

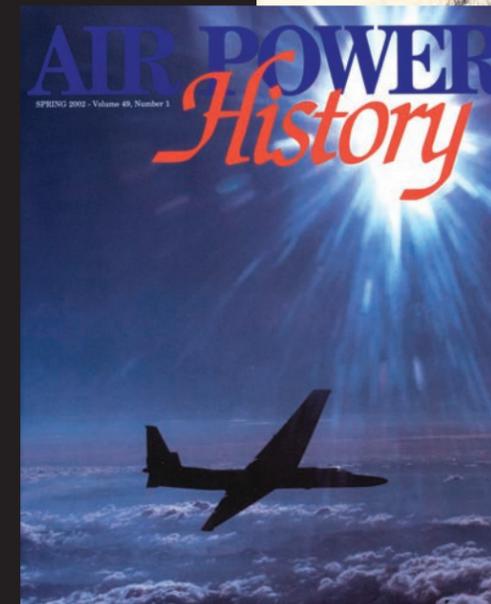
AIR POWER

SPRING 2003 - Volume 50, Number 1

History



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AIR POWER

History

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The Air Force Historical Foundation



Air Force Historical Foundation
1535 Command Drive – Suite A122
Andrews AFB, MD 20762-7002
(301) 981-2139
(301) 981-3574 Fax
E-Mail: afhf@earthlink.net
<http://afhistoricalfoundation.com>

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Jacob Neufeld

Technical Editor

Robert F. Dorr

Book Review Editor

Scott A. Willey

Layout and Typesetting

Richard I. Wolf

Advertising

Mark D. Mandeles

Circulation

Richard I. Wolf

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Address **Letters to the Editor** to:

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

Correspondence regarding missed issues
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Air Power History
P.O. Box 151150
Alexandria, Virginia 22315
Telephone: (301) 981-2139
Fax: (703) 923-0848
e-mail: airpowerhistory@yahoo.com

Advertising

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

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In his third contribution to *Air Power History* on the subject of early Soviet aviation, Viktor Kulikov writes about the beginning of the USSR's ship-based airplanes. Initially based on German planes and launchers, the Soviets experimented extensively from the late 1920s until 1950. Their interest then waned and attention turned to ship-based helicopters.

"Brick" Eisel and Daniel Watkins retell the story of the famous 1924 round-the-world flight by the U.S. Army Air Service Douglas World Cruisers. Their interest was sparked by the chance discovery, in a storage area of the Air Force Art Collection, of the Collier Trophy awarded for that historic flight. A year ago, on March 27, 2002, the trophy was reunited with other artifacts of the famous flight housed at the U.S. Air Force Museum, Wright-Patterson AFB, Ohio.

On June 14, 1943, when a B-17C Flying Fortress, operated as a transport, crashed at Baker's Creek, Australia, killing forty American GIs aboard, the news was suppressed because of wartime exigencies. The accident was little known for about fifty years, until some Australians and Americans, including author Robert Cutler, began to investigate. Cutler's interest was partly personal—in 1943, his father, the executive officer of the nearby U.S. Army rest area, recorded the accident in his diary. An engineering professor and former USAF navigator, Cutler analyzed the crash in depth.

In "Air Power and the Battle for Mazar-e Sharif," Air University's Don Chipman writes one of the first histories of the United States' war on terrorism, from October to December 2001, against Afghanistan's Taliban rulers and their al Qaeda allies. Dr. Chipman demonstrates how the "vertical flank" of air power proved decisive in the U.S. victory.

Anyone interested in the exploits of the Polish Air Force, especially of their service with the Royal Air Force in World War II, would do well to read Michael A. Peszke's review essay. Dr. Peszke's essay (see p. 46) on the English-language historiography of the Polish Air Force is both comprehensive and analytical.

The year 2003 marks the fiftieth anniversary of the Air Force Historical Foundation and its journal, *Air Power History*. Our goal is to continue to provide "quality articles—based on sound scholarship, perceptive analysis and/or firsthand experience—that contribute to knowledge, are well-written, and attractively illustrated." To achieve that goal, we depend on our readers. Especially in demand are manuscripts on space and missile history (see page 64, letter from Col. Mark Owen, 91st SW/CC).

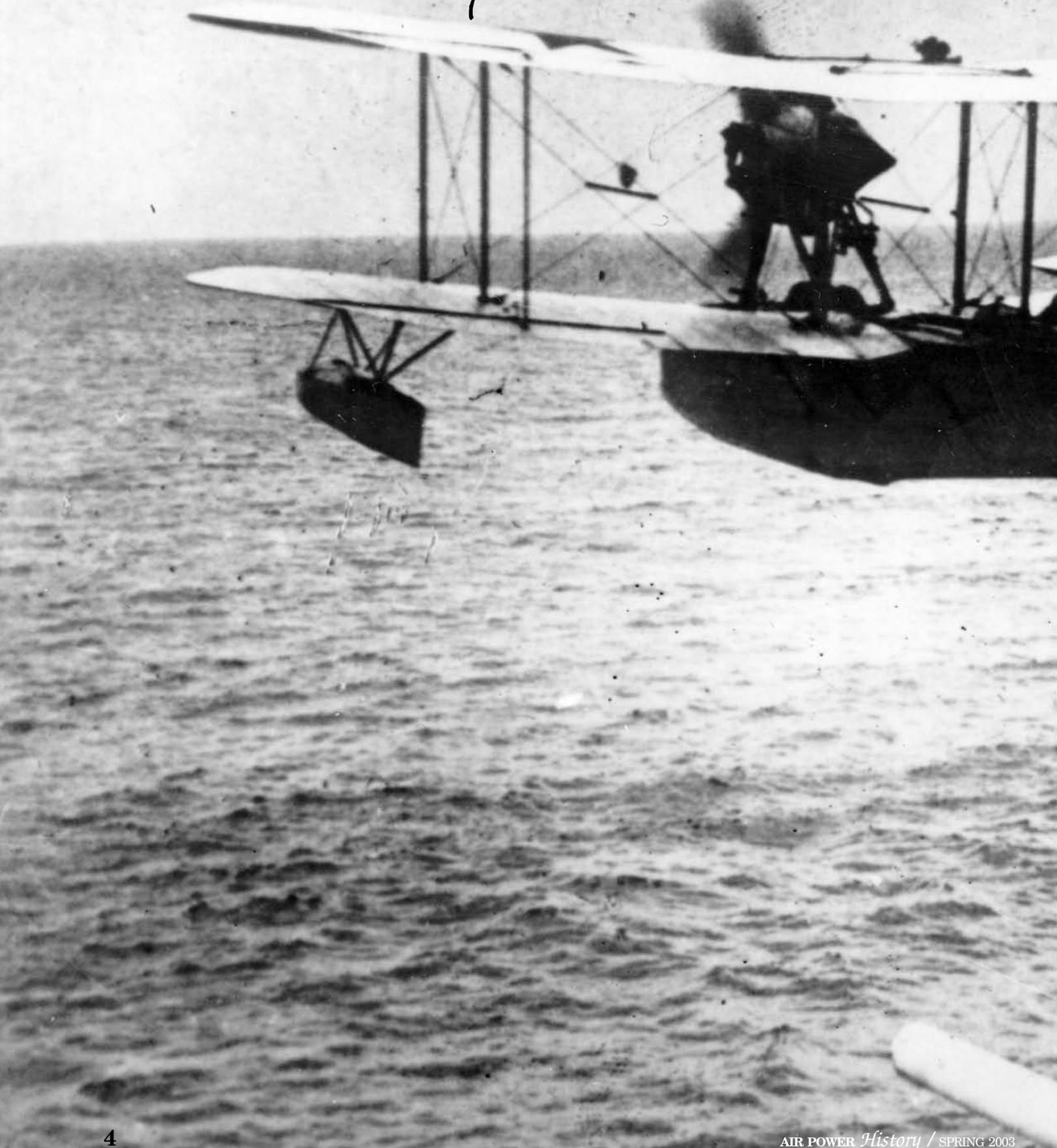
There are a dozen reviews on a variety of new books, ranging from aviation poetry to the advanced extravehicular space suit. The usual departments include Bob Dorr's "History Mystery," letters, news, notices, reunions, and upcoming events.

Finally, we mourn the passing of yet another great Air Force leader, former Secretary John L. McLucas, who died December 1, 2002. A tribute to Dr. McLucas appears on page 66. He will be sorely missed by the many people whose lives he touched and especially by the Air Force Historical Foundation, which he actively supported as a Trustee.

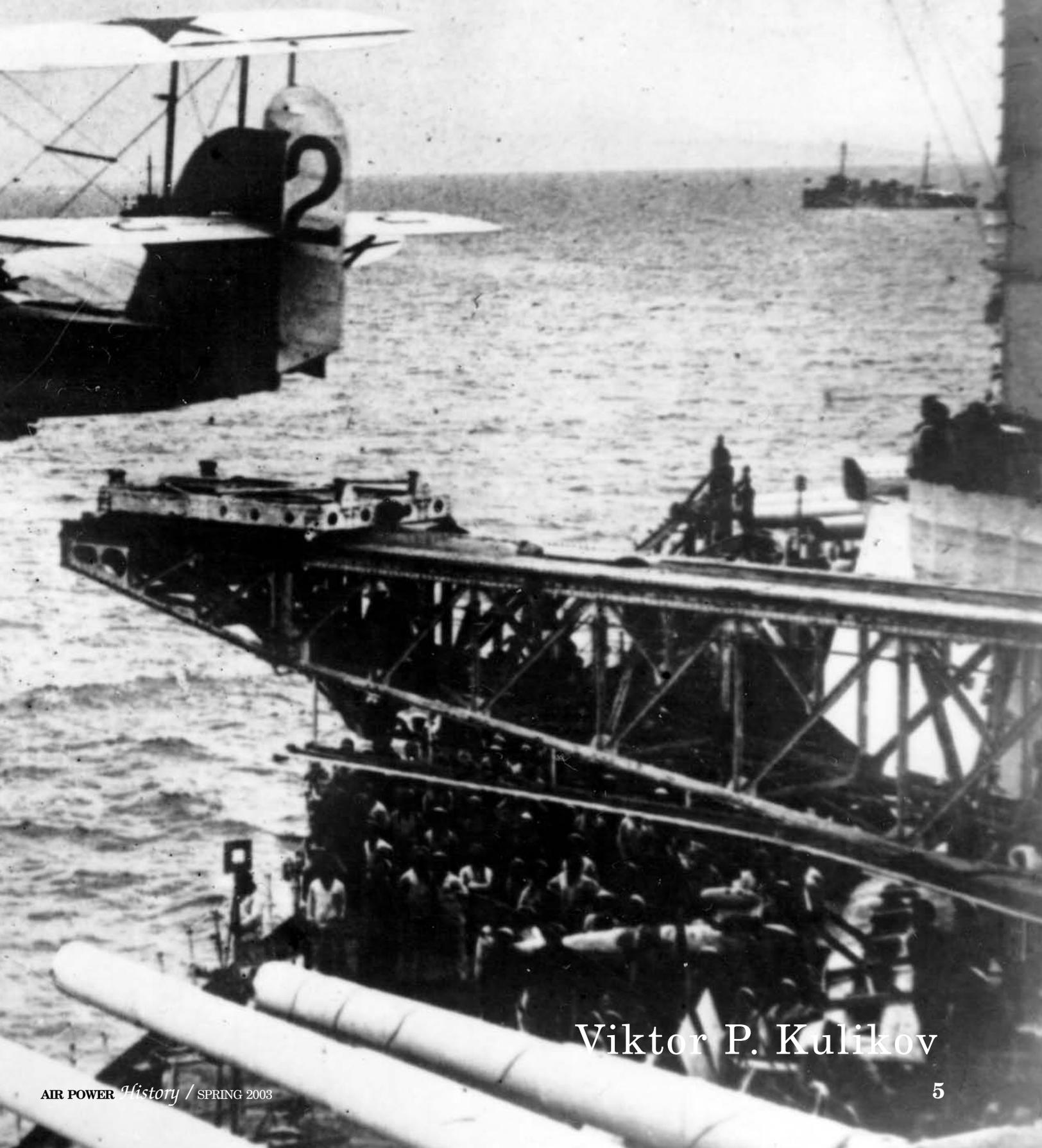


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Soviet Ship-Based Recon



naissance, 1920s-1950



Viktor P. Kulikov

(Overleaf) KR-1 takes off from catapult installed on the battleship *Parizhskaja Kommuna* (the Paris Commune) during Baltic Fleet exercises in the 1930s. (All photos courtesy of the author.)

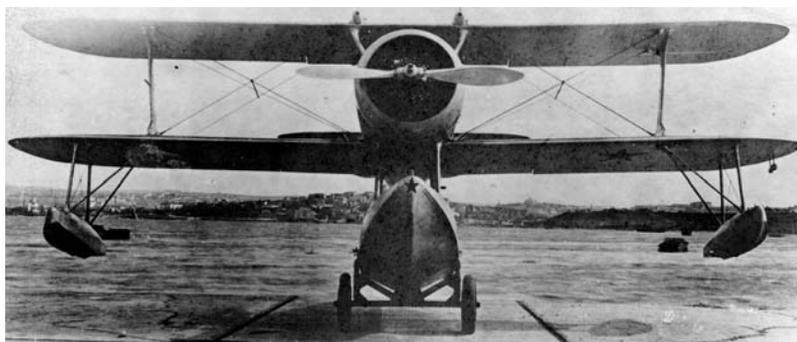
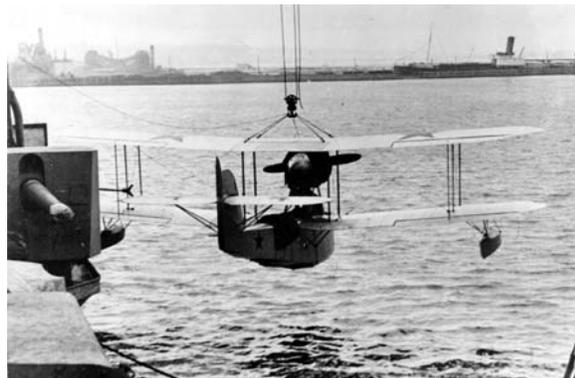
(Right, top) Ship based reconnaissance KR-1 (Heinkel H.D.-55) purchased in Germany and used in the Soviet Navy until the mid-1930s. In winter, while serving in the Baltic Sea fleet, it was equipped with ski undercarriage.

(Right, second from top) Launching the KR-1 from the cruiser *Krasnyi Kavkaz* (Red Caucasus).

(Below and below right) KOR-1 was classic biplane of single float scheme.

The reconstruction and modernization of the Soviet Union's Navy Fleet began in the mid-1920s. In accordance with Soviet defensive doctrine of that time, the fleet's goal was to protect its sea coasts, transports, and communications from any hostile threat. This approach defined mainly the interest of the Navy Command in ship-borne airplanes. In 1929, the utter lack of experience in creating and exploiting ship-based airplanes, obliged the command to purchase two German K-3 catapults and thirty Heinkel H.D. 55 two-seater, ship-based reconnaissance planes. The Soviets redesignated the German planes as KR-1 (*Korabelnyi Razvedchikpervyy*/ship-based reconnaissance number one).

Subsequently, the Soviets upgraded the German technology to develop a native catapult ship-borne airplane. Shipboard catapult subunits were designated BCh-6 (*Boevaya Chast*/battle unit). In 1935, the OKB MS (*Opytnoe Konstruktorskoe Byuro morskogo samoletostroeniya*/Experimental Design Bureau of Naval Aircraft Construction), headed by Georgy Beriev, directed the construction of an experimental, ship-based reconnaissance plane—the KOR-1—at the Taganrog aircraft factory No. 31.



In 1937, the KOR-1 seaplane was built and its flight testing began. The two-seater, single-float biplane, powered by an M-25A engine, was intended for reconnaissance, aerial spotting for ship's bombardment, dive bombing, communication, and air combat. Transverse stability was ensured by two small wingtip floats on the lower wing. The airplane structure was all-metal, with fabric covering the wings, fuselage, and tail unit. The airplane had dual controls. Its wings could be folded back for more convenient stowage on board ship. The main float had fixtures for the launching trolley of the catapult. The airplane's armament consisted of two ShKAS machineguns at the center wing section of the upper wing and one ShKAS machinegun on king pin mounting for the observer.

(Above) The first experimental KOR-1 (TsKB MS-3) that underwent official tests was equipped with the "Wright Cyclone F-3" engine. It had great head resistance that negatively influenced its flight performance.

A Muscovite, Viktor P. Kulikov graduated from Urals University. For the past twenty years, he has been researching and writing the history of Russian aviation of the World War I period. Mr. Kulikov's articles, Sikorsky's Fighters and Aeroplanes of Lebedev's Factory, appeared in the Winter 2000 and Winter 2001 issues of this journal, respectively. Mr. Kulikov acknowledges the editorial assistance provided by Mr. August G. Blume, an expert in Russian-Eastern European military aviation, 1909-1922, in preparing this article for publication.



(Top) KOR-1 towed by motor boat to a test site.

(Above) Several KOR-1 were built on wheel undercarriages.

(Right) First prototype of KOR-2 at sea tests in Taganrog.

THE SHORTCOMINGS OF THE KOR-1 FORCED ITS DESIGNER, BERIEV, TO TURN BACK TO THE WELL-TRIED CLASSIC FLYING BOAT SCHEME

The combat loaded version envisaged the external stores of two FAB-11 bombs, each weighing 100 kg. The KOR-1 was equipped with an airborne radio and special aerial camera. While undergoing its tests, the airplane achieved a maximum speed

of 245 km/hr near the water and 277 km/hr at 2,000 meters. Flight performance advantages over the flying boat KR-1 were offset by its unseaworthy qualities. Engine cooling was so inadequate that the engine overheated while taxiing. Although the KOR-1 failed to meet official tests, there were no other aircraft of that type and it was decided to enter it into intermediate service. A small series of twelve aircraft were built and they remained in the Navy aircraft inventory until 1939 or 1940. For training purposes, a land version mounted atop a wheel undercarriage was built. Until new catapults could be installed on light cruisers of the *Kirov* type, serial KOR-1s were used in its floatplane version.

The first Soviet catapults appeared in 1939, and were produced at a Leningrad works named after S. M. Kirov. The new catapults were installed on the newest Soviet cruisers of the Baltic and Black Sea Fleets. During the summer of 1941, the seaplanes saw only sporadic action, but the KOR-1, on wheel undercarriage, was used against German troops on the southern front. At that time, KOR-1 was redesignated the Be-2.

The shortcomings of the KOR-1 forced its designer, Beriev, to turn back to the well-tried classic flying boat scheme. The prototype made its first flight on October 8, 1940. Official tests were flown from February 2-18, 1941, by two experimental copies of the KOR-2 at the Black Sea Fleet LII VVS BMF (*Letno-Ispytatel'ny Institut Voenno-Vozdushnykh Sil Voenno-Morskogo Flota*/ Flying Test Institute of the Naval Air Force) base at Sevastopol. The prototypes, equipped with M-63 engines produced good results, with speed near the water surface of 310 km/hr, and 356 km/hr at 4,700 meters, ceiling at 8,100 meters and a maximum range of 1,150 km. They were clearly superior to the KOR-1 in speed and seaworthiness and could take off and land in choppy seas and into lateral winds. The major drawback was its steep glide path, which later caused several fatal accidents and crashes. Nonetheless, testing officials recommended that the KOR-2 be placed into serial production.





Second experimental KOR-2 undergoing tests.

THE LAUNCH OF KOR-2 INTO SERIAL PRODUCTION WAS DELAYED

Test of KOR-2 built at aircraft factory No. 477, on the Abakan channel at Krasnoyarsk, 1944.

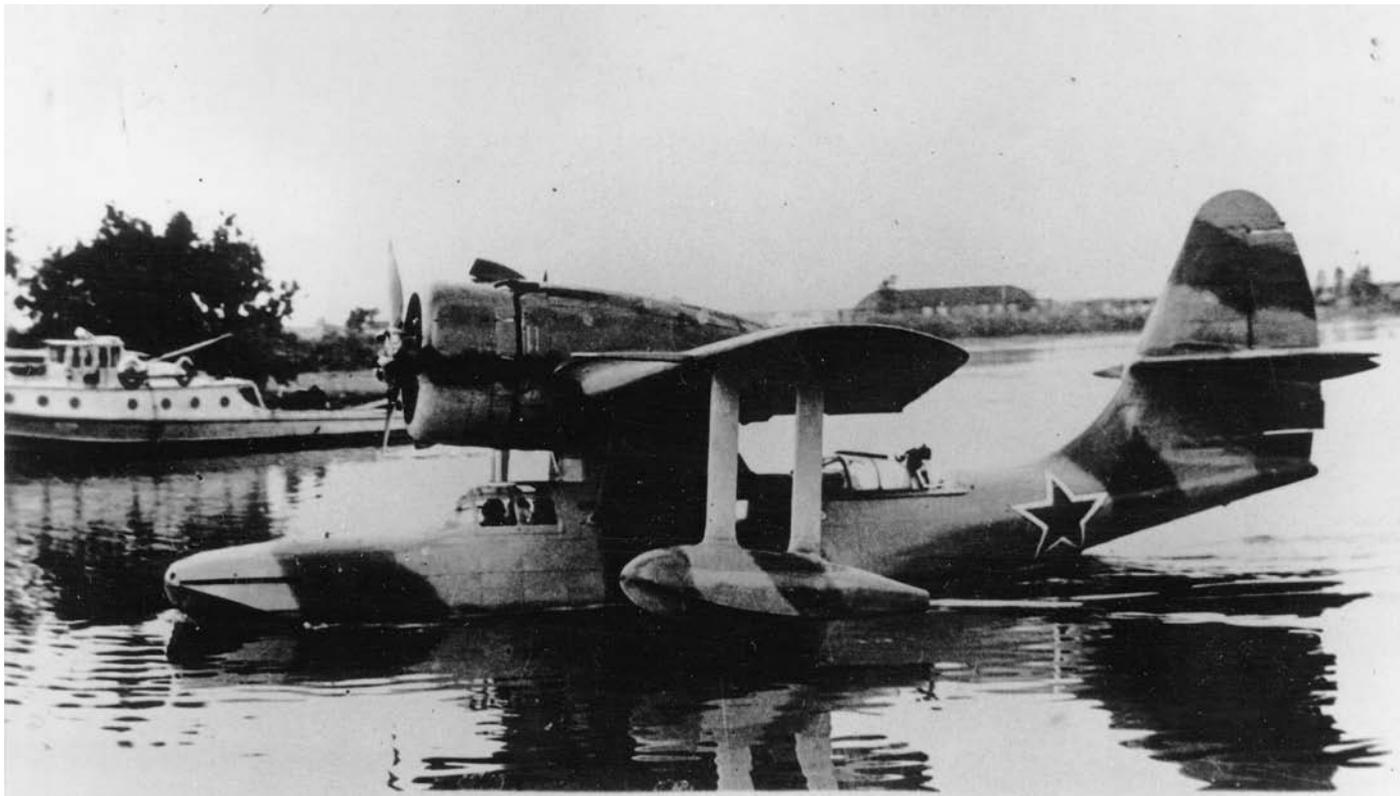
The KOR-2 was a high-wing, monoplane flying boat with pylon and short bracing struts, resembling a small "Catalina." The M-62 engine generated between 850 and 1,000 HP, and was equipped with a three-bladed pusher propeller of VISH-105-63 or AV-24 types. The hull of the flying boat had two planing steps, the main step was angular, and the boat's bottom was heavily dished. The plane had an all-metal structure, only the aileron and rudder were covered with fabric. The rifle armament consisted of one stationary ShKAS machine-gun on a turret deck mounting, and carried a maximum bomb load of 400 kg. The airplane could also be armed with four RS-82 rockets, installed in pairs beneath the lower wing.

The job of finishing KOR-2 serial production was transferred to the new aircraft factory No.

288, located north of Moscow at Savelovo on the Volga River. Aircraft factory No. 31 at Taganrog was reoriented to produce the short-range bomber Su-2, designed by Sukhoi OKB.

Plans called for the production of twenty KOR-2s, which were redesignated the Be-4. The first serial aircraft (works number 28801) was built on August 11, 1941. Production models of the KOR-2 differed from the prototype because of the substitution of the M-62 engine. This engine was less powerful than the M-63, but had greater engine life and was more reliable. The KOR-2 was equipped with an emergency jettisonable canopy and an armored plate in the cockpit. During the sixth test flight, on September 9, 1941, the plane crashed into the water at high speed. The crew consisted of the pilot, Major Kotakov, OKB engineer Morozov, and technician Sukachev. The cause of the crash was called the mirror phenomenon, meaning that without a reference-point, it was difficult for the pilot to determine the flight altitude and glide path over water. The first flight of the second serial KOR-2 (works number 28802) was held on September 20. The third serial KOR-2 was built shortly before the evacuation, which began in August 1941.

The launch of KOR-2 into serial production was delayed because of the lack of ship catapults designed by the engineer, Bukhvostov, and were built at the Leningrad factory named for S. M. Kirov. Soon the war began and combat reports introduced corrections into the test programs. By the summer 1941 the ZK-2B type catapult was built, delivered to Oranienbaum near Leningrad and mounted on a sea barge. KOR-2 differed from KOR-1 by its greater takeoff weight and speed.



Basic Data on Soviet Ship-Based Airplanes					
Aircraft type	KR-1	KOR-1	KOR-2	OSGA	SPL
Year of production	1930	1937	1941	1934	1935
Type of engine,	M-22	M-25	M-62	M-11	M-11
Capacity, HP	480	700	850	100	100
Wing span, m	14	11	12	11.45	9.68
Wing area, sq m	56.9	29.3	25.5	17	13.4
Aircraft length, m	10.4	8.67	10.5	7.6	7.45
Weight of empty acft, kg	1,550	1,800	2,082	630	592
Normal flying weight, kg	2,200	2,486	2,760	880	800
Total load, kg	650	686	678	250	208
Maximum speed near the water surface, km/hr	194	245	310	170	186
Cruising speed, km/hr	172	277	356	130	183
Landing speed, km/hr	80	100	130	75	85
Time to climb, min to height, m	15.5	20	12	N/A	50
Practical ceiling, m	3,000	5,000	5,000	N/A	5,000
Flight endurance, h	4,800	6,600	8,100	3,500	5,400
Maximum flying range, km	5.5	3	2	3	2.5
	800	1,000	1,150	400	400

IN ALL, TWELVE CATAPULT "JUMPS" WERE PERFORMED DURING THE TESTS ... [WHICH] PROVED THE SUCCESSFUL PERFORMANCE OF THE KOR-2 AND ITS LAUNCHING EQUIPMENT

KOR-2's catapult tests were very important. On July 23, 1941, Navy pilot S. Reitel fulfilled the first start from a catapult. In all, twelve catapult "jumps" were performed during the tests. When they ended on August 6, the tests proved the successful performance of the KOR-2 and its launching equipment. With 2,440 kg takeoff weight and flaps deflected 30 degrees downwards, KOR-2 normally started from a catapult even at a reduced speed of 115 km/hr.

As the Germans approached the Soviet front lines, the OKB, headed by Georgy Beriev, was evacuated to Omsk, Siberia, and placed at a small aircraft repair plant No. 166 that belonged to the Civil Air Fleet. Despite the difficulties connected with "evacuation" and rearrangement at the new place, some serial KOR-2 were assembled. These were planes constructed at the Taganrog aircraft factory before the evacuation and delivered in disassembled parts to Omsk by train. A small hydrolaunching facility for testing was built on a bank of the Irtysh River. Two first serial copies were tested in 1942 by the polar aircraft pilot Malkov from the Central Department of the North Sea Route. In June of the same year, Navy pilot S. Reitel successfully conducted the tests of KOR-2 to refine the tactics and techniques for dive bombing. A total of nine KOR-2s were built at aircraft factory No. 166.

