Near right) Gen. John Joseph Pershing (1860–1948), shown here with Brig. Gen. B. D. Foulois, commanded the 2.5 million men of the American Expeditionary Force in France in 1918. General Pershing directed that the fledgling Air Service, AEF, be ready to support the growing numbers of U.S. ground troops as they entered combat. (Photo courtesy of NARA.)



(Far right) The Nieuport 28 equipped the four fighter squadrons of the First Pursuit Group, the first American-trained unit to enter combat. This lightweight pursuit, powered by a 160 hp Gnome 9N rotary engine, was fast, highly maneuverable, and performed successfully during four months of combat operations. Many pilots were loath to give it up for the heavier SPAD XIII pursuit. The U.S. Air Service was the only air service to use the Nieuport 28 in combat. (Photo courtesy of the author.)

[for Air] telling him that is what we want. The question of deliveries of these machines depends entirely upon the arrival [from the United States] of raw materials."²⁷

The raw materials and machine tools from the United States, however, and the supply of airplanes and engines from France were not forthcoming within the specified time. As a result, on January 29, 1918, General Pershing canceled the August 30, 1917 agreement. The pressure on Foulois and the Air Service, AEF, to acquire airplanes to equip their rapidly forming squadrons was now intense.

On February 16, 1918, Foulois sent a formal request to the French government for a complement of airplanes for the Zone of Advance, as the front-line operational area was then called. Based on the French government's earlier offer, communicated on November 30, 1917, by Gen. Hageneau, Foulois requested eighteen SPAD XIII pursuits with Hispano-Suiza 220 hp engines to equip one squadron, thirty-six Nieuport 27 pursuits with Le Rhone 120 hp engines to equip two squadrons, seventy-two Sopwith 1-1/2 Strutters (thirty-six were equipped with the 120 hp Le Rhone rotary engines and the balance with 130 hp Clerget rotary engines), and thirty-six Dorand A.R. 1 planes. The A.R. 1 and the Sopwith aircraft were intended for the observation role.²⁸

This request, formalized as Contract F-12 and dated January 23, 1918, specified that thirty-six fully equipped Nieuport 27s be delivered to Villeneuve by February 1, 1918. The SPAD XIII were intended for the American 103rd Aero Squadron, formerly called the Lafayette Escadrille and still under the direction of the French Army. The Nieuport 27s were intended for the newly formed, American-trained pursuit squadrons that would shortly become operational.

Foulois was clearly unhappy at the prospect of equipping American squadrons with obsolete aircraft, and particularly so with the Nieuport 27 pursuit. He directed his chief of supply to request sufficient SPAD XIII with 220 hp engines to be delivered March 15, 1918, to equip two fighter squa-



drons for service use at the Front. Foulois' rationale for this request was communicated to the French government:

*To enable these squadrons to function to the best advantage, they will need first-class equipment. A further reason for furnishing the latest equipment is that these few squadrons will be the first ones in the American service to fly over the enemy's lines. Their performance will be watched by not only all the pilots in training, both in this country and in the United States, but by the entire American people. It is greatly to be desired that they should [not] be handicapped in any way as regards lack of up-to-date equipment.*²⁹

Foulois' plaintive appeal for the immediate supply of the same SPAD XIII then being supplied to French pursuit squadrons appeared to fall on deaf ears. He communicated his lament to General Pershing in a memorandum dated February 14, 1918:

*These types of aeroplanes [the Dorand A.R. 1, Sopwith 1-1/2 Strutter, and Nieuport 27 pursuit] are rated as 2nd class ... although a great number are being used by the French, at the present time, for frontline service. Although I fully disapprove of equipping any American Air Service squadrons with inferior types of aeroplanes, yet in view of the failure on the part of the United States to supply raw material as previously agreed upon, and further, in view of the fact that the French Air Service is, through necessity, [still] using a large number of these inferior types for front line service, I can offer no logical objection against equipping such number of our squadrons with these types of aeroplanes as the military necessity may demand.*³⁰

On February 21, 1918, M. Dumesnil, le Sous-Secrétaire d'Etat de l'Aéronautique Militaire et Maritime, informed Foulois that "the two Nieuport [27] squadrons mentioned in your order of January 23 [Order F-12] and formed for purpose of training at the front, will be made up of planes, Type XXVIII [28], fitted with 150 [this should be 160] hp Gnome monosoupape engines."³¹

The French government had not been entirely unresponsive to Foulois' plea, and it now made a last-minute substitution of thirty-six of the untested (in combat) Nieuport 28 pursuits for the obsolete Nieuport 27s called for in Order F-12. There was no change in the number or composition of the other aircraft specified in the order. The first

THE FRENCH GOVERNMENT... MADE A LAST-MINUTE SUBSTITUTION OF THIRTY-SIX OF THE UNTESTED (IN COMBAT) NIEUPOINT 28 PURSUITS FOR THE OBSOLETE NIEUPOINT 27s

**DURING THE
WAR, THE
FRENCH
AVIATION
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73.5 PER-
CENT OF THE
6,624
AIRPLANES...
RECEIVED BY
THE AIR
SERVICE**

deliveries of aircraft began to reach American pursuit and observation squadrons in February and March 1918.

The 94th Aero Squadron became officially combat operational on April 14, 1918, and scored a glorious double victory on its first day of battle. The Nieuport 28 equipped the four squadrons of the First Pursuit Group and served creditably, before being phased out of combat in August 1918 after suffering a series of wing failures and engine fires. The SPAD XIII replaced the Nieuport 28, and would ultimately equip fifteen American pursuit squadrons in operation at the end of the war.

The 1st Aero Squadron was initially equipped with a mix of Dorand A.R. 1s, nicknamed the "Antique Rattletrap" by American pilots, and SPAD XIIs, whose poor weight distribution made them difficult to fly.³² Sopwith 1-1/2 Strutters and Dorand A.R. 1s equipped four other observation squadrons. By August 1918, all five squadrons were re-equipped with the outstanding Salmson 2. Within three months, the Air Service had forty-five squadrons assigned to American armies at the front; all twenty of the pursuit squadrons were equipped with foreign-built aircraft.³³

On November 11, 1918, American authorities scrambled to cancel all aviation contracts placed with European manufacturers. During the war, the French aviation industry supplied 73.5 percent of the 6,624 airplanes [this total includes training planes, as well as aircraft sourced in England and Italy] received by the Air Service, AEF. American factories delivered 1,213 license-built D.H. 4s to France before the Armistice; of this number, only 417 were actually utilized at the Front.³⁴

Congressional inquiries into America's failure to produce fighting planes for the American Expeditionary Force began months before the war ended. Intending to fend off a potentially embarrassing Senate inquiry, President Woodrow Wilson prevailed on Chief Justice Charles Evans Hughes, his Republican opponent in the 1916 election campaign, to undertake an investigation of the "airplane mess." This ploy failed, however, for a subcommittee of the Senate Military Affairs Committee soon undertook its own investigation into the matter.

The Senate subcommittee published its report on August 22, 1918, quickly followed by the report issued by Chief Justice Hughes on October 25, 1918. The Senate report focused on organizational shortcomings described as "unsystematic and ineffective," especially, the "ineffective systems of liaison to report the requirements of the forces in combat to the drawing boards of industry." Intelligence was lacking in all respects at the beginning of the war; manufacturing techniques and drawings, required for every mass-production manufacturing process, were not provided on a timely basis by the Allies, if at all. The Senate subcommittee, having noted the confusion resulting from too many conflicting voices attempting direction of aviation matters, recommended "the need for a single, unified source of command to give authoritative decisions

in the selection and development of aerial weapons.³⁵

The Senate subcommittee and Chief Justice Hughes both took issue with the decision to standardize on the American-designed and -built Liberty engine. Standardization was necessary in order to begin mass production, but there were some serious repercussions.

Adapting the D.H. 4 airframe to the Liberty engine caused inordinate delays in getting the aircraft to the Front. By the time it reached the Front in appreciable numbers, the redesigned D.H. 4 was not only considered obsolescent, but also possessed a dangerous design flaw. The unprotected fuel tank was positioned directly behind the pilot, who was doubly vulnerable — to being crushed in the event of a crash or being burned to death when the tank was penetrated. The American-modified D.H. 4 gained the unfortunate sobriquet "Flaming Coffin" as a result. Hurried attempts to correct this flaw and others resulted in the improved D.H. 4B, but this model failed to reach the Front before the war ended.

The unsuccessful attempts to "marry" the Liberty engine to the American-built SPAD XIII and Bristol F2.B two-place pursuit were further evidence of the unfortunate decision (some said it was politically motivated) to standardize engines on many types of aircraft. Historian I. B. Holley Jr. pointed out the pitfalls of this policy:

As all designers knew, airframes are planned around engines. The power plant is the heart of the aircraft. To standardize with one engine was to force all designers to conform to the limitations and characteristics of that one engine regardless of the functions to be performed by the airplane. When a standardized engine was imposed upon designers of aircraft, long range night-bombers were limited to the same power plant used by low-flying observation aircraft. To standardize was to stultify creative design and the development of the aircraft as a whole.³⁶ [my underline]

Dr. Holley noted that the struggle between rapidly shifting performance requirements and quantity to be obtained by mass production was never resolved during the war. At the outset of combat, tactical commanders demanded numbers, and when aircraft in quantity began to reach the Front, their demands "shifted sharply to performance."³⁷

The report of the House of Representatives Subcommittee No. 1 on Aviation was released on February 20, 1920. Members of the majority of this extremely partisan subcommittee primarily blamed Secretary Baker and the Chief Signal Officer, Maj. Gen. George Squier. With the creation of the Army Air Service in May 1918, the Signal Corps and General Squier, who was pilloried in the press, ceased to have anything to do with the production or use of aircraft. With the removal of General Squier from the aviation scene, Coffin also lost his position as chairman of the Aircraft Production Board. One historian con-

Brig. Gen. Mason M. Patrick, at the request of his USMA classmate General Pershing, relieved Brigadier General Foulois of command of the Air Service, AEF, in May 1918. He ably served until demobilization after the war, and then returned to his branch of service, the U.S. Corps of Engineers. Patrick was recalled in 1921 to assume command of the Army Air Service. Shown here as a major general, he helped restore the postwar Air Service to vitality, and moved it towards total independence with the creation of the Army Air Corps in 1926. Major General Patrick got his wings at age 59; he served as the first Chief of the Air Corps before retiring in 1927. (Photo courtesy of the author.)



sidered Coffin the “chief villain” behind the production scandal, characterizing him as a “classic high-pressure automobile salesman [who] toured the country describing how thousands of planes would smash the German army into submission, making it unnecessary for American infantry to charge machine guns.”³⁸

The following brief exchange, quoted on page 3 of the House report on expenditures in the War Department, summarizes, and also captures the tone of, the majority report: “Our utter failure to produce fighting planes after 19 months of war is disclosed by one question.”

Mr. [Congressman Walter] Magee. “As far as the manufacture of pursuit planes or bombing planes in the United States is concerned, we are practically in the same position [in August 1919] we were in when we entered the World War?”

Col. [Mason] Patrick. “Quite true.” That in brief, is the story of America’s aircraft production failure, occasioned by a record of stupidity and stubbornness that involved inexcusable waste of men and money and invited military disaster.³⁹

Minority members of the House subcommittee, branding the majority report as “intemperate, biased, and vituperative,” were far more circumspect and prescient in presenting their views: “The big mistake in the aircraft production program has been not so much that those in charge did not fulfill it, but rather that they made the mistake of creating a public expectation that they could do so.”⁴⁰

In view of the short lifespan of the military airplane, they recommended that constant experimentation and development of serviceable aircraft and engines be undertaken. The minority members recognized that “aircraft have become a vital means of offensive and defensive warfare,” and that “future wars are possible and it is the duty of Congress to keep the country in a reasonable state

of preparation to meet an emergency, which, when it does arise, [will be] of monumental consequence.”⁴¹

In his final report as Chief of the Air Service, AEF, Maj. Gen. Mason M. Patrick, [Patrick had relieved Brigadier General Foulois in May 1918] identified the underlying cause of problems encountered by the fledgling Air Service: “As we consider these errors with a view to avoidance in the future, one fact stands out most prominently, one common source of all our difficulties becomes apparent; these failures were the unavoidable result of our unpreparedness and of the necessity for actually preparing for war while hostilities were in progress.”⁴² Major General Patrick’s commentary may also offer the best explanation for the abject failure of American industry to build fighting planes for the Air Service, AEF, during the First World War.

It is, therefore, instructive and deeply satisfying to know that the lessons of the failure of America’s production efforts in World War I were learned, and applied with spectacular success by a future generation of America’s war leaders. Preparedness and full national economic mobilization were keys to ultimate victory in World War II. An essay entitled *Mobilization*, published in 1990 by the U.S. Army Center of Military History, identifies the milestone events and decisions that bought this sea change about:

The National Defense Act of 4 June 1920, charged the assistant secretary of war with planning for industrial mobilization and responsibility for the War Department’s procurement. The act represented a first step toward recognizing that modern warfare, with its demands for huge mechanized forces armed with sophisticated weapons and the ability to move over large fronts, demanded that the entire national economy be harnessed.⁴³

The creation of the Army and Navy Munitions Board in 1922 brought about joint service planning for wartime resources. The following year, the General Staff produced the first peacetime plan for mobilization of an army of 400,000 on the first day of mobilization, with rapid increases in mobilized manpower planned after that.

In 1929, the newly created Army Industrial College began offering a one-year course of study on industrial mobilization. In the 1930s, course graduates helped prepare a series of planning documents that provided for wartime civilian control and direction of the nation’s resources. “Implicit [in these planning documents] was the expectation that management of the economy and particularly, control of industry in wartime, were presidential functions that would be exercised through temporary agencies run and largely staffed by civilians. This assumption reflected a realistic understanding of the American political system and the transcendent character of industrial mobilization.”⁴⁴ It also meant that industrial mobilization in wartime would be vested with the highest authority.

THE ARMY AND NAVY MUNITIONS BOARD... BROUGHT ABOUT JOINT SERVICE PLANNING FOR WARTIME RESOURCES

ROOSEVELT CALLED FOR 50,000 NEW MILITARY AIRPLANES

THE ATTACK ON PEARL HARBOR ...UNIFIED THE COUNTRY AND REMOVED ALL PEACETIME CONSTRAINTS

In spite of the new realizations and resulting reforms in military and industrial planning, the period between the world wars would prove to be very difficult years for the U.S. Army and all U.S. military services, as historian Edward M. Coffman explained:

*During the Roaring 1920s and the Depression-ridden 1930s, public desire to cut government expenditures and traditional antimilitary attitudes combined with the dominant isolationist mood to reduce the Army to the point that it was negligible as a world power. Tight budgets year in and year out meant understrength units, slow promotion, and restrictions on virtually any activity beyond maintenance of the status quo.*⁴⁵

However, Coffman continues, “these years were marked by increasing professionalism in the form of emphasis on advanced schools and the opportunities they provided officers to prepare for future possibilities.”⁴⁶ Future possibilities, no doubt, meant the coming war.

President Franklin D. Roosevelt began to prepare the nation as the European war loomed in 1939. The industrial mobilization plan promulgated in 1939 assumed that economic mobilization could commence prior to the actual outbreak of hostilities against the United States. President Roosevelt knew, however, that he could not impose all of the measures required for full mobilization, because the nation was still neutral and isolationist in thought and would not accept it. He sought, instead, to move ahead with bold, but incremental, steps.

The protective mobilization plan for 1939 began to balance wartime production schedules with projections of material requirements. A limited rearmament effort, with emphasis on enhancing the striking power of the U.S. Army Air Corps, was undertaken at the same time.

With the outbreak of war in September 1939, the size of the regular Army and National Guard was immediately increased. With the fall of the Low Countries in May of the following year, President Roosevelt called for 50,000 new military airplanes, along with a supplemental industrial mobilization plan to make that happen. The passage of the Selective Service Act in 1940 vastly increased the number of trained men, and Army appropriations jumped to \$8 billion, only to jump again to \$26 billion the following year.

The U.S. government encouraged private expansion of war production facilities with financial incentives such as accelerated depreciation schedules and government financing. One beneficiary of this program was the massive Willow Run Factory built by the Ford Motor Company. Construction of the factory began in April 1941 and the first B-24 bomber rolled off its mile-long production line in October 1942. At its peak, the plant employed 42,000 men and women, with 650 B-24s coming off the line every month. During the course of manufacturing over 8,600 bombers, Ford introduced hun-

dreds of engineering changes right on the production line. This process, adopted by major American factories across the country, ensured that the B-24 remained a viable and potent weapon throughout the war.

“Lend-Lease,” introduced by President Roosevelt in September 1941, supplied America’s soon-to-be-allies with desperately needed weapons and raw materials, sometimes at the expense of her own forces. However, the program did ensure that demand for standard American weapons and equipment would keep up with the growing productive capacity until fully mobilized American forces could use the bulk of the country’s output.

On July 9, 1941, the President directed the secretaries of the War Department and of the Navy to prepare a plan that would guide the United States in the event of war with the Axis powers. President Roosevelt requested a detailed plan that would “predict with confidence the kinds and amounts of ‘munitions and mechanical equipment’ we would need to win a war.”⁴⁷ In order to achieve creditable numbers, the planners would have to start with a careful assessment of potential enemies’ strengths and then determine allocation, training, and employment of American manpower by each of the services.

The air annex to the war plan, entitled AWPDP-1 (Air War Plans Division-1) was completed in only nine days in August 1941, by four outstanding Army Air Forces officers: Lt. Col. Harold Lee George, Lt. Col. Kenneth N. Walker, Maj. Haywood Hansell, and Maj. Laurence S. Kuter. AWPDP-1, and a slightly revised AWPDP-2 completed a year later, proved to be remarkably accurate projections of future requirements, setting the “course for the production and employment of U.S. airpower in World War II.”⁴⁸

The attack on Pearl Harbor on December 7, 1941, unified the country and removed all peacetime constraints, allowing President Roosevelt to undertake full national economic mobilization. Thus, 1942 saw a dramatic growth in productive capacity. Manpower and material mobilization management were brought together in 1943 with the creation of the Office of War Mobilization. The director of the OWM, James Francis Byrnes, a former congressman, U.S. senator, and associate justice of the U.S. Supreme Court (and a future U.S. secretary of state and governor of South Carolina), had the credentials and the authority to do the job.

Organization for full economic mobilization in wartime was now complete, and the task remaining for American industry was to sustain high production for the balance of the war. By 1945, the U.S. Army Air Forces, now numbering over 2,400,000 airmen, had taken delivery of over 225,000 American-built military aircraft.⁴⁹ The support given by U.S. industry to the USAAF was indicative of the overwhelming material support given to all of America’s military services.

It mattered greatly that people such as President Roosevelt, George C. Marshall, and Henry H. Arnold had experienced directly the prob-

lems encountered when a woefully unprepared nation entered World War I in 1917. Their collective experience and leadership, along with that of many others, helped mobilize the nation's vast productive

energies and resources and bring about the carefully planned and executed production and military victories during World War II. The bitter lessons of the earlier war had indeed been learned. ■

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FLIGHT TO KOREA,



JUNE 25, 1950



James A. Scheib

(Overleaf) An SB-17G sits on the apron at Johnson AB, Japan. (All photos courtesy of the author.)

(Right) The author.

OUR PLANE, AN SB-17G... WORE DISTINCTIVE YELLOW PAINT MARKINGS IN WIDE BANDS AROUND THE FUSELAGE, WINGS, AND TAIL

A HIGGINS, DROPPABLE A-1 LIFEBOAT, PAINTED YELLOW AND CALLED THE "FLYING DUTCHMAN," WAS BOUND BY CABLES TO HER BELLY

The air rescue crews who provided a continuous presence in occupied Japan were predominantly veterans of World War II. Their twenty-four tours ranged from the tolerance of boredom to the excitement of unusual and unpredictable challenges. The crews' reward was the knowledge that during peace or war the alert phone would send them on a real-life mission to satisfy a vital need. They lived the Air Rescue Service's motto: "Those things we do, that others may live."

My most memorable experience began on Sunday morning, June 25, 1950, as our nine-man crew, of Flight A, 3d Air Rescue Squadron, Military Air Transport Service, routinely relieved the previous alert crew on the flight line of Johnson Air Base, near Tokyo. Our plane, an SB-17G (for Search Bomber, serial number 44-83885), wore distinctive yellow paint markings in wide bands around the fuselage, wings, and tail. It was the last B-17 produced at Long Beach, California. A Higgins, droppable A-1 lifeboat, painted yellow and called the "Flying Dutchman," was bound by cables to her belly, which were secured to the bomb rack shackles in the bomb bay.

The flight engineer, MSgt. William J. Brewster, had inspected the plane, checked the engineering forms, performed the pre-flight, and run up the engines. Other crew members had assured me that the communication, navigation, and rescue and survival equipments were in good order. Brewster, 1st Lt. Ronald G. Carver, the co-pilot, and I reviewed the records and declared that -885 was "fit for duty." The odds were, however, that we would have no reason to fly her during our Sunday tour. The summer monsoon had started, but the weather was fair over most of Japan. A cold front, moving southward over Korea, was predicted to bring rain and low clouds to Japan by Tuesday, June 27th.¹

Also parked on the ramp were Douglas B-26s of the 3d Bomb Group's, 13th Light Bomb Squadron, displaying their World War II nose art. The 8th Light Bomb Squadron had left on the previous day to participate in an air defense readiness test at Ashiya Air Base, in southern Japan. With them went the RF-80As of the 8th Photo Reconnaissance Squadron, their pitot cover streamers swaying like reins on speeding horses.²

The morning's quiet stopped suddenly at 1102 hours, Korean time, when 1st Lt. Thomas L. Wight, our navigator, answered the alert phone. It was Air Defense Control Center (ADCC) in Tokyo, relaying orders from Far East Air Forces (FEAF) headquarters. They directed the 3d Air Rescue to prepare a fully-armed SB-17, pick up a passenger at Tokyo's Haneda Airport, and transport him to Kimpo airfield, at Seoul, Republic of South Korea. ADCC had



already filed a flight plan for our mission.³

Our crew could not have imagined the portent of that message. The concise wording gave us neither explanatory nor implementing instructions, and we reacted reflexively. The stand-by alert crew was instructed to report for duty and notify Capt. Edmund F. O'Connor, the Flight A commander. As our support personnel arrived, they received a short briefing. Aware of participating on yet another "real-life mission," they moved enthusiastically to their shops, the hangar, and the ramp, eager to get -885 combat-ready and airborne.

The early arrival of engineering officer 1st Lt. Henry L. Laird and armament officer 1st Lt. Kenneth F. Bailey, hastened the removal of the lifeboat. Machineguns and ammunition were installed, the plane's fuel tanks topped off, and all tasks completed to ensure we were fully combat ready for the mission. Operations officer Capt. Bror C. Seaburg and 1st Lt. Vincent H. McGovern tried to anticipate and resolve potential problems that might impede our efforts. Crew chief TSgt. Thomas B. England and his maintenance crew inspired us with their confidence in the airplane's health.

During preparations, we learned that the North Korean People's Army, in force, had penetrated the border of the Republic of South Korea at 0400

Major James A. Scheib, USAF (Ret.), flew thirty-one missions as a B-24 pilot with the 485th Bomb Group, 831st Bomb Squadron in World War II. From 1948 to 1951, he flew SB-17s and SA-16s on air rescue missions. Subsequently, he worked as a civil service employee in aircraft acquisition, at the, Aeronautical Systems Division, Wright-Patterson AFB, Ohio.



(Above) Operations building at Johnson AB, Japan.

**EN ROUTE,
WE RECEIVED
YET
ANOTHER
FEAF
MESSAGE,
DIRECTING
US TO LAND
AT AN
AIRSTRIP
NEAR PUSAN**

hours. At 1227, one hour and 25 minutes after receiving the phone call from ADCC, and eight hours and 27 minutes after the invasion began, we flew -885 the short distance to Haneda Airport. In the terminal, I met and briefed our passenger, Col. William H. S. Wright, USA, chief of staff, Korean Military Advisory Group (KMAG).⁴ At 1310 we were airborne again, climbing westward over the Japanese Alps toward our destination.

The tension eased as we settled into our routine. We were in weather for most of the flight. Our crew assumed that we would deliver our passenger, refuel, and return to Johnson AB that evening. I remember leaving the flight deck to Lt. Carver and making my way through the bomb bay to the waist compartment, where gunner/scanners Cpls. George E. Seymour, Hugh H. Fowler, Daniel W. Guyton, and Robert P. Gauss were stationed. Colonel Wright stood at the right waist window and had unwittingly positioned himself in a pose reminiscent of the familiar photograph of General Douglas MacArthur in his personal B-17. I told Colonel Wright that I would contact Kimpo AB to arrange for his debarkation. We discussed the event of the day and I returned to the flight deck.

The only Airways and Air Communications Service (AACS) navigation aid available at Kimpo Airfield was a low-power radio beacon that could be used for homing and instrument landings.⁵ I familiarized myself with the headings, altitudes, and frequencies that we would be using for an Automatic Direction Finding (ADF) letdown and low approach. "No problem there," I thought. Suddenly, the routine changed when radio opera-

tor SSgt. Richard G. Grimm handed me a message from FEAF. It instructed us not to land at Kimpo, but to proceed instead to Itazuke AB, Kyushu, Japan. There was no explanation.

En route, we received yet another FEAF message, directing us to land at an airstrip near Pusan on the southeastern tip of the Korean peninsula. Its existence was about the extent of our knowledge of our new destination. Tom Wright searched his brown leather navigation case and found a sectional chart of the area. We radioed Itazuke Control in Japan and asked them to provide any available information concerning the airstrip at Pusan. They told us to stand-by. Some minutes later, Itazuke came back stating that Pusan was an abandoned 4,000-foot emergency landing strip with no radio or navigation facilities. They had located a pilot in the officers' club who had landed a C-47 at Pusan two years before and who opined, "It wasn't too bad." I asked Control for the most valid barometric pressure in the Pusan area for setting our altimeter. With Tom Wright on the APQ-13 radar, we began our descent to the Japan Sea, breaking through a 200-foot ceiling.⁶

As we approached the Korean coast, Tom stood between the pilots' seats with his chart and gave us headings. We adjusted the engine controls to climb and the superchargers control set for "War Emergency Power." All three of us tried to find a visual route inland. We soon flew between two coastal hills with only ground fog in front of us. Now lightly loaded, -885 responded smoothly and pulled us out of there. We climbed to altitude, made another attempt at coastal penetration, and

(Right) The author at Johnson AB, Japan.

(Below) The author's son in front of an SB-17G.

TWO NORTH KOREAN YAK-7BS... HAD BUZZED KIMPO

OUR MISSION, ...MAY WELL BE THE FIRST COMBAT MISSION LAUNCHED BY THE UNITED STATES AIR FORCE



again broke off. Even had we found the Pusan airstrip, I doubted that the low ceiling would have permitted us to maneuver for a landing. We so informed Itazuke Control and were subsequently instructed to return to Japan.