Conditions at Omsk after the evacuation were not conducive for KOR-2 serial production. There were not enough apartments and no industrial base existed. At a reception in Moscow by P. Dementjev the first deputy of people's commissar of aircraft industry, Georgy Beriev managed to get an order to transfer his OKB to aircraft factory No. 477 in Krasnoyarsk. The transfer of the Beriev's OKB was accomplished in May 1943, when Beriev was appointed the factory's chief designer. The fac-

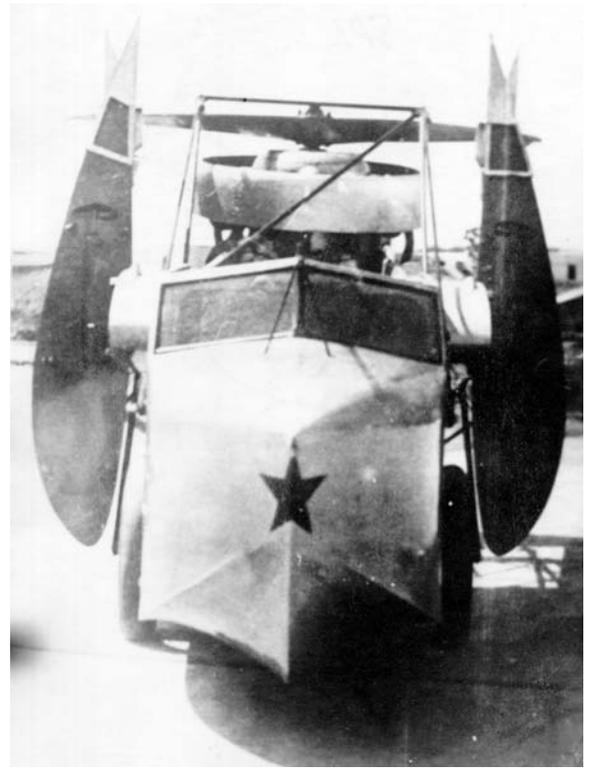
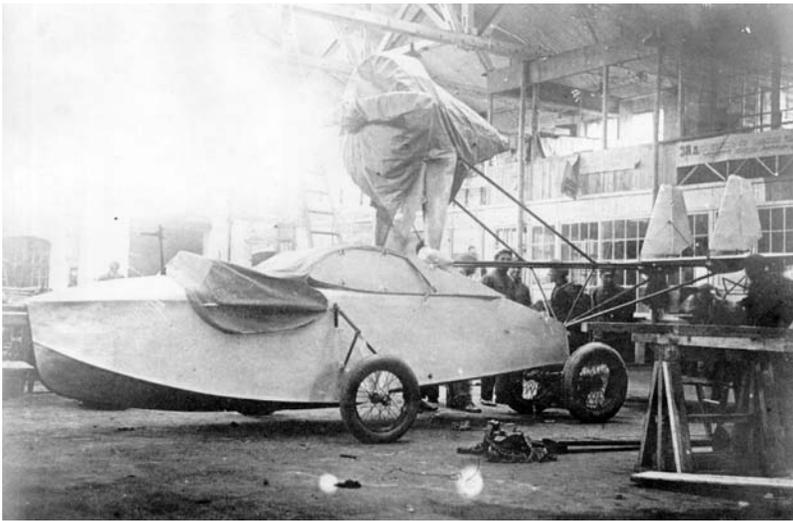
tory was located on the bank of Abakan channel not far from the Yenisei River. Work on finishing KOR-2 production continued in Krasnoyarsk. One of the aircraft (works number 28807) was equipped with eight RS-82 rockets. Bomb armament was also reinforced. A variant dive bomber carried four high-explosive PLAB-100 bombs. To increase its flight-range, KOR-2 (beginning with works number 4770202) from the second half of 1943, were equipped with auxiliary fuel tanks, with 300 liter capacity. Flight range increased up to a radius of 575 km. Its takeoff weight exceeded three tons. Military pilots requested that the machinegun mounting in the rear fuselage be reinforced. Beginning with works number 4770305, the large caliber (12.7 mm) UBT machinegun on the VUB-3 turret replaced the 7.62 mm ShKAS machinegun. These variants were produced at the aircraft factory No. 477 from 1944 to 1946.

Beriev's OKB numbered forty people and was occupied in 1943-1945 with serial production of KOR-2. They were turned out in small numbers for the Navy Fleet of the USSR. KOR-2 were used during the war for air reconnaissance in Arctic region. Four KOR-2 served at the coast guard station in Poti, a Black Sea port. KOR-2s were also used in Tuapse, Riga, Leningrad, Archangel, Murmansk, and Vladivostok.

Many KOR-2s saw service in the Black Sea Fleet and were included in the armament of the 60th, 80th and 24th Aviation Squadrons until 1944. Their main tasks were spotting German submarines, guarding the coast, and searching for floating mines. No KOR-2s were used during the war for its primary purpose of ship-based reconnaissance. It was only during exercises in 1946 that a KOR-2 took off from a catapult aboard the *Lazar Koganovich*, a cruiser of the Pacific Ocean Fleet. After the war, the KOR-2 was carried on the cruisers *Molotov* and *Voroshilov*, where it mastered starts from the catapult. Spitfire fighters were also used in these tests.

In April 1946, the USSR received as reparations from its allies, the Italian light cruiser *Miluoki*. The ship was renamed the *Murmansk*. It had on board an American catapult and two Kingfisher aircraft. The *Murmansk* remained in the Soviet inventory until 1947 and was later returned to Italy.

The history of Soviet ship-based aircraft would not be complete without mention of submarine aircraft. From the beginning of the 1930s work on the design, of ship-based airplanes for large cruiser submarines of the "L" and "K" types. By then, the U.S. Navy, and the navies of Italy, France, and England had the same kind of airplanes at their disposal. The airplane's increased range of observation made it very desirable. Igor Chetverikov proposed the design of such an aircraft to be mounted on a submarine (*Samoljet dlya Podvodnoy Lodki/SPL*) in a hangar 7.5 meters long and 2.5 meters high. But Soviet Navy commanders worried about the destruction of English submarine M-2 in January 1932, because of the loss of



(Top) Amphibian OSGA-101 during construction.

(Above, middle) The OSGA-101 airplane designed in 1934 by Igor Chetverikov.

(Above) OSGA-101 was to be used for ice patrol in the Arctic.

(Top, right) SPL airplane in folded configuration could be placed into a cylinder measuring 2.5 meters in diameter and 7.5 meters long.

(Middle, right) Flight tests of SPL carried out in the summer of 1935 in Sevastopol.

(Right) The SPL scheme represented a flying boat with a short step hull and truss tail unit.





(Top) The SPL was equipped with an M-11 engine.

(Above) Autogiro TsAGI A-4 in the summer of 1934 was tested for navy uses.

(Above, right) The Ka-8 was the first Soviet ship-based helicopter.

(Below) A version of the Ka-25 helicopter for anti-submarine warfare.

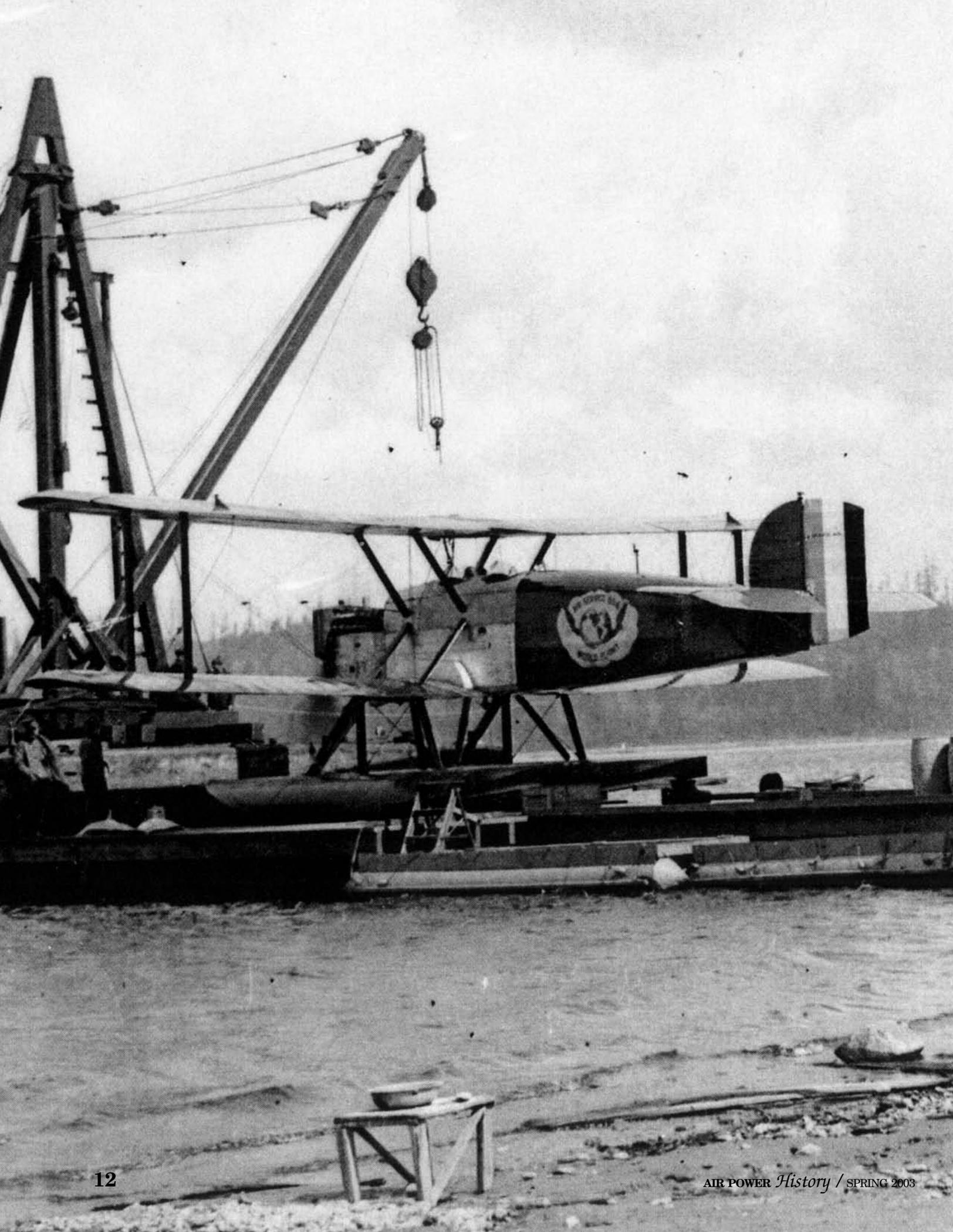
sealing in the airplane's hangar. But Chetverikov's idea was supported by a civil organization—the Department of Polar Aircraft of “Glavsevmorput” (*Glavny Severny Morskoy Put/Main North Sea Route*). The head of that department suggested creation of such an amphibian to fulfil the tasks on ice patrol at ice-breaker steamers. Such an airplane, named OSGA-101, was built in 1934 in a section of NIB GVF (*Nauchno-Issledovatel'skiy Institut Grazhdanskogo Vozdushnogo Flota/Scientific Research Institute of the Civil Air Fleet*). At the same time, work was proceeding on the experimental SPL airplane.



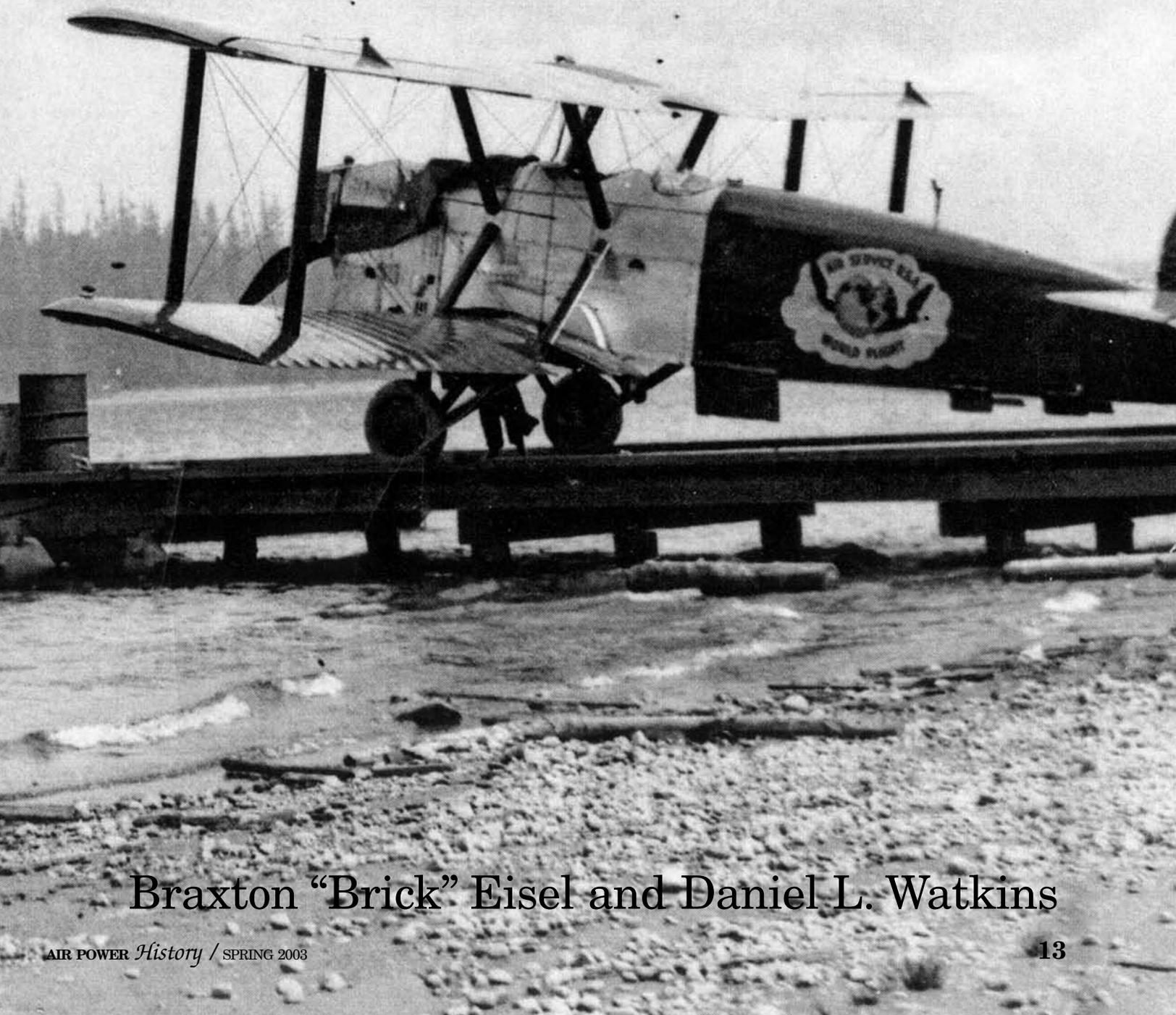
The tests of OSGA-101 by pilot Kastanov at Moscow River proved the rated data; the airplane appeared to be stable and well-controlled. Construction of SPL airplane was finished in December 1934, its tests were carried out in Sevastopol in the spring of 1935. During the tests, pilot A. Krzhizhevsky developed maximum speed 186 km/hr and reached an altitude of 5,400 meters. On the whole, the flight performance of SPL airplane was considered to be satisfactory. In 1936, SPL under the designation “Hydro-1” was demonstrated in Milan at the International Aircraft Exhibition. A year later, the plane set world speed records over a closed course (170.2 km/hr), with a range of 470.7 km. OSGA-101 and SPL airplanes remained as experimental copies and were not built in series.

In the postwar period, interest in ship-based reconnaissance airplanes profoundly decreased due to the complexity and danger of launches from ships. By that time, military airplanes on wheeled undercarriage were capable of a large radius of action, had safer engines, and could provide the fleet with necessary reconnaissance. Short range reconnaissance missions were successfully fulfilled by ship-based helicopters. In the summer of 1934, the Soviet autogiro TsAGI A-4 was tested by military sailors to search for submarines, artillery spotting, communication between ships and interaction with torpedo boats. But imperfections prevented its use for new missions.

In December 1950, testing the first Soviet ship-based helicopter Ka-8 *Irkutjanin*, designed by Nikolai Kamov, was carried out on the cruiser *Maxim Gorky*. Later on cruisers, antisubmarine ships, and ice-breakers were equipped with helicopters designed by Kamov. The ease of takeoff and landing at the restricted landing area resulted in the use of Kamov's helicopters in the Soviet fleet for more than forty years. ■



Fabric Planes—Iron Men: Reuniting the Collier Trophy with 1924 Round-the-World Flight Artifacts



Braxton “Brick” Eisel and Daniel L. Watkins

(Overleaf) The Douglas World Cruisers in Alaska, one on wheels, one on floats. (All photos, except where indicated otherwise, are courtesy of the U.S. Air Force Museum.)

IN THE FALL OF 2001 THE TROPHY WAS REDISCOVERED IN THE STORAGE AREA OF THE AIR FORCE ART COLLECTION

[IT WAS] NAMED FOR ROBERT J. COLLIER, BEST KNOWN AS THE PUBLISHER OF THE MAGAZINE "COLLIER'S WEEKLY"

[HE] WAS THE FIRST PRIVATE INDIVIDUAL TO PURCHASE AN AIRCRAFT FROM THE WRIGHT BROTHERS

On March 27, 2002, a piece of American aerospace heritage was reunited with many of the surviving artifacts from one of the most significant events in early aviation history. The Robert J. Collier Trophy, awarded to the United States Army Air Service for its 1924 Round-the-World flight, was presented to the United States Air Force Museum, Wright-Patterson Air Force Base, Ohio.¹ The museum has one of the world's most extensive collections of artifacts from that flight.

The fate of the actual trophy has remained a mystery since its initial presentation in 1925, but in the fall of 2001 the trophy was rediscovered in the storage area of the Air Force Art Collection. Neil Planzer, a senior executive with the Department of the Air Force, came across the trophy and upon recognizing it, sought to find a more appropriate venue for displaying it. Since the trophy was not considered art, it was not officially on the Art Collections inventory; thus Planzer was readily given custody of the trophy.

The trophy graced his conference room table for several months, while Planzer and the authors of this article researched its history and tried to determine the proper place for the trophy to be displayed. At numerous meetings held in the conference room, the trophy garnered comments on its unique appearance and importance to Air Force heritage. While generally aware of the 1924 Round-the-World flight's importance, the authors did not have an in-depth knowledge or appreciation of the flight's dynamics or the incredible adventure experienced by the crews who made the flight. This article is a tribute to the men and the organization that dared to circle the Earth.

The Collier Trophy is named for Robert J. Collier, best known as the publisher of the magazine "Collier's Weekly." An early aviation enthusiast, Collier commissioned the trophy in 1910 to bolster the fledgling U.S. aviation community by encouraging excellence and achievement in aeronautics. Indeed, he was the first private individual to purchase an aircraft from the Wright brothers.² Collier's ideal, embodied by the trophy, was that "the flying machine should be unselfishly and rapidly developed to its ultimate potential for America's advancement."³

In 1911, Glenn L. Curtiss won the first trophy for his achievement in the development of the hydro-airplane.⁴ The award has since been pre-

sented annually for the greatest achievement in aeronautics or astronautics in the U.S., with respect to improving the performance, efficiency, and safety of air or space vehicles, the value of which has been demonstrated by actual use in the previous year. The National Aeronautic Association (NAA) has been presenting the award since Collier's death in 1918.⁵

So, if the Collier Trophy is arguably the most prestigious award in aviation, why was it awarded to the Air Service in 1925? The Air Service completed a feat that had never been done before. Although several other countries had attempted the challenge of a global flight in the years immediately before 1924, none had been successful. Several key pieces of a global circumnavigation had been completed—the 1918 non-stop crossing of the Atlantic by Capt. John Alcock and Lt. Arthur Brown in a Vickers Vimy bomber; the 1919 spectacular London-to-Melbourne 11,294 mile journey by the Smith brothers (also in a Vimy)—but as the Air Service's attempt began in the spring of 1924, the entire puzzle had not been pieced together.⁶ At that time, only one airplane had made it more than half way around the world.⁷ Many had tried and many had paid dearly in the effort. Now it was the Air Service's turn.

The Air Service Fights for Survival

Air Service leaders, seeing their service starved for funding following World War I, recognized the challenge of a global flight as a way of garnering publicity and, thus, public support. With increased public support, they hoped that increased congressional funding would follow.

By the summer of 1923, the Air Service was moving ahead with a plan to attempt the flight. Various aircraft were considered and rejected as unsuitable for the mission. An Air Service committee examined the myriad logistical, diplomatic, and navigational issues confronting the planned expedition.⁸ The planning committee believed that an west to east routing offered the best overall chance of success, due to the weather conditions likely to be encountered as the flight progressed.⁹

The committee determined the flight was feasible and on November 6, 1923, Maj. Gen. Mason Patrick, Chief, U.S. Army Air Service, formally requested permission from the Army to initiate the flight. The request estimated the flight would cost

Braxton "Brick" Eisel is a USAF Reserve major on active duty. He is currently an air defense advisor to the FAA. Previous assignments included serving as the military assistant to the Air Force Associate Director for Civil Aviation, missile officer, air battle manager on mobile ground radar systems, E-3 AWACs, and E-8 Joint STARS aircraft, and as a military historian for Warner Robins Air Logistics Center, Robins AFB, Georgia. He has a bachelor's degree in political science and an MS in space operations.

Daniel L. Watkins is a Senior Technical Advisor for Titan Systems Corporation, assigned to the Air Force Associate Director for Civil Aviation Office, Pentagon, Washington, D.C. He has an MA in liberal studies and an undergraduate degree in history from North Carolina State University. He is a U.S. Airways B-737 pilot and a retired Air Force Reserve colonel flying C-130s. Among his military assignments, he has commanded a logistics group in the Maryland Air National Guard.

Seven of the Round the World flyers (left to right): TSgt Arthur H. Turner, SSgt Henry H. Ogden, 1st Lt. Leslie P. Arnold, 1st Lt. Leigh Wade, 1st Lt. Lowell M. Smith, Maj. Frederick L. Martin, and SSgt Alva L. Harvey.



PLANNING INDICATED THE FLIGHT WOULD TAKE 360 FLYING HOURS AT AN AVERAGE CRUISING SPEED OF 80 MPH

\$127,882.71, excluding the price of the aircraft.¹⁰ Preliminary planning indicated the flight would take 360 flying hours at an average cruising speed of 80 mph.¹¹

The issue concerning what type of aircraft to use was solved when the committee recommended a modified version of the Douglas DT-2, a torpedo bomber then in service with the U.S. Navy. One of the major factors used in selecting this aircraft was its ability to operate as a land plane with fixed undercarriage or as a floatplane, exchanging the wheels for floats.¹² Douglas produced five aircraft, dubbed the Douglas World Cruisers (DWC), built solely for this mission. The first served as a test-bed for suitability checks and pilot training and the remaining four served as mission aircraft.¹³

Specifications of the Douglas World Cruiser

- Manufacturer: Douglas Aircraft Company, Inc.
- Type: Single-engine tractor, two-place biplane (land or sea)
- Construction: Tubular steel and wood framework with fabric cover. Metal fittings and cowling. Floats are 3-ply veneer and mahogany planking.
- Wingspan: 50 ft
- Length: 35 ft, 6 in
- Height: 13 ft, 7 in
- Engine: Liberty V-12, rated 400-420 HP
- Fuel capacity: 450 gal
- Oil capacity: 50 gal
- Cooling: water

DOUGLAS PRODUCED FIVE AIRCRAFT, DUBBED THE DOUGLAS WORLD CRUISERS (DWC), BUILT SOLELY FOR THIS MISSION

	Landplane	Seaplane
Weight (empty/max)	4300/6915 lbs	5100/7715 lbs
Max speed	104 mph	100 mph
Cruise:	90 mph	85 mph
Rate of climb	500 fpm	500 fpm
Ceiling:	10,000 ft	7,000 ft
Endurance:	2,200 miles	1,650 miles ¹⁴

Training

The Air Service selected ten flyers for the flight. Training began in January 1924. The following personnel reported to Langley Field, Virginia to start the training:

- Maj. Frederick L. Martin commander (pilot)
- 1st Lt. Lowell M. Smith adjutant (pilot)
- 1st Lt. Leigh Wade supply officer (pilot)
- 1st Lt. Erik H. Nelson engineering officer (pilot)
- 2d Lt. John Harding, Jr. asst engineering officer (mechanic)
- TSgt Arthur H. Turner mechanic
- SSgt Alva L. Harvey mechanic
- SSgt Henry H. Ogden mechanic
- 1st Lt. Leslie P. Arnold alternate pilot
- 1st Lt. Laclair D. Schulze alternate pilot¹⁵

The training consisted of brief courses in aerial navigation, meteorology, and first aid. Academics took up morning classes, while the afternoon was devoted to map study of the proposed routes and familiarization flights in the prototype DWC. During these flights, the pilots practiced both the



1st Lt. Leigh Wade and Maj. Frederick Martin at Clover Field.

AFTER SIX WEEKS AT LANGLEY FIELD, VIRGINIA, THE ENTIRE CONTINGENT REPORTED TO WASHINGTON D.C. FOR FINAL INSTRUCTIONS

GENERAL PATRICK RECOGNIZED THE PUBLICITY VALUE OF GIVING A CITY'S NAME TO EACH OF THE AIRCRAFT

arts of navigating over water, a thoroughly different proposition than the more typical dead-reckoning navigation used by the Air Service at that time, and the various techniques necessary for landing a floatplane on the water.¹⁶

After six weeks at Langley Field, Virginia, the entire contingent reported to Washington, D.C. for final instructions from General Patrick and then headed off to Santa Monica, California, to oversee the final assembly and checkout of the four mission aircraft. The Douglas Company completed building the aircraft and turned them over to their respective crew on the following dates:

- No. 1 - February 29, crewed by Maj. Martin and SSgt Harvey,
- No. 2 - March 7, crewed by Lt. Smith and TSgt Turner,
- No. 3 - March 11, crewed by Lt. Wade and SSgt Ogden,
- No. 4 - March 15, crewed by Lts. Nelson and Harding

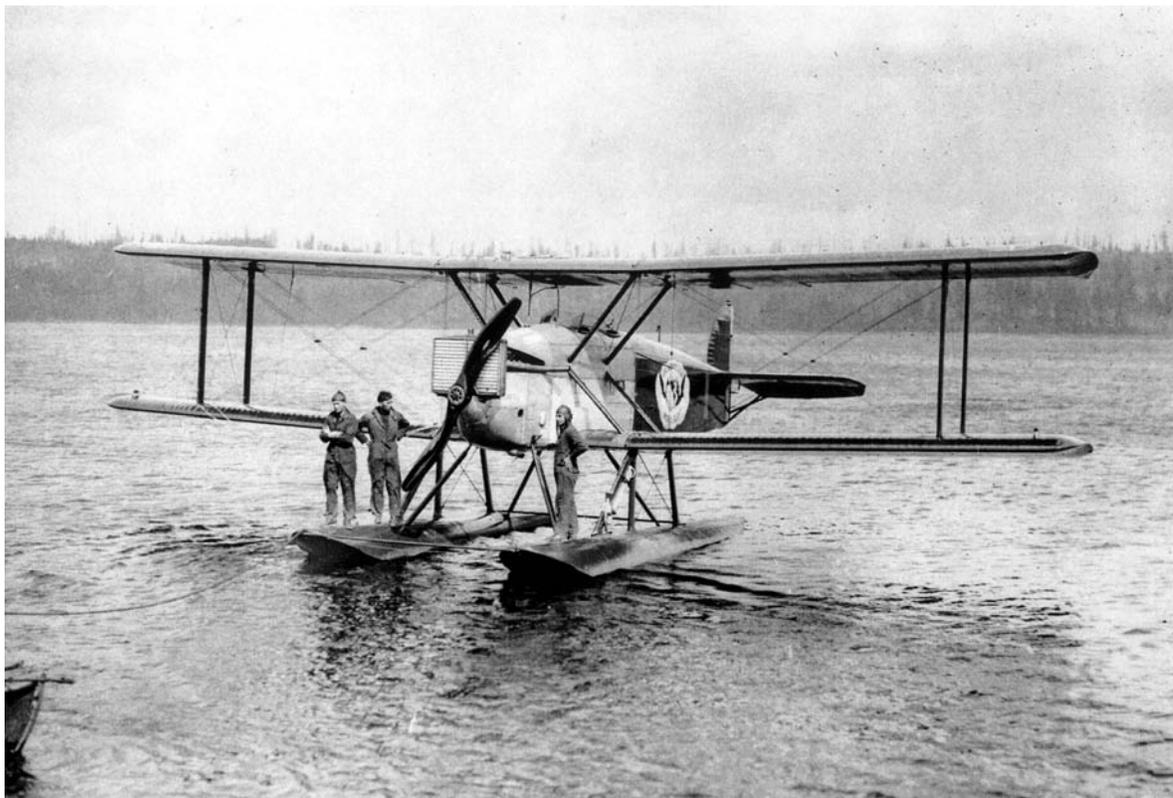
As each plane left the factory, the assigned crew flew it to nearby Rockwell Field, California, for final fitting out for the journey. This work included entirely varnishing each aircraft, as well as constructing and arranging special storage racks for tools, map containers, and spare parts. Finally, due to general dissatisfaction with the engines supplied by the Douglas factory—including loss of engine rpm—all of the engines were exchanged for ones overhauled by the Air Service.¹⁷

Between March 17-20, 1924, Numbers 1, 2, and 3, and later No. 4, flew in stages to Seattle, Washington. Some claim that this start of the

flight from Santa Monica to Seattle was the “official” start of the Round-the-World flight. However, General Patrick considered the takeoffs from Seattle as the starting point. That effectively, for most historians if not the city fathers at the time, put the matter to rest.