Base Operations at Itazuke AB that Sunday evening was crowded. Colonel Wright left quickly to communicate with Ambassador John J. Muccio and his K MAG staff in Seoul. My next contact with Wright occurred years later. I learned that he had been flown to Kimpo early the next morning, June 26th, by U. S. Navy pilot Curtis Allen in a Navy JRB-6 (generic C-45). Wright told me that after arriving at Seoul, he had received a stirring message and later, an inspiring visit from General MacArthur. A graduate of West Point's class of 1930, Wright retired in the grade lieutenant general.⁷

I also learned why, as we prepared for let-down at Kimpo on June 25th, we were abruptly redirected to divert to Pusan. Apparently, two North Korean Yak-7Bs (Russian fighters similar to the British Spitfire) had buzzed Kimpo at 1315. And at 1700, as we prepared to land, the Yaks strafed the control tower, a gas dump, and an Air Force C-54.⁸

The significance of our mission, launched on the first day of the Korean War, may well be the first combat mission launched by the United States Air Force since it was established in September 1947. ■

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The “What is it?” aircraft in our last issue was the Temco T-35 Buckaroo primary trainer.

It was a product of Texas Engineering & Manufacturing Company, Inc. (Temco), the firm that acquired rights to Globe Aircraft products, including the Swift lightplane. Temco used the Globe Swift Model GC-1B to create its two-seat primary trainer, known in company jargon as the TE-1. It offered the “tail dragger” TE-1B version with a 165-hp Franklin engine to the Air Force and built three service-test YT-35 prototypes.

In 1949, the Air Force looked at the YT-35 along with the Beech Model 45—forerunner of the T-34—and the Fairchild T-31. The Fairchild plane was judged the best of the three, but budget cuts killed the program. In 1950, when the Air Force was looking for a new trainer, one solution seemed to be the T-35.

The Air Force accepted the three YT-35s in an August 2, 1950 ceremony. The date of the first flight of a YT-35 does not appear to be on record; perhaps an *Air Power History* reader can help.

The YT-35 Buckaroo handled well, had the forgiving qualities needed in a trainer, and cruised at 177 mph. The Franklin engine had reliability problems, however, and was going out of production. The Air Force eventually chose the T-34, with its tricycle gear, as its next trainer.

In July 1951, the Air Force evaluated several “armed trainers” for light, close-support duties. Together with the T-34 and Fletcher FD-25 Defender, a YT-35 Buckaroo was modified to mount two 7.65-mm machinegun pods, up to ten rocket projectiles, or two 150-lb bombs. This was a colossal load for such a small ship. No aircraft in this category was ever purchased, although airmen flew much older propeller-driven planes in combat in Southeast Asia a decade later.

Nineteen readers, including one each in Switzerland and Germany, entered our “name the plane” contest. Unusually, two got it wrong. Our History Mystery winner is Thomas O. Gamble of Santa Rosa, California, who will receive an aviation book as soon as we get organized around here.

This Issue's Mystery Plane

Once more, we present the challenge for our ever-astute readers. See if you can identify this month's mystery aircraft, shown in an artist's rendition. But remember, please: postcards only. The rules, once again:

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

2. Correctly name the aircraft shown in our artist's conception. Also include your address and telephone number, including area code. If you have access to e-mail, include your electronic screen name. Remember that a telephone number is required.

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

cal editor.

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



REVIEW ESSAY

A Question of Loyalty: Gen. Billy Mitchell and the Court-Martial that Gripped the Nation.

By Douglas Waller. New York: HarperCollins Publishers, 2004. Illustrations. Photographs. Bibliography. Index. Pp. 448. \$26.95. ISBN: 0-06-050547-8.

While one of the most satisfying elements of being a historian with the Office of Air Force History is the opportunity to assist authors and other historians with their work, that opportunity occasionally requires a confession. Accordingly, I had a hand in this book, although my contribution was far smaller than the “acknowledgments” section suggests. I also must admit to sharing most of the author’s conclusions, but that is because they are cogently reasoned and thoroughly grounded in primary research, as *A Question of Loyalty* reveals.

William “Billy” Mitchell remains the most important and controversial individual in the history of American military air power. Born in 1879, Mitchell chose to make his mark in the U.S. Army and ultimately in military aviation. Dynamic, articulate, intelligent, charming, forceful, and politically well connected, he advanced rapidly. Mitchell came to aviation later in life than did many of his contemporaries, but he quickly became a passionate advocate and fervent enthusiast. During World War I, Mitchell proved to be an outstanding tactician, noted for massing over 1,500 Allied aircraft to support the American assault on the St. Mihiel salient in September 1918. He returned from France determined to establish an independent air force and make air power the dominant weapon of modern war. His methods, however, were questionable. Mitchell consistently appealed to Congress and the public—outside the chain of command—and questioned the motives, intelligence, and competence of those who disagreed with him, including his superiors. His major victory came in 1921, when army airmen sank the former German battleship *Ostfriesland*. Despite this success, Mitchell’s larger goals remained unfulfilled, and he became increasingly arrogant and confrontational, alienating

friends as well as infuriating enemies in the process. Denied reappointment as assistant commander of the Air Service in 1925, Mitchell seized upon the crash of the U.S. Navy dirigible *Shenandoah* to charge “incompetency, criminal negligence and almost treasonable administration of the national defense by the Navy and War Departments.” (p. 20) The ensuing court-martial was one of the great public trials of the Twentieth Century. Convicted, Mitchell subsequently resigned from the U.S. Army. The court-martial and his resignation made him into both a martyr to the cause and a legend in the history of air power.

In *A Question of Loyalty*, Douglas Waller has fashioned a dramatic, detailed, day-to-day account of the court-martial proceedings, while examining Mitchell’s life through a series of flashbacks that shed new light on the general’s professional and private life. In less competent hands, this technique might cause confusion, but Waller, a senior correspondent for *Time Magazine* and author of five books, has handled his material well, producing an illuminating story about a compelling, fascinating, and terribly flawed individual.

Waller stresses the political nature of the trial and suggests that Mitchell’s choice of civilian defense counsel, Congressman Frank Reid of Illinois, was a better choice than previous writers have acknowledged, despite Reid’s ignorance of military culture and tendency to show disrespect for the army in the courtroom: “Anyone in uniform had now become ‘you people’ to Reid.” (p. 189) Through most of the trial, Reid was able to avoid a ruling on whether defense testimony was to be offered only for mitigation of the sentence, or could be considered as absolute defense of the charge against Mitchell. If the court had ruled that testimony could only be offered to mitigate the sentence, it would have been pointless for Reid to call witnesses. Thus by avoiding the ruling, Reid was able to put government management of air power on trial instead of Billy Mitchell, and to turn the court-martial into an expensive, lengthy national carnival that enthralled the newspapers and public.

The trial began with fireworks when Reid challenged several general officers off the court, including its president, Maj. Gen. Charles P. Summerall, a distinguished senior commander with a personal grudge against Mitchell. In another dramatic development, Reid put Margaret Lansdowne, wife of the dead commander of the *Shenandoah*, on the stand to testify that the navy had tried to pressure her to commit perjury during the *Shenandoah* investigation. Such steps generated headlines for weeks. The court-martial turned into the media circus that best suited Mitchell’s purposes, as when his friend, the immensely popular humorist Will Rogers, slipped in to watch, but ended up being escorted to the front of the room and having his photo taken with the generals sitting in judgment.

The trial was not all show, however, and Waller details numerous substantive issues uncovered by the defense. Mitchell, for example, had demanded

**WILLIAM
“BILLY”
MITCHELL
REMAINS THE
MOST
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AND CONTRO-
VERSIAL
INDIVIDUAL IN
THE HISTORY
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MILITARY AIR
POWER**

unity of command in the Hawaii Islands. The testimony of Maj. Jarvis Bain, of the general staff, made it clear that “unity of command was a concept largely foreign” to army and navy officers. (p. 263) Instead, the services had evolved a system based upon “paramount interest.” Reid’s cross-examination exposed this as an ill-defined term, in which the service with less interest was supposed to cooperate with the service with a larger interest. In practice, however, cooperation was strictly voluntary and could neither be required nor compelled. The problem would prove critical sixteen years later, when confusion generated by the lack of unity of command would play a role in the Pearl Harbor debacle on December 7, 1941.

Also, it seems likely that army leadership came to favor a highly public trial that would humiliate Mitchell and diminish his ideas. Waller satisfactorily documents the lengths to which the army went to ensure a highly visible conviction. The chief prosecutor, Col. Sherman Moreland, severely underestimated the defense and was poorly prepared to cross-examine the stream of witnesses that Reid produced. The army then assigned to the case Maj. Allen W. Gullion, one of the “most skilled and aggressive prosecutors the service had.” (p. 222) It was Gullion who made Mitchell look weak, ill informed and erratic during a devastating cross-examination.

Meanwhile, behind the scenes, Mitchell’s bitterest foe, Brig. Gen. Hugh Drum—who “had willingly been the point man for the army’s opposition to a separate air force”—engineered “the general staff’s operation to destroy Billy Mitchell.” (pp. 310) Drum had the trial transcripts scoured thoroughly and War Department records sifted carefully for material that could be used against Mitchell. When Moreland proved out of his depth, Drum assigned his top aide, Maj. Francis B. Wilby, “to sit at Moreland’s side and begin managing the prosecution.” (p. 204)

And the army was not the only service involved. Waller describes a telling vignette in which Reid questioned the identity of two individuals in civilian clothes sitting at the prosecution table. They turned out to be Captains A. W. Johnson and M. G. Cook of the U.S. Navy, furnished by Mitchell’s savvy rival Adm. William A. Moffett to assist Moreland with questions. Ultimately, the navy allotted four naval officers to the prosecution throughout the trial.

Human touches transform Waller’s narrative from the mundane. In one example, at precisely 10:57 A.M., on November 11, Maj. Gen. Robert Howze, the president, suspended the proceedings in recognition of the seventh anniversary of the signing of the Armistice. The court stood and faced east in silence until 11:00 A.M., a poignant reminder of what was really at stake in the courtroom. And in still another touch, the entire court—probably stupefied, one suspects, by the complex and lengthy testimony—became transfixed watching a woman next door hanging her washing in a stiff breeze!

Interspersed with the drama of the court-martial, Waller explores the impact of Mitchell’s private life, based upon the author’s discovery of new caches of letters and official documents. Mitchell’s first marriage to Caroline Stoddard, in 1903, was an idyllic love match, but it rapidly fell apart following his return from Europe at the end of World War I. Waller documents that Mitchell’s heavy drinking, episodes of domestic violence, and cheating, including quite probably with the wife of one of his officers, took its toll. The divorce, in 1922, was a bitter one. Especially painful for a historian to read, as a final chapter features the elderly Caroline burning boxes of papers that documented her life with Billy Mitchell.

The trial’s end brought final retribution. According to Waller, during rebuttal “the prosecution planned to bring the full weight of the War Department down on Mitchell. . . . Long lists were drawn up of every claim the defense had made. Rebuttal witnesses were assigned to each point, and counter arguments were prepared.” (p. 257) The navy offered over forty witnesses of its own; the Judge Advocate General’s Office assigned an officer to locate and bring potential army witnesses to Washington; and a stellar group of officers, including Drum and Summerall, lined up to “settle scores with Billy Mitchell.” (p. 259)

The verdict was guilty, and Mitchell subsequently resigned. His service, however, ended in the kind of pettiness that had often characterized it. Army finance officers docked him \$393.67 for a leather coat, trousers, camera, goggles, flight suits, and general’s flags still in his possession. But Mitchell had the last laugh by visiting Bolling Field, where he made thirty-seven landings in one day, thus qualifying for \$1,028.08 in flight pay.

Waller tells a great story, although it is not the complete story. Most important, his technique prevented a systematic examination of the evolution of Mitchell’s thinking on air power and air power doctrine, and prevented him from placing Mitchell’s changing concepts within the larger evolution of air power thought. *A Question of Loyalty* thus complements, rather than competes with, Dr. Alfred F. Hurley’s classic 1964 study, *Billy Mitchell: Crusader for Air Power*. Hurley’s work, however, sorely requires revision in light of the new evidence and interpretations developed by Robert White, James Cooke, Burke Davis, Michael Grumelli, Mark Clodfelter, Tami Davis Biddle, Douglas Waller, and others.

The “bottom line” is that Douglas Waller has produced a significant biography of a fascinating and important military thinker and leader. *A Question of Loyalty* belongs on the shelf of everyone interested in the history of air power, the history of the U.S. Air Force, and the military history of the Twentieth Century.

Roger G. Miller, Ph.D., Office of Air Force History,
Bolling AFB, Washington, D.C.

World History of Warfare. By I. Archer, John R. Ferris, Holger H. Herwig, and Timothy H. E. Travers. Lincoln: University of Nebraska Press, 2002. Index. Pp. xii, 626. \$29.95 ISBN: 0-8032-4423-1

Archer and his colleagues have written an outstanding reading text on the history of warfare from its origins to the twenty-first century. More than a description of past key events and turning points, it is a rewriting of this history articulating the concept of change and organized around five central themes: the idea of war, the experience of total war in each era, the impact of technology on warfare, the nature of armies (structure and organization), and the experience of the soldier.

The authors divided their book into fifteen chapters and used as many non-Western sources as possible, so as to avoid confining their history mainly to European military history. Following an introduction on the origins of warfare, they devote the next thirteen chapters to its succeeding eras, encompassing along the way "Warfare of the Ancient Empires," "War and Society in the Classical West," "Migrations and Invasions," "European Chivalry and the Rise of Islam," "Eastern Styles of Warfare," "The Age of Gunpowder and Sail," "New Signs of Total War," "Absolutism and War," "The Revolutionary Era," "The Beginning of Industrial Warfare," "The West Conquers the World," "Twentieth-Century Militarisms and Technological Warfare," and "Third World Wars." The final chapter is an epilogue on "The Future of War and Peace."

Each of the chapters covering a particular era of warfare contains a case study and a list of suggested reading materials. Probably because of book's length, the authors dispense with footnotes or endnotes. Although this is unfortunate in the eyes of the expert reader, undergraduate and graduate readers will not find the book less authoritative for it. The authors, all reputable Canadian military historians with established academic records, take particular care not to leave any rock unturned. Their approach, while broad, is meticulous and respectful of opposing explanations and characterizations. The authors' strengths are their abilities to go straight to what mattered most in a particular era. They focus on the key themes relevant to all eras, rather than discussing trivial issues which had no long-lasting impact. This approach allows readers to develop a comparative understanding between eras, and provides them with a lens to appreciate the evolution of warfare over extended periods of time. Also of particular value are the authors' discussions of warfare in non-Western societies, which usually tends to be set aside in more traditional textbooks.

Because selections had to be made, readers will not find lengthy discussions on every combat arm, combat support, or com-

bat service support function in each and every chapter. While the infantry, artillery, naval, and air operations are relatively well covered throughout the book, more could have been said about logistics and intelligence. With respect to the latter and its impact on warfare, it seems that the literature may have been underexploited. (For an overview of this rich literature, see Rose Mary Sheldon, *Espionage in the Ancient World: An Annotated Bibliography*, McFarland & Company, 2003.) Likewise, the epilogue on the future of warfare is only two-pages long and could have benefited from a look at recent trends in warfare and projections into the future. That aside, the book is superbly edited, and I highly recommend it to undergraduates, graduates, and professionals alike.

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



Warthog and the Close Air Support Debate. By Douglas N. Campbell. Annapolis, Md.: Naval Institute Press, 2003. Photographs. Notes. Bibliography. Index. Pp. xii, 202. \$ ISBN 1-55750-232-3

This book is about A-10s and close air support, or CAS as it is more commonly known. The Air Force officially named the A-10 the Thunderbolt II, giving it a direct linkage to the P-47 of World War II fame. But the first pilots who flew it looked at all of its bumps and bulbous features and renamed it the Warthog, which then morphed into simply the Hog.

Truth in advertising: I flew the Hog from 1982 to 1990 in two different units. Later, I worked on the Air Staff and saw a few of these issues from the inside. Reading this book was like reliving some of those experiences.

The author has done an excellent job of capturing the story of the genesis of this versatile aircraft and the role it played in the endless CAS debate between the services and politicians. Unfortunately though, this is a doctoral thesis. As such, the author has to devote a goodly portion of the book plowing through a lot of the CAS history. Some of this is tedious, but the author adroitly documents how—even though all of the services have traditionally been involved in some way with CAS—each service had its own definition of what it is. And each used its own definition to create a specific weapon designed to best fit its own specific needs.

To the Army, CAS was a command and control problem. Still smarting from the loss of its air forces after World War II, it wanted armed aircraft that could be task organized with ground maneuver units. Too many

Army commanders had been left "high and dry" by the Air Force and they wanted their CAS in hand. Interservice agreements had restricted the Army mostly to rotary-wing operations, and it pushed for armed helicopters.

The Marines wanted a CAS that was responsive to the needs of its combined arms teams and could move with its task forces. They pushed for the VSTOL AV-8 and helicopters.

The Air Force traditionally pushed for multirole aircraft. Focused on air superiority, interdiction, and then CAS, its commanders wanted forces that could be used in all mission areas. When ultimately forced by Congress to have aircraft dedicated to CAS, they were more than happy to satisfy the politicians by so designating several wings of aircraft. They knew that in combat, the aircraft could be used in some manner to support all three missions. Hence, for the Air Force generals, CAS became a force structure issue. As the author notes, "Money is the engine of air power. . . . Congress controls the budget for all these things."

With the groundwork laid, the author then takes us through the myriad historical studies, proposals, debates, tests, starts, false starts, fly-off competitions, and political maneuvering which marked the process of conceptualizing, planning, selling, funding, and then fielding the A-10. It is a long and interesting read which well captures the process of bringing a weapons system to fruition, especially in the face of governmental bureaucratic detractors, opposition from other services, and resistance even from within the Air Force. The author also details, through side discussions, the development of the 30-mm cannon and Maverick air-to-surface missile that were developed primarily for the A-10. They were vital to giving the Warthog the lethality it needed to be an effective CAS aircraft.

Coming off of the production line in the late 1970s, A-10s were organized into two stateside wings. Then a super wing of six squadrons was formed in England. From there, A-10s would regularly rotate into forward bases on the continent. Soon, every Army base in Europe got used to the sound of Warthogs overhead. Reinforced by more A-10 squadrons from the States (many were Guard and Reserve units), the Hogs became a mainstay of the NATO plan to defeat any Warsaw Pact invasion. The A-10s endurance, lethality, maneuverability, and survivability gave our ground forces the CAS they needed. This was the high-point of CAS.

Unfortunately, the A-10 still had determined detractors. "Purist" fighter pilots continued to believe that the aircraft was just too narrowly focused and ungainly for evolving enemy threats. New efforts were launched to mothball the aircraft and replace them with the new F-16. This led to more studies, competitions, fly offs, and con-

gressional fights. At one point in the late 1980s, plans *did* exist to deactivate the aircraft.

Then Saddam Hussein sent his army into Kuwait and everything changed. Seven squadrons of Hogs eventually went to the war, where the aircraft were used for many types of missions. The author writes, "The coalition needed many air tasks accomplished and the A-10 with its excellent loiter and weapons carriage capacity answered the call." A-10s were used for reconnaissance, interdiction, attacks on enemy air defense sites, forward air control, sector control, combat search and rescue, traditional CAS, and direct support of special operations teams operating deep in enemy territory. Two A-10s even shot down Iraqi helicopters. The air commander, Lt. Gen. Chuck Horner said of the Hogs, "I love them. They are saving our asses!" In fact, the Hog pilots started referring to their aircraft as the RFOA-10. As the author well documents, Desert Storm validated the value of the A-10.

But as good as this book is, the author misses in one very important area. The A-10 was built to do what it did. But any aircraft is only as good as the pilot or crew which operates it. "The man is the weapon," said General Patton. Many of the men who initially influenced the creation of the A-10 had combat experience in Southeast Asia. They understood what an attack aircraft should be able to do. But more importantly, they understood how an attack pilot should be trained. As the A-10s began to fill the

squadrons, the initial cadre of experienced pilots were also veterans of that war. They had mostly flown A-1s, O-2s, and OV-10s. These men intuitively knew the air-to-ground battle. They had attacked enemy trucks, put in air strikes in front of friendly ground units, and run rescue operations for downed airmen. They knew the basics of air battle and brought to the A-10 community a solid grounding in the application of air power at the tactical level. It was they who then trained the younger warriors who flew along the East German border and went to Desert Storm. It was they who developed the "bag of tricks" taught to every A-10 pilot. It was they who created the success of the A-10 in the Kuwait Theater of Operations. The author alludes to this but does not bring it out clearly. It would have added to the value of this book.

But other than that, this is an excellent book, which does a great job of showing how a weapon system is created. A-10s were of course used later in Bosnia, Afghanistan, and the second Gulf War. Apparently, the A-10s will now be around well into this century. I think that we can assume that the CAS debate will continue. Some things are just endless.

Col. Darrel Whitcomb, USAF (Ret.) Fairfax, Virginia

From Autogiro to Gyroplane: The Amazing Survival of an Aviation Technology. By Bruce H. Charnov. Westport Ct.: Praeger, 2003. Photographs. Index. Notes. Bibliography. Pp. xxiv, 389. \$49.95 ISBN: 1-56720-503-8

Bruce Charnov, Business Department chairman at New York's Hofstra University, is clearly a man with an obsession about the history of rotary-wing aircraft. He has amassed what surely must be an exhaustive collection of virtually every effort to perfect some sort of rotary-wing vehicle. He begins with an account of Spaniard Juan de la Cierva's brilliant concept of the rotary-wing principle and his collaboration with Harold F. Pitcairn. Pitcairn poured a great deal of his Pittsburgh Plate Glass fortune into developing an autogiro in the United States and perfected the technique of direct control by tilting the rotor blades. Competition from the Kellett Autogiro Company in the already scanty market stimulated research but reduced the profits essential for continued research. Just when the approach of war made a large increase in military sales seem probable, Igor Sikorsky of the Vought-Sikorsky Division of United Technologies came out with a practical helicopter design which could actually hover and land and take off vertically—something the autogiro could not do. Although the U.S. Army continued to fund experimental autogiros, it was evident that the helicopter would capture U.S. military production orders. Despite



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Pitcairn's generous offer to cut royalties from the usual 5 percent on his patents used on helicopter rotors to less than 1 percent, both Pitcairn and Kellett were forced to stop building autogiros by the end of the war.

In Europe, however, the autogiro remained alive. Cierva's patents licensed to Avro in England and Liore-et-Olivier in France. LeO delivered fifty-five autogiros to the French air force as substitutes for observation balloons. In Germany, despite the success of helicopters, an autogiro with a tip-jet rotor blade proved so excessive in fuel consumption that it could be used only for vertical flight, reverting to unpowered rotation on reaching altitude. This autogiro was designed for use by German submarines. Both the Soviets and the Japanese developed autogiros during World War II.

During the war both the Germans and the British experimented with rotary-wing kites, very light vehicles for dropping agents into enemy territory. Igor Bensen, a Russian immigrant engineer working with General Electric on rotary-wing projects, was fascinated by one of these contraptions, a rot chute weighing barely 100 pounds. In 1953, Bensen founded his own firm, the Bensen Aircraft Company, where he soon moved beyond the Gyro-Glider he developed to the more ambitious powered Gyrocopter. This was a lightweight vehicle, in which the pilot sat out in the open using a conventional stick to control the pitch of the rotor. Bensen was a shrewd entrepreneur. He not only built Gyrocopters to sell but offered sets of plans or kits of parts for the hobbyist to build for himself. No license was required for these vehicles which soon attracted a swarm of amateurs. Bensen organized the Popular Rotocraft Association and encouraged annual "fly-ins," where enthusiasts could demonstrate the many variants of his original design.

The author has endeavored to track down every one of these rotary-wing applications, whether successful or not. While this makes for tiresome reading, one must admit the book provides an excellent reference work on the afterlife of Cierva's rotary-wing principle, especially its 26-page bibliography of books, articles, and films.

Dr. I. B. Holley Jr., Duke University



Anatomy of a Reform: The Expeditionary Aerospace Force. By Richard G. Davis. Washington, D.C.: Air Force History and Museums Program, 2003. Illustrations. Notes. Glossary. Pp. vii, 103.

Ask any airman who spent time on a remote airstrip deployed for Bullet Shot, Giant Warrior, Coronet Lightning, or a host of other exercises and remote assignments, and he will tell you that since its inception, the USAF has been an expeditionary force.

So what then is the Expeditionary Air Force (EAF), and what is the establishment of Air Expeditionary Forces and this "reform" business all about?

Richard Davis looks into the background of previous "expeditions" conducted by the Air Force, and what the Chief of Staff intends to be the reformed attitude or mindset of our airmen. The EAF is intended to be a visceral change spanning the entire force—not just the "pointy end." While USAF has deployed all over the world, it did so at great cost, at an extreme OpTempo, and with increasing unrest from its members. *Anatomy of a Reform* provides a good explanation of the problems with "Split Operations," equipment and manning shortfalls, and the readiness issues associated with fulfilling the USAF's national defense obligations. He correctly indicates that of all the issues associated with conducting these operations, the morale and attitude of our airmen was both the thing that made it work and the element that would eventually cause operations to fail if not corrected and supported quickly.

The book well captures the OpTempo and constraints placed on the USAF and their spiraling effect in the 1990s. By showing Air Staff basing laydown graphics, he brings a very powerful argument to the forefront of his treatise that helps set the stage for the reader throughout the book. This key issue, and its effects on our airman, was central to the changes necessary to prevent another instantiation of a "Hollow Force" before it occurred.

Davis lays down the AEF cycle and graphically demonstrates the process of planning and execution for each AEF. He does well in providing context for how the AEF will operate, and the resultant "dependable schedule" that each airman can use when planning even the most mundane activities—like leave or a wedding! By implementing the AEF cycle, USAF gave 60 percent of its force the opportunity to know when they would be deployed and for how long. This was something the Air Force had been unable to do for more than ten years!

Anatomy of a Reform provides a concise view of a very dynamic and highly-paced time in Air Force history. Headquarters, USAF performed superbly during the relatively short twenty-four months that kicked off the EAF reform. But that tells only part of the story, and that is the single shortfall of the book. While Davis tells a great story of one Air Staff office, that is all he tells. I was frankly very surprised to see scant mention of the analytic efforts of the major commands or any mention of the industry support provided through the Air Force Studies and Analyses Agency. No fewer than ten non-government agencies and fourteen government analytic agencies provided direct support and studies for this effort, and they receive scant mention. The many briefings and slides Davis cites and reproduced in his book were a direct result their work in

exploring concepts and developing options for the Air Staff. This story will not be complete until the objective data and analyses they conducted are also documented beyond their halls.