In late March and early April, the aircraft were again varnished in preparation for the expected rough conditions ahead. Pontoon floats replaced fixed wheels, and the necessary sea-keeping accouterments, including anchors, ropes, and tools were stowed aboard.¹⁸ It was during this final preparation that General Patrick recognized the publicity value of giving a city’s name to each of the aircraft. He hoped the publicity of the flight would be enhanced by recognizable symbols for the citizenry, and to give the press a “catchier” name to report an aircraft’s progress. Thus, for example, *New Orleans* made a more interesting headline than “No. 4.” Consequently, plane No. 1 was named for the start point, *Seattle*. Number 2 became the *Chicago*, No. 3, the *Boston*, and No. 4, the *New Orleans*. Notice that practically every corner of the United States was represented by the names of the aircraft.¹⁹

During this final preparation phase, TSgt Turner became ill and reported himself unable to make the flight. First Lieutenant Arnold replaced Turner as mechanic for the *Chicago*.²⁰ The crews had originally planned to depart on April 4, 1924, but a solid forecast for bad weather on the route to Alaska delayed them until April 5. On that day, the *Seattle* damaged her propeller after several unsuccessful attempts at takeoff. Boeing Aircraft Company worked all night to repair the propeller in time for an April 6 takeoff. On that day, three



THE FLIGHT DEPENDED ON THE LOGISTIC AND DIPLOMATIC COORDINATION ACCOMPLISHED

planes managed to take off together, the *Boston* being delayed 40 minutes by a faulty starter.²¹

Logistics

After departing Seattle, the flight depended on the logistic and diplomatic coordination accomplished during the months before. Lieutenants Clarence E. Crumrine and Clifford E. Nutt had surveyed the proposed routes, working with the military attaches in several countries, to determine suitable landing and maintenance facilities. Twenty-two countries either granted overflight or landing rights.²² They completed their work by the spring of 1924, and their findings were incorporated into the Air Service's plans.²³

The Air Service's flight committee divided the route into six divisions with an officer in charge of each, to provide flight support. Each officer was responsible for arranging refueling, quarters, meals, security, press relations, and maintenance at each of the planned stops. A seventh division, using various Air Service facilities would be formed in North America if the flight made it back to the continental United States. Each division established major depots of spare engines, wings, and other parts. Moreover, each depot had subdepots scattered along the flight route in that particular division.²⁴

Divisions or Areas of Responsibility (Officer in Charge)

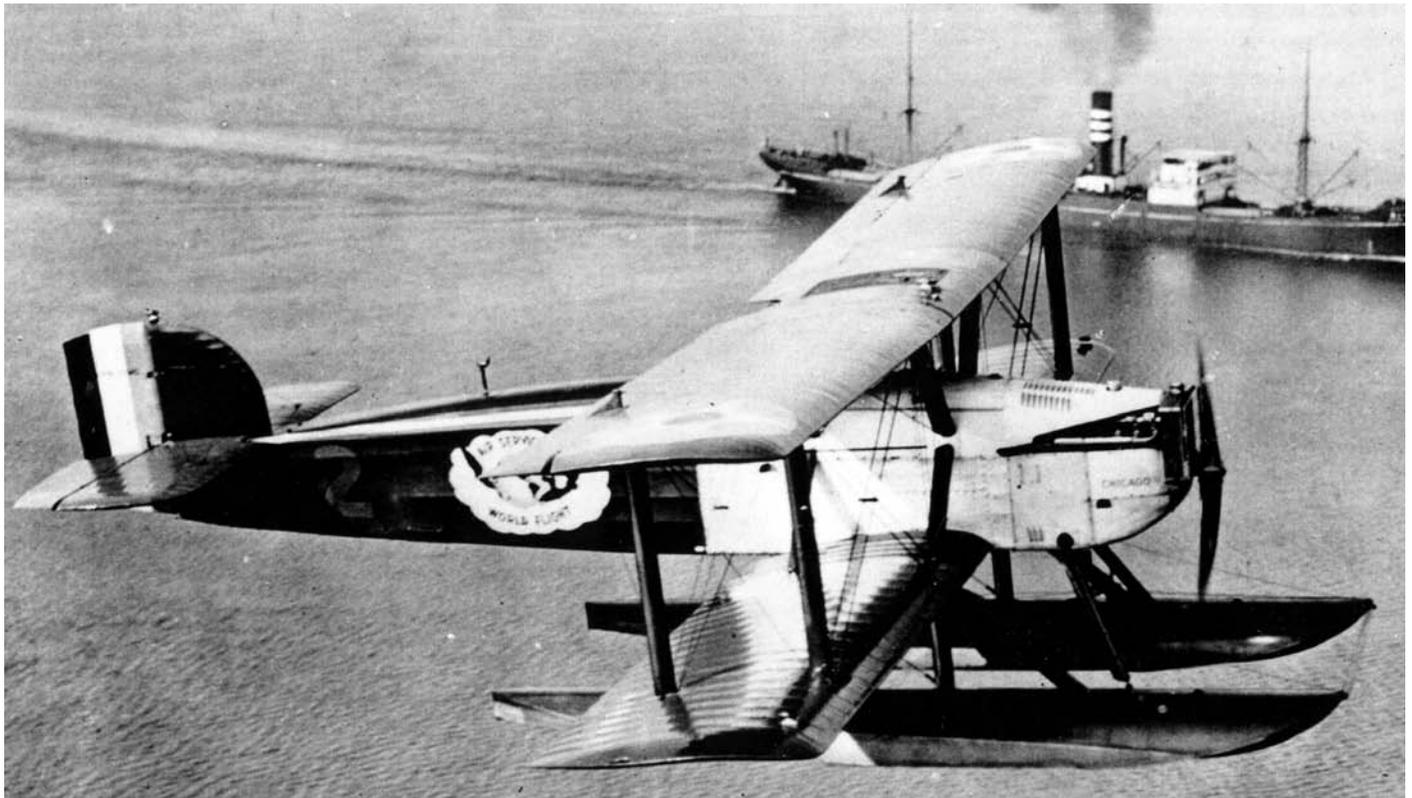
1. Seattle, Washington, to Attu Island, Alaska
— 3,290 miles (1st Lt. Clayton Bissell)
2. Attu, Alaska, to Kogoshima (Nagasaki), Japan
— 2,980 miles (1st Lt. Clifford Nutt)

3. Japan to Calcutta, India
— 4,860 miles (1st Lt. Malcolm Lawton)
4. India to San Stefano, Turkey
— 4,355 miles (1st Lt. Harry Halverson)
5. Turkey to London, England
— 1,815 miles (Maj. Carlyle Wash)
6. England to Washington, D.C.
— 4,636 miles (1st Lt. C. Crumrine)
7. Washington, D.C. to Seattle, Washington
— 3,000 miles (installations en-route)²⁵

The Field Service Section (FSS) of Fairfield Air Intermediate Depot (FAID), Ohio, commanded by Maj. A. W. Robins, prepared and shipped the logistical support. The FAID was a subordinate unit of the Materiel Division of the Air Service. The supplies included engines, complete wing sets, utility parts such as tubing, plywood, and shock-absorber cord. The supplies were ingeniously packed in crates made of ash, spruce, and plywood that could themselves be used for emergency repair material.²⁶

Items carried aboard the aircraft included basic tools, such as pliers, screwdrivers, hammers, wrenches, flashlights, and emergency survival items. Interestingly, during the planning for the flight—in order to reduce weight—planners decided not to carry any parachutes, life preservers, or life rafts. Each man did carry an assortment of personal items, but each was weighed carefully to keep down the weight of the aircraft. Each flier wore an eleven-pound fur-lined flying suit, fur-lined gloves, and two changes of underwear, socks, and flannel shirts. A pair of hunting boots, a cap, handkerchiefs, matches, and toiletry items completed their wardrobes.²⁷

THE FIELD SERVICE SECTION ... PREPARED AND SHIPPED THE LOGISTICAL SUPPORT



Douglas World Cruiser in flight.

THE FLIGHT NEEDED SEVEN SEGMENTS, COVERING 3,250 MILES AND TAKING 33 DAYS TO GET FROM SEATTLE TO ATTU ISLAND, ALASKA

TWO FLYERS WERE STRANDED MILES FROM ANYWHERE IN THE SEVERE ALASKAN WEATHER

After the flight had passed through each logistics division officer's area of responsibility, he was responsible for settling all the bills and either shipping back all the unused supplies to FAID or selling it to local agencies.²⁸ Each officer earned extensive praise in the final report of the "Round the World" Flight, as Lt. Lowell Smith noted, "[M]uch of the success of the flight is due to the untiring and efficient manner in which the Advance Officers fulfilled their duties under the most trying circumstances."²⁹

Operations

The flight needed seven segments, covering 3,250 miles and taking 33 days to get from Seattle to Attu Island, Alaska, the jumping off point for the Trans-Pacific flight.³⁰ Along the way, the crews experienced freezing weather, ice, rain, and magnificent sights of pristine Alaskan and Canadian scenery. Unfortunately, on April 30, the bad weather caused Major Martin and SSgt Harvey to become separated from the flight and crash land.³¹ Skillful flying and fortuitous circumstances saved both crewmembers from injuries, but the *Seattle* was a total write-off. The two flyers were stranded miles from anywhere in the severe Alaskan weather. After a remarkable story in survival and perseverance, the two hiked to rescue on May 10.³²

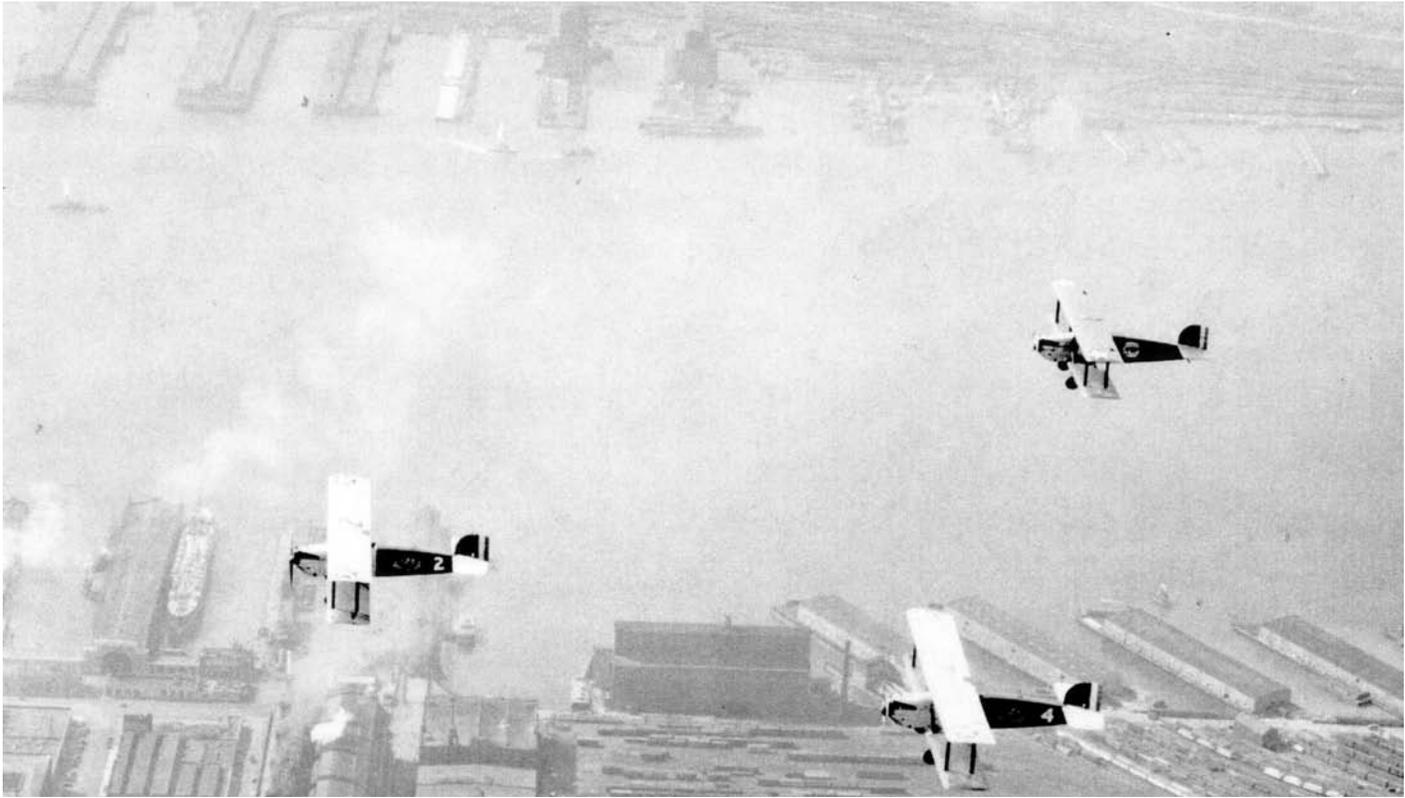
In the meantime, the rest of the flight had been ordered to continue on its mission while the search for the missing crew unfolded. Lieutenant Smith took temporary command, although this became permanent when Major Martin, offered the chance to rejoin the flight by going the opposite way around the world and rejoining them in Turkey, magnani-

mously declined. Martin felt that Smith had done an outstanding job in assuming the leadership, and it would be unfair not to let him finish.³³

On May 17 (May 16th in the continental United States—the flight having crossed the International Date Line), the remaining three planes reached Paramushiru, Kurile Islands, Japan. This was an historic moment, even without the ultimate goal of circling the globe. The three DWCs became the first aircraft to cross the Pacific.³⁴

The flight continued on its way, reaching the coast of China on June 5. Making their way across the Asian mainland, by June 26 the planes landed in Calcutta, India. Here they replaced the floats with wheels for the long overland flights.³⁵ The aviators experienced many exotic adventures crossing what was to them the mysterious Indian subcontinent and Asian landmass. On July 12, 1924, the flights crossed into Eastern Europe, landing in Bucharest, Romania.³⁶

The pace picked up a bit crossing Europe, no doubt due to the generally better and more numerous aviation facilities available along their route. At Brough, England, the planes changed once again into floatplanes in preparation for the Atlantic crossing. On July 17, the planes launched with great expectations, but appalling weather kept them from going any further than Kirkwell, Scotland, until August 2. On that day, the three aircraft took off, but climbed immediately into a dense fog. The *Chicago* and *Boston* aborted the flight and returned to Kirkwell. The *New Orleans*, after avoiding a disaster, broke free of the fog and continued to Iceland. Lieutenant Nelson, in a laconic telegraph to Smith describing the near mishap, sent, "GOT INTO PROPELLER WASH



Chicago, New Orleans, and Boston II over New York City.

LARGE CROWDS MOBBED THE AIRMEN ... PRESIDENT CALVIN COOLIDGE HAILED THE ARRIVAL OF THE FLIGHT

THE FLIGHT HAD TAKEN 175 DAYS AND COVERED 26, 345 MILES IN 363 HOURS, 14 MINUTES FLYING TIME

AND NEAR TAIL SPIN CAME OUT JUST ABOVE WATER PAST FOG BELT ARRIVED FIVE THIRTY SEVEN³⁷

The next day, the two remaining aircraft launched into excellent flying weather. Midway into the flight, however, the *Boston's* oil pressure dropped to zero. Lieutenant Wade was forced to land on the open ocean. The *Chicago*, due to fuel considerations, continued along the route of flight, but did drop notes to a telegraph station on Syders Island and to the destroyer, USS *Billingsby*. In time the cruiser USS *Richmond* arrived, rescued the crew and took the *Boston* under tow. The towing, however, damaged the aircraft beyond reasonable hope of repair and Wade decided to abandon the aircraft. It had to be sunk, so that it did not constitute a hazard to ship navigation.³⁸

The two remaining planes made a circuitous crossing of the Atlantic with stops at Hornafjord and Reykjavik, Iceland; Frederiksdal and Ivigtut, Greenland; and Indian Harbor, Labrador; Hawkes Bay, Newfoundland; and Pictou, Nova Scotia, Canada. In Nova Scotia the original DWC prototype, outfitted to mission configuration, joined the flight. The new addition was christened *Boston II* and was flown by the rescued crew of the sunken *Boston*, Lieutenants Wade and Ogden. Ogden had been commissioned during the Japan portion of the flight to help alleviate the strict social separation between officers and enlisted men that many countries insisted upon. In addition, making all the crews officers lessened the heavy burden of receptions and speeches.³⁹

The two weary planes and the one new DWC crossed back into U.S. territory at Casco Bay, Maine, on September 5.⁴⁰ It was during this reen-

try into the United States proper that the Air Service hoped to reap the return on its investment in the flight. And, indeed, they did.

At each stop large crowds, stirred by the flight's success, mobbed the airmen. During Defense Day ceremonies at Bolling Field, Washington D.C., President Calvin Coolidge hailed the arrival of the flight, despite his distinct lack of enthusiasm for the project at its beginning.⁴¹

Anxious to finish the flight and deflect the clamor from almost every city in the country asking the flight to stop, the Air Service sped the flight from Washington, D.C., to McCook Field, Dayton, Ohio, on September 13. In Dayton, at FAID, they were hailed as one of their own. Considering that Major Robins and the officers serving under him had established the logistics network for the flight, it is understandable why this stop was meaningful for the crews.

On September 15, the flight proceeded to Chicago, and then on the 17th to Omaha, Nebraska. On the 18th they flew to St. Joseph, Missouri, and Muskogee, Oklahoma.⁴² The DWCs took two days to cross Texas, arriving in Arizona on September 21. Between September 22 and 27, they made the California circuit, flying to San Diego, Los Angeles, and San Francisco.⁴³

Pushing onto the final legs, the three aircraft—*Chicago*, *New Orleans*, and *Boston II*—took off from Eugene, Oregon, on September 28, and at 1:28 p.m., the flight landed at Sand Point Field, Seattle, Washington, completing one of the greatest feats in aviation history. The flight had taken 175 days and covered 26, 345 miles in 363 hours, 14 minutes flying time.⁴⁴ Miraculously, although two aircraft were lost, no one was killed or seriously injured.



(Above) The Director of the USAF Museum, Maj. Gen. Charles D. Metcalf, USAF(Ret.), accepting custody of the trophy from co-author.

Maintenance

The flight crews, with some exceptions, performed their own maintenance at every stop. "General inspection, routine work, and servicing" was the phrase used in Flight Engineering Officer Lieutenant Nelson's report. That phrase was shorthand for inspecting all wires, fittings and visible parts, flushing gasoline line strainers, oiling thrust bearings and valve stems, wiping clean the fuselages and cowlings, replenishing oil and gasoline tanks, topping off the radiators, and when in floatplane mode, removing the port hole covers and inspecting the pontoons morning and night. This post-flight checklist was accomplished after each leg of the flight, no matter how long the day had already been.⁴⁵

Such attention to detail was simply considered routine maintenance. At several stops, both scheduled and unscheduled heavy maintenance was

(Near right) Co-author with trophy on the way to the USAF Museum. (Photo courtesy of the co-author.)



(Far right) The *New Orleans* hangs in the Museum of Flying. (Photo courtesy of the Museum of Flying.)

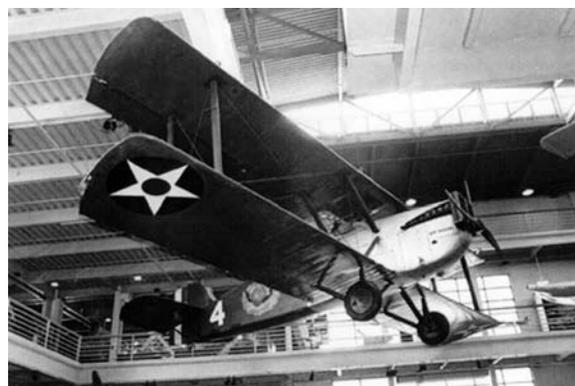
performed. A total of 22 engine changes, including the initial Rockwell Field change, were made.⁴⁶ Sometimes, engine change facilities were available, while at other times the conditions could not have been worse. For example, the *Chicago*, forced down due to a cracked cylinder, landed on a lake at Hue, French Indo-China. It required a new engine and a replacement had to be ferried from Saigon to Tourane via a U.S. Navy destroyer and then trucked to Hue. As aircraft facilities were non-existent, the crew used a bridge as both a tie-up point and a block and tackle fulcrum for removing and replacing the engine. Hot, humid weather and the interference of less than friendly locals proved large hindrances to the unplanned maintenance.⁴⁷

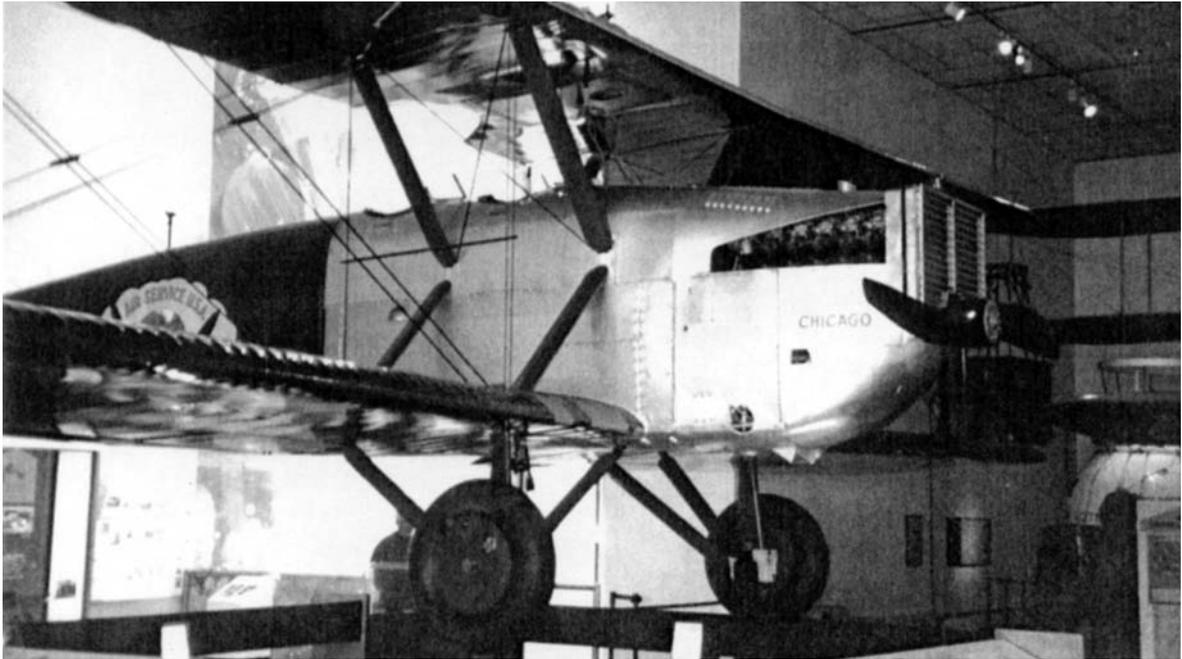
Each time they changed the landing gears from pontoons to wheels, they had to replace the propellers, due to the different aircraft performance characteristics inherent in each configuration. The changeover from land to floatplane and back also dictated the sealing or opening of various access panels, tail skid removal or replacement, adjusting tension on the wing bracing, and many other small but essential adjustments.⁴⁸

The physical efforts and determination of the crews in flying open cockpit aircraft through oftentimes horrendous weather and using primitive navigation equipment over largely unpopulated, inhospitable terrain cannot be overstated. To think that after landing from a flight, they had to perform maintenance work ranging from the "general inspection, routine work, and servicing" to an engine and/or landing gear change is astounding. Truly this was the era of "fabric aircraft and iron men."

Epilogue

The two surviving original Douglas World Cruisers reside in museums. The *Chicago* is in the Smithsonian Institution's National Air and Space Museum, in Washington, D.C. The *New Orleans* is in the Museum of Flying, Santa Monica, California. The United States Air Force Museum probably has the largest collection of 1924 Round-the-World flight artifacts, including flying suits, a compass, beverage flasks, and a 'good luck' stuffed monkey that each member of the flight carried. The Collier Trophy, commemorating the 1924 flight, will soon go on display as the capstone to the Air Force Museum's exhibit. ■





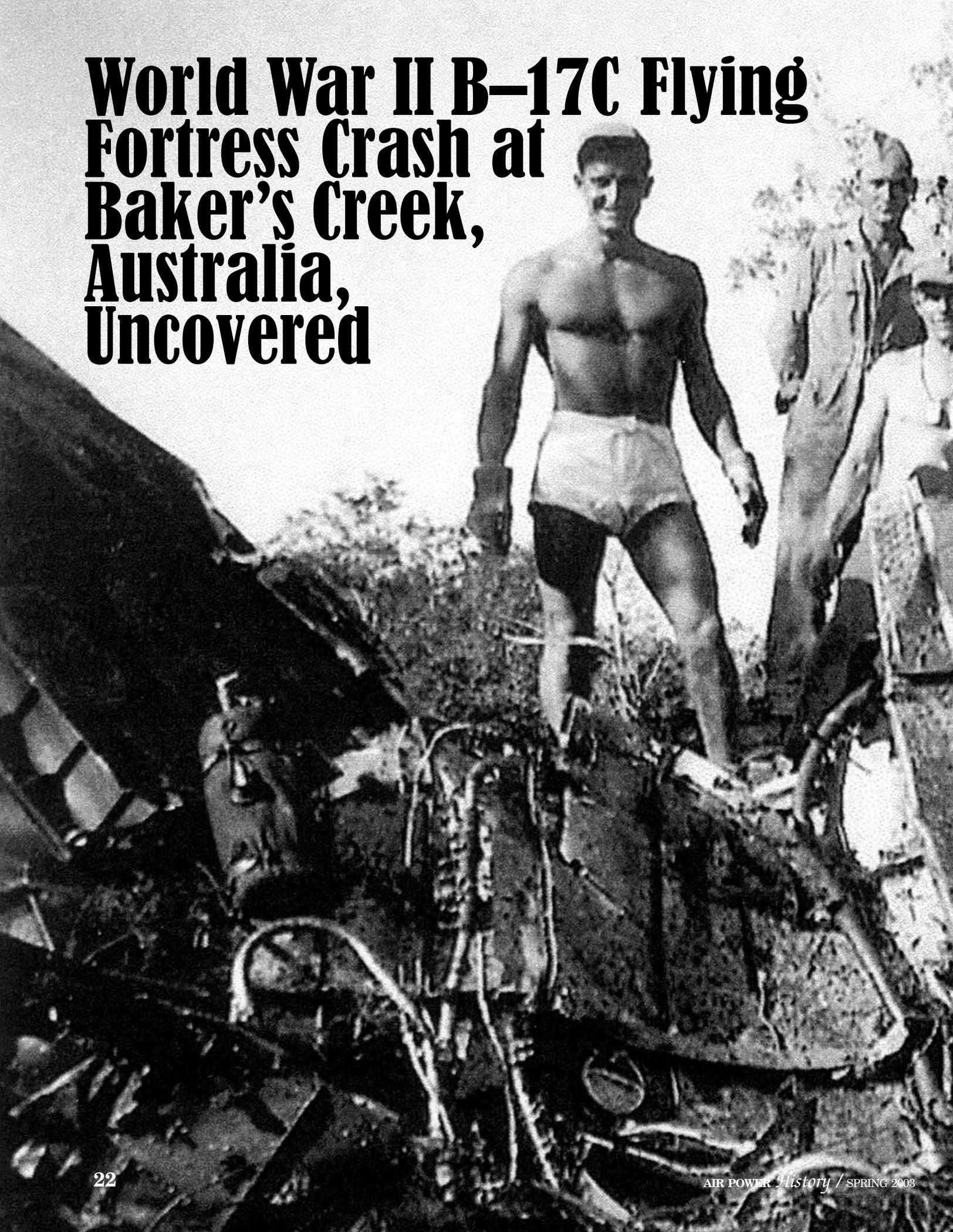
NOTES

Note: Many thanks to Dr. William Head, the chief historian at the Warner-Robins Air Logistics Center, for reading this in manuscript form and commenting extensively. For a detailed chronology of the flight, as recorded by the New York Times, see The Airpower Historian, "The First Round-the World Flight," April 1964, (Vol. 11, No. 2) April 1964, pp.45-48.