For a good overview of the transformation of the Air Force to the EAF, please read this book. But for the whole story, we'll wait for volume II?

Lt. Col. Robert A. Morris, USAF, Barksdale AFB Louisiana, served as chief analyst for AF/XOP during the EAF transformation.



To the End of the Solar System: The Story of the Nuclear Rocket. By James A. Dewar. Lexington: The University Press of Kentucky, 2004. Maps. Diagrams. Illustrations. Photographs. Appendices. Notes. Bibliography. Index. Pp. xxi, 438. \$65.00 ISBN: 0-8131-2267-8

Termination of the Rover/NERVA (Nuclear Engine for Rocket Vehicle Application) program in January 1973 closed a significant chapter in the development of nuclear thermal rocket propulsion. That story had begun seventeen years earlier when the U.S. Air Force and Atomic Energy Commission (AEC) laboratories commenced work on a reactor suitable for propelling a super-Atlas ICBM. The National Aeronautics and Space Administration (NASA), created in 1958, inherited from the Air Force responsibility for the program and, in August 1960, negotiated an agreement with the AEC to form a joint Space Nuclear Propulsion Office (SNPO). By the time the program ended, its participants had progressed significantly toward creation of a fully functional rocket engine employing a nuclear reactor with a solid graphite core.

James Dewar's *To the End of the Solar System*, an extraordinarily detailed, skillfully crafted account of the nuclear rocket's evolution, examines Rover/NERVA from several inextricably linked perspectives: scientific, technical, economic, bureaucratic, and political. Dewar argues convincingly that bureaucratic infighting and budget concerns threatened the program's existence at nearly every turn. However, the unswerving advocacy of New Mexico's powerful Senator Clinton P. Anderson, combined with timely test-stand results, ensured its survival for more than a dozen years. The waning of both a national policy of preeminence and an expansionist space vision coincided with Anderson's declining health and departure from public office. A new cast of characters used post-Apollo policy and a focus on more immediate earthly problems to render unnecessary a nuclear-powered Saturn third stage.

Although not a historian by training, Dewar scoured practically every relevant, unclassified source in dozens of repositories, as evidenced by his "Essay on Sources" and

ninety pages of endnotes. Between the beginning of his research in 1969 and completion of a draft manuscript in 1994, the author pored through many different congressional and executive record groups in the Library of Congress, National Archives, presidential libraries, files of the Air Force and NASA History Offices, and several university archives containing the personal papers of key individuals. Dewar also accumulated a substantial amount of material from program participants who provided papers, memoranda, and reports in their personal files at home. Sources requiring more judicious use—e.g., oral histories, media accounts, secondary literature, and Internet sites—enabled him to comprehend more thoroughly the Rover/NERVA story.

Dewar, who worked exclusively in the Department of Energy and its predecessors as an expert on nuclear affairs, employs several clever devices that make his book more intelligible to both scholars and lay people. Carefully interlaced political and technical development stories become the warp and woof of his complex, tightly woven narrative. Even more detailed information about technical progress appears occasionally in boxed inserts, and explanatory endnotes contain information that might otherwise disrupt the storyline. Eight appendices address more generic matters such as fuel element development, alternative and advanced concepts, safety and environmental aspects of testing, turbo pumps and nozzles, program budget, and the Russian nuclear rocket program. One especially insightful appendix outlines for government program managers and the public lessons derived from the Rover/NERVA project.

Given NASA's renewed emphasis on Project Prometheus, publication Dewar's *To the End of the Solar System* seems especially well timed. It offers instructive analysis for current decision makers. In a more academic vein, together with George Dyson's *Project Orion: The True Story of the Atomic Spaceship* (2002) and several scholarly articles, it signals a growing body of historical literature written about nuclear rocket propulsion.

Dr. Rick W. Sturdevant, Deputy Command Historian, HQ Air Force Space Command, Peterson AFB, Colorado



The Indochinese Experience of the French and the Americans: Nationalism and Communism in Cambodia, Laos, and Vietnam. By Arthur J. Dommen. Bloomington and Indianapolis: Indiana University Press, 2001. Notes. Glossary. Index. Pp. xiii, 1172. \$49.95 ISBN: 0-253-33854-9

Books about the Vietnam War often make exciting and easy reading for a very

good reason: they are frequently first person accounts and/or accounts about special units in combat and are filled with the emotion of battle. This book, in contrast, is neither of these. The combat aspect of the wars fought in Southeast Asia barely warrant mention in this book, and then only as minimal side notes. There are other books, such as H. R. McMaster's *Dereliction of Duty*, that angrily recapitulate the chain of failures in senior leadership during the Vietnam War. Arthur Dommen's book does speak to the inadequacies of key political and diplomatic leaders, but it is much more. This work is a classic piece of historiography. It was written by a scholar who was also a journalist with firsthand knowledge garnered during much of the American phase of the war, and he has personally spoken with many of the principals. It is long; at first I thought too long and burdened with detail. Its 1,172 pages are neither softened with illustrations nor clarified with maps; there are none. Aside from three very simple graphs, the words flow unimpeded.

What does this book, then, bring to the table? A great deal. I have done scholarship on the war, have written a college-level course on it, and fought in it. Yet, like many people, I believe that intellectually there has existed a considerable vacuum that should already have been filled. A book was needed that addressed core issues without reflecting personal agendas in a manner that McNamara's apologia or Kissinger's account of his diplomatic efforts have. Why did "we" choose to make a stand there with unclear national strategic objectives? Was the immensity of this nation's effort there disproportionately greater than the region's criticality to U.S. national security? Were counter-arguments within the government against U.S. involvement given short shrift by the decision-makers? What lessons could have been learned from the French experience? For the most part this book speaks to these themes which are woven throughout the book; themes that capture the motivations behind this nation's involvement and the personalities central to decision making, especially at critical junctures.

As one reads this book, one realizes that there are identifiably critical events and diplomacy that, perhaps more than the battlefield, determined the direction and eventual outcome of the war. Dommen sees a direct correlation between President Kennedy's shaken reaction to his 1961 summit with Khrushchev and significantly increased U.S. involvement in South Vietnam. The author highlights the failures of the 1962 Geneva Agreement (supposedly ending the Laotian Crisis), the U.S.-driven coup against Diem, the "secret talks" that paralleled the Paris Talks, French duplicity at Geneva (1954) and throughout the U.S. phase of the war, and the collective failure of the community of nations to condemn North Vietnam's unending violations of international agreements and its use of violence to

reshape the geopolitical landscape. The author is critical of senior U.S. and French diplomats like Henry Cabot Lodge, Etienne Manac'h, and Averell Harriman, who were so enamored with their respective roles that they had failed to realize that they were being outmaneuvered or manipulated by the communists. The author is especially critical of Henry Kissinger. There is an undercurrent of bitterness in Dommen's discussions of Kissinger's diplomacy, especially his willingness to "sell out" the South Vietnamese to the communists as the price for extrication from the war and return of POWs. Kissinger may have been duplicitous, but at a higher level he was involved in a comprehensive and global approach to improved relations with communist nations. Kissinger was, after all, the chief architect and driving force behind *détente*. Coincident with Kissinger's peace negotiations and subsequent developments in Indochina (but with rare exception either ignored by the book or given short shrift) were his secret overtures to the People's Republic of China, the tensions in the Middle East culminating in the Yom Kippur War and the oil embargo, the aftermath of Prague Spring and the subsequent Warsaw Pact invasion, *détente* with the Soviet Union, and the Strategic Arms Limitation Treaty talks. It was Kissinger who orchestrated Nixon's visits to Moscow and Peking in 1972. The Nixon Administration wanted to disengage from a war unpopular at home which was of marginal importance to the United States and distracting from issues crucial to national strategy. The author, however, maintains that the greatly enlarged war in South East Asia had been largely of U.S. making and, therefore, this nation had a responsibility to see it through. He also points out that it was the United States that was involved in the overthrow of legitimate governments in Laos (1960) and South Vietnam (1963); the United States was the driving force in toppling the Diem government and taking over the war just when South Vietnam was pursuing discussions with North Vietnam that could lead to a bilateral solution to the conflict. Likewise in Laos the U.S. significantly expanded the war. The U.S. had turned Southeast Asia into a major battlefield and in the end was unwilling to stand by its allies during the most intense and difficult phase.

I am not in complete agreement with the author's conclusions, but I am impressed with the depth of his scholarship and intellect. The book does make clear that the nature and direction of the war and in many ways its outcome, from the U.S. perspective, was not necessarily shaped by millions of American military members who fought in Vietnam but was the product of a small number of political and diplomatic elitists who ultimately drove the decision making process.

Col. John L. Cirafici, USAF



100 Years of Air Power and Aviation. By Robin Higham. College Station: Texas A & M University Press, 2003. Maps. Photographs. Notes. Appendices. Bibliography. Index. Pp. xi, 435. \$50.00 ISBN: 1-584-544-241-0

Robin Higham is well known to readers of this journal as its former editor, a prolific author, and one of America's foremost aviation historians. His scholarly reputation is based on a large number of excellent books he has written and edited, but most especially for his trail blazing *Air Power: A Concise History* (St Martin's, 1972). At long last he has updated and expanded this significant book.

Higham surveys the broad history of the field with a firm hand that delivers compact and effective coverage. Especially noteworthy is his broad definition of the subject that covers not only development of aircraft and their employment—areas that have received the bulk of attention by most aviation historians and writers; but also such aspects as aviation industry, its infrastructure, and civil aviation—which have not. This encyclopedic coverage is truly impressive and, considering its expansive scope, well balanced. Along the way Higham makes

frequent acute observations on all aspects of the topic. He certainly is not afraid to take a stand or voice an opinion, often times contrary to conventional wisdom. *100 Years of Air Power and Aviation* is handsomely presented in a large (8.5 x 11 inch) format including about 400 illustrations and informative captions that add much to the book. Extremely useful is an excellent bibliography that lists about 800 items. For the most part, this book is summary and analysis, with much less narrative—a large improvement over the original.

Such an effort, however, is not without its difficulties. The most serious is the prose. Not only is it dense, as might be expected in such an ambitious survey, but also oftentimes it is unclear. The topical organization, coupled with little attention to dates, does not help. In places the text is redundant, uneven, and choppy, if not disjointed: this is not an easy read. Errors present another, albeit lesser, problem. I counted over a dozen—most unfortunate and unnecessary. While they are generally details that should be correctly regarded as minor that do not undercut the overall value of the book or undermine its conclusions, these annoying distractions are regrettable. It would appear

the author either was not well served by his copy editors and reviewers, or he did not heed their warnings. Other criticisms are perhaps as much of this genre (a broad overarching survey) as of this particular effort. The absence of citations streamlines the book but also limits it. Certainly several of Higham's bold assertions require more support than given; for lacking such, these are at best arguable and sometimes questionable. A few of the photos are too small to be really effective and all deserved to be indexed. However all these failings pale next to the overall value of this effort.

In sum, this is an impressive and important book. It should be known to all students of military history and military affairs, and certainly read by all students of aviation history. All will profit from this experience. Higham has enhanced his already illustrious reputation, raised the standard for this type of book, and advanced the study of aviation history. Well done!

Kenneth P. Werrell, Christiansburg, Virginia



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Air Power History (along with its predecessor *Aerospace Historian*) is one of nearly 350 publications indexed and abstracted in the bibliographic database *Lancaster Index to Defence & International Security Literature*. This information is produced by Military Policy Research Ltd., of Oxford, England, and can be found at www.mpr.co.uk. It contained over 90,000 citations and abstracts as of the end of May 2002, and is increasing at the rate of around 10,000 per year.

The *Lancaster Index* database is primarily designed for information professionals in the defense and security sector, and can appear somewhat daunting to the casual visitor. A look at the User Guide, downloadable from the site, is recommended. Free access, using the global index, scans the whole database, but returns literature citations that exclude the volume, issue, and page references. Researchers who need these references for serious research purposes will need to take out a paid subscription. Individual rates range from \$9.95 for a 24-hour pass to \$99.95 for a 365-day pass.

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Draw from last issue, Page 51

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The Royal Air Force in Texas: Training British Pilots in Terrell During World War II. By Tom Killebrew. Denton: University of North Texas Press, 2003. Photographs. Appendices. Bibliography. Index. Pp. xii, 182. \$26.95 ISBN: 1-57441-169-1

Tom Killebrew served in the U.S. Marine Corps Reserve and U.S. Navy Reserve. A Dallas native and licensed private pilot, he earned a master's degree in history from the University of Texas at Arlington, and teaches American history at Navarro College. His book explains the inception of Royal Air Force (RAF) flying training in the United States, with the focus on British Flying Training School (BFTS) No. 1, at Kaufman County Airport, Terrell, Texas.

We learn of early courses taking place at Love Field in Dallas, while the school at Terrell was under construction. The author outlines arrangements between the U.S. Army, the RAF, and the contractor (Terrell Aviation School, Ltd.) and then details operations at the school. The reader immediately sees the changes that took place after the United States entered the war. Killebrew

tells us how the school started as a Lend-Lease operation and later became Defense Plant Corporation property under U.S. Army control. He goes on to describe the expansion of the school and the maturation of its training process. Killebrew then takes the reader through the end of training and shutdown of the school at war's end. The epilogue offers a look at what happened to the BFTS graduates during and after the war and describes the current condition of the school premises.


When I first glanced at this book, I had two concerns: First, the copious endnotes gave an appearance that this might be a dry, academic report. Second, the title suggested this might be a narrow look at one airfield, without a larger context. Those concerns melted away as I read this excellent book.

While Killebrew did, indeed, use his master's thesis as the basis for this book, it reads more like a novel. The author has a good sense of what makes for interesting reading. He also balances detailed depictions of life at the Terrell school with explanations of the overall British training system, the broader scope of Army Air Forces flying training, and the international politics of World War II in general.

I only have two minor criticisms: First, where are the maps? I think any book about a location needs a map of the place! A layout diagram of the flying school and field would be useful, and a vicinity map showing the various auxiliary fields in relation to the main field and the town would also be nice. Second, the author occasionally jumps from one idea to another a bit abruptly. For example, on just one page we learn about school utility expenses, aircraft gun cameras, cadet physical training, and school personnel assignments! Smoother transitions would help the flow, even though all of the information is interesting.

This book should please anyone interested in military flight training, Lend-Lease and the RAF, or even just WWII aviation in general. Former wartime pilots—from either side of the pond—should especially appreciate this look back in time.

Scott D. Murdock, independent historical researcher

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Illustration courtesy NASA

Mastering the Ultimate High Ground: Next Steps in the Military Uses of Space. By Benjamin S. Lambeth. Santa Monica, Calif.: RAND, 2003. Notes. Appendix. Bibliography. Pp. xviii, 193. \$24.00 Paperback ISBN: 0-8330-3330-1

Under the auspices of Project Air Force, RAND Corporation's Benjamin Lambeth has produced a thought-provoking analysis of America's military space challenges at the beginning of the twenty-first century. Plumbing nearly six decades of Air Force involvement in space, from the late 1940s through release of the Space Commission report in January 2001, he has pinpointed several longstanding conceptual and organizational impediments to more rapid growth of U.S. military space capabilities. In the process of helping readers better understand the issues, he suggests some potentially worthwhile shifts in U.S. military space policy, but avoids prescriptive solutions.

Lambeth's fundamental premise is that the Space Commission's recommendations reflect a clear historical understanding of factors that have hindered Air Force space activities and that implementation of those recommendations affords the service an unprecedented opportunity to excel in space-related endeavors. After explaining briefly the context in which Congress chartered the Space Commission, *Mastering the Ultimate High Ground* chronicles how a combination of national policy, which emphasized the peaceful use of space, and interservice rivalries frustrated Air Force ambitions for decades. Next, it describes how Air Force senior leaders' recurrent fixation since 1958 on the "aerospace" construct has inhibited the full development of a theory of space power as distinct from air power. In his estimation, the flawed concept of "air and space integration" led to an overly restrictive paradigm that prevented the evolutionary changes in doctrine and resource allocation needed to integrate more thoroughly the space capabilities of the Air Force with all the services' air, land, and sea force employment and operational support functions.

The 2001 Space Commission report, Lambeth observes, focused more on *how* the defense establishment should be organized for space than on *where* the nation should be headed in terms of military exploitation of space and *what* should be done to get there. While acceptance of the commissioners' recommendations corrected many troublesome bureaucratic deficiencies, the controversial question of whether space should be treated as just another operating medium or considered different and, therefore, remain weaponless went unanswered. The author's cogent examination of the relationship between the concepts of space control and space force application leads him to conclude that "weaponization" of space is not inevitable. Considering America's traditional commit-

ment to the peaceful use of space, it seems appropriate in the near term to ensure that an emphasis on space control remain decoupled from the thorny issues surrounding space force application.

Contending that the Air Force's conceptual focus in the past has been on simply integrating space and air functions, Lambeth suggests it is time for a more comprehensive perspective. An appropriate focus today should emphasize operational integration and organizational differentiation. Such a bifurcated approach would harness space for all components in the joint arena and, simultaneously, ensure proper treatment of space program and infrastructure management, funding, cadre building, and career development.

The notes and bibliography for *Mastering the Ultimate High Ground* reveal good use of sources—books, articles, monographs, reports, documents, congressional testimony, oral histories, and unpublished presentations. While Lambeth's interpretations of those materials are generally sound, readers should be advised that note 23 on page 21 contains a mistaken causal connection. Apparently misunderstanding David Spires' narrative in *Beyond Horizons: A Half-Century of Air Force Space Leadership* (1997), Lambeth incorrectly explains Aerospace Corporation's establishment as resulting from the Air Force's loss of the Corona and Samos satellite programs. This annotative error should be forgiven, however, by anyone seriously interested in becoming better informed about the historical circumstances behind the Air Force's current space responsibilities.

Dr. Rick W. Sturdevant, Deputy Command Historian, HQ Air Force Space Command, Peterson AFB, Colorado



Choosing War: The Lost Chance for Peace and the Escalation of War in Vietnam. By Fredrik Logevall. Berkeley: University of California Press, 1999. Notes. Bibliography. Index. Pp. xxviii+529. \$19.95 (paper) ISBN: 0-520-22919-3. \$50.00 (cloth) ISBN: 0-520-21511-7

This award-winning book, which began as a doctoral dissertation at Yale University, is a magisterial effort to explain the U.S. decision to escalate the Vietnam War during the period August 1963 to February 1965. Logevall argues that, to be properly explained, the decision must be comprehended within a context larger than one focused exclusively on U.S. decisionmaking. Hence, he dutifully combed the archives of key allies of the United States and that of its opponents, and carefully took into consideration congressional politics, the 1964 presidential elections, public opinion, and

the role of the media in his evaluation of the options faced by U.S. decisionmakers.

Thorough, rich in details, and well researched and articulated, Logevall's analysis of all the facts in this wider framework leads him to conclude that—contrary to the Administration's arguments—American credibility, prestige, or reputation were not really at stake in Vietnam; that efforts to prevent escalation of the Americanization of the conflict through diplomatic efforts were willfully thwarted by the Administration; and that the notion of credibility had as much to do with domestic politics as anything else (i.e., "the Democratic Party's credibility, and the personal credibility of leading officials, rather than the credibility of the United States").

Logevall clearly demonstrates that there were in fact several options, in addition to escalation, available for consideration by U.S. decisionmakers during the period under review. Rigidity, however "characterized American decision making on the war, especially with respect to diplomacy." Opponents of escalation, he adds, were not committed enough to stop the United States. Escalation, therefore, was not inevitable, but the result of decisions made by individuals who knew (from personal observations or pessimistic intelligence reporting) the odds were against victory. "Neither domestic nor international considerations compelled them to escalate the war." President Johnson was a key actor throughout. Logevall convincingly shows he was deceitful and more concerned with his personal historical reputation and domestic political objectives. Johnson and his key advisers, in other words, chose escalation in Vietnam primarily "because of the threat of embarrassment—to the United States and the Democratic Party and, most of all, to themselves personally. They were willing to sacrifice virtually everything to avoid the stigma of failure."

While Logevall places more explanatory power on the short-term and personal factors, he remains cognizant that "long-term, subterranean currents in American ideology and culture" also played but a lesser role. It is probably on such an explanatory focus that other historians and experts on the Vietnam conflict will find flaws in Logevall's analysis and his conclusions. For one, I believe his work is rigorous, convincing, and will stand scrutiny until new archival material is unearthed to refute some of the key archival facts he relied on in drawing his judgments. Wherever one stands on the issue of escalation and its reason, this book is a must read.

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



Stand Well Clear. By D. K. Tooker. Annapolis, Md.: Naval Institute Press, 2003. Photographs. Pp. 208. \$26.95 ISBN: 1-59114-871-5

What does “a week with no Tuesday,” a 1939 Poterfield, and people who look like pheasants have in common? Well, read Colonel Tooker’s book and you will find out. In *Stand Well Clear*, Tooker tells nineteen stories of events that happened to him and his friends during his aviation career. D.K., as his friends call him, learned to fly in 1943, with the Naval Aviation Program and went on to fly Vought F4U Corsairs in the Marine Corps. During his twenty-five years of active duty, he flew 133 combat missions spanning three wars. During peacetime, he logged over 7,000 hours, while flying 36 different types of fixed-wing aircraft and 19 models of helicopters. He earned two Distinguished Flying Crosses, ten Air Medals, two Navy Commendation medals, and the Presidential Unit Citation. Tooker is the author of one other book and has written many articles about his flying experiences for various magazines, including *Reader’s Digest*.

The aviation stories presented in *Stand Well Clear* represent a spectrum; some are serious and others are humorous. On the serious side, Tooker shares what it was like to fly propeller-driven F4U-5s during the Korean War. He describes being attacked by a Soviet-built Yak-9 fighter aircraft in 1951, and tells a gripping story of his participation in the largest air raid of the Korean War over Sinuiju. He also speaks of scary moments some years later involving in-flight emergencies he and another pilot had while flying the Chance Vought F-8 Crusader. On the fun side, Tooker shares his experiences with “The Blue Blooper,” a car—with no brakes—that was a rolling party on wheels; and his assignment with VMF-323, the squadron without a motto, and the trials and tribulations he and his squadron mates went through to find one. The final chapter tells the story of his experiences commuting in a Cessna 150 every day to work and back—a practice that he sometimes found more dangerous than flying combat missions.

Stand Well Clear provides its readers with a glimpse into the world of military flying from the perspective of a combat-hardened Marine flyer who never lost his sense of humor. This often light-hearted book uses easy-to-understand language; there is very little technical jargon, and most of the aviation terms are well defined. Even readers with no aviation background will relate to and enjoy the antics of Colonel Tooker. His book is an easy read and a fun experience.

William A. Nardo, NASM Docent



Heroic Flights: The First 100 Years of Aviation. By John Frayn Turner. South Yorkshire, UK: Pen and Sword Books, 2003. Illustrations. Photographs. Index. Pp. vii, 279. £19.95 ISBN 0-85052-970-0

This book’s title would lead a reader to believe that the contents are devoted to heroic flights by aviation pioneers, both past and present. For the most part, this is not quite what the author provides. Some samples of what various chapters cover are:

Development of the Hawker Hurricane and the Supermarine Spitfire. While these were important aircraft, the story of their development is not one of heroic flights, and it takes up two chapters.

Birth of the Concorde—again, not an heroic flight at all.

A number of air races, Atlantic crossings, and a few early jet speed records and flights—all covered in a chapter called “The Jet Age.”

Turner’s flight during the VC-10 flight test program (takes up eight pages). Most aviators would not describe a flight well into the development test program of an airliner as heroic.

Coverage of Turner’s flights in the back seat of an RAF Lightning and a Red Arrows acrobatic team Gnat trainer. This chapter is particularly galling since it isn’t even interesting and is nothing more than personal puffery.

A narrative of Ens. George Bush being shot down in a U.S. Navy TBM Avenger in the Pacific. No one disputes that being shot down is a terrifying experience, but many aviators have been shot down. Selecting the mission of a future President of the United States strikes me as pandering.

Exploits of World War I heroes in the air. The difficulty is that all of these heroes are British. One would not guess that German, American, or French aviators had flown any heroic flights. Further, these are not flight descriptions, but rather the selected pilots’ total war experiences.

On the plus side, Turner is a gifted writer; the narrative is well done, easy to read, and interesting. Occasionally, he does a superb job of describing truly heroic flights. His account of Alcock and Brown on the first nonstop Atlantic crossing is gripping. He captures the heroism, danger, and enormous difficulties the two had to overcome in order to succeed as they did, even if the outcome was a crash landing in an Irish peat bog that the crew barely survived. Similarly, he does a wonderful job of describing how unbelievably dangerous Bleriot’s crossing of the English Channel was. Few people probably realize that Bleriot knew that his engine would probably not hold up for the whole flight and that a water landing would be a disaster. But he attempted it anyway and barely made it only through unbelievable skill. It’s interesting to note that Bleriot’s

grandson attempted to duplicate his grandfather’s feat in a modern replica of Bleriot’s aircraft and didn’t even clear the French shoreline.

These early aviators were incredibly skillful and courageous. When Turner devotes himself to their exploits, he does a great job.

Col. John Braddon, USMC (Ret.), Docent, NASM Udvar-Hazy Facility, Dulles Airport, Virginia



Vulcan the Fire God—The Inside Story of the Avro Vulcan. Power Point Communications, Ltd., 2002. [CD-Rom] Available from www.govulcan.com. £25.49 (approx. \$45).

The Avro Vulcan bomber, with its enormous delta wing and small canopy with round windows, is instantly recognizable and somehow unmistakably “British.” Whether decked out in tiger stripe camouflage or resplendent in “anti-nuclear flash white,” this was an awesome aircraft. If the mere sight of a Vulcan quickens your pulse, you will definitely enjoy this interactive CD. It is packed with a vast amount of written material, including the development of the aircraft, original plans and diagrams, service histories (including the Falklands conflict), and full technical details of the plane’s systems and a detailed history of nuclear weapons development.

The CD’s images are what really make it attractive, however. The CD has more than thirty minutes of video, including an extended depiction of a Vulcan making repeated low-level passes in which the plane demonstrates seemingly impossible fighter-style tight turns and climbs. Equally interesting are the virtual reality panoramas inside the aircraft. There are also plenty of still pictures, including one side-by-side with a B-52 that graphically demonstrates just how enormous the Vulcan was.

I had a little trouble running the CD on a computer equipped with Windows ME; it ran flawlessly with Windows XP but is not compatible with any Macintosh.