1. NAA: National Aeronautic Association. "Robert J. Collier Trophy." http://www.naa-usa.org/website/html/awards_inside.htm (Apr. 4, 2002).
2. *Ibid.*
3. *Ibid.*
4. *Ibid.*
5. *Ibid.*
6. Carroll V. Glines, *Around the World in 175 Days: The First Round the World Flight* (Washington and London: Smithsonian Institution Press, 2001), p. 10. [Hereinafter, Glines]
7. Lowell Thomas and Lowell Thomas, Jr., *Famous Flights That Changed History* (Garden City, N.Y.: Doubleday and Company, 1968), p. 62. [Hereinafter, Thomas]
8. Glines, p. 13.
9. *Ibid.*, p. 12.
10. Memo, Maj. Gen. Mason M. Patrick, Chief, U.S. Army Air Service, Adjutant General, USA, Nov. 6, 1923, in National Archives, College Park, Md., Record Group 18, Series 140, Subject Round the World Flight File. [Hereinafter, NA, RG 18]
11. *Ibid.*
12. Boeing-McDonnell Douglas History. "Douglas World Cruisers (DWC) Transport." <http://www.boeing.com/companyoffices/history/mdc/dwc/htm> (Mar. 26, 2002).
13. *Ibid.*
14. Untitled fact sheet on DWC, U.S. Air Force History Support Office, Bolling AFB, Washington, D.C. and Boeing-McDonnell Douglas History, "Douglas World Cruisers (DWC) Transport."
15. 1st Lt. Lowell H. Smith, "Report of the Commander of the World Flight, 1924," U.S. Air Force Historic Research Agency (AFHRA), Maxwell AFB, Alabama, file 168.3982-155, 1-2. [Hereinafter, Trip Report]

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17. *Ibid.*, p. 4 and Maurer Maurer, *Aviation in the U.S. Army, 1919-1939* (Washington, D.C.: U.S. Air Force History Office, 1987), pp. 185-88.
18. Trip Report, p. 7.
19. *Ibid.*
20. *Ibid.*
21. *Ibid.*, p. 8.
22. Thomas, p.62.
23. Glines, pp. 17, 23.
24. *Ibid.*, p. 24.
25. *Ibid.*, and William P. Head, *Every Inch a Soldier: Augustine Warner Robins and the Building of U.S. Airpower* (College Station: Texas A & M University Press, 1995), p. 94. [Hereinafter, Head]
26. Head, pp. 94-96.
27. *Ibid.*, p. 96.
28. Glines, p. 24.
29. Trip Report, p. 71.
30. *Ibid.*, pp. 11-17.
31. Glines, p. 59.
32. *Ibid.*, p. 63.
33. *Ibid.*, p. 64.
34. *Ibid.*, p. 76.
35. Trip Report, p. 33.
36. *Ibid.*, p. 41.
37. *Ibid.*, p. 49.
38. *Ibid.*, p. 51.
39. Glines, p. 81.
40. Trip Report, p. 59.
41. TSgt Harold L. Craven, "Around the World in 175 Days," *Airman Magazine*, February 1959, from the USAF Museum archives collection and Glines, p. 30.
42. Trip Report, p. 65.
43. *Ibid.*, p. 68.
44. *Ibid.*, p. 69 and Head, p. 97.
45. Lt. Erik H. Nelson, "Appendix A: Engineering Report of Round the World Flight," U.S. Air Force Museum archives, Wright-Patterson AFB, Ohio, p. 5. [Hereinafter, Engineering Report]
46. Engineering Report, pp. 4, 6, 9, 11, 13, 17, 19, 21, 23, 26.
47. *Ibid.*, p. 6 and Glines, p. 40.
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World War II B-17C Flying Fortress Crash at Baker's Creek, Australia, Uncovered





Robert S. Cutler

(Overleaf) B-17C crash site at Bakers Creek, Australia, June 14, 1943. (Photo courtesy Peter Dunn Collection.)

(Right) B-17C Flying Fortress at Batchelor Field near Darwin, Australia, in 1942. (Photo courtesy Noel Tunney Collection.)



THE WAR DEPARTMENT HAD NOT AUTHORIZED THE U.S. ARMY AIR FORCES IN AUSTRALIA TO OPERATE AN AIR TRANSPORT ORGANIZATION

In October and November 1941, twenty-six B-17C and D Flying Fortresses were transferred to the Philippines to deter Japan against further aggression in the Far East. Number 40-2072, piloted on its trans-Pacific trip by 1st Lt. Alvin J. H. "Red" Mueller, 30th Bombardment Squadron, 19th Bomb Group arrived at Clark Field in early November. This was one of the few B-17s not destroyed or damaged beyond repair during the Japanese attack on December 8th. Ten days later, it was evacuated from Del Monte, Mindanao, to Batchelor Field, Darwin, Australia. On December 24, Mueller flew it up to Del Monte Field for further orders. On December 25, accompanied by a B-17D, it took off at 04:30 in the morning and headed south to Japanese-occupied Davao, Mindanao, where the two aircraft bombed the airfield there. The two met fierce opposition by anti-aircraft fire and Japanese Zeros of the 3d Kokutai. Although severely damaged, both planes made it

back to Batchelor Field, but required depot overhaul and never flew in combat again.¹

Early in 1942, in Australia, the problems of land and sea transportation made air delivery the only reliable method of moving critical military supplies north to the beleaguered Allied forces in the Philippines, Java, and New Guinea. However, the War Department in Washington had not authorized the U.S. Army Air Forces in Australia (USAFIA) to operate an air transport organization. Moreover, the Royal Australian Air Force (RAAF) rarely airlifted cargo at that time. While transport-type aircraft had been requested from the United States, priority demands for combat airplanes delayed delivery of planes, such as C-47s and LB-30s, uniquely designed to haul cargo.

On January 28, Maj. Gen. George H. Brett, the first USAFIA commander, directed that all combat

Maj. Robert S. Cutler, USAF (Ret.), is an engineering management professor at George Washington University. He earned a B.S. in Mechanical Engineering from the University of Massachusetts, and a master's degree in Management Science from Stevens Institute of Technology. Mr. Cutler was a policy research analyst at National Science Foundation (1973-1990), and a Fulbright Fellow at University of Tokyo (1986-1987). He wrote numerous articles in his field and edited three books: Science in Japan, (1987); Engineering in Japan, (1991); and Technology Management in Japan, (1993). In 1977, he completed a 20-year flying career as a navigator in the Air Force Reserve. During the Vietnam War, he served as a combat crew navigator on C-141 and C-5A aircraft. In August 1999, he traveled to Australia to conduct research for a book about the AAF in Australia during the early part of World War II. Material for this article is drawn from the forthcoming book by R.S. Cutler and H.S. Brownstein, "It Happened at Baker's Creek—Australia."



IN MARCH 1943, THE CONVERTED AIRCRAFT, REDESIGNATED "VH-CBA," WAS LISTED AS THE ONLY B-17C ASSIGNED TO THE 22d TROOP CARRIER SQUADRON

airplanes unfit for combat be made part of a new directorate for air transport, within the Southwest Pacific Area (SWPA) "to overcome the immediate airlift shortage."² As a result, any airplane that could be made flyable was pressed into transport service.³ In particular, a four-engine airplane capable of carrying a 4,800-pound payload at 250 mph was highly desirable. It could be fixed up to make the 2,000-mile round-trip cargo run between North Queensland and Port Moresby in less than ten hours of flying time.

One such aircraft, B-17C (40-2072), sat broken and abandoned at Batchelor Field, near Darwin. Despite extensive damage to its left wing and hundreds of bullet holes in its skin, she was made flyable.⁴ A small section of metal tubing was used to fix the brake system and the damaged control cables were replaced. In this condition, and with its four engines operating, the plane was flown 900 miles south to Archerfield (Brisbane) for more extensive repairs and removal of all of its heavy armament.

In March 1943, the converted aircraft, redesignated "VH-CBA," was listed as the only B-17C assigned to the 22d Troop Carrier Squadron. *Newsweek* reporter John Lardner wrote of his encounter with the former bomber, now fully restored to flying status. He commented that the airplane had been neatly patched and was now ready for operation.⁵

On June 14, 1943, VH-CBA was parked at the RAAF aerodrome near Mackay, Queensland, 600 miles north of Brisbane on the northeast coast of Australia. Painted on the plane's olive-drab fuselage were the white, five-pointed stars marking it as belonging to the U.S. Army Air Forces (AAF). Unlike other AAF airplanes, however, there were no serial numbers on its tail.

A bystander would quickly note the airplane was a four-engine Boeing B-17C Flying Fortress, but with Australian civil registry. There were several other obvious differences between this plane and the newer B-17E and F-models operating elsewhere in the Southwest Pacific. This B-17 lacked the gracefully swooping vertical tail structure, a tail gunner's position, and the wider, controllable engine cowling flaps.

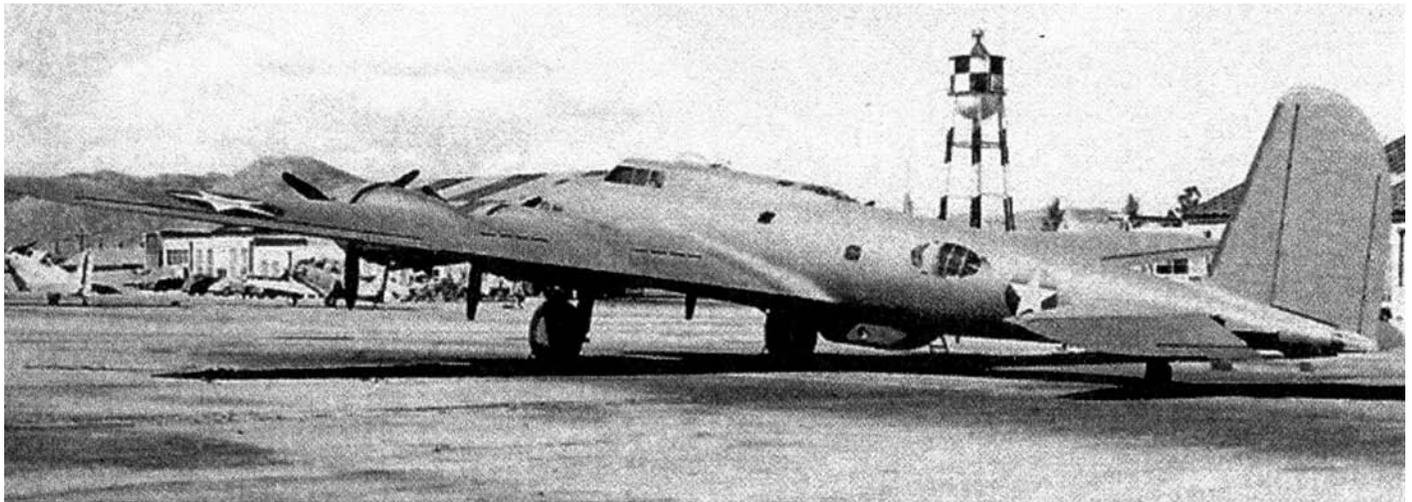
Three miles from where VH-CBA was parked was the city of Mackay, a popular seaside resort with wide streets, tropical gardens, and long avenues of imported Royal Palms. The U.S. Army and the American Red Cross jointly operated a rest and recreation (R&R) center there for American troops assigned to combat units in New Guinea. Planeloads of GIs from these remote outposts were regularly carried on the four-and-a-half hours flight from Port Moresby to Mackay. There, the men could find ten days of refuge from battlefield horrors and the hardships of Army life in the steamy, disease-ridden jungle.

Tragedy at Baker's Creek

Just before dawn on June 14, thirty-five passengers climbed aboard VH-CBA, now operated by a detachment of airmen from the 46th Troop Carrier Squadron (TCS), Fifth Air Force, based in Townsville. As the passengers passed through the small rear doorway of the striped-down bomber, they were directed to various floor locations inside. Some men sat on the fitted plywood that covered the drafty bomb bay doors. Others occupied the radio operator's compartment, while still others simply sat on the floor in the narrower section, aft of the radio compartment. Only the six-man flight crew occupied seats equipped with body restraints. The passengers were expected to huddle together in the confined space. They sat on their own duffel bags during the entire trip, leaving only to use the crude urinal relief tube located rearward at the tail-wheel bulkhead.

The plane carried forty-one American servicemen returning from their ten days of R&R leave at the American Red Cross Center in Mackay en route to their combat units in New Guinea. Fully loaded, the aircraft took off into ground fog and levelled off at an altitude of about 300 feet. In a matter of minutes, it made two 90-degree left turns at low altitude, then crashed in flames into a tree-lined, sugarcane paddock at Baker's Creek, five miles south of Mackay.⁶ There was only one survivor.

For reasons of military security and morale, the incident was hushed-up by U.S. Army and Australian civil authorities. Nothing about the



B-17C Flying Fortress (1941).

THE CAUSE OF THE CRASH REMAINS UNCERTAIN... THE AUTHOR'S RESEARCH, HAS UNCOVERED RELIABLE INFORMATION ...OF SOME SERIOUS AIRCRAFT MECHANICAL PROBLEMS

COLIN E. BENSON, A HISTORIAN IN MACKAY, UNCOVERED A SIGNIFICANT REPORT

crash, or its magnitude, was allowed to be published or broadcast to the public. The tragic air crash, deemed the worst in the Southwest Pacific war, still rates as the worst aviation disaster in Australian history.⁷

The cause of the crash remains uncertain, although sabotage, pilot error, and poor visibility originally were claimed. The author's research, however, has uncovered reliable information pointing to the existence of some serious aircraft mechanical problems, which are analyzed and discussed below.

Eyewitness Accounts

The crash stunned the people in Mackay, particularly the U.S. military. There were several eyewitnesses to the calamity and much confusion. Capt. Samuel Cutler, the executive officer of the U.S. Army Rest Area at Mackay, recorded some details of the incident in his personal wartime diary. On Sunday, June 13th, he wrote:

Saw CBA Flying Fortress test hopping over us. Our Major Diller was aboard with Lt. Gidcumb as pilot. The B-17 was in good shape after having been laid up for almost a month while getting a special gas tank from the U.S. The plane was known as Miss EMF of "every morning fixit" fame.⁸

Then, the following day:

What a day and a TRAGIC one. Up at 4 AM and lined up 35 enlisted and two officers to go on CBA to Moresby for 6:00 AM take-off from Mackay Aerodrome. The weather was misty and one of those things DID HAPPEN. Yes, at 6:02 AM, two minutes after I turned my back on the CBA plane (same one I saw yesterday) it crashed into some woods five miles away and exploded killing 40 people, only one saved. Biggest air crash in American air transport history, to date. Pilot error and poor visibility. As OD, I put the men on the ship and so had a direct part in sealing their fate. Also I was at the scene of the crash and saw the mangled bodies, killed while flying at 200 mile per hour. Terrible.⁹

Over the next few days, the cleanup activities continued for all U.S. Army personnel around Mackay. They worked under pressure, collecting bodies, personal effects, interviewing witnesses—and keeping quiet about the details of the crash.

A postwar 1945 newspaper editorial describing the Flying Fortress air crash, stated:

The plane caught afire soon after taking off from Mackay aerodrome, the flames licking along the fuselage and across the wings, so that the mighty airliner appeared for a few moments as a terrifying fiery cross in the air as it screeched low towards Baker's Creek.¹⁰

More recently, in August 1999, a graphic account of the crash was published in the local Australian newspaper recalling the flight of the doomed aircraft during the Second World War:

Miss Roger on that morning was rounding up cows for milking... She paused to watch the Fortress as it rose above the trees fringing the Mackay airport and began to turn northwards. Most people in Mackay were aware of the US Army routine of ferrying servicemen to and from Mackay for their leave and she realized the B-17 would be taking men back to New Guinea. She said you could set your clock by the arrival and departure of the airplanes. She said that usually the Fortresses gained altitude quickly with their noses pointed upward but on this morning after the B-17 had risen about 300 feet, she sensed it was in trouble. As it made the sweep to the west and north she sensed that the pilot could not lift its nose. Sitting in the saddle of her horse she could do nothing but watch.... The engines began backfiring and then a final backfire illuminated the entire fuselage from cockpit to tail and the Fortress fell almost horizontally from the sky. It disappeared from view and then there was a tremendous crash. The whole countryside was lit up by a brilliant flash of fire. In a straight line, she was about a mile and a half from the crash site and could feel the ground reverberating under herself and her horse.¹¹

Mackay Police Department Investigation

Fifty years after the fatal crash, Colin E. Benson, a historian in Mackay, uncovered a significant report,¹² prepared by the Mackay police department shortly after the crash. However, because the VH-CBA mishap involved a U.S. military plane, Australian civil aviation authorities lacked jurisdiction to investigate further.

The report was based on the testimony of eye-witnesses and the observations of local police personnel investigating the crash site. The AAF Engineering officer who supervised the daily flight operations of the 46th TCS Detachment at the Mackay civilian airport provided some additional information. One purpose of the police report, to ascertain whether sabotage was involved, concluded: "No suspicion or possibility of sabotage; the whole occurrence being entirely accidental."¹³

The report promptly went through official channels of the U.S. Army Services of Supply (USASOS) to the Commanding General of the Fifth Air Force. The cover letter, dated July 4, 1943, read in part: "The cooperation of the Queensland Police Force in this matter and in many others is appreciated, as are your expressions of sympathy in this tragic occurrence."¹⁴ Although there may have been Army investigators involved soon afterward, no official U.S. Army investigation reports of the incident have been found.

The VH-CBA crash was the worst suffered in the Southwest Pacific Area (SWPA) during World War II.¹⁵ The accident earned several other grim distinctions. In terms of loss of life, it was the worst aircraft crash in American air transport history up to the time, the worst crash ever involving a U.S. bomber, and the worst air crash in Australian aviation history.¹⁶

Because of wartime censorship the American public was given no news about the accident. The U.S. Army commanders ordered the incident hushed up at the time for security and morale reasons. Only scant evidence was reported in classified military records¹⁷ to substantiate the tragic loss. Even today, most of the families of the forty crash victims do not know the full story of how their loved ones died.

Search for Casualty List

For several years during the 1990s, the Mackay Sub-branch of Returned Services League of Australia (RSLA) made unsuccessful efforts to obtain the names of the thirty-five passengers killed in the crash. Unable to find the passenger lists from any U.S. military sources, they began to query veterans' organizations and aviation museums in the United States. One request found its way to the Smithsonian's National Air and Space Museum in Washington, D.C.

When the Australian inquiry arrived at the Smithsonian in May 1993, Herbert Brownstein was working in the Museum's Aeronautics Depart-

ment. He had just completed a book about a contemporary B-17D aircraft, *The Swoose*,¹⁸ published by Smithsonian Institution Press. The book chronicles the history of a famous B-17D that was used as the personal aircraft of Maj. Gen. Lewis H. Brereton, FEAF Commander in 1941.¹⁹

Brownstein became interested in uncovering the full circumstances surrounding the B-17C Baker's Creek crash, particularly finding out how forty-one men could be carried in a B-17C bomber designed for a nine-member crew. During World War II, he was a B-17 flight engineer instructor with the AAF Air Training Command and was skeptical of such a claim. He also was curious to learn how this proud, star-crossed American Flying Fortress became identified with the Australian civil aviation registration—"VH-CBA." Further, he wondered why "nobody in America seemed to know anything about this big wartime aviation incident."

Possible Causes

It is difficult to reconstruct events surrounding a plane crash that happened nearly sixty years ago in the middle of World War II in Australia. At the time of the crash, "VH-CBA" was the only B-17C still flying in the Southwest Pacific.

Fortunately, the author was able to interview three former AAF flying crew chief veterans of the World War II 46th Troop Carrier Squadron.²⁰ They actually flew and performed maintenance on VH-CBA at Mackay in 1943. They provided valuable facts and realistic opinions about the condition of the plane and its final flight.

Five possible causes of the crash are presented and discussed below. They are drawn from information found in the historic records, published statements, and from knowledgeable individuals. They are, not in order of probability:

Scenario A - Pitot-Tube Malfunction

Scenario B - Aircraft Weight/Balance Overload

Scenario C - Engine Fire Emergency

Scenario D - Engine Power Failure

Scenario E - Pilots Proficiency

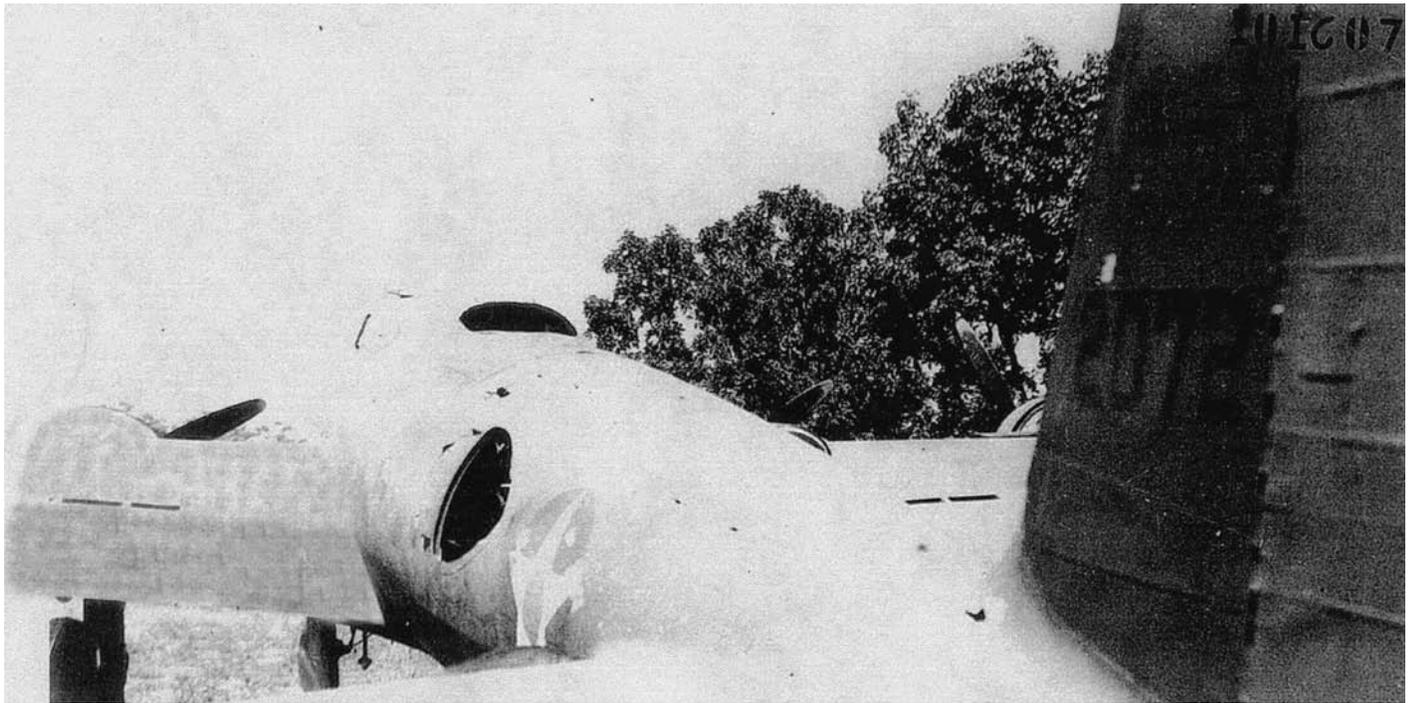
One basic question lingers: Why did the pilot of VH-CBA, just after takeoff and while still flying at low altitude, elect to make two, 90-degree turning maneuvers that led to the crash?

Scenario A - Pitot Tube Malfunction

Each B-17 was equipped with probe devices called "pitot tubes," installed at two places outside the airplane. Smaller aircraft of that era were equipped with pitot tubes mounted on a single probe. The ambient air entering the tubes of the B-17 was used to activate three sets of airspeed

NO OFFICIAL
U.S. ARMY
INVESTIGATION
REPORTS OF
THE
INCIDENT
HAVE BEEN
FOUND

BROWNSTEIN
...WONDERED
WHY
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AMERICA
SEEMED TO
KNOW
ANYTHING
ABOUT THIS
BIG WARTIME
AVIATION
INCIDENT"



B-17C (No. 40-2072) at Batchelor Field, near Darwin, on August 21, 1942, waiting eight months for repairs to combat damage suffered during Christmas Day 1941 mission. (Photo courtesy of Herb Brownstein.)

SEVERAL CASES OF BULLY BEEF—NOT ACCOUNTED FOR ON THE MANIFEST—WERE FOUND AT THE CRASH SITE

APPARENTLY, THE HEAVILY-LOADED PLANE HAD LITTLE MARGIN FOR SAFETY

indicators and altimeters. They were located on the pilot, copilot, and navigator instrument panels. When combined with “static ports,” the device created the “Pitot-Static System,”²¹ which provided the flight instruments with airspeed and altitude information.

To prevent foreign objects from entering the tubes, cloth sleeves usually covered them while the airplane was parked. Routinely, the crew chief or a member of the ground crew removed the cloth sleeves from the two external tubes during the preflight check of the airplane, before the engines were started.

Failure to remove a pitot-tube sleeve can result in an inoperative airspeed indicator. The device is critical to the proper control of the airplane. If just one protective cloth cover had not been removed, the accuracy of the pilot’s altimeters could be adversely affected. If he were unable to continue the flight to Port Moresby because of faulty airspeed or altitude indicators, the pilot may have elected to return to the landing field for repairs.

Since no technical evaluation of the wreckage was made (the cloth pitot-tube covers were destroyed in the crash fire) there is no evidence pointing to this scenario as the probable cause.

Scenario B - Aircraft Weight/Balance Overload

The passengers on the fatal flight were positioned primarily in the bomb-bay area, with some seated, toboggan-style, on the floor of the radio operator’s compartment and others in the fuselage. Moreover, passengers on these R&R flights typically were told to squeeze-up towards the front of the plane for takeoff. Such forward load distribution, most likely, did not exceed the safe CG [center of gravity] limits.²²

If the aircraft became loaded beyond its designed CG limits, it could become unstable in flight. Improper loading of the VH-CBA airplane could have resulted in exceeding the CG limits, if the passengers had been distributed aft of the bomb-bay compartment. The CG for bombers is located within the bomb-bay area, where its payload originally was expected to be carried. VH-CBA, however, was converted in March 1942 from bomber to transport service.

The day of the final flight, the aircraft was loaded in typical mission configuration and within maximum gross weight for takeoff. The taxi weight was calculated on the manifest to be 46,810 lbs. On board were 7,200 pounds of fuel and forty-one passengers and crew. The figures closely correspond to the maximum safe weight of 47,500 pounds, shown in the Boeing Flight Manual for the model B-17C.²³ Thus, the aircraft was technically not overloaded, but very close to it.

Former members of the 46th Troop Carrier Squadron insisted that the aircraft was not overloaded. They claimed the same VH-CBA had made many flights between Australia and New Guinea with forty men on board. Unfortunately on the final flight, there is grim evidence the plane was incapable of gaining altitude, or of maintaining its flying speed after liftoff, on fewer than four properly operating engines. In addition, several cases of Bully Beef—*not* accounted for on the manifest—were found at the crash site. Apparently, the heavily-loaded plane had little margin for safety.²⁴

Another reason for exceeding the aircraft “CG limits” could have been an unexpected movement of passengers, thrust by rapid acceleration to the rear of the airplane. However, the so-called “inertia effect” is considered an unlikely problem for this type aircraft.

A NEW FUEL TANK HAD RECENTLY BEEN INSTALLED

BOTH REPORTED HEARING LOUD AND SHARP NOISES, ONE DESCRIBED IT AS "BACK-FIRING"

A LOCAL WOMAN... DESCRIBED ANOTHER SOUND ...INDICATIVE OF A RUNAWAY PROPELLER, RACING AT EXTREMELY HIGH RPM

The lone survivor, Cpl. Foye K. Roberts, years later said that it appeared to him that each passenger was loaded with "goodies" unobtainable in New Guinea. Besides the additional weight, the place where the purported goodies were stowed could have made a difference in the location of the "CG," especially if the bags were placed in the aft section near the entrance door where most of those aboard entered the aircraft. Under such circumstances, the unstable airplane, resulting from the rearward shift of the CG could also have challenged the pilots.

Scenario C - Engine Fire Emergency

Eyewitnesses reported seeing flames shooting out of the low-flying plane. One saw, "a plume of flame come out of the exhaust—as if from a flamethrower."²⁵ If a fire was observed by a crewmember in any one of the four engines just after takeoff, the pilot would have faced three problems: 1) emergency crew coordination, 2) extinguishing the engine fire, and 3) expediting a return to the airfield under conditions of reduced power, low altitude, and poor visibility. Another possible cause of fire may have been a fuel leak in one of the wings. A new fuel tank had recently been installed inside the left wing and flight-tested the previous day.