Larry Richmond is an attorney for the federal government and a NASM docent



Imagining Flight: Aviation and the Popular Culture. By Bowdoin Van Riper. College Station: Texas A&M University Press, 2004. Illustrations. Photographs. Notes. Bibliography. Index. Pp. xii, 206. \$33.00 ISBN: 1-58544-300-5

Bowdoin Van Riper is a professor of history at the Southern Polytechnic State

University in Marietta, Georgia, whose specialty is the history of science and technology. He has written two other books in addition to many articles on geology, archaeology, and aerospace technology. Van Riper was five years old when he took his first airplane ride and “has been looking up ever since.”

This book addresses the relationship between the American public and the technological marvel called the airplane. In this social history, Van Riper lists three reasons why airplanes (or aviation technology) fascinate the public: (1) Technology makes us human (since no other animal on earth has it). (2) Aircraft technology confers a sense of extraordinary power to the people who fly. Man has wanted to fly since the dawn of time and now he can. (3) The idea of flight (“slipping the surly bonds of earth”) has had tremendous appeal for people for thousands of years. If this were not true, why do so many pilots continue to fly after bad experiences or non-fatal crashes?

Van Riper examines pre-WWI predictions on the airplane’s impact on the future. He surveys the literature discussing why, for example, aviators spoke about aviation’s impact in rather modest terms, whereas non-aviators predicted profound world change. He next discusses why pilots became national heroes, looking at Lindbergh’s and Earhart’s rise to fame in the aviation world and why they were international heroes. He also addresses groups of heroes such as the pilots of the Battle of Britain and the Tuskegee Airmen. But here Van Riper also hypothesizes why some pilots, although well known and accomplished, were never raised to hero status, even in the eyes of their own countrymen.

In his chapter entitled “Death from Above,” Van Riper discusses the concept of the aerial bomber as the ultimate weapon of

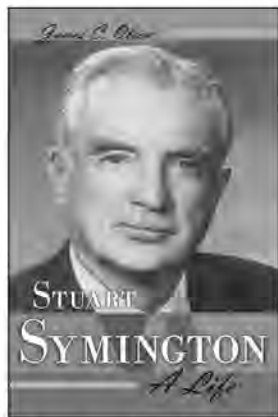
destruction and its effect on the general population. Here he compares the predictions of the bomber during WWI and the reality of the bomber of WWII and into modern times. The book then takes a more pleasant turn as Van Riper discusses how the airplane and related technology ushered in the air transportation industry, giving America’s middle class access to modern airliners at affordable prices after WWII.

Van Riper also investigates the effects of aviation crashes and other unfortunate events on air travel and the public at large and concludes by looking at the aerospace industry and what to expect in the future.

This social history of aviation and the popular culture is concise and to-the-point. It is a well written book geared for the gen-

eral reader and absents itself from long discourses of esoteric, intellectual issues that would interest only a philosopher. It contains very little technical jargon, as its main focus is how people react to the phenomenon called the airplane. Lastly, it is very well documented; I was impressed with Van Riper’s notes and his bibliographic essay. Well worth the read.

William A. Nardo, NASM Docent

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

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Boyne, Walter J. *The Influence of Air Power upon History*. Gretna, La.: Pelican Publishing Co., 2003. Notes. Appendix. Bibliography. Index. Pp. 447. \$29.95 ISBN: 1-58980-034-6

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Home Field Advantage: A Century of Partnership between Wright-Patterson Air Force Base and Dayton, Ohio, in Pursuit of Aeronautical Excellence. Wright-Patterson AFB, Ohio: Aeronautical Systems Center History Office, 2004. Illustrations. Photographs. Pp. xvii, 400. \$67.00. www.ascho.wpafb.af.mil. ISBN: 0-16-068065-4

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Shawcross, William. *Allies: The U.S., Britain, Europe, and the War in Iraq*. New York: Public Affairs, 2004. Bibliography. Index. Pp. 261. \$20.00 ISBN: 1-58648-216-5

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Strasser, Steven. *The 9/11 Investigations*. New York: Public Affairs, 2004. Appendix. Glossary. Index. Pp. xxxvi, 580. \$14.95 Paperback ISBN: 1-58648-279-3

* Waller, Douglas. *A Question of Loyalty: Gen. Billy Mitchell and the Court-Martial that Grippped the Nation*. New York: Harper Collins, 2004. Notes. Bibliography. Index. Pp. 428. \$26.95 ISBN: 0-06-0500547-8

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Coming Up



Compiled by George Cully

September 9-12

The **Tailhook Association** will hold its 47th Annual Symposium at the Nugget Hotel and Casino in Reno, Nevada. Contact:

The Tailhook Association
9696 Businesspark Ave.
San Diego, CA 92131
(858) 689-9223 / (800) 322-4665
e-mail: thookassn@aol.com
website: <http://www.tailhook.org>

September 11-15

The **Air Force Association** will hold its annual National Convention and Aerospace Technology Exposition in Washington, DC. Contact:

AFA
1501 Lee Highway
Arlington, VA 22209-1198
(703) 247-5800
website: <http://www.afa.org>

September 15-18

The **Society of Experimental Test Pilots** will host its 48th Annual Symposium and Banquet at the Westin Bonaventure Hotel in Los Angeles, California. Contact:

SETP
P. O. Box 986
Lancaster, CA 93584-0986
(661) 942-9574, Fax 940-0398
e-mail: setp@setp.org
website: <http://www.setp.org>

September 24-25

The **Belgian Luxembourg American Studies Association** and the **Centre for Historical Research and Documentation on War and Contemporary Society** will co-host a Conference on the 60th Anniversary of the Battle of the Bulge in Luxembourg City, Luxembourg. Contact:

William L. Chew III, Ph.D.
Professor of History
Vesalius College, Vrije Universiteit Brussel
Pleinlaan 2
B - 1050 Brussels, Belgium
e-mail: wchew@vub.ac.be

September 28-30

The **American Institute of Aeronautics and Astronautics** will host its Space 2004 Conference & Exhibition in San Diego, Calif. Contact:

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

October 4-8

The **American Institute of Aeronautics and Astronautics** will host the 55th Congress of the

International Astronautical Federation, the International Academy of Astronautics, and the International Institute of Space Law in Vancouver, British Columbia. Contact:

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

October 7-10

The Dutch Foundation for the History of Technology will host the annual meeting of the **Society for the History of Technology** at the Renaissance Amsterdam Hotel in Amsterdam, the Netherlands. Contact:

SHOT
Department of History
603 Ross Hall
Iowa State University
Ames, IA 50011
(515) 294-8469, Fax x6390 - include "SHOT" on cover
e-mail: shot@iastate.edu
website: <http://shot.press.jhu.edu/>

October 8-9

The **McCormack Tribune Foundation** and **VMI's Marshall Library** will co-sponsor their third Conference on the Cold War, focusing upon the years 1963-1975. Contact:

Malcolm Muir, Jr.
Dept. of History
Virginia Military Institute
Lexington VA 24450
(540) 464-7447/7338
e-mail: murim@vmi.edu

October 17-20

The **Association of Old Crows** will host its 41st annual international symposium and convention in San Diego, California. Contact:

AOC Headquarters
1000 North Payne Street, Suite 300
Alexandria, VA. 22314-1652
(703) 549-1600, Fax x2589
e-mail: wood@crows.org
website: <http://www.aoc.org>

October 18-20

The **3rd Global Conference on War and Virtual War** will be held in Salzburg, Austria. This inter-disciplinary and multi-disciplinary conference seeks to provide a challenging forum for the examination and evaluation of the nature, purpose and experience of war, and its impacts on all aspects of communities across the world. Contact:

Dr Rob Fisher
Inter-Disciplinary.Net
Priory House Freeland
Oxfordshire, England OX29 8HR
01993 882087, Fax 0870 4601132
e-mail: rf@inter-disciplinary.net
website: <http://www.interdisciplinary.net/ptb/vww/vww3/vww04cfp.htm>

October 25-27

The **Association of the U.S. Army** will hold its annual convention and symposium at the New Washington Convention Center in Washington, D.C. Contact:

Association of the United States Army
2425 Wilson Blvd.
Arlington, VA 22201
(800) 336-4570
e-mail: ausa-info@ausa.org
website: <http://www.ausa.org/>

October 26-27

The **U.S. Naval Institute** will host its 9th Annual Naval Warfare Symposium and Exhibition in Virginia Beach, Virginia. Contact:

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

October 27-30

The 2004 meeting of the **Northern Great Plains History Conference** will be held in Bismarck, North Dakota. Contact:

Joe Fitzharris
Dept. of History – Mail #4018
University of St. Thomas
2115 Summit Ave.
St. Paul MN 55105
e-mail: jcfitzharris@stthomas.edu

October 29-30

The **28th annual Great Lakes History Conference**, sponsored by Grand Valley State University, will be held in Grand Rapids, Michigan. This year's theme is "Challenging Historical Borders: Exploring Intersections between Nations, Regions, and Disciplines." Contact:

Dr. Paul Murphy or Dr. David Stark
Department of History
Grand Valley State University
Allendale, MI 49401
(616) 331-3298, Fax x3285
e-mail: murphyp@gvsu.edu or starkd@gvsu.edu
website: <http://www.gvsu.edu/history/glhc.html>

October 29-30

The Rensselaer County Historical Society's Fall 2004 symposium is entitled "**Upstate New York Goes to War: War and the Home Front, 1775-2004.**" The symposium will be held in Troy, New York. Contact:

Stacy Pomeroy Draper
Curator, Rensselaer County Historical Society
57 Second Street
Troy NY 12180
(518) 272-7232 x14
e-mail: spdraper@rchsonline.org
website: <http://www.rchsonline.org>

November 11-14

The Film & History League, with the Literature/Film Association, will be holding its conference on "**War in Film, Television, and History**" near Dallas, Texas. Topics include ABC-TV shows of the 1960s, including "Twelve O'Clock High," "Rat Patrol," and "Combat;" the war movies of Stanley Kubrick; and "Hollywood on the Homefront." Contact:

Dr. Sara Jane Richter
Dean, School of Liberal Arts
Oklahoma Panhandle State University
Box 430
Goodwell, OK 73939
e-mail: saraj@opsu.edu
website: <http://www.filmandhistory.org>

November 16-17

The **American Astronautical Society** will hold its National Conference and 51st annual meeting at the Pasadena Hilton in Pasadena, California. Contact:

American Astronautical Society
6352 Rolling Mill Place, Suite #102
Springfield, VA 22152-2354
(703) 866-0020, Fax -3526

e-mail: info@astronautical.org
website: <http://www.astronautical.org>

2005

February 24-27

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

Professor Kyle S. Sinisi
Department of History
The Citadel
171 Moultrie Street
Charleston, SC 29409
Tel.: (843) 953-5073, fax x7020
e-mail: sinisik@citadel.edu
website: <http://www.smh-hq.org/>

April 14-15

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

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

May 19-21

The **Business History Conference** will host its annual meeting in Minneapolis (USA), home to the flagship campus of the University of Minnesota. The theme for the conference is "Reinvention and Renewal." Contact:

Roger Horowitz
Secretary-Treasurer
BHC
PO Box 3630
Wilmington DE 19807
(302) 658-2400, Fax 655-3188
e-mail: rh@udel.edu
website: <http://www.h-net.org/~business/bhcweb/>

September 8-9

The **Centre for Second World War Studies** will host a conference entitled "Defeat and Memory." The aim of this conference is to examine the manner in which defeat in its military form has been understood and remembered by individuals and societies in the era of modern warfare. The Conference will be held at the University of Edinburgh, in Edinburgh, Scotland. Contact:

Dr. Jenny Macleod
Centre for Second World War Studies
University of Edinburgh
24 Buccleuch Place
Edinburgh, Scotland
EH8 9LN
e-mail: jenny.macleod@ed.ac.uk

If you wish to have your event listed, contact:

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

Letters

DSCS is no GPS

I couldn't let the misidentification of the satellite on page 44 [Summer 2004, Vol. 51, No. 2, "Open Skies Policy and the Origin of the U.S. Space Program"] go by without comment. It's a fine artist's rendition of a DSCS III satellite, not of a GPS or any navigation satellite! I used to brief GPS and DSCS as part of Lt. Gen. Dick Henry's Command Mission Briefing, and I can tell a DSCS III with one arm tied behind my back. The accompanying article is generally pretty good, with only a couple of minor errors. For instance, the SAMOS camera was used in Lunar Orbiter. I'm not sure what was used in Ranger, but Lunar Orbiter was definitely the SAMOS optical system. The Jupiter-C did not use strap-on rockets; it had a set of rockets in the upper stage, but nothing that amounted to thrust augmentation in the first stage. The author was confused with the TAT (Thrust Augmented Thor), used in the CORONA program. Still, the author provided some genuinely good new bits of insight.

Dr. L. Parker Temple III

Newer Scholarship Overlooked

Lester F. Rentmeester's article in the Summer 2004 issue of *Air Power History*, "Open Skies Policy and the Origin of the U.S. Space Program," contains several errors and presents a misleading account of early American space history, and the resulting policy that developed from the reconnaissance program.

For example, on page 42 the author wrote, "Because of the constraints, we selected a television camera that would transmit its signal to three ground stations in the United States. This system led to the first project name Feedback. Because of the low resolution of the images, the system was later discarded for this program although it was used a decade later in NASA's Ranger program. The Feedback name for the pro-

ject was changed often; Sentry, Samos, and Pied Piper; Keyhole was the name for various photographic subsystems, KH-1, KH-2, etc."