Scenario D - Engine Power Failure

An on-board emergency, such as an engine or propeller failure, is possibly another reason the pilot might have attempted an immediate return to the airfield following takeoff. Retired CMSgt. Teddy W. Hanks, a former AAF aircraft mechanic and crew chief stationed near Port Moresby, New Guinea, corresponded with two Australian civilians who observed the ill-fated Flying Fortress's final flight. Both reported seeing abnormally bright and excessively long exhaust flames coming from a starboard engine. Also, they both reported hearing loud and sharp noises, one described it as "back-firing."

In addition, a local woman, who was standing nearer to the aircraft's flight path and crash site than the two other eyewitnesses, described another sound coming from the low-flying B-17, as the aircraft came closer to her location. The unusual sound she heard—a propeller running in full-low pitch—was indicative of a runaway propeller, racing at extremely high RPM (engine speed).²⁶

A propeller going into full "low-pitch" results from either loss of engine oil pressure, loss of engine power, or from a combination of the two. If the engine throttle control is put in the "full-forward" position, as during a takeoff roll, the engine RPM will be extremely high. Chief Hanks recently wrote:

The fact that B-17C (VH-CBA) performed satisfactorily the day before the crash cannot absolve its four engines of blame. Trouble-free operation one day does not guarantee continued proper operation

*any more than a report of good health today eliminates the possibility of a fatal heart attack tomorrow. I don't believe the maintenance crew should feel any guilt for the aircraft's fateful crash. I do believe, however, that those prone to accept the "pilot error" theory as cause of the tragedy are doing a grievous and unfounded injustice to the pilot and copilot. They were faced with unpredictable, insurmountable problems yet fought valiantly to overcome it. The fact their efforts were in vain should not detract from their valor.*²⁷

An aircraft engine can fail in flight for various reasons. As with any mechanical device, an internal combustion-reciprocating piston engine will fail when subjected to great stress. For the Wright Cyclone (R-1850) nine-cylinder radial engine used on the B-17C, the greatest stress usually occurs during a heavy-loaded takeoff. However, without benefit of an Engine Teardown Report, any attempt to identify the specific cause of internal engine failure remains speculative.

To maintain aircraft in operational readiness in 1943 Australia, essential parts often were removed from one airplane, or obtained from airplane graveyards, to keep another one flight-worthy. Spare engines were extremely scarce and resupply from the U.S. was slow. An obsolete airplane would have been used for spare parts. However, by this time in the war, all other surviving B-17C and D-model aircraft in the Southwest Pacific had been sent back to the United States.²⁸

The 46th TCS maintenance crew assigned to the Mackay civilian airport actually installed and tested three replacement engines, in order to obtain two suitable ones. The test flight for the first two engines lasted about 30 minutes; they each overheated and the oil pressure dropped off. The pilot feathered the propellers and landed the plane. Once on the ground, according to former flight mechanic, Paul L. Maynard:

*I removed the magnetic oil-sump plugs on each engine; found them both full of small pieces of metal. This is a common sign of bad engine bearings. The Engineering officer was finally able to obtain two new replacement engines, received in crates from the U.S., not ones rebuilt in Australia.*²⁹

Even though a flight test was performed the day before the crash, the reliability of the "brand-new" engines is highly suspect. With the failure of any one of the four engines after takeoff, the pilots would have been faced with the problem of expediting a safe return to the airfield. From the above accounts, it appears reasonable to consider that "engine power failure" is a strong contender for the probable cause of the crash.

Scenario E - Pilot's Proficiency

The aircraft was observed making two, 90-degree left turns at a low altitude. It was specu-

B-17C crash site at Baker's Creek, Australia, June 14, 1943. (Photo Al Soxman Collection.)

**LOCAL
GROUND FOG
WAS
REPORTED
BY THE AAF
WEATHER
SERVICE AT
200-250 FEET
DEEP**

**INSTRUMENT
FLIGHT
TRAINING
HAD NOT YET
BEEN PRO-
VIDED TO
THE DAT
PILOTS BY
THE FIFTH
AIR FORCE**

**NEARLY
SIXTY-YEARS
AFTER THE
EVENT, IT IS
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DETERMINE A
SINGLE
CAUSE FOR
THE CRASH**



B-17C crash at Bakers Creek near Mackay on 14 June 1943.
Photo: Al Soxman, USAF/AFMuseum

lated that the pilot might have lost visual contact with the ground, possibly not fully transitioned to his instruments. Further, the 46th TCS engineering officer testified to the Mackay Police that takeoff was shortly after 5:58 am and “first light” broke about 6:10 am.³⁰ Therefore, one can conclude the takeoff took place in early predawn darkness. In addition, local ground fog was reported by the AAF Weather Service at 200-250 feet deep, within a few miles of the airport. The runway lights were operating normally and, according to people familiar with the Mackay airfield, the daily takeoff pattern for VH-CBA was from Runway 230, toward the southwest. A short time later, the usual flight plan would take the plane through a series of climbing left-turns in order to assume a northerly course from Mackay—out over the Coral Sea—toward its destination, Port Moresby, New Guinea.

On the fateful day, it is surmised, the two pilots would have to penetrate the semi-darkness and ground fog shortly after lifting off the lighted runway; the pilot operated the controls “in the blind” until the airplane broke into clear air at about 250 feet altitude. This would have been their first opportunity for visual contact with the surroundings, if the airplane was climbing normally. It would also be time for the landing “gear-up” flag to appear. Moreover, at least one of the two pilots should have remained on instruments until sunrise, but it is not clear whether either pilot had the necessary training. Instrument flight training had not yet been provided to the DAT pilots by the Fifth Air Force.³¹

This scenario for “probable cause” appears valid, providing the pilots were not also dealing with an on-board emergency, like an engine power failure. Under such circumstances, they may have properly attempted to return to the airfield at low altitude because, after making the two level turns, they realized the heavily loaded aircraft was unable to climb any higher. With loss of power from one (or two) of the four engines, just after takeoff, the pilot most probably was attempting a return to Runway 230—the one he had just left—under reported weather conditions of light wind and low visibility.

It is possible that the two low-altitude turning maneuvers were contributing factors to the crash. The second 90-degree turn may have decreased the necessary flying speed to the extent that the heavily loaded airplane stalled and the pilots lost control. The Mackay Police report suggests that just before the second 90-degree left turn, at an altitude of 150 feet, the pilot was attempting to orient himself with objects on the ground in preparation for landing. Describing the use of the high intensity landing lights housed in the leading edge of each wing, the report states: “The ground was brightly illuminated by the lights from the airplane...very brightly lit from the illumination attachments on the plane.”³² The two pilots were between twenty-one and twenty-four years of age. Most of the other pilots in the 46th TCS at that time (early 1943) were fresh from flying school with only a few hundred hours of flying experience and limited instrument flying technique. The copilot had only a few flights in VH-CBA.³³



B-17C crash site at Baker's Creek, Australia, June 14, 1943. (Photo Al Soxman Collection.)

IN DECEMBER 2000, SIX AIR FORCE FLYING VETERANS WERE ASKED TO REVIEW THE AVAILABLE FACTS

THE AUTHOR CONCLUDES THAT AN IN-FLIGHT MALFUNCTION OF AT LEAST ONE OF THE FOUR ENGINES WAS THE PROBABLE CAUSE

Conclusion

The cause of the crash remains uncertain, although sabotage, pilot error and poor visibility originally were claimed. The present research suggests the possibility of aircraft mechanical problems. However, nearly sixty-years after the event, it is not possible to determine a single cause for the crash. The accident was engendered by several factors, not solely because the pilot was flying the plane too low, a conclusion suggested in the Mackay Police report. Obviously, just before it crashed the plane was too low, but what circumstances brought the airplane to that place?

In December 2000, six Air Force flying veterans were asked to review the available facts about the Baker's Creek air crash and provide comments. Each was later polled for his opinion regarding the probable cause. Fortunately, they were willing to reflect on their own experience, albeit for some it was nearly sixty years after the fact. Their comments focused on airplane loading, pilots' experience, mechanical problems, ground witness reports, weather conditions, and demands of the wartime situation. The veterans noted that:³⁴

- The original pre-dawn takeoff was delayed 30-minutes, then cleared by the AAF operations officer as daylight approached.
- The plane had a new fuel tank and two new engines installed, and passed a flight test the previous day—unloaded and in clear daylight;
- one witness on the ground said she saw flames, heard backfiring noises, sounds of a runaway prop;
- both pilots were inexperienced with in-flight emergencies in this airplane;
- several cases of Bully Beef, unaccounted for on the preflight manifest, were found in the plane wreckage—the plane may have been overloaded.

- mechanics had trouble with locally rebuilt engines, had to get two new ones from the U.S.
- sabotage was ruled out by the Mackay police report.

One former pilot stated:

The resulting crash was probably caused either by the gradual descent unavoidable due to loss of power or by an inadvertent descent into the trees, due to the pilots' failure to cope with the above challenges. And the weather was a factor.

A former maintenance crewmember said:

We named that B-17C airplane, "Miss EMF," meaning, "Every Morning Fix-It." For every eight hours of flying, we spent at least 12-hours fixing it up, usually all night long. Maintenance facilities were primitive; some of the gear we used was improvised. Lack of training and experience were factors.

And a former World War II crew chief wrote:

Many replacement engines supplied to flying organizations in the Southwest Pacific in 1943 were rebuilt by local AAF Depot Repair facilities in the area. Those units suffered the same inadequacies experienced by most other wartime units; patriotic and eager young men compelled to do a job for which they were inadequately trained. Obligated to reuse marginally acceptable components, such as, bearings possibly installed by marginally qualified technicians, it becomes apparent that some rebuilt engines were time bombs waiting to explode.

A contributing factor to the crash was the heavy load aboard the aircraft. The plane did become airborne with such a load, but there is grim evidence that it was incapable of gaining altitude or maintaining flying speed on less than four properly operating engines. The heavily loaded aircraft, therefore, was denied any margin for safety.

Regarding statements in the Mackay Police report, the group was split. A minority weighed in on the "pilot error" allegation, while the majority supported the "overloading" and "mechanical problem" theories. However, all mentioned that the unfortunate combination of all of these operational factors probably caused the crash.

Finally, another reviewer wrote: "The truth may never be known, but we offer our hope that we have done no disservice to the memory of those who gave their lives."

The author concludes that an in-flight malfunction of at least one of the four engines was the probable cause. In addition, the heavy gross weight of the airplane, poor local weather conditions and the inexperience of the pilots and the maintenance crews are considered contributing factors.



(Above) Baker's Creek Memorial, Mackay Australia, Dedicated May 11, 1992. (Photo by Colin E. Benson.)

(Right) 10th Anniversary Ceremony, Baker's Creek Memorial, June 2, 2002. (Photo by John Pickup.)

Mackay Remembers: The Baker's Creek Memorial

Just about everybody in Mackay knows about the Flying Fortress air crash. For over fifty years, it was more a part of folklore in the region, handed

down from previous generations, than a publicly known and reported event. In recent years, however, the story became more widely publicized through volunteer efforts of the local citizens' committee. They built and dedicated a permanent monument at Baker's Creek to mark the B-17C crash site. The event on May 11, 1992, coincided with local North Queensland observances of the Fiftieth Anniversary of the Battle of the Coral Sea in World War II.³⁵

During the next ten years, additional information was uncovered about the crash and the Americans who died there. The author visited Mackay in August 1999. His subsequent collaboration with Herbert S. Brownstein at the Smithsonian Air and Space Museum and several others, gave rise to a book to document the B-17C air crash and what caused it.

The Australians remain grateful to the Americans who rescued their nation from possible enemy invasion during the uncertain early part of the Second World War. Thousands of American GIs later spent their R&R leave time at Mackay; many became longtime friends of local families. Commemoration ceremonies are now held each June at the Baker's Creek Memorial.

On June 4, 2000, the U.S. Air Force returned to the crash scene. Col. Rick Lester, the air attaché in Canberra, represented the USAF Chief of Staff, and Col. Timothy G. Murphy, represented the Commanding General of the Fifth Air Force. They laid a wreath during ceremonies held at the memorial near the crash site.³⁶

On June 2, 2002, Lt. Gen. Thomas C. Waskow, commander of the Fifth Air Force, traveled from Yokota AB, Japan, to deliver the keynote address at the memorial's tenth annual ceremony. He thanked the citizens of Mackay who had built the monument to honor the loss of the American servicemen at Baker's Creek.

COMMEMORATION CEREMONIES ARE NOW HELD EACH JUNE AT THE BAKER'S CREEK MEMORIAL



Recently, a group of retired Air Force veterans built a scale-model replica B-17C, cast in bronze. They plan to donate it to the Baker's Creek Memorial in Australia to coincide with the forthcoming 60th Anniversary Commemoration of the crash, scheduled for June 14, 2003.³⁷

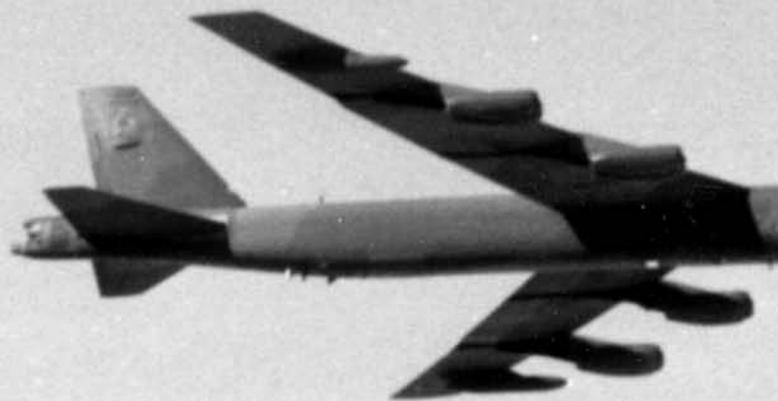
Acknowledgement: A special debt of gratitude

is due to the following for their valuable comments and encouragement: Lt. Gen. John B. "Skip" Hall, Jr., USAF (Ret.), Lt. Col. H. James Greene, USAF (Ret.), CMSgt Teddy W. Hanks, USAF (Ret.), Hubert S. Brownstein, Romeo "Connie" Constantine, Delmar L. Sparrowe, John Dolan, Yvonne Kinkaid, Terry Hayes, and Colin E. Benson, Mackay RSL Historian. ■

NOTES

1. Background contributed by William H. Bartsch.
2. To harness aircraft for transport duty in February 1942, USAAF planes under RAAF operational control displayed a five-letter civil aircraft registration, instead of U.S. Army Air Forces tail numbers. See 317th TCG Operations Report, May 1943, and intvw, H. Brownstein with Dana Bell, NASM, Sep. 1999.
3. The DAT command was set up as an Australian-based, Allied organization, not to be confused with USAAF Air Transport Command that later flew trans-Pacific air routes from the U.S. to Australia. Hist, Air Transport Allied Air Forces Southwest Pacific, Squadron History of 21 TCS, May 24, 1945.
4. Herbert S. Brownstein, "Crash at Bakers Creek," Draft Report, Dec. 1999, pp. 25-26.
5. John Lardner, "Lardner Goes to the War: The Japs Don't like the Sting of the Fortress," *Newsweek*, Apr 6, 1942.
6. Police Report, "Aeroplane Crash: Flying Fortress VHCBA at Bakers Creek via Mackay," Mackay District Queensland Police Department, Jun 16, 1943. Also: Peter Nielsen, Diary of WW II North Queensland, Appendix A (Air Crashes), Cairns: Bolton Inprint, 1993, p.159; Hist Records of the 46th Troop Carrier Squadron, Vol.1, Narration & Appendix (1 Jan 1943 - 31 Jan 1944), declassified, Sep 27, 1958.
7. Parade Program: "Bakers Creek Memorial," Colin E. Benson, Mackay RSL Historian, Mackay, Qld., Jul 12, 1997.
8. Diary entry, Capt. Samuel Cutler, Jun. 13, 1943.
9. *Ibid.*, Jun. 14, 1943.
10. Editorial, *The Daily Mercury*, Mackay, Qld., Aug 21, 1945
11. Terry Hayes, "Air Crash Story Still to be Told," *The Daily Mercury*, Mackay, Qld., Australia, Aug. 28, 1999.
12. Report, "Aeroplane Crash: Flying Fortress VH-CBA at Bakers Creek via Mackay," Mackay District Queensland Police Department, Jun 16, 1943.
13. C. Howie, Inspector of Police, Mackay, Qld., Jun 19, 1943.
14. Ltr, C.J. Carroll, Commissioner of Police, Qld., to Brig. Gen. Donaldson, US Army SWPA, APO 923, Jun 26 1943. Acknowledged by 2d Lt. R. W. Bolling, Actg. Asst. Adj Gen., Office of the CG, Hqs, Base Sect 3, USASOS, APO 923, dtd. Jul 4, 1943.
15. Hist Record, Hqs 317th TCG, Vol. 1, Narration & Appendix A & B, 1 January 1943 to 31 January 1944, declassified, DOD Dir. 5200.9, Sep. 27, 1958 p. 20.
16. Robert F. Dorr, "Deadly WWII Crash Kept Quiet," History in Blue, *Air Force Times*, Jun 12, 2000, p. 12.
17. Hist Records of the 46th TCS and the 317th TCG, Fifth Air Force, declassified on Sep. 27, 1958, pp. 19-20.
18. Herbert S. Brownstein, *The Swoose*, Washington, D.C.: Smithsonian Institution Press, 1992.
19. Lt. Gen. George C. Kenney, cmdr of Fifth Air Force, and on a separate occasion, U.S. Navy Cdr. Lyndon B. Johnson, also once used "Swoose," a sister B-17D to VH-CBA, as a transport plane during 1942. The plane is now part of National Air & Space Museum collection in Washington, D.C.
20. Intvw: Romeo "Connie" Costantine and Delmer L. Sparrowe, 20th Reunion, 46th TCS, Louisville, Ky., Sep. 29, 2000, and e-mail correspondence, Paul L. Maynard, Oct. 9, 2000.
21. The B-17C had two Pitot-Static Systems. One activated the navigator's instruments, the other, the pilot's and copilot's flight panel indicators. Two pitot probes were contained in streamlined housings attached to masts extending away from the fuselage below the Bombardier's position, on the right and left sides of the aircraft's nose. Impact air entered the front port. Another port, at the rear of the streamlined housing, provided static air pressure. The static port supplied barometric pressure to the altimeter.
22. Aircraft control in flight is sensitive to the location of its center of gravity. The "CG" is the point along the centerline of the fuselage about which the total weight of the flying aircraft, if simply suspended, would balance. There is a limited range, a few feet forward and aft of the wing axis, within which the location of the "CG" is safely allowed.
23. Tech Order, B-17C (01-20EC-1), Dec 11, 1941, p. 48.
24. Tech narrative, "The Bakers Creek Aircraft Crash," CMSgt. Teddy W. Hanks, USAF (Ret.), Feb. 6, 2001.
25. *The Daily Mercury*, Aug 23, 1945.
26. Ltr to author, CMSgt. Hanks, Feb. 16, 2001.
27. *Ibid.*
28. Herbert S. Brownstein, *The Swoose*, Washington, D.C.: Smithsonian Institution Press, 1992, p.20
29. E-mail to author, Paul L. Maynard, Nov. 16, 2000.
30. Before America's entry into the war, little had been done to teach fledgling AAF pilots the rudiments of instrument flying. Student pilots were taught to use only three basic flight instruments for all-weather navigation: airspeed indicator, altimeter, and turn and bank indicator. The gyroscopic turn indicator and artificial horizon were neglected. Instrument flying time required for graduation from pilot school amounted to 15-20 hours. Samuel Fishbein, Flight Management, Westport, Ct.: Praeger, 1995, p. 17.
31. A comprehensive program of instrument flying instruction was introduced to pilots of the Fifth Air Force in 1943. General Kenney Reports, p. 125.
32. Cyril Victor Godwin, testimony to Police investigator, Qld Police Report, "Aeroplane Crash: Flying Fortress VHCBA at Bakers Creek via Mackay," Mackay District Queensland Police Dept., Jun 16, 1943, p. 6.
33. Delmer Sparrowe, E-mail message to author, Feb. 12, 2001.
34. Reviewers were: Lt. Gen. John B. Hall, Jr., USAF (Ret.); Lt. Col. H. James Greene, USAF (Ret.); CMSgt. Teddy W. Hanks, USAF (Ret.); Delmer L. Sparrowe, former S/Sgt., 46th TCS; Romeo Costantine, former S/Sgt., 46th TCS; and Paul L. Maynard, former Sgt., 46th TCS.
35. "Air Crash Remembered," *The Daily Mercury*, Mackay, Qld., Jun. 5, 2000.
36. "Special Guests Attend Bakers Creek Memorial Ceremony," *Drumbeat*, Newsletter of Mackay RSL, Mackay, Qld., May-Jun 2000.
37. "Group Plans Replica of Crash Plane," *The Daily Mercury*, Mackay, Qld., Nov. 15, 2000.

Air Power and the Battle for Mazar-e Sharif





Don Chipman

(Overleaf) The venerable B-52 still has a role in modern air warfare. Air Force B-2, B-1 and B-52 bombers expended more than 80 percent of the tonnage dropped on combat missions over Afghanistan.

(Right) Pakistan's President Gen. Pervez Musharraf.

In a similar way, the battle for Mazar was a transforming battle. Coalition forces took existing military capabilities—from the most advanced (such as laser-guided weapons) to the antique (40 year-old-B-52s updated with modern electronics) to the most rudimentary (a man on a horse with a weapon)—and used them together in unprecedented ways, with devastating effect on enemy positions, enemy morale....

Donald Rumsfeld, Secretary of Defense

THE AIR OFFENSIVE BEGAN ON OCTOBER 7, AND BY LATE DECEMBER TALIBAN FORCES WERE FLEEING

THE KEY TO THESE VICTORIES WAS THE CAPTURE OF MAZAR-E SHARIF BY THE NORTHERN ALLIANCE

THE LAST ...RECOMMENDATION FOCUSED ON IMPLEMENTING A COORDINATED AIR CAMPAIGN USING SPECIAL FORCES AS FORWARD AIR CONTROLLERS

The Vertical Flank

Phase One of America's war on terrorism was fought during the fall of 2001 against Afghanistan's Taliban and Al Qaeda forces. The air offensive began on October 7, and by late December Taliban forces were fleeing from their fortifications. The key to these victories was the capture of Mazar-e Sharif by the Northern Alliance on November 9. Shortly afterward, the Taliban retreated from Herat, Kabul, Jalalabad, and eventually from Kandahar in early December. These cities fell like dominos, as Taliban and Al Qaeda forces headed into the mountains, where they continued their fight using guerrilla warfare tactics.

The Northern Alliance, a patchwork of militias, was commanded by Gen. Muhammad Fahim. This armed force's triumph over the Taliban defending Mazar-e Sharif was primarily due to the effectiveness of air power. American special forces, working with the Northern Alliance, used laptops and ground-laser target designators to pinpoint enemy forces. Then, they signaled this information to loitering B-52s and other aircraft that attacked with precision guided munitions. The Taliban were confronted from the right flank, the left flank, and the vertical flank as air power rained bombs down upon them. According to the *Jane's Intelligence Review*, it was in these vertical flank attacks, especially in the conquest of Mazar-e Sharif, that victory hinged.¹ The sequence of events leading to the capture of Mazar-e Sharif began immediately after September 11th.

The President's War Plans

Immediately after the terrorist attacks on the New York World Trade Center and Pentagon, President George W. Bush and his administration began searching for those responsible and evaluating possible responses. Claiming that Osama bin



Laden had master minded the attacks, CIA Director George J. Tenet was the first to call for a military operation against the Taliban and Al Qaeda forces in Afghanistan.² Four days later the President and his staff headed for Camp David, where they continued their discussions of various options. Again, CIA Director Tenet presented his robust strategy, that involved a military campaign to overthrow the Taliban and conduct a covert anti-terror war against Al Qaeda in sixty or more nations.³

Tenet wanted to send CIA agents and Special Forces into Afghanistan and provide the Northern Alliance with military support in their war against the Taliban. Once in place, Special Forces would provide targeting information to American aircraft, which would then attack key Taliban positions.

The war would be fought by the Northern Alliance, with the U.S. providing financial aid, logistical support, arms, and precision air attacks. "It would take discipline and patience," stated Tenet, "but it would work."⁴

At this point, the Pentagon offered the President other options, including an immediate cruise missile attack on various Al Qaeda training camps. A second option involved a combined cruise missile and manned bomber attack against the terrorist training camps and key Taliban centers.

Don D. Chipman is a professor of military studies at the Air University Squadron Officer College, Maxwell AFB, Alabama. He retired as a commander from the U. S. Naval Reserve. A rated navigator, he flew 300 combat hours in the Vietnam War. He earned a Ph.D. from Florida State University. Dr. Chipman has written two books and numerous journal articles on military affairs. Three recent essays appeared in Companion to American Military History, published by Oxford University Press. He last wrote for this journal in the Summer 2002 issue, with an article titled "General Short and the Politics of Kosovo's Air War."



A proposal for an all-out land invasion was offered, but it was quickly dismissed. The last Pentagon recommendation focused on implementing a coordinated air campaign using Special Forces as forward air controllers.⁵

The Pentagon was skeptical of providing direct support to the Northern Alliance.⁶ This amalgam of forces controlled only a small portion of Afghanistan's northeast corner and was little more than a collection of about 30,000 poorly armed militia-men. It may be too risky, explained one Pentagon official. The U.S. should not "put its faith-and its people-in the hands of an opposition force that had shown little skill in fighting the Taliban in the past."⁷ The assassination of the Northern Alliance's talented commander, Ahmed Massoud, on September 9th, created even more unsettling doubt concerning the Tenet proposals.⁸

After reviewing various options and dismissing a suggestion to attack Saddam Hussein, President Bush retired to consider America's course of action. Two days later, on September 17, he reconvened his cabinet officers and notified them of his decision. America, he began, will fight the terrorists and will confront anyone who aids and harbors them. Phase One of this military campaign would basically follow the plans proposed by George Tenet.⁹ In Afghanistan, stated the President, "I want the CIA to be first on the ground," work with the Northern Alliance¹⁰ and fight with the Northern Alliance. Then, he turned to Defense Secretary Donald H. Rumsfeld and Gen. Henry Shelton, Chairman of the Joint Chiefs of Staff, and told them to ensure that the air strikes were coor-

inated with guidance from Special Forces. "We'll attack," emphasized the President, "with missiles, bombers and boots on the ground."¹¹

A pivotal factor in these decisions was the status of various countries surrounding Afghanistan. Of these Pakistan's loyalty was especially critical. From 1979 to 1989, during the USSR's occupation of Afghanistan, Pakistan supported the most radical factions of the *Mujahideen* guerrillas in their fight against the Soviets. Then, from 1994 through 2001, Pakistan was one of only three countries that provided the Taliban with major support in their continuing civil war against Ahmed Massoud's Northern Alliance forces.¹²

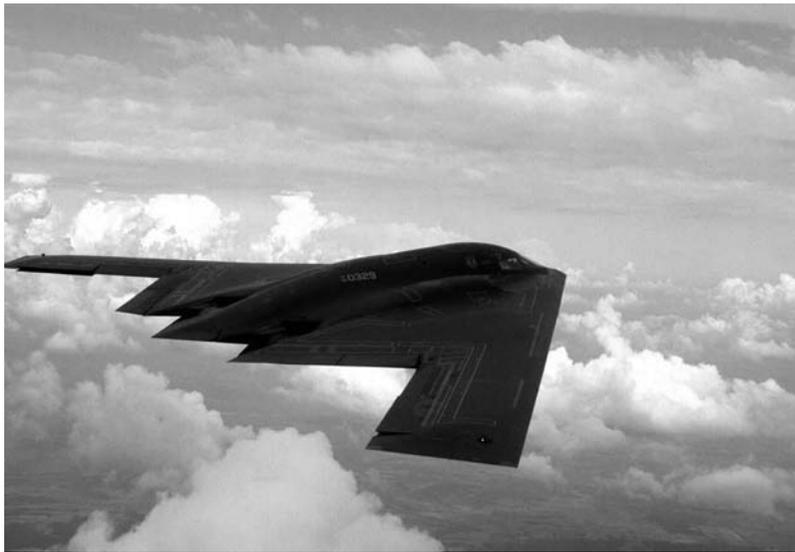
The question of Pakistan's support, therefore, was crucial. To fight the Taliban and Al Qaeda, the U.S. would need military bases and permission to over-fly Pakistan. Secretary of State Colin Powell informed the President that radical Muslims were constantly threatening Pakistan's government and, therefore, he believed President Gen. Pervez Musharraf would support the American cause. I believe, explained Secretary Powell, that Musharraf does not want the radicals to turn Pakistan "into a rogue state," and, therefore, he will be open to the U.S. assistance.¹³

Later, in a Washington meeting with one of Musharraf's representatives, the Bush Administration forcefully encouraged Pakistan's full cooperation. Under Secretary of State Richard Armitage requested that Pakistan "seal the borders, provide over flights and basing rights, sever diplomatic relations with the Taliban and cut off the flow of oil and gas to Kabul." If Pakistan would agree to these terms, explained Armitage, the U.S. would lift all economic sanctions, and "shower Musharraf with more financial aid than he would know how to spend." Essentially, noted Secretary Powell, "we gave him an offer and he decided to he could not refuse it."¹⁴

While work continued on the diplomatic front, the Bush Administration began sending military supplies to the Northern Alliance. Just days after the American attacks, an arms agreement was made with Russia in which the U.S. began financing the transfer of weapons from Russia to the Northern Alliance.¹⁵ Interestingly, several months prior to the September 11th attacks, Northern Alliance spokesmen were in Washington trying to get military aid. However, because the U.S. wanted to remain loyal to Pakistan, an old time Cold War ally, these pleas for assistance were overlooked.¹⁶

From September 17 through October 6, the deployment phase of the "Operation Enduring Freedom" moved forward. Ships, planes, CIA operatives, Special Forces, and logistical support began moving into striking positions. On September 21, USAF Lt. Gen. Charles F. Wald, the commander of American Air Forces assigned to the Middle East, headed for the Combined Air Operations Center [CAOC], located in Saudi Arabia. From his post, General Wald would help direct the air campaign against Taliban and Al Qaeda forces. While the U.S. and British navies were sending ships into the

**"WE'LL
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MISSILES,
BOMBERS
AND BOOTS
ON THE
GROUND"**



(Above) The B-2 flew missions over Afghanistan from halfway around the world.