Although RAND had considered a television camera in various studies through the 1954 Feed Back report, it was ultimately rejected by the Air Force in 1956 and did not fly on any reconnaissance satellite. The Weapons System 117L program office evaluated three contractor proposals under the "Pied Piper" competition in early 1956. Both RCA and Martin proposed television-based systems. Lockheed proposed a satellite that would take pictures on film, scan the film, and then transmit the images to the ground. Lockheed won the contract for several reasons, but one of them was that the Air Force officers evaluating the proposals felt that the film system was the likeliest to succeed. Starting in late 1960, three satellites using this film-scanning technique were launched but only one reached orbit. But by the time that the satellites were launched, the Air Force had already been ordered to abandon the technology. The film-scanning technology was later revived for NASA's Lunar Orbiter program, not Ranger.

Feed Back was not the first project name. It was the name of a report produced by the RAND Corporation in 1954 that started the satellite program. Pied Piper was the name of the competition to select a contractor. The program was officially called Weapons System 117L, the Advanced Reconnaissance System, or ARS, and it was underfunded until after Sputnik. Starting in early 1958, WS-117L was divided into three components, one of which was Sentry. The name Sentry was discontinued by late 1958 in favor of Samos, which ultimately included over a half dozen different camera and electronic intelligence payloads. The Keyhole designation was not adopted until the early 1960s and did not apply to the Samos satellites. Instead, Keyhole referred to the product from satellite reconnaissance. Designations such as KH-1, KH-2, KH-3, KH-4, KH-4A and KH-4B were applied to the various CORONA models. CORONA was a distinctly different system that returned its film in capsules to the earth, and was not related to the film-scanning system originally chosen in 1956.

On page 44, the author wrote of the difficulty in selecting a booster for putting the first U.S. satellite in orbit and that this delayed the development of the reconnaissance satellite for four years. Actually, the civilian scientific satellite was entirely separate from the reconnaissance satellite and utilized the Vanguard rocket. The reconnaissance satellite was always intended to use a modified Atlas ICBM. When CORONA was started, the Air Force utilized the Thor ballistic missile. Delays in the satellite program were primarily due to skepticism by Air Force Undersecretary Donald Quarles that the technology was sufficiently mature to make the system work.

While the author cited Cargill Hall's article in *Prologue*, he missed other relevant sources on this subject, including Air Force Capt. James Coolbaugh's personal memoir on the Feed Back report, which appeared in the *Journal of the British Interplanetary Society*. He also missed the book I edited on the CORONA reconnaissance satellite program, *Eye in the Sky*, and several chapters in the book *Reconsidering Sputnik* on the establishment of freedom of space. The "freedom of space" policy actually stemmed from a recommendation made by CIA official Richard Bissell in fall 1954 that found its way into an early 1955 report to President Eisenhower.

Dr. Dwayne A. Day, Vienna, Virginia

Notices

World War II Fighter Pilots to Share Experiences on Veterans' Day, November 13, 2004

Travel back in time on November 13, 2004 and relive the life and death drama of World War II aerial combat in Europe. The Dixie Wing, Commemorative Air Force will host "A Flight with Eagles: 365th Fighter Group Hell Hawks Symposium" at their hangar, the Historical Airpower Facility, at Falcon Field in Peachtree City, Georgia. The Hell Hawks flew the famous

Republic P-47 Thunderbolt and were assigned to the Ninth Air Force of the United States Army Air Forces from December 1943 until the end of World War II. The Hell Hawks provided close air support to United States and allied forces in France, Belgium, and Germany and were awarded Distinguished Unit Citations in October 1944 and April 1945.

“A Flight with Eagles” will be held the week of Veterans Day and will feature a panel discussion of Hell Hawks veterans, moderated by John “Skipper” Hyle, former captain, USAF and F-16 Viper pilot. A rare P-47 Thunderbolt and other operational World War II aircraft, including a North American P-51 Mustang and Douglas SBD Dauntless dive bomber, military vehicles, and memorabilia will be on display.

Proceeds from the event will benefit “Education through Living History,” a World War II program presented by Dixie Wing volunteers at their facility. The education program is available to area schools and youth groups free of charge. More information can be found on www.dixiewing.org. For tickets call (678)-364-1110.

The Commemorative Air Force is a 501(c)3 that has 10,000 members in 27 states and four countries. The mission of the CAF is to 1) to restore, maintain, and fly World War II aircraft; 2) to maintain museum facilities for aircraft as a tribute to the thousands of men and women who built, serviced, and flew the planes; and 3) to perpetuate in the memory and hearts of all Americans, the spirit in which these great planes were flown in the defense of this nation. www.commemorativeairforce.org



the former editor of *Flying Magazine*, and former president and chairman of the board of the AFA—is the association’s highest award presented annually in the field of Arts and Letters. Mr. Wolk was honored for his latest book, *Fulcrum of Power: Essays on the United States Air Force and National Security*. John J. Politi, AFA’s current chairman wrote, “This is a unique and first-hand insight into important events and periods in the nation’s military history and the evolution of the Air Force and its impact on military affairs.” Mr. Wolk will receive the award on September 13, 2004, at the AFA’s Air & Space Conference and Technology Exposition, at the Marriott-Wardman Park Hotel in Washington, D.C.

Mr. Wolk is a frequent contributor and reviewer for *Air Power History*. His latest article, an interview with Robert S. McNamara on the former defense secretary’s World War II service, appeared in the Winter 2003 issue. [Vol. 50, No. 4, “Whiz Kid,” pp. 4-15]

Bartsch’s Book Wins Best History Award

Tom Wisker executive producer of New York’s WBAI-FM announced that William H. Bartsch’s book, *MacArthur’s Pearl Harbor* (Texas A&M Press. 2003) was selected unanimously as the best military history of the year. Bill Bartsch has written an article and reviewed manuscripts for *Air Power History*.



Major General John W. Huston, USAF (Ret.) Wins Air Force Historical Foundation’s Best Military History Award for 2004.

The AFHF Book Award Committee, composed of Alfred F. Hurley, Donald R. Baucom, Robert E. Vickers, and John F. Kreis, chairman, unanimously selected General Huston’s *American Airpower Comes of Age: General Henry H. “Hap” Arnold’s World War II Diaries*, published by Air University Press.

David Schoem

David Schoem, formerly with the Office of Air Force History, died on March 27, 2004. He was eighty-five. Born in Passaic, New Jersey, Mr. Schoem came to Washington in 1941. During World War II, he served in France as a U.S. Army court reporter. After the war, he returned to Washington, where he worked as chief of reference and office manager in the Office of Air Force History. After retiring in 1979, Schoem volunteered for many charities and causes including the Jewish War Veterans, B’nai B’rith, United Jewish Appeal, and the Hebrew Home. He read weekly at elementary schools in Silver Spring, Maryland, where he was known as “Grandpa David” to hundreds of children. Mr. Schoem received many awards for his outstanding, public service. Survivors include his wife of sixty-one years, Lillian; his sons, Alan, Ira, and Marc; six grandchildren; and three sisters.

News

Herman S. Wolk Wins 2004 Gill Robb Wilson Award

The Air Force Association (AFA) named Herman S. Wolk, senior historian with the Office of Air Force History, as its 2004 recipient of the Gill Robb Wilson Award. The award—named for

Reunions

The **Sampson AFB Veterans Association** seeks to contact all 3650th Basic Military Training Wing members, especially permanent party, Women's Air Force, Basic Trainees, and Special Training school personnel, from 1950 to 1956. Contact:

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

The **567th Strategic Missile Squadron** (Atlas) will hold its reunion at Branson, Missouri, September 22-26, 2004. Contact:

Jim Henderson
6628 Dare Cir.
Columbia, SC
(803) 782-2977
e-mail: chieftarheel@webtv.net

The **610th Air Control and Warning Squadron** (618th, 527th, and all Southern Japan Radar GCI sites). Proposed reunion at Branson, Missouri, in September 2004. Contact:

Marvin Jordahl
(904) 739-9337
e-mail: jordahlmarvin@attbi.com

The **309th Strategic Missile Wing** (Titan II) will hold its reunion at Tucson, Arizona, September 29-October 3, 2004. Contact:

The Lashers
e-mail: jelainelasher@aol.com

The **27th Air Transport Group** (310th, 311th, 312th, 325th Ferrying Sqdns; 86th, 87th, 320th, 321st Transport Sqdns.; 519th, 520th Service Sqdns.) will hold its reunion September 30-October 3, 2004, at Bossier City, Louisiana. Contact:

Fred Garcia
6533 West Altadena Ave.
Glendale, AZ 85304
(623) 878-7007

Misawa Recall: 416th TFS, 531st TFS, (1959-1964) will meet October 4-6, 2004 in Austin, Texas. Polkadotters and 4th fighter pilots also invited. Contact:

Les Frazier
702 River Down Road
Georgetown, TX 78628
e-mail: FLoftus@mac.com
or les@lesfrazier.com.

The **1st, 11th, and 69th Pilotless Bomber Squadrons** will hold their reunion October 6-10, 2004, at Secaucus, New Jersey. Contact:

Micky Hart
156 East 2d.
South Preston, ID
(208) 852-1863
e-mail: qhart@plmw.com

The **49th Fighter Group Association** will hold its reunion on October 20-24, 2004, in Las Vegas, Nevada. Contact:

Lt. Col. Doug Melzer, USAF, (Ret.)
1915 Country Club Dr.
Redlands, CA 92373-7305
(909) 793-4957

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

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

Contact

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

U.S. Navy readers are advised to log on to www.navalinstitute.org and then click on reunions.

Guidelines for Contributors

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

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

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

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

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



Meet the New Executive Director

On June 21, 2004, Col. George K. Williams, USAF (Ret.) was named to be the new Executive Director, Air Force Historical Foundation. He succeeds Col. Joseph Marston, USAF (Ret.).

A native of southeastern Colorado, Colonel Williams is a graduate of West Point, Class of 1968. He served ten years as an Army combat arms officer, attended Ranger School, served with the 82d Airborne Division and commanded at the platoon and company levels in the 1/1 Cavalry in Vietnam, where he was awarded two Silver Stars, a Purple Heart, and other decorations. He attended Cornell University for his master's degree in American Studies and subsequently taught in the English Department at West Point. After an exchange tour on the faculty of the Air Force Academy, he initiated an interservice transfer to the Air Force. He has had a long association with the E-3 AWACS at various operational and staff levels in the U.S., NATO, and Saudi Arabia. In

1981, Williams entered Oxford University where he earned his Ph.D. degree in Modern History, under Sir Michael Howard. Colonel Williams's doctoral dissertation examined the operations and consequences of long-range bombing by the Royal Air Force during World War I. After several assignments in the AWACS community, he was selected to be the Deputy Air Force Historian, where he served from 1992 to 1996. He completed his military career as a research associate at the National Defense University, retiring in 1998. He has been published in various formats and has authored a book, *Biplanes and Bombsights: British Bombing in World War I*, published by the Air University Press. Colonel Williams began full-time work with the Foundation on June 21, 2004.

The Fall 2004 meeting of the Air Force Historical Foundation's Board of Trustees is scheduled for Tuesday, October 19th, at the Andrews Air Force Base, Maryland, Officers' Club, commencing at ten o'clock in the morning. All members of the Foundation are welcome and encouraged to attend.

Lieutenant General Keith Karl Compton 1915–2004



Lt. Gen. Keith Karl Compton died on June 15, 2004, in San Antonio, Texas. He was eighty-eight.

General Compton was born in 1915 in St. Joseph, Missouri, and graduated from Central High School there in 1933. He received his BA degree from Westminster College at Fulton, Missouri, in 1937. He then entered military service as an aviation cadet at Randolph Field, Texas, and received his pilot's wings in 1939.

He spent the next two and a half years at Langley Field, Virginia, with the 2d Bomb Wing, the first unit equipped with the B-17 Flying Fortress. In April 1942, he commanded the 409th Bomb Squadron and later was operations officer for the 93d Bomb Group, at Fort Myers, Florida.

In February 1943, Compton became commander of the 376th Bomb Group in Africa and, on August 1st of that year, led the famous "Tidal Wave" air attack on the German oil refineries in Ploesti, Romania.

He was reassigned as assistant to the air chief of staff for operations, Fifteenth Air Force, in North Africa in March 1944 and returned to the United States in July that year as assistant deputy chief of staff for operations

and training, Second Air Force, Colorado Springs, Colorado.

In June 1948, following several command assignments and graduation from the Air University, General Compton was assigned to the Air Proving Ground Command, Eglin Air Force Base, Florida, as deputy for operations, a position he held until February 1953. It was during this tour of duty that Compton, flying an F-86 Sabrejet, won the National Air Races Bendix Trophy for 1951, setting a new national speed record for the route.

In February 1953, General Compton transferred to SAC. Several successful command assignments in SAC resulted in his designation in September 1961 as SAC director of operations. In June of 1963 he became SAC's chief of staff.

In August 1964 he was assigned to be the inspector general, U.S. Air Force. Six months later he was designated the deputy chief of staff for plans and operations, Headquarters U.S. Air Force. With these duties he also became the Air Force's operations deputy sitting with the Joint Chiefs of Staff for the chief of staff, U.S. Air Force. He became vice commander in chief, Strategic Air Command in February 1967. Compton held the position until he retired on August 1, 1969.

An accomplished golfer, he belonged to the Society of Seniors, made up of the nation's best senior golfers. In 1978, he won the U.S. Golf Association's Senior Amateur championship.

Among the military decorations awarded to General Compton are the Distinguished Service Medal, Legion of Merit with oak leaf cluster, Distinguished Flying Cross with oak leaf cluster, Air Medal with nine oak leaf clusters, and the Air Force and the Army Commendation medals.

He is survived by his son, Keith Compton, Jr.; daughters Mary Mace, Tegwin Anne Smith, and Michele Walker; eight grandchildren; and two great, grandchildren.