(Right) The AC-130 gunships were used mostly in the south.



THE AIR CAMPAIGN BEGAN ON OCTOBER 7, WHEN ABOUT FIFTY CRUISE MISSILES WERE LAUNCHED

THESE ATTACKS WERE FOLLOWED BY... STRIKES AGAINST TALIBAN HEAD-QUARTERS

Persian Gulf and off Pakistan's coast, B-52s and B-1B bombers were heading for the Indian Ocean to the British island of Diego Garcia.¹⁷ The air war over Afghanistan was about to begin.

The Afghan Air War and the Capture of Mazar-e Sharif

The air campaign began on October 7, when about fifty cruise missiles were launched from American and British ships. These attacks were followed by F-14, F-18, B-2, B-1, and B-52 strikes against Taliban headquarters, training camps, airfields, air defense nodes, and other key targets. In Kandahar and Kabul the electrical systems were quickly destroyed, plunging the cities into darkness. Other missiles struck and destroyed Taliban leader Mulla Omar's guest house.¹⁸

At the time of these attacks, there were an estimated 45,000 Taliban soldiers, equipped with

approximately 450 T-55 and T-62 tanks. Their air force consisted of about 30 MiG-21s and Su-22s. Taliban air defenses were fortified with a few SA-3s, some 300 or so anti-aircraft guns, and about 100 shoulder-fired Stinger missiles left over from the Soviet-*Mujahideen* war of the 1980s. In terms of conventional arms, Taliban fortifications were not overly formidable.¹⁹

While U.S. air strikes continued through the first week, a radio station-configured C-130 aircraft headed into the battle arena and began broadcasting messages to the Afghanistan people. Called "Commando Solo," this aircraft informed Afghan listeners of America's intentions of aiding them in their struggle against the Taliban.²⁰ In addition, USAF C-17 transports dropped over 75,000 packets of food and medical supplies. These planes flew out of Ramstein Air Base and parachuted most of their cargo into Afghan refugee

camp. Each food packet contained the written statement: "This is a food gift from the people of the United States of America."²¹ Commenting on this unique "dual" air strategy, U.S. Congressman Ike Skelton said, "It's the first time I've ever heard of trying to feed the people while you're trying to destroy their government. I don't think it's ever been done before, but I think it's an excellent strategy."²²

By day three, the Americans had gained air supremacy.²³ During the initial strikes, the Taliban had launched several Stingers and they continued to fire their anti-aircraft guns. However, because the Americans flew above 15,000 feet, the Stingers were ineffective.²⁴ From the state of Missouri, B-2 stealth bombers flew forty-one hours across half the world into the war zone, where they attacked Taliban air defenses. Bagram Air Base was hit and Shindand airfield, located near Herat, was pocketed with craters.²⁵ After

(Right) The B-1, here taking off from a forward location, saw significant service in the Afghan conflict.

(Below) The B-52 was once again a standout performer.



TALIBAN-INTEGRATED AIR DEFENSES AND THEIR COMMAND-AND-CONTROL SYSTEMS WERE DEMOLISHED “WITHIN THE FIRST 15 MINUTES OR SO.”

these attacks, the B-2s flew to the island of Diego Garcia, where a new crew took the controls and flew them back to the U.S. Although B-2s would be used later in the war, by October 11, with most of the Taliban air defenses destroyed, they were no longer scheduled to fly regular sorties.²⁶ For the most part, explained General Wald, Taliban-integrated air defenses and their command-and-control systems were demolished “within the first 15 minutes or so.”²⁷

After the first week, various American planes began flying around the clock, striking key Taliban targets. There were, however, accusations that an errant bomb had struck the Kabul offices of a land mine removal team, killing four civilians.²⁸ Commenting on this, Secretary of Defense

Rumsfeld, who twice a day relayed political guidance to Gen. Tommy R. Franks, USA, Commander of U.S. Central Command, stated that as always, “coalition forces will continue to make every reasonable effort to select targets with the least possible unintended damage.”²⁹ Shortly afterward, U.S. Navy pilots, flying off the U.S. carrier *Carl Vinson*, were told to “fly over and visually identify targets before dropping their bombs.”³⁰ As in the 1999 Kosovo air war, political considerations concerning collateral damage played a significant role in the planning and execution of the air campaign.

Two weeks into the war, C-130 gunships and F-15E Eagles made their first appearance.³¹ Initially, C-130 gunships flew primarily in the south, attacking Taliban posts in the Kandahar region. Because of their extended loitering ability, they could remain over enemy territory for long periods of time, thus providing a continuous threat. While aerial attacks from passing bombers were relatively short in duration, noted one Air Force officer, the AC-130 gunships could strike with their Gatling guns providing continuous fire and that the “experience can be even more frightening.”³²

By week three, the air war shifted away from striking airfields, air defenses, communication nodes, and other fixed targets to attacking tanks and Taliban troop placements. Engagement zones were established as patrolling forward air controllers looked for targets and authorized attacks.³³ On or about October 19, in support of the Northern Alliance, USAF C-130 cargo planes began ferrying U.S. and British Special Forces into Afghanistan’s back country.³⁴ Both C-17s and C-130s continued dropping ammunition, warm



Many air missions involved dropping food to the Afghans.



NORTHERN ALLIANCE COMMANDERS DID NOT UNDERSTAND WHY AIR POWER WAS BEING HELD BACK

THIS INCREMENTAL USE OF AIR POWER WAS A CALCULATED ATTEMPT BY THE U.S. GOVERNMENT TO ENSURE THAT THE MILITARY CAMPAIGN WAS NOT LEAPING AHEAD OF A DIPLOMATIC EFFORT

clothes, boots, and miscellaneous equipment to these commandos.³⁵

Despite the intense air assault, by late October, Taliban forces were still occupying all the major Afghan cities and they appeared to be more resilient than ever. In addition, the Northern Alliance had not made any significant advances against the enemy and while air attacks continued against key Taliban targets, there were few signs of progress. At this point, because of political constraints, aircrews were required to withhold strikes against the Taliban defending Kabul. About thirty-five miles northeast of the capital, the enemy had constructed a series of bunkers and were fully entrenched in these defensive perimeters. A Northern Alliance force was maneuvering southward through the Panjshir valley toward Kabul and requested more air strikes. The U.S., however, responded with only token air attacks.³⁶ According to *Jane's Defense Weekly*, the number of air strikes in this area were "sporadic and limited in intensity" with fighter-bombers "dropping usually no more than eight bombs."³⁷

When one Northern Alliance commander was asked about the importance of air power, he claimed that it was of little help to his troops but it was certainly aiding the enemy. "After a few attacks, their morale was better." In comparison, he submitted, "our artillery is better."³⁸ Most Northern Alliance commanders did not understand why air power was being held back. The "concerns of American generals and politicians—to exhaust diplomatic avenues, to minimize civilian deaths, to avoid alienating the Muslim world, to stop short of being dragged into the quagmire of Afghanistan's politics—have little resonance among these men," explained the *New York Times*.³⁹

This incremental use of air power was a calculated attempt by the U.S. government to ensure that the military campaign was not leaping ahead of a diplomatic effort to restore a pro-Western Afghan government. Pakistan wanted assurances that a new Kabul government would represent all of Afghanistan's tribes. Between 1992 and 1996, a Mujahideen government, dominated by Tajiks and Uzbeks and void of Pashtuns, who comprised over forty percent of the population was unable to bring stability to Afghanistan. Then, in 1996, the

Pashtun-dominated Taliban captured Kabul and with Pakistan aid forced the Northern Alliance into an extensive military retreat. The configuration of a post Taliban government, therefore, was a serious political issue. It was even more sensitive to Pakistan since its arch rival, India, had fully supported the Northern Alliance.⁴⁰

Washington wanted to slow the advance on Kabul, to convey a message to the Pashtuns that in the future they would play a vital political role. In addition, there was a belief that a sudden Taliban retreat from Kabul would throw all of Afghanistan into total anarchy.⁴¹ "In effect," concluded the *New York Times*, American military planners were "finding themselves obliged to calibrate the bombing to achieve a desired political result—establishing a stable, broadly representative government in Kabul—that has eluded Afghanistan for decades."⁴²

With little progress to report, there suddenly appeared a swelling chorus of complaints concerning the U.S.'s slow military progress. A few U.S. congressmen claimed that the American strategy was just too timid and sluggish. They wanted to send in more U.S. ground troops and sever American dependence on the Northern Alliance.⁴³ This viewpoint was reinforced on October 20, when a Northern Alliance advance against Mazar-e Sharif collapsed, after suffering from significant casualties.⁴⁴ At this point, even Northern Alliance commanders were complaining that the "American bombing campaign appeared increasingly misguided and ineffectual."⁴⁵

For many skeptics, America's new war appeared to be slipping into a morass of inconclusiveness. Noting that the signs of progress were sparse, the *New York Times* wondered if America was facing another Vietnam and, thus, becoming involved in "another stalemate on the other side of the world."⁴⁶ While the Taliban were "oozing bravado", announced *Time* magazine, critics from the Middle East to Congress were claiming that America was "hurtling toward either humiliating defeat or inescapable quagmire."⁴⁷

In November, *Foreign Affairs* featured the essay "Afghanistan, Graveyard of Empires." In their pre-view, the editors noted that for ten years (1979-1989), the Soviet Union was unsuccessful in trying to conquer Afghanistan. Accordingly, noted the editors, the U.S. needed to "proceed with caution—or end up on the ash heap of Afghan history."⁴⁸ This period of pessimism concerning America's war effort was exacerbated by the portent of a harsh, early Afghan winter, with its sub-zero freezing temperatures and winds of over 100 miles per hour. And finally, there was confusion over how the U.S. would react to the advent of the Muslim holy month of Ramadan, that was scheduled to begin on November 17.⁴⁹

In early November, America's war momentum began to rise. On October 30, Gen. Tommy R. Franks, Commander of U.S. Operations in Afghanistan, flew to Tajikistan and met with Gen. Mohammed Fahim, Commander of the Northern

Army Gen. Tommy Franks, commander of U.S. Central Command, visits with airmen at Prince Sultan Air Base, Saudi Arabia, on April 22, 2002.

AMERICAN SPECIAL FORCES COMMANDOS GREW BEARDS AND WORE TRIBAL CLOTHING AND RODE ON HORSES ATOP WOODEN SADDLES

THE COMMANDOS BROUGHT ...HIGH-POWERED TELESCOPES, GLOBAL POSITIONING RECEIVERS, HAND-HELD LASER RANGE FINDERS, AND RADIOS

The Predator unmanned aircraft carrying a Hellfire missile.



Alliance. The conference, according to General Franks, was very formal and productive.⁵⁰ Upon conclusion, there were widespread forecasts that the intensity of fighting around Mazar-e Sharif would increase. Subsequently, the Pentagon announced that more troops and forward air controllers were en route to Afghanistan to join the 100 or so commandos already in country.⁵¹

Once in place and among the Northern Alliance fighters, many of these American Special Forces commandos grew beards and wore tribal clothing and rode on horses atop wooden saddles to the front lines, over treacherous high mountain trails. In addition, pack mules were used to carry in heavy equipment.⁵² The commandos brought with them targeting equipment that included high-powered telescopes, global positioning receivers, hand-held laser range finders, and radios that allowed them to send maps and close-up photographs to command centers via satellites and to loitering aircraft.⁵³ Once these messages arrived in the Saudi Arabian CAOC, they were linked with data gathered from JSTARs, U-2s, satellites, RC-135 Rivet Joints, flying Predator UAVs and other sources.⁵⁴ Then, as the *New York Times* explained, "in Saudi Arabia, American commanders could watch all these moving parts on a big

screen, directing aircraft like pieces on a chess board."⁵⁵

According to Secretary Rumsfeld, the commandos not only helped plan the offensive against the Taliban defending Mazar-e Sharif, they were an integral part of the advancing Northern Alliance forces.⁵⁶ At one point, Northern Alliance Commander Rashid Dostum cornered a young Air Force Special Operations lieutenant and told him he desperately needed air support. Twenty minutes later, Dostum, one of Afghanistan's most feared warlords, was astounded when bombs rocketed out of the sky, striking Taliban positions, sending fireballs everywhere, destroying artillery, and killing over 250 enemy soldiers. Since Dostum did not expect air support for at least another day, he was shocked with the rapidity, accuracy and power of the strike.⁵⁷

These quick and precise strikes were indications that net centric war had arrived in Northern Afghanistan. They were the culmination of new advances in surveillance and the most obvious signs of America's transformation in warfare. Using laser guided target designators, U.S. Special Forces forwarded messages to waiting B-52s bombers that quickly unleashed their precision guided weapons. Twenty-first Century technology was now linked to the Nineteenth Century fighting skills of the Northern Alliance. Indeed, noted Secretary Rumsfeld, "the battle for Mazar, was a transformational battle."⁵⁸

The Northern Alliance's offensive against Mazar-e Sharif began on November 4, when Dostum's forces captured Keshendeh, a town fifty miles southwest of the key objective. This village, explained *Janes Intelligence Review*, was taken only after Dostum's cavalry charged into the Taliban's defensive lines.⁵⁹ According to Secretary Rumsfeld, U.S. commandos participated in the attack. Initially, there were several key air strikes in which:

*the explosions were deafening and the timing so precise that, as the soldiers describe it, hundred of Afghan horsemen emerged, literally, out of the smoke, riding down on the enemy through clouds of dust and flying shrapnel. A few carried RPGs, some had less than ten rounds of ammunition in their guns-but they rode boldly—Americans and Afghans—into tank, mortar, artillery and sniper fire. It was the first U.S. cavalry attack of the 21st Century.*⁶⁰

While Dostum was maneuvering against Keshendeh, another Northern Alliance force, under the command of Gen. Atta Mohammed, was preparing for an attack against Ag Kupruk, a town forty miles south of Mazar-e Sharif. An U.S. Army commando team of twelve, plus one USAF forward air controller were fighting with this force of about 2,000 troops. Earlier, to equip these soldiers, the commandos had called in air drops of supplies that included shoes, blankets, food, and ammunition. Now, as they approached



The fight for Mazar-e Sharif involved American combat controllers as well as local fighters.

SIX COMMANDOS ADVANCED WITH ATTA'S FORCES

TWO COMMANDO TEAMS DESIGNATED TARGETS WITH THEIR LASERS, CALLED IN AIR STRIKES, AND HELPED GUIDE BOMBS

PHASE ONE OF THE WAR AGAINST TERRORISM ENDED WITH THE CAPTURE OF KANDAHAR ON DECEMBER 7



Ag Kupruk, six commandos advanced with Atta's forces, while the other seven circled northward through the mountains and maneuvered behind the enemy's lines. From their vantage points these two commando teams designated targets with their lasers, called in air strikes, and helped guide bombs to their marks:

The bloody accuracy of the attacks instantly lifted the spirits of Atta and his troops. During one bombing raid, Stan, the A-team's warrant officer, was showing Atta how the lasers worked. Just as Atta put his eye up to the view finder, an American bomb obliterated a distant target.⁶¹

On November 6, after more air strikes, followed by a Northern Alliance ground attack, Ag Kupruk capitulated. With Keshendeh and Ag Kupruk in Northern Alliance hands, Generals Atta Muhammed and Dostum joined forces and advanced northward through Shulgarah Gorge toward Mazar-e Sharif, where more battles were fought. In support of these operations, U.S. aircraft continued their attacks from the vertical flank, as sorties increased to approximately 120 per day.⁶²

Once outside of Mazar-e Sharif, a third element of the Northern Alliance, a Hazara military unit, joined in for the final advance. Then, on the evening of November 9, more than 5,000 Taliban soldiers fled the city, leaving behind most of their armor and heavy weapons. For the first time since 1997, Mazar-e Sharif was in Northern Alliance hands. Within the next few days, the cities of Taloqan, Herat, Jalalabad, and Kabul capitulated, as Northern Alliance forces consolidated their grip on most of Afghanistan. The uncontrolled stampede of retreating Taliban from Mazar-e Sharif, explained *Jane's Intelligence Review*, "began a rapid domino like collapse first across the north and then across Afghanistan as a whole." Northern Alliance commanders agreed that one of the primary keys to this victory, was "the intensity and accuracy of relentless U.S. bombing."⁶³

After the capture of Kabul, the battle for Afghanistan shifted to the Kandahar region, where the Taliban held out until early December. Except for continuous mopping up military operations, primarily in the mountains of Paktia province, Phase One of the war against terrorism ended with the capture of Kandahar on December 7. Commenting on the importance of Mazar-e Sharif, *Jane's Intelligence Review* stated that "within a single week in early-mid November, the USA's coalition had all but won the war."⁶⁴

Transformation: Net-Centric Air War

We witness transformation when we see airmen traveling by horseback with the tools of their trade (GPS and laser range finders) hanging from a saddle. With secure satellite and radio links, they pass target coordinates to bombers, or fighters from the Air Force, Navy, or Marines flying miles overhead. We see the venerable 40 year old B-52 precisely place a JDAM just 800 meters from our friendly positions. No single piece of this equation is transformational but together it yields a transformational, asymmetrical advantage over any enemy.

Gen. John P. Jumper, Chief of Staff, U.S. Air Force

The B-2s flew missions from Missouri and continued on to Diego Garcia where new crews returned the aircraft home, using midair refueling from tankers like this KC-10.

IT WAS ... A "NET-CENTRIC" CAMPAIGN WHERE THE TIME BETWEEN ACQUIRING ENEMY POSITIONS AND STRIKING TARGETS FROM THE AIR DECREASED SUBSTANTIALLY

THE CONCEPT OF EYES ON THE GROUND WAS ONLY PART OF SUCCESS STORY



In the 2001 air war over Afghanistan, the use of new surveillance technology and techniques, coupled with precision guided weapons, aided the campaign's effectiveness. It was what Norman Friedman called a "net-centric" campaign where the time between acquiring enemy positions and striking targets from the air decreased substantially.⁶⁵ When the warlord Dostum asked for air strikes, he was not aware that a B-52 was flying unseen above the clouds and that an Air Force forward air controller had just scanned the enemy's position with a laser range finder. This target information was quickly relayed via satellite to the

theater command center and returned to the loitering bomber. In some cases, if the Northern Alliance was under direct attack, the data was sent directly to loitering planes, that had authorization to attack. The emphasis was not on weapon platforms as much as on the ability to remotely sensor the target and quickly coordinate the signals into an effective air strike. Moreover, stated General Franks, a critical factor was not so much of having boots on the ground as having "eyes on the ground."⁶⁶

Yet, the concept of eyes on the ground was only part of success story. The Air Force also used new

The E-8A Joint STARS aircraft provided valuable support to the ground troops.





Combat controllers traveled by any means necessary, and with support from local leaders.

THE AIR WAR OVER AFGHANISTAN WAS A MILESTONE IN THE TRANSFORMATION OF AIR STRATEGY AND SURVEILLANCE OPERATIONS

techniques to integrate aerial surveillance aircraft throughout the war theater. When an orbiting satellite or Rivet Joint aircraft received suspected communication from Taliban or Al Qaeda forces in the Mazar-e Sharif area, this intelligence was quickly forwarded to the CAOC, where it was analyzed. From there, officers directed other surveillance aircraft, such as Joint STARS, AWACS, or P-3s with wide-area sensors to further investigate these signals and narrow their place of origin. Once the confined area was identified, Predator UAVs were sent in to pinpoint the target and call in waiting AC-130 gunships or strike aircraft for an attack.

There is no doubt, noted *Aviation Week & Space Technology*, that the air war over Afghanistan was a milestone in the transformation of air strategy and surveillance operations. Moreover, analysts and senior military officers:

*are hailing it as the first conflict in which intelligence was the primary U.S. weapon. Key factors in their assessment were persistence (the ability to maintain around-the-clock surveillance), integration at the tactical and operational levels of intelligence from many sources, and the ability to control data collection.*⁶⁷

John T. Correll, editor of *Air Force Magazine*, noted that some of these net-centric target acquisitions and subsequent air strikes required less than twenty minutes. In contrast, he noted, “for various reasons—some technical, some procedural, some political—most targeting of air power takes much longer than nineteen minutes.”⁶⁸ During the Kosovo air campaign, for instance, a war that involved nineteen NATO nations, the targeting cycle sometimes required more than two weeks.⁶⁹

The Afghanistan net-centric air war was achieved by gathering intelligence, using commandos, spy satellites, unmanned drones, and aircraft equipped with downward looking radar. All of these sources helped improve the accuracy of acquiring targets. Because of the rapid communication of messages through digital links from surveillance units to commanders and then to weapon platforms, the effects of fog and friction caused by excessive distances were decreased. In contrast, the “Special Operations Forces dramatically increased the effectiveness of the air campaign and on the ground,” explained U.S. Assistant Secretary of Defense Robert Andrews. Overall, “they turned the Northern Alliance into a conquering army.”⁷⁰

Emblematic of this war was the depiction of a U.S. commando leaning over his laptop, sending digital targeting data to a circling B-52 bomber and a UAV forwarding video photos to a waiting AC-130 gunship.⁷¹ These were the obvious signs of a transformation in warfare. Moreover, stated General Jumper, “we are witness to the true potential of transformation. It can be seen in the stories from current operations.”⁷²

As of this writing, the war in Afghanistan continues as allied forces attempt to root out the remaining Al Qaeda and Taliban resistance. The first phase of America’s war on terrorism was primarily fought against Taliban forces who used conventional tactics of massing their troops in defense of their cities. In Maoist terms, the Taliban were using conventional tactics in the strategic offensive phase of the protracted war strategy. This was a phase of guerrilla warfare in which Americans, with their advanced technology, had a superior edge. But now the Taliban and Al Qaeda forces are in the mountains and using Mao’s guerrilla tactics. There is little doubt that fighting this type of war will be a test of America’s know how and ingenuity. ■

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REVIEW ESSAY

Michael Alfred Peszke

Review of English Language Historiography of the Polish Air Force.

In 1977 Norman Davies noted that, in regard to Polish military history, “very little has been written in English on this subject which figures prominently in Polish historiography.”¹ Thirty years later the situation is not significantly better, except for the Polish Air Force, which now has a considerable number of interesting and valuable publications. This review of English language history will follow a chronological sequence of that spans seventy years, including personal memoirs, official works, and a growing number of well researched publications.

The first English language books on the Polish Aviation Service,² were written by American participants of the Polish–Soviet War of 1919–1920. Merian Cooper, Edward Corsi, and Kenneth Murray all flew with the famed 7th Squadron. Since the American volunteers in France during the Great War, called themselves the *Lafayette Escadrille*, the Americans who flew with the Poles in the relatively unknown, but strategically important war against the Soviets, decided to call themselves the *Kosciuszko Squadron*, in their words to repay a debt of gratitude.³ They were all veterans of the U.S. Army Air Corps of the First World War, and were commanded by Col. Cedric E. Faunt le Roy. Three Americans were killed—Graves, McCallum, and Kelly—and were buried in the Cemetery of Defenders of Lwow.

The Americans started a tradition that continued through World War II and was again revived after 1989. A Polish fighter squadron continued to be named the *Kosciuszko Squadron* after the hero of Poland’s and Colonial America’s war of independence.⁴ Until the city of Lwow fell to the Soviets in 1939, there were annual commemorations at the graves of the American heroes, attended by the United States ambassador and Polish dignitaries.

Two relatively recent publications on this little known, but for Poles very symbolic and important historical episode, must be noted. Robert F. Karolevitz and Ross S. Fenn, produced a readable and beautifully illustrated book on the American heroes.⁵ Janusz Cisek conducted extensive research on available published and archival material, which documents the very important role of the fledgling Polish Air Service in the war against the Soviets that culminated in the Polish victory in August 1920.⁶ For better or worse, the success of the Polish Air Service (as well as of the American volunteers) in interdicting Soviet ground troops and in providing reconnaissance for the ground forces determined the focus of the doctrine of Poland’s military aviation in the interwar period.⁷

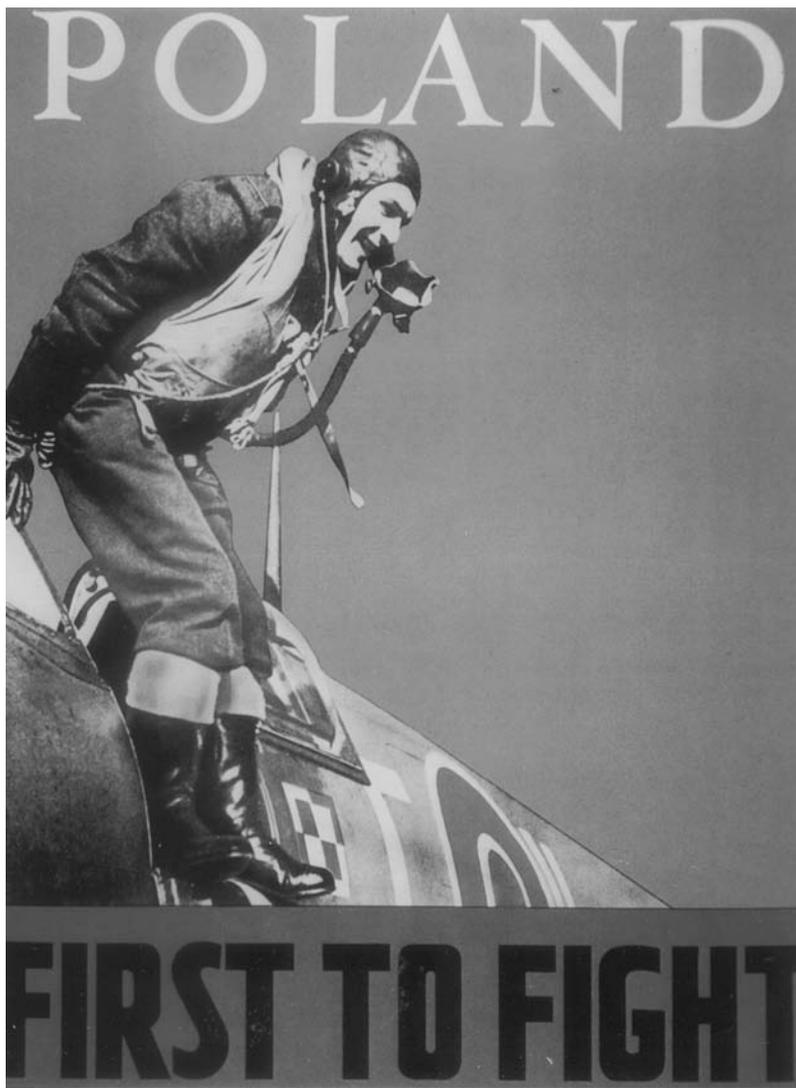
The next two English language books on the Polish Air Force were published in the United Kingdom during World War II. The first was a very effective, perhaps understandably exaggerated story of the Polish 303d Fighter Squadron, also known as the *Kosciuszko Squadron*.⁸ The fame won by the 303d in the Battle of Britain was duly recognized by many British authors. For example, Anthony Robinson wrote that “in four and [a] half weeks in combat it [the 303d] had been credited with 126 enemy aircraft destroyed, for the loss of eight of its own pilots killed. It was an achievement unequalled by any other Royal Air Force (RAF) fighter squadron.”⁹

The Polish Government in exile (based in London from 1940–1945) sought to garner the greatest amount of publicity regarding the accomplishments of its military through a series of publications called, *For Your Freedom and Ours*.¹⁰ The relevant air force brochure was short, simple, and in the spirit of the time.¹⁰

A more ambitious effort in this propaganda endeavor came to light on the day the war ended and the Polish cause was not just lost, but a tiresome footnote in the western public mind. This attempted to review the whole prewar history of

THE FIRST
ENGLISH
LANGUAGE
BOOKS ON
THE POLISH
AVIATION
SERVICE,
WERE
WRITTEN BY
AMERICAN
PARTI-
CIPANTS OF
THE POLISH-
SOVIET WAR
OF 1919–1920

Dr. Michael Alfred Peszke was born in Poland. After the German invasion on September 1, 1939, he and his mother fled to Romania, France, Portugal, and, in July 1941, to the United Kingdom. He graduated from Trinity College, Dublin, with the medical degrees of MB, BCH, BAO, and the standard BA. In August 1956, he came to the U.S. on a special visa enacted for dependents of Polish World War II veterans. He pursued graduate studies in psychiatry at various schools and hospitals in New England. Among his positions, were professorships at several universities, including Chicago, Connecticut, and Maryland. In 1999, he retired from clinical and academic work in psychiatry. Dr. Peszke has published research in psychiatry and is a fellow of the American Psychiatric Association, a member of the American College of Psychiatrists, the Polish Institute of Arts and Sciences of America, and the Royal United Services Institute.



Propaganda poster distributed by the Polish Government in Exile in the UK during World War II. It spoke to the fact that Poland was the first country to stand up to Nazi Germany and that Poles continued to be involved in the war with significant contributions in the air during the Battle of Britain. (Photo courtesy of the author from his personal collection.)

Polish aeronautical achievements.¹¹ The British also published an official account of all the “exiled” air forces, that should be noted, but which added few historical facts.¹²

Upon the conclusion of hostilities in Europe, the General Officer Commanding (GOC) the Polish Air Force, Gen. Mateusz Izycki, appointed a historical committee chaired by Col. Olgierd Tuskiewicz, that produced a comprehensive report in two sections—dealing with the prewar and war periods. While never published, it became the foundation of all published works, both in Polish and English.¹³ At the same time, the Polish Chief of Staff, Gen. Stanislaw Kopanski, also ordered all military archives to be placed in one location. Consequently, all such archives are located at the Polish Institute and General Sikorski Museum in London. The Polish Air Force files are filed under LOT.¹⁴

Since the Polish Air Force in the United Kingdom was operationally integrated into the RAF, a great deal of material can also be found in the British Public Records Office (PRO) under AIR. Of the published postwar works, the first, most comprehensive, and most readable, is *Destiny Can Wait: The History of the Polish Air Force in the*

Second World War.¹⁵ This evocatively titled monograph, with an elegant introduction by the RAF Air Chief Marshal, Sir Charles Portal, was written by a combined Polish and British editorial committee. While lacking specific citations, its provenance is guaranteed by the two English members of the editorial board, Mr. J. C. Nerney, head of the Air Historical Branch of the Air Ministry, and Mr. T. C. G. James.

Written in typical English understatement, this monograph covers all aspects of the Polish Air Force at the side of the RAF during World War II. It also gives a comprehensive account of the significant Polish-French and Polish-British air agreements that governed the recruitment, basing, disposition, equipment, and financing of the Polish Air Force in France and the United Kingdom. However, it is very sketchy regarding the prewar period, the Polish September Campaign, and the history of the Poles in France in 1939–1940.

This book was published only four years after the end of the war, and the quality of the paper reflects the inherent difficulties at the time in the United Kingdom. While the black and white photos are at best adequate, the book has a superb collection of art by Feliks Topolski, who did a whole set of sketches of the Polish and also British military during the war. Battery Publishing company of Nashville, Tennessee, deserves great credit for reprinting this out-of-print monograph in 1988.

The next published book was also an outstanding success because of the great research effort made by Jerzy B. Cynk. His comprehensive history of the Polish aircraft industry and a description of all the planes built in Poland until 1939, was a seminal study that still has not been equalled.¹⁶ Shortly after, Cynk published a history of the Polish Air Force from 1918 to 1968. The book’s strong features include several interesting photographs and the history of the early years of the Polish communist air force.¹⁷

There are two English language memoirs of Polish pilots from the Second World War. By destroying two German planes on September 1, 1939, over the environs of Cracow, Wladek Gnys became the first Polish and first allied pilot to score an aerial victory. He then flew in France, was with the 302 (Duxford Big Wings) in the Battle of Britain, and was shot down over France in 1944, while commanding the 317 Polish Squadron. The next published study was the memoirs of a Polish Coastal Command pilot. J. F. Jaworzyn’s reminiscences describe superbly the activities of the Coastal Command 304 Squadron.¹⁸

Several years elapsed before another publication devoted to the Polish Air Force appeared. Dr. Jan Koniarek wrote a short, but very well illustrated, booklet that also featured a number of attractive color prints of aircraft concerning the establishment of Polish squadrons in Poland, France, and the United Kingdom. This relatively inexpensive study is recommended for young air enthusiasts.¹⁹

IN 1998, THE POLISH AIR FORCE ASSOCIATION IN LONDON SPONSORED A SIGNIFICANT, ... ADDITION TO THE POLISH AIR FORCE BIBLIOGRAPHY

THE BRITISH HAD A JAUNDICED VIEW OF POLAND'S PERFORMANCE IN SEPTEMBER 1939, AND WERE NOT KEEN ON HAVING POLES IN THEIR COUNTRY

Two years later saw the publication of a study that brought a different slant to the history of the Poles in blue.²⁰ Adam Zamoyski, an author of the Polish-Soviet war²¹ and of an excellent history of Poland²² wrote his history of the Polish Air Force, using a significant number of oral histories. Using poetic license, he borrowed Churchill's famous aphorism, and called his book *The Forgotten Few*. Zamoyski's bibliography is rich and extensive, and his illustrations emphasize the human element. To appreciate the influence the British hosts had on their Polish allies, and to a lesser extent the reciprocal influence, this is the book to read.

It is not merely an account of bravery in the air, or a listing of top scorers. Rather, it is a history of the human and social factors that make this monograph unique. The photographs are also different in character. Besides the many portrayals of smiling and gallant men, there are also photographs of Polish cooks, men in disguise en route to Great Britain, and my favorite, titled "*assorted mascots*" showing two very pretty WAAFS and two cute dogs on the wing of a Spitfire with the Polish white and red checkerboard.

In 1998, the Polish Air Force Association in London sponsored a significant, and most likely definitive, addition to the Polish Air Force bibliography. This two-volume study by Cynk is a great reference book and superbly illustrated.²³ I know of no other published work on military aviation that has a comparable number of such high quality black and white and color photographs. Based on squadron logs and the Polish Institute in London archives, it presents a comprehensive account of the part played by the Poles in the air and in the allied effort during the war. The story of the ten fighter and four bomber squadrons is detailed down to each operational flight, including the names of the pilots or crews. Moreover, Cynk also develops the role of the Poles at Boscombe Down, Farnborough, and in the Transport Command, just to mention three vital and little known contributions. Comprehensive tables, and lists of aces complement this extensive study.

The above works are all short on the histories of the Polish staffs, and Polish liaison officers working with all the RAF commands. These are often mentioned in the text, but there is no clear delineation or even adequate indexing. *Destiny Can Wait* does the best job in that regard, having sections on the Polish training establishments, including the Polish Staff College and Air Force Academy in the United Kingdom, and the various exchanges with American and British training establishments. An example of this kind of omission is the history of the Polish Operational Training Unit at Bramcote (near Nuneaton), that was the crucible for the Polish Bomber Squadrons. In late 1941, the Air Ministry officially called it the 18 (Polish) OTU; the base population was entirely Polish and was commanded by a Polish officer. The permanent complement of the Polish OTU in January 1942 was 84 officers and 580 other ranks. At its acme, the number of crews in training

peaked in June 1941, when 260 aircrew were integrated. In May 1942 this training center provided 24 Polish crews to complement the 64 crews of the four Polish combat bomber squadrons in the major 1,000-thousand plane raid against Cologne. This training establishment deserves a specific in depth history as much as do the combat units.

In 1998, Robert Gretzyngier and Wojtek Matusiak wrote a short, but readable and useful, study of Polish aces in the war.²⁴ As always in the Osprey publishing series, the illustrations are excellent. Gretzyngier, who lives in Warsaw, soon added to his credits by publishing in 2001 the day-to-day account of Polish pilots between July 1940 and June 1941.²⁵ This book has a gracious introduction by Christopher Shores. This period encompasses the Battle of Britain and the dramatic spurt of growth of Polish fighter squadrons. The title suggests that this is the first of more volumes.

That same year two other air force historians living in Poland collaborated to produce what they clearly intend to be volume one of an extensive historical work.²⁶ The particular strength of Bartłomiej Belcarz and Robert Peczkowski's *White Eagles* is in the fascinating photos from the early pre-war period and the account of vicissitudes of the early years of the Polish Aviation Service, which in 1940 became the Polish Air Force.

My book, *Battle for Warsaw, 1939-1944*, focused on the efforts of the Polish Staff in London to aid the Polish Underground. The two major prongs of this theme were: the failed attempt to tie in the Polish Underground to Western Allied military strategy, and a partly successful attempt to develop an autonomous special duties unit to support the underground from the West. These efforts, heartily endorsed by the British Special Operations Executive (SOE), and grudgingly tolerated by the British Air Ministry, are the meat of this monograph based on Polish Institute (London) archives the PRO archives—Cabinet (CAB), Foreign Office (FO), Admiralty (ADM), War Office (WO), and of course Air Ministry (AIR) as well the National Archives at College Park, Maryland.²⁷

There are some very important references to the Poles in published material by British authors. Alan Brown has done by far the best research into the early period of Polish and British negotiations regarding the recreation of the Polish Air Force in the United Kingdom.²⁸ The beginning was far from auspicious, as the British had a jaundiced view of Poland's performance in September 1939, and were not keen on having Poles in their country. Finally, they arranged to share equally with the French the burden of rearming the Polish air force. The Poles, however, were limited to forming two bomber squadrons, equipped with single-engined Fairey Battles, the same planes that they had sold to Poland in the summer of 1939, but never delivered.

The reluctance of the British Air Ministry was undoubtedly based on their reports about the Poles in September 1939. There was and still continues to be a myth about the destruction of the Polish Air

Force. While its origin certainly cannot be laid at the feet of the German historians, it seems to be a ubiquitously accepted fact.²⁹ Where did this myth originate? It appears that it may have stemmed from the report of a man, who was in fact very friendly and sympathetic to the Poles, namely Gen. Carton de Wiart, head of the British military mission to Poland in September 1939.³⁰ The British mission had actually only one task: to encourage the Poles to sabotage their oil fields and the rail connections between Lwow and Western Poland. But General de Wiart met with the Polish Air Force General Ludomil Rayski, at that time the deputy minister of military affairs. De Wiart

was told that Polish air power was in dire straits, since it had been destroyed.³¹ In retrospect, it is far from clear whether Rayski was trying to make a point in order to get the RAF involved, or whether he was misunderstood. Most conversations between the Poles and British were carried out in French, which de Wiart undoubtedly knew well, but did Rayski? When General de Wiart reported the destruction in the starkest terms, the myth was born!

It would appear that the English language historiography of the Polish Air Force, while perhaps far from complete, is in fact quite extensive, quite rich, and actually very fascinating. ■

NOTES

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2. The Air Service was very shortly renamed Military Aviation (*Lotnictwo Wojskowe*) and in 1940, the Polish Air Force (*Polskie Siły Powietrzne*).
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5. Robert F. Karolevitz and Ross S. Fenn, *Flight of Eagles: The Story of the American Kosciuszko Squadron in the Polish-Russian War, 1919-1920*, Sioux Falls, Ia.: Brevet Press, 1974.
6. Janusz Cisek, *Kosciuszko, We are Here! American Pilots of the Kosciuszko Squadron in Defense of Poland, 1919-1921*, Jefferson, N.C.: McFarland & Co., 2002.
7. Lord D'Abernon, *The Eighteenth Most Decisive Battle of the World: Warsaw, 1920*, London: Hodder and Stoughton, 1931. Norman Davies, *White Eagle-Red Star: The Polish-Soviet War, 1919-1920*, London: MacDonald, 1972.
8. Arkdy Fielder, *Squadron 303: The Story of the Polish Fighter Squadron with the RAF*, London: Letchworth Printers, Ltd., 1942. (four editions in English three Polish underground editions, and also translated into French.)
9. Anthony Robinson, *RAF Fighter Squadrons in the Battle of Britain*, London: Arms and Armour Press, 1987. Discusses eight RAF Fighter Command squadrons in the Battle of Britain including No. 303 (Polish), pp. 248-73.
10. L. G. Marsh, *Polish Wings over Britain*, London: Max Love Publishing, 1943.
11. Peter Jordan, ed., *Aviation in Poland: A Brief Historical Outline*, London: MaxLove Publishing Co., 1946.
12. There's Freedom in the Air: The Official Story of the Allied Air Forces from Occupied Countries, London: HMSO, 1944.
13. Unpublished manuscript, a copy of which is in the archives of Michael Alfred Peszke.
14. Often quoted as IPMS (*Instytut Polski/Muzeum Sikorskiego*) located at 20 Princess Gate, London. In addition to being a depository for all of the exiled military

- papers, it is also a fascinating museum exhibiting many uniforms, military artifacts and close to eighty regimental standards. Open to all visitors and researchers.
15. *Destiny Can Wait: The History of the Polish Air Force in the Second World War.*, London: William Heinemann, 1949.
16. Jerzy B. Cynk, *Polish Aircraft, 1893-1939*, London: Putnam & Co., 1971.
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21. Adam Zamoyski, *The Battle for the Marchlands*, New York: Columbia University Press, 1981.
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27. Michael Alfred Peszke, *Battle for Warsaw, 1939-1944*, Boulder, Colo.: East European Monographs, 1995.
28. Alan Brown, *Airmen in Exile: The Allied Air Forces in the Second World War*, Stroud, UK: Sutton Publishing, 2000, pp. 23- 134.
29. Cajus Bekker, *Luftwaffe War Diaries*, New York: Doubleday and Co., 1969. Bekker writes, "despite all assertions to the contrary, the Polish air force was not destroyed on the ground in the first two days", p. 59.
30. Carton de Wiart, *Happy Odyssey: The Memoirs of Lt. General Sir Adrian Carton de Wiart*, London: Jonathan Cape, 1950 pp. 152- 62.
31. PRO HS4/223 and 225.

When Giants Roamed the Sky: Karl Arnstein and the Rise of Airships from Zeppelin to Goodyear. By Dale Topping, ed. by Eric Brothers. Akron, Ohio: University of Akron Press, 2001. Illustrations. Photographs. Appendices. Bibliography. Pp. xiv, 276. \$27.95 ISBN: 1-884836-70-4

It may be hard for us to realize that in the early years of the 20th century, the dirigible competed with the airplane for aerial supremacy. Taken from the French "ballon dirigeable," or steerable balloon, the dirigible took to the air before the airplane and inspired fear as a military vehicle throughout World War I. The first great bombing raids in aviation history were conducted by German airships against English cities. By the end of the war, however, the technology of the airplane had overtaken that of the dirigible. As Topping points out, however, that certain knowledge remained to be discovered.

Karl Arnstein, who had worked at the famous *Luftschiffbau-Zeppelin* works in Germany and became one of the leading aeronautical engineers of his day, migrated to the United States after the war. He believed that dirigibles could provide commercially viable passenger transport—as the success of the German "Graf Zeppelin" proved—and that there were military applications to be exploited. The use of a dirigible as an aircraft carrier is one of the most interesting experiments in U.S. military history. Outweighing these possibilities were the disastrous results the United States Navy achieved with the USS *Akron* and *Macon*, both designed by Arnstein and built by the Goodyear Zeppelin Corporation under his supervision. After great fanfare, both crashed, with the loss of the *Akron* taking the life of Admiral William A. Moffett, one of the early architects of naval aviation. The spectacle of the *Hindenburg* burning at Lakehurst Naval Air Station, New Jersey, in 1937 effectively ended the era of the large dirigible. Despite government investigations over the airship crashes and the negative publicity Goodyear received, Topping points out that it became one of the leading aviation companies of World War II, in part because of the successful line of blimps they produced for the U.S. Navy.

Much of this book, by necessity, is a social and economic history. The heady rush of the Roaring Twenties and the calamity of the Great Depression shaped the politics and funding of dirigible production in the United States. The author points out the tremendous engineering feat required to design a hangar for the construction of a 900-foot long airship, something about which I had never given much thought. It was also interesting to learn of the continuing exchange of information between the United States and Germany regarding airship technology during the interwar years. Topping also provides a telling discussion about the determination of American pilots to try to fly through

stormy weather, contrasted with German pilots willing to fly around bad weather.

When Giants Roamed the Sky is a beautifully illustrated book and a testimony to a man generally overlooked by air power historians. For the serious researcher, the lack of footnotes will be frustrating, though there is a list of sources for each chapter. Many of those sources, however, are letters and conversations between Topping and Arnstein over the course of some twenty years. On balance, this book is a wonderful tribute to a man who deserves recognition as one of the leading air power theorists and practitioners of his day.

Bruce Ashcroft, Historian, Air Education and Training Command, Randolph AFB, Texas.



Wilbur & Orville Wright: A Bibliography Commemorating the One-Hundredth Anniversary of the First Powered Flight, December 17, 1903 (Monographs in Aerospace History, No. 27). Comp. by Arthur G. Renstrom, with additional contributions by Roberta W. Goldblatt, Carl Minkus, and Karen L. Berube. Washington D.C.: U.S. Government Printing Office, 2002. Photographs. Pp. 144. \$3.95 NASA Publication SP-2002-4527.

This joint publication of the U.S. Centennial of Flight Commission and the NASA History Office (history.nasa.gov) is based on Renstrom's earlier *Wilbur & Orville Wright: A Bibliography Commemorating the Hundredth Anniversary of the Birth of Wilbur Wright, April 16, 1867* (Washington, D.C.: Library of Congress, Science and Technology Division, 1968, government documents call number: LC 33.2: W 93). It was updated by the Federal Research Division of the Library of Congress.

This specialized reference tool lists hundreds of unnumbered bibliographic citations to books, journal and newspaper articles, and government publications. The citations to small, obscure publications, many older materials, and items in foreign languages—many of which are not included in newer bibliographies—are particularly useful. Sometimes a sentence or two annotates the citation; source titles are in italics, making them easy to distinguish. The main method of accessing contents is using the extremely detailed table of contents. This informs the user about sections on monuments, medals, mechanical equipment, technical matters, flights, motion pictures, etc. The second method is through the index. While much material is available on this subject, this excellent publication has organized the references logically. Renstrom (1905-1991) served for forty-four years at the Library of Congress, almost all of them in the Aeronautics Section. He aided Marvin W. McFarland in *The Papers of Wilbur and Orville Wright* (New York: McGraw-Hill, 1953). Over the

years he compiled *Wilbur & Orville Wright: A Chronology Commemorating the Hundredth Anniversary of the Birth of Orville Wright, August 19, 1971* (Washington D.C.: Library of Congress, Science and Technology Division, 1974, government documents call number: LC 33.2: W 93/2), and *Wilbur & Orville Wright, Pictorial Materials: A Documentary Guide* (Washington, D.C.: U.S. Government Printing Office, 1982, government documents call number LC 1.6/4: W 93), along with many other bibliographies on aeronautical subjects. Another finding aid that researchers may want to consult is *The Wright Brothers Collection: A Guide to the Technical, Business and Legal, Genealogical, Photographic, and Other Archives at Wright State University*, by Patrick B. Nolan and John A. Zamonski (New York: Garland Publishing Co., 1977).

To order a copy of this bibliography, send a stamped, self-addressed 9 by 12-inch envelope to NASA Headquarters Information Center, Code CI-4, Washington, DC 20546. The \$3.95 covers postage. This document may not be found in most library collections, but it might be available in federal government document depository collections under the Superintendent of Documents government documents call number NAS 1.21: 4527 or NAS 1.21: 2002-4527. Check with your local librarian to locate it.

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Daniel K. Blewett, Reference Librarian, The College of DuPage Library, Glen Ellyn, Illinois.



Hitler's Squadron: The Fuehrer's Personal Aircraft and Transport Unit, 1933-1945. By C. G. Sweeting. Washington, D.C.: Brassey's Inc., 2001. Maps. Tables. Illustrations. Photographs. Notes. Appendices. Glossary. Index. Pp. 184. \$31.95 ISBN: 1-57488-287-2

This slim, scholarly book has a wealth of World War II photographs, some published for the first time. As one would expect from a Smithsonian curator, strict attention is paid to detail. Each mention of an aircraft includes not only its model and type, but also the *werk-nr.* (serial number) and *Luftwaffe* or civilian registration. Serious students of the Second World War and, more particularly, those interested in Hitler and his immediate circle, will enjoy this book.

The book's central character is not Hitler, but Hans Baur. Considered a natural pilot in World War I, he flew for the Bavarian Army

Air Service. The author notes the class distinction of the time where observation pilots were usually from the enlisted ranks, serving merely as "drivers" for the observers who were the aircraft commanders. After the war, Baur was a pilot with Bayerischer Luft-Lloyd, a nascent airline headquartered in Munich, which eventually became Luft Hansa (not one word until 1934). Hitler chartered an aircraft in 1932 from Luft Hansa and interviewed Baur for the pilot's position, thus beginning a friendship that lasted until Hitler's death. Baur died in 1993 at the age of 95—an unrepentant Nazi maintaining to the end "that the Holocaust was an invention of Allied propaganda."

The story is told in essentially chronological order beginning with Baur's First World War exploits and concluding with his attempted escape from Berlin with Martin Bormann. However, the story is covered in fewer than 100 pages. The remainder of the book is filled with extensive appendices. One appendix is devoted to each major type of aircraft flown by the *Fliegerstaffel des Fuehrers* (F.d.F), and an additional one covers all other aircraft used by the squadron. In addition, the extensive glossary includes not only translations from the German, but also abbreviations. The author is quite comfortable with the German language (for example, he takes exception to the normal translation of *Wolfsschanze* as "Wolf's Lair," stating that "Wolf's Bulwark" would be closer to the German meaning. In German military parlance, *Schanze* means bulwark, fortification,

entrenchment, redoubt, or earthwork").

While Baur is the central character, the stars of the story are the aircraft. Sweeting recounts each of the aircraft that Hitler used, from the "Rohrbach Ro VIII Roland II named *Niederwald*. through the venerable Junkers Ju-52, Focke-Wulf Fw 200A, Junkers Ju 290 and, on one occasion, even a Heinkel He 111. In addition to telling how these aircraft were used to transport Hitler and his lieutenants, the author includes in the appendices background on the craft and other roles they were assigned. Included also are specification sheets from the German files and reports from pilots who had actually flown these aircraft. Also included are cockpit diagrams identifying all the equipment, and tables listing crew, dimensions, engines, performance, and armament.

Those of us who love aircraft sometimes become so enthralled with the beauty of the machine or the accomplishments of the engineers that we forget momentarily that even the most wondrous inventions can be used for mundane or even evil purposes. This book reminds us that evil men can, and do, endanger civilization; and regardless of the lessons of history, they will still have their followers.

Harry Cawood, Docent, NASM's Garber Facility.



Sunburst: The Rise of Japanese Naval Air Power, 1909-1941. By Mark R. Peattie. Annapolis, Md.: Naval Institute Press, 2001.

Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xxi, 364. \$36.95 ISBN: 1-55750-432-6.

At the opening bell of the War in the Pacific, Japanese naval air power proved it had transformed itself into a prizefighter. On December 7, 1941, Japanese naval pilots severely damaged the U.S. Navy's Pacific Fleet based at Pearl Harbor, Hawaii, and just three days later sank the British battleship *Prince of Wales* and the battle cruiser *Repulse*—the first time in history aircraft had sunk capital ships underway. Mark Peattie, the prize winning author of *Kaigun: Strategy, Tactics, and Technology in the Imperial Japanese Navy, 1887-1941*, used information in handbooks and new information obtained from Japanese-language sources to reveal in *Sunburst* why the prizefighter had a glass jaw.

Arranged chronologically, the book begins with the genesis of Japanese naval aviation. What follows is a detailed explanation of the development of Japanese naval aircraft and air tactics, the development of Japanese aircraft carriers and carrier doctrine, the effect the air war in China had on Japanese naval air power, the building of Japanese naval air power into an offensive weapon, and the eventual destruction of Japanese air power.

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American aircraft carriers. *Sunburst* gets into the bowels of the ship—explaining the inferior method the Japanese used to store aviation fuel aboard their carriers, hangar decks with no side openings to flush out weapons and spilled fuel during fires, fewer watertight doors, and little damage control training for the crew. The author goes into each subject with an eye for this type of technical detail.

Throughout *Sunburst*, Peattie weaves three strategic mistakes that led to the eventual defeat of Japanese naval aviation in World War II: a bitter rivalry in aviation between the army and navy, learning the wrong lessons from the air war over China, and the assumption of a short war in the Pacific. These strategic mistakes often led to the design of tactics, equipment, and personnel systems (such as pilot training) that would not hold up under the pressure of attrition.

Well illustrated with photographs and maps, the book also offers an excellent appendix section that includes biographical sketches, a glossary, the organization of Japanese naval aviation, the specifications and histories of naval aviation ships in the Japanese inventory at the start of the Pacific War, naval air bases and land-based air groups, Japanese naval aircraft, Japanese naval aircraft designation systems, principal Japanese naval aircraft engines, and the “turning-in” maneuver. The informative appendix fills 109 pages of the book.

Serious students of the War in the Pacific will enjoy this book and find it useful.

David F. Crosby, Writer, Ninth Air Force History Office, Shaw AFB South Carolina.



Shield and Sword: The United States Navy and the Persian Gulf War. By Edward J. Marolda and Robert J. Schneller, Jr. Annapolis, Md.: Naval Institute Press, 2001. Maps. Tables. Illustrations. Photographs. Notes. Bibliography. Index. Pp. 517. \$36.95 ISBN: 1-55750-485-7

More than a decade after the successful campaign to oust Iraqi invaders from Kuwait, Operations Desert Shield and Desert Storm have largely receded from public and military memory. Even in the heyday of Gulf War military literature, the maritime aspects of the operation received little attention relative to the ground and air efforts. This detailed account of U.S. and coalition naval operations in that conflict fills a significant gap in the popular historical record and has enduring relevance for those concerned with future military operations and all aspects of joint force planning.

Shield and Sword is the commercial edition of Marolda and Schneller’s official U.S. Navy history of maritime operations in the Persian Gulf War first published by the Naval Historical Center in 1998. The book is based upon an impressive range of sources,

including previously classified material and interviews with a long list of significant participants at all levels. The text is amply supplemented by clear and concise maps, data tables, organizational diagrams, and a wealth of photographs.

As would be expected, the volume offers a detailed description of naval events that will be familiar to those who followed Gulf War: ground attacks by carrier-based aircraft, shore bombardment by battleships, and long-range strikes by Tomahawk cruise missiles. But the book’s unique value is the perspective it provides on all other maritime activities that proved critical to the success of the ground and air campaigns. These include the massive sealift effort (both to and from the theater), maritime interception operations to enforce the Iraqi embargo (ongoing to this day), naval operations by coalition partners, amphibious assault planning, medical services afloat, and Navy civil engineering ashore. There is truly a wealth of detail here that offers a comprehensive picture of the maritime aspect of modern joint military operations.

Perhaps the most important feature is the extent to which the authors thoroughly and objectively address the Navy’s deficiencies as well as triumphs. Any who served afloat in the Persian Gulf during the war will find that the authors pull few punches in documenting areas of the Navy’s lack of complete preparedness for the conflict. The sea service had largely ignored emerging joint doctrine in the 1980s and, thus, lagged months behind the Army and Air Force in adapting to the highly centralized and fully integrated command structure in the Persian Gulf. Although first on the scene, Navy carrier battle groups brought pitifully small numbers of precision guided munitions and laser designators to the fight. The unanticipated severity of the low altitude air threat relegated aircrews to high altitude strikes that suited neither their weapons nor their training. There were severe deficiencies in operational and tactical surveillance of ground activity—including inadequate capabilities to collect and disseminate timely battle damage assessment. Sealift proved much more capable than in any previous war, but far short of being able to “rapidly” deploy heavy ground forces half way round the world. And once again, the Navy discovered it had no effective capability to counter sea mines threatening access by high value ships to littoral waters. It is sobering to reflect on these problems in light of the unique advantages the U.S. enjoyed in that conflict, including a much larger military force than today, a fully-developed port and airfield infrastructure in theater, and nearly six months of time to deploy forces into the region unmolested by the enemy.

Much of this book is not a pretty story, but therein lies its value. All of the problems revealed in the Gulf War have been addressed and many solved. But there are still sufficient challenges in most of these

areas—interoperability, inter-theater force lift, timely tactical intelligence, low level threats to aircraft, and (of course) mine countermeasures—that a great deal of this account has relevance even ten plus years after the war. To be sure, this is not a lively or engaging read. Despite efforts to animate the text with eyewitness accounts, it is based upon a tight chronology crammed with facts, figures, command structures and often obscure terminology. Some of the quotes by both U.S. and foreign officers tend to be platitudes, and the importance of carrier aircraft strikes to the outcome of war is in some cases overstated. But these are minor quibbles. *Shield and Sword* is a textbook on modern naval warfare in a littoral environment that is a must read for anyone with an interest in joint military planning or the ongoing debate over force transformation.

Capt. James R. FitzSimonds, USN (Ret.), EMC Corporation Chair of Information Technology, Naval War College, Newport, Rhode Island.



Combined Fleet Decoded: The Secret History of American Intelligence and the Japanese Navy in World War II. By John Prados. Annapolis, Md.: Naval Institute Press, 1995. Maps. Notes. Glossary. Bibliography. Index. Pp. 832. \$27.95 ISBN: 155750431-8

This big book covers a big subject—World War II naval (primarily) communications intelligence in the Pacific—and an impressive time span—1917-1945. But the book’s size and scope should not daunt the reader: it is a manageable and enjoyable read.

Mr. Prados enriches the historical tapestry by seeding it with human-interest stories. How many of those who fought the Japanese in World War II knew of the aid U.S. Navy language students provided to Japanese inhabitants during the 1923 earthquake? War understandably changes the way people think about each other, creating or strengthening misperceptions and biases. The author reminds us that governments use these misperceptions in times of war to convince their people of the justness of their own causes. *Combined Fleet Decoded* also provides the other side of the picture: one that reminds us that we are all just ordinary people, with hopes and dreams like those who live next door or thousands of miles across the ocean.

One amazing story recounted is how the U.S. was surprised at the attack on Pearl Harbor, despite vast evidence of the Japanese military buildup and regional aggression. Throughout the 1930s, U.S. naval attachés reported on the Imperial Navy’s technological developments: including conversion of the liner *Kasuya Maru* into the aircraft carrier *Taiyo*, development of the Type-93 Long Lance torpedo, the quality of the Japanese Air Force, and development of the

A6M Zero fighter. There was also Japan's growing belligerency. This information was picked up not only by the U.S. embassy in Tokyo (including the military attachés), but also by communications intercepts and code breaking since 1931. Prados reminds us of one of the more important duties a military attaché performs: "...one of the main fears of host countries has always been that envoys would be spies in their midst. To a degree, that fear is well-founded.... Even more so than diplomats, however, military and naval attachés are sanctioned spies."

Not only does the author provide plenty of meat in the text, but also the supporting material is impressive and very helpful: 27 pages of notes, 36 pages of bibliography, and 27 pages of index. In fact, there is so much good material on the political, military, economic, and cryptographic phases of the Pacific theater, the book would be an excellent choice for a university-level text. It provides the student plenty of material to think about and discuss. All of this background material is fascinating and quite pertinent to the story. However, there is so much that one could well argue that the subtitle is somewhat inappropriate. Prados doesn't even get to Pearl Harbor until page 158.

I have only a few, relatively minor quib-

bles. The first is with style. As with James Bamford's books (*Puzzle Palace*, 1982; and *Body of Secrets*, 2001), Prados does not enumerate his endnotes and sources—only the direct quotes. At the back of the book, he notes the page where the passage occurs, quotes a four to six-word phrase in the pertinent paragraph, and then provides the source—a somewhat cumbersome method.

Lack of footnoting for non-direct quotes is another shortcoming. Prados' treatment of the Dusko "Tricycle" Popov case (page 150) is a prime example. While he at least mentions the incident (unlike some authors), he does not discuss or even footnote the controversy the issue has stirred up in many other scholarly works.

The index does not totally reflect content. Major items such as *joho kyoku* (information or, contextually, intelligence bureau); Z-flag; and the Naval General Staff First, Second, and Fourth Bureaus do not appear. Also, ordering logic seems to be lost in the "F" section which sequentially lists 4th, Fourth Fleet, 4th Marine Division, Four Power Treaty, Fourteenth Air Fleet, 14th Army, XIV Corps, 14th Naval District, and fourteen-part message (p. 810).

Finally, although the attention to detail can be quite astounding (e.g., Prados discuss-

es tonnages, names of captains, and specific courses of vessels during engagements), this becomes distracting and pulls the narrative away from the book's theme as expressed in the subtitle.

Overall, however, one would be hard pressed to find another book that covers this subject so well.

Richard Florence was a Chinese-Mandarin linguist for four years in the Army Security Agency and twenty-one years in the CIA. The views expressed are the author's own and do not necessarily reflect those of the U.S. government.



The Origins and Technology of the Advanced Extravehicular Space Suit. By Gary Harris. San Diego, Calif.: American Astronautical Society, 2001. Tables. Illustrations. Photographs. Notes. Appendix. Pp. 542. \$85.00 ISBN 0-87703-482-6.

After ten years of research, Gary Harris has completed an informative and thorough book on the creation, evolution, and employment of the advanced extravehicular (EV) space suit—a suit "whose primary function is EVA (extravehicular activity), and is con-

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ceived with that goal as its primary driver.” The suits used during past manned spaceflights were based on an intravehicular (IV) configuration that limited their usefulness for long-term lunar missions. The book is a valuable research tool for anyone interested in the complex history of space suit development.

This eight chapter book begins with technical details of space suit engineering. Without an engineering background, this chapter can be tedious and overwhelming, but it is a necessary building block to understanding the evolution of suits. The chapters that follow this are “reader-friendly” for a layman. In these later chapters, Harris takes the reader through the history of the advanced EV suit. He begins with its use as a means for testing vacuum tubes for the Litton Company, continues with its involvement in the Shuttle suit competition, and concludes with the many benefits that could come from its use during future Mars missions. An appendix is included that contains results of an inquiry into complaints made by various companies involved in the competition for a Space Shuttle suit.

The text is highlighted with photographs and diagrams of advanced EV suits and their uniquely designed components. These illus-

trations are a useful device for navigating through the explanations in the text. Many of the suits were similar in their composition and, at times, even in titles, so the visual aid of a suit on a test subject standing in front of a range of motion grid or actively testing a space suit in a simulator helps with reading comprehension. The arrangement of the photographs on the pages sometimes disrupts the flow of the text, but the overall focus of the subjects is not lost.

Harris is fortunate to have had the opportunity to draw on the knowledge and experience of extraordinary engineers of the space suit community – men such as Joseph Kosmo, Herbert “Vic” Vykukal, James McBarron, and William Elkins. These men represent a portion of those who were responsible for the evolution of the space suit into a viable life support system for humans in space. The research and experiments they conducted were unparalleled. Until this book was published, the general public had only limited information regarding these men and their products. Information and details about space suits and their composition at the time of their inception and experimentation was classified and guarded data.

The future of the advanced EV space suit is unknown, but the potential is there for this

type of suit configuration to be a viable apparatus for future space missions. Through his explanations of the mechanics, construction, and applications of this type of suit, Harris describes this important link in the evolutionary chain of space suits.

Samantha Gallagher, Museum Technician, National Air and Space Museum, Washington, D.C.



XIX Tactical Air Command and ULTRA: Patton's Force Enhancers in the 1944 Campaign in France (CADRE Paper No. 10). By Bradford Shwedo. Maxwell AFB, Ala.: Air University Press, 2001. Maps. Photographs. Notes. Bibliography. Pp. xiii, 142. ISBN: 1-58566089-2 and **Air Power for Patton's Army: The XIX Tactical Air Command in the Second World War.** By David N. Spires. Washington, D.C.: Air Force History and Museums Program, 2002. Maps. Tables. Photographs. Notes. Bibliography. Index. Pp. xix, 377 ISBN: 0-16-051081-3

Although the titles are similar, each book's content shows that history is a variegated tapestry with many stories woven through it. Major Shwedo argues that Patton

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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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used ULTRA—codename for the Allies' German code breaking efforts—and Maj. Gen. Otto Weyland's XIX Tactical Air Command (TAC) to actually avoid battles, surround enemy concentrations, by-pass enemy strongpoints, and speed Third Army's advance across France. In the end, Shwedo argues (as many have done before) that Eisenhower should have supported Patton's proposed drive to Metz over Montgomery's drive to "a bridge too far." Spires takes a different tone and approach. In a more traditional history, Spires argues that Weyland repeatedly violated doctrine in the name of effectiveness and ultimately forged a brilliant air-ground team.

It is unfortunate that Shwedo's work is a government publication; it will probably not receive the notice it deserves. His basic premise is that contrary to popular legend, Patton supported his air power component and, when used with ULTRA intelligence, was able to multiply his combat effectiveness. Shwedo well integrates the three arrows in Patton's quiver (Third Army, ULTRA, and XIX TAC) into a coherent narrative—the way history should be written.

Using many primary and secondary

sources, Shwedo succinctly relates Patton's use of ULTRA and XIX TAC. Dispelling the Hollywood myth, he shows that Patton loved and understood air power and its effectiveness, and used it as a force multiplier for Third Army. For example, soon after his army's activation, Patton received word through ULTRA of the pending German counterattack aimed at Avranches. Although skeptical, he halted one corps and turned it towards the threat. As it happened, this was just in time to meet and absorb an assault by five *panzer* divisions. While ground troops absorbed the German thrust, Weyland's fighter-bombers brought the attack to a standstill. After the war, at least one German general argued that Allied aircraft simply stopped the attack. Although the valiant stand by American GIs deserves praise, the air forces never received the credit they deserved for halting Hitler's first serious counteroffensive in the West.

As time went on, Patton relied more and more on ULTRA decrypts and Weyland to speed his advance. Much is said about how Patton used XIX TAC to guard his right flank as he sped east across France in the late summer of 1944. He could do this because

ULTRA kept him informed of German troop movements so Weyland's pilots could pound moving columns. In fact, XIX TAC was so effective that when 20,000 German troops trapped behind Allied lines surrendered, their commander demanded that Weyland be present at the ceremony.

Unfortunately, Shwedo ends his narrative in September, just as Patton's army slowed due to lack of fuel. His excellent integration of intelligence, ground maneuver, and air power shows their synergy. His analysis of the rest of the war would have been interesting as well. Fortunately, David Spires fills this void well. He covers much of the same material as Shwedo but in more depth (the Smithsonian Institution Press also published the book as *Patton's Air Force: Forging a Legendary Air-Ground Team*). Spires' excellent research and documentation of Weyland's TAC reinforces that flexibility is truly the key to air power. Through four different campaigns, XIX TAC proved this time and again. During the breakout from Normandy, Weyland often decentralized much of his command, parceling out forces to Third Army's several corps and leaving strike decisions to levels much lower than



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doctrine stipulated. Of course, this was possible because the Allies had almost undisputed air supremacy over the battlefield, and Weyland could afford to devote much of his strength to direct ground support missions.

When the Allied juggernaut ran out of steam in late September 1944, Weyland shifted from “column cover” to more formalized ground support missions and interdiction. Often finding his resources misused (as with bombing the Brittany ports instead of supporting the drive towards Germany), Weyland nevertheless saluted smartly and made the most of his situation. Discovering that fighter-bombers were ill equipped to destroy concrete fortifications, he called upon heavy bombers to blast through German fortifications—with mixed results. In XIX TAC’s third campaign, the Battle of the Bulge, air power once again proved its effectiveness not only in direct support of the hard-pressed ground troops, but also through interdiction and isolation of the battlefield. In the final phase of operations, command and control once again devolved, and Weyland violated doctrine to get the job done.

Both books show that airmen and air power should not be tied to a single doctrine but must remain flexible to the situation and mold resources to best bring combat power and effectiveness to the battlefield. Patton integrated his ground forces, intelligence sources, and Weyland’s TAC into an agile combat force, bypassing German strongholds and concentrating power where needed. Although sixty years removed from the war, both of these excellent books provide lessons for today’s chaotic and troubling conflicts. No one service is the panacea; together the air/ground team provides the nation with unequalled combat power.

Maj. James Gates, USAF, Washington, D.C.



A Command Post at War: First Army Headquarters in Europe, 1943-1945. By David W. Hogan, Jr. Washington, D.C.: Center of Military History, 2000. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Bibliography. Index. Pp. xiv, 360. GPO S/N 008-029-00345-7

After World War II, the U.S. Army published an official history (the “Green Books”), that reported on almost all aspects of the Army’s war efforts. Content ranged from doctrine to small unit battles. The major unreported aspects (due to security considerations at the time) were ULTRAMAGIC, the mostly successful cryptanalysis of German and Japanese cryptosystems. Release of previously classified information, publication of memoirs by various participants, and unpublished oral and written histories have enabled the Center of Military History to publish a series of studies of various aspects of the war; this is one of the series. It covers how First Army Headquarters addressed problems of command at the operational level in the

European Theater from its establishment in 1943 until V-J Day, when it was awaiting transfer to the Pacific for the invasion of Japan.

General Omar Bradley was the commanding general when First Army was established; Headquarters was basically his old II Corps staff from Africa. General Bradley took over 12th Army Group after D-Day, with General Hodges assuming command of First Army and retaining it until retirement after the war. There were very few changes of the principal general and special staff officers. This meant that they knew each other and also meant that personalities were very important in the staff’s functioning—for good and ill. Besides this aspect, there was the problem that the U.S. Army had only a few months’ experience (during World War I) with the problems of command of large modern armies and that in a very static venue with senior partners to help. First Army was the groundbreaker. It went from being the senior U.S. Army command at D-Day to being one of several armies in several Army groups under SHAEF on V-E Day.

Due to the major role of the First Army in Europe, almost all of the controversies of World War II in Europe—Omaha Beach, the breakout, COBRA, the Falaise pocket, priorities in the pursuit across France, the Battle of the Bulge, and the Remagen bridge—are discussed, although briefly. There are no astounding new views on any of the subjects. In fact, the biggest surprise to American readers probably would be the kind treatment of Field Marshal Montgomery, and the relative downplaying of Bradley’s generalship. On the other hand, there is a lot of information about what is really important to an army headquarters staff, such as logistics, relations with higher and lower headquarters, transportation, morale, and civil affairs. For example, there are data to show the effects of the June 19 gale that caused major supply problems in replacements, vehicles, and supplies. When 179 vehicles—instead of the planned 4,222—cross the beaches in one day, everyone notices, worries, and comments!

The book also contains a lot of trivia: for example, did you know the first USO show in France after D-Day occurred on July 11, 1944? It also has one objectionable feature. While the maps are fine, they are printed with each half facing the other. This prevents examination close to the book’s spine. All in all, however, this is a very interesting read if you want to learn about war with less emphasis on the daring-do of close combat.

James A Painter, Ph.D., Lt. Col., USAR (Ret), Docent, National Air & Space Museum.



Because I Fly: A Collection of Aviation Poetry. By Lt. Col. Helmut H. Reda, USAF, editor. New York: McGraw-Hill, 2002. Appendices. Bibliography. Pp. xxii, 231. \$16.95 ISBN: 0-07-138085-X

I must admit to not having read much poetry since my college days—probably not much different from many of the journal’s readers. So, it was with some trepidation that I decided to review this book. Any concern, however, was soon allayed as I discovered a rich and enjoyable collection of aviation material.

Colonel Reda has assembled an impressive collection of 176 poems written by 75 poets. Some of the works are extraordinarily well known (in fact, he leads off with the one aviation poem everyone has heard, *High Flight*). Others have been culled from diverse and unlikely sites, such as files or, in one case, a gravesite. The authors range from the famous—e.g., aerobatic champion extraordinaire Patty Wagstaff and a writer well known to Air Force Association members, Gill Robb Wilson—to relatively little known writers, many of them anonymous. Adding to the richness of the collection is the fact that the material covers not just one segment of aviation history and activities (such as World War II), but rather the spectrum of flying throughout the last century.

The book is beautifully organized. Reda grouped the works into fifteen major topics: the classics, pushing the envelope, the physical sky, death by flying, and religion/prayer are examples. This lends itself to one of the really nice features of a book like this: depending on one’s mood at any given time, a reader can pick it up and read all of the entries under a topic of interest, read a single poem, or read it cover to cover. There is no plot or historical trail to keep track of between reading sessions. One can take in as much or as little of it as desired.

What I found most interesting about the selections was the wide diversity of feelings and moods they convey. Some of the works are relatively lighthearted in nature. Others tend to the ethereal. A large number are downright macabre and dark. In other words, the many authors have explored the panoply of feelings generated in the air.

Though not formally designated as appendices, there are two sections at the end that add a great deal to the book. The first consists of short biographical sketches of many of the known authors. The second is a listing of other aviation poetry sources—anthologies, books, and even several web sites. For those who want to delve even deeper into the poetic aspects of aviation writing, Colonel Reda has provided any number of places to explore.

I liked this book and feel that no matter whether one is a seasoned fighter jock, a weekend general aviation pilot, or one who has never “topped the windswept heights with easy grace,” there is something in this wonderful book to delight everyone. So sit back, and let your imagination soar!

Col Scott A. Willey, USAF (Ret), Docent and Volunteer, NASM’s Garber Facility.



Books Received

Blumenson, Martin. *Heroes Never Die: Warriors and Warfare in World War II*. New York: Cooper Square Press, 2001. Index. Pp. xii, 641. \$32.00 ISBN: 0-8154-1152-9

Carlisle, Rodney. *Powder and Propellants: Energetic Materials at Indian Head, Maryland, 1890-2001*. Denton: University of North Texas Press, 2002 [2d ed.; 1st ed. published in 1990]. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xviii, 322. \$19.95 ISBN: 1-57441-149-7

Edwards, Charlene. *Voices from Vietnam: The Tragedies and Triumphs of Americans and Vietnamese*. Bayside, N.Y.: Journeys, 2002. Photographs. Appendices. Index. Pp. 264 \$25.00 ISBN: 0-9714020-3-5 www.voicesfromvietnam.com

Garber, Stephen J., ed. *Looking Backward, Looking Forward: Forty Years of U.S. Human Spaceflight Symposium, 8 May 2001*. [NASA SP-2002-4107] Washington, D.C.: NASA History Office, 2002. Illustrations. Photographs. Pp. vi, 234. Paperback

Granholtz, Jackson. *The Day We Bombed Switzerland: Flying with the US Eighth Army Air Force in World War II*. Shrewsbury, UK: Airlife Publishing Ltd., 2002. [First published in 2000] Photographs. Index. Pp. ix, 246. \$16.95 Paperback ISBN: 1-84037-371-7

Launius, Roger D. and Dennis R. Jenkins, Eds. *To Reach the High Frontier: A History of U.S. Launch Vehicles*. Lexington: The University Press of Kentucky, 2002. Tables. Diagrams. Illustrations. Photographs. Notes. Index. Pp. 519. \$49.95 ISBN: 0-8131-2245-7

Mann, Edward C., III, Gary Endersby and Thomas R. Searle. *Thinking Effects: Effects-Based Methodology for Joint Operations*. [CADRE Paper No. 15] Maxwell AFB, Ala.: Air University Press, 2002. Tables. Diagrams. Notes. Glossary. Pp. xi, 99. Paperback ISBN: 1-58566-112-0

Meilinger, Philip S. *Airmen and Air Theory: A Review of the Sources*. Maxwell AFB, Ala.: Air University Press, 2001. Photographs. Glossary. Index. Pp. ix, 164.

Messimer, Dwight R. *In the Hands of Fate: The Story of Patrol Wing Ten, 8 December 1941-11 May 1942*. Annapolis, Md.: Naval Institute Press, 2002 [Bluejacket Books edition; originally published in 1985]. Photographs. Notes. Bibliography. Index. Pp. xv, 350. \$18.95 Paperback ISBN: 1-55750-547-0

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

Stanik, Joseph T. *El Dorado Canyon: Reagan's Undeclared War with Qaddafi*. Annapolis, Md.: Naval Institute Press, 2003. Maps. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xvi, 319. \$34.95 ISBN: 1-55750-983-2

Van Staaveren, Jacob. *Gradual Failure: The Air War over North Vietnam, 1965-1966*. Washington, D.C.: Air Force History and Museums Program, 2002. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Glossary. Bibliography. Index. Pp. xiv, 388.

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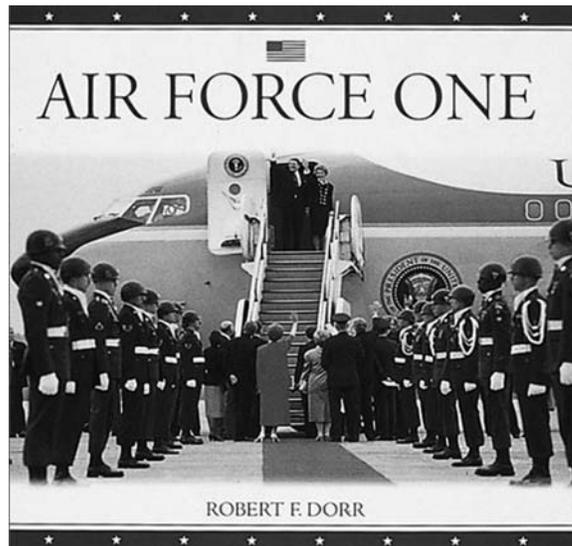
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Vernon, James W. *The Hostile Sky: A Hellcat Flier in World War II*. Annapolis, Md.: Naval Institute Press, 2003. Photographs. Index. Pp. x, 208. \$28.95 ISBN: 1-55750-865-8

Williams, Ted and Amy E. Williams. *The American Fighter Plane*. New York: Metro Books, 2002. Illustrations. Photographs. Bibliography. Index. Pp. 176 \$15.98 ISBN: 1-58663-175-6

Wise, James E., Jr. and Scott Baron. *International Stars at War*. Annapolis, Md.: Naval Institute Press, 2002. Photographs. Appendixes. Bibliography. Index. Pp. x, 263. \$29.95 ISBN: 1-55750-9654

Young, James O. *Lighting the Flame: The Turbojet Revolution Comes to America*. Edwards AFB, Ca.: Air Force Flight Test Center History Office, 2002. Diagrams. Illustrations. Photographs. Appendix. Pp. 50. Paperback



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Coming Up



Compiled by George Cully

March 14-15

The **Society for History in the Federal Government** will hold its annual meeting at the Robert C. Byrd Center for Legislative Studies on the campus of Shepherd College in Shepherdstown, West Virginia. The theme for this conference will be "Federal Records and the Cause of History." Contact:

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March 18

The **Military Classics Seminar** meets for dinner-discussion at the Ft. Myer, Virginia, Officers' Club. This month's selection is Steven Runciman, *History of the Crusades*, 3 volumes: 1. The First Crusade; 2. The Kingdom of Jerusalem; 3. The Kingdom of Acre and Later Crusades. Cambridge, 1951-1954. Speaker: Dr. Kelly DeVries, Loyola College. Contact:

Ms. Sandra Doyle
Naval Historical Center
805 Kidder Breese Street, SE
Washington Navy Yard, D.C. 20374-5060
(202) 433-9785
e-mail: sandy.doyle@navy.mil

March 25-26

The **American Astronautical Society** will host its "41st Annual Goddard Memorial Symposium" at the Greenbelt Marriott Hotel in Greenbelt, Maryland. Contact:

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March 28-29

The **2003 Hagley Fellows Conference** will be held at the University of Delaware. Conference themes embrace the History of Technology, Business, and Science. This year's theme is "Reinventing the Factory." Contact:

Gabriella M. Petrick
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236 Munroe Hall
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e-mail: gpetrick@udel.edu

March 28-29

The Graduate Students of **Virginia Tech's Center for Science and Technology Studies** will hold a workshop, "Technologies/Moralities: The Ethical Grammar of Technological Systems." The workshop will be held in Blacksburg, Virginia. Contact:

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The **U.S. Naval Institute** will present its 129th Annual Meeting and 13th Annapolis Seminar on the grounds of the Naval Academy in Annapolis, Maryland. Contact:

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April 15

The **Military Classics Seminar** meets for dinner-discussion at the Ft. Myer, Virginia, Officers' Club. This month's selection is Thomas C. Hone, Norman Friedman, and Mark Mandeles, *American and British Aircraft Carrier Development, 1919-1941*. Naval Institute Press, 1999. Speaker: Captain Jan van Tol, USN. Contact:

Ms. Sandra Doyle
Naval Historical Center
805 Kidder Breese Street, SE
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April 24-26

The **Economic & Business Historical Society** will hold its 28th annual conference in Memphis, Tennessee. Contact:

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website: <http://www.ebhsoc.org>

May

Air Power 2003. Kickoff event for Air Force celebration of the 100th anniversary of powered flight. Many USAF aircraft will be on display at Wright-Patterson AFB, Ohio. Other activities at the Aeronautical Systems Center, Air Force Research Laboratory, and the Air Force Museum. Contact:

Tana R. Hamilton
ASC Public Affairs
(937) 255-1729
e-mail: Tana.Hamilton@wpafb.af.mil

May 1-4

The **Society for Military History** will hold its annual meeting in Knoxville, Tennessee. This year's theme is "The Military and Society during Domestic Crises." Contact:

Dr. Kurt Piehler
SMH 2003 Committee
Center for the Study of War and Society
220 Hoskins Library
University of Tennessee at Knoxville
Knoxville, TN 37996-0411
(865) 974-7094
e-mail: gpiehler@itk.edu

May 2-3

The **Society of Air Racing Historians** will hold its 19th annual meeting at the Holiday Inn-Airport, Brook Park in Cleveland, Ohio. Contact:

Herman Schaub, Secretary/Treasurer
Society of Air Racing Historians
168 Marion Lane
Berea, OH 44017
(440) 234-2301
website: <http://www.airrace.com>

May 6-8

The **American Helicopter Society** will hold its 59th Annual Forum and Technology Display at the Phoenix Civic Plaza in Phoenix, Arizona. This year's theme is "Vertical Flight Transformation." Contact:

AHS International - The Vertical Flight Society
217 N. Washington Street
Alexandria, VA 22314-2520
(703) 684-6777, Fax (703) 739-9279
e-mail: Staff@vtol.org
website: <http://www.vtol.org>

May 7-11

The **Council on America's Military Past** will hold its 37th Annual Military History Conference at the Holiday Inn Select in St. Louis, Missouri. Contact:

CAMP '03 Conference Papers
P. O. Box 1151
Ft. Myer, VA 22211-1151
(703) 912-6124, Fax (703) 912-5666
e-mail: camphart2@aol.com

June 5-6

Siena College will host its annual symposium, "World War II: A 60-Year Perspective," with presentations featuring the year 1943. Contact:

Prof. Thomas O. Kelly, II
Dept. of History
Siena College
515 Loudon Road
Loudonville, NY 12211-1462
e-mail: legendziewic@siena.edu

June 26-29

The **Business History Conference** and the **European Business History Association** will hold a joint meeting at the Doubletree Hotel in Lowell, Massachusetts. The focus of the meeting is globalization in a long-term perspective. Contact:

Roger Horowitz
Business History Conference
P. O. Box 3630
Wilmington DE 19807
(302) 658-2400, Fax (302)655-3188
e-mail: rh@udel.edu

July 14-17

The **American Institute of Aeronautics and Astronautics** will co-host an "International Air and Space Symposium and Exposition: The Next 100 Years," to be held in Dayton, Ohio. Contact:

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

September 12-13

The **Institute of Contemporary British History** will host a conference on "Britain and the Cold War," at the University of London. Contact:

Tony Shaw
Humanities Faculty
University of Hertfordshire
Watford, Hertfordshire WD2 8AT
United Kingdom
e-mail: a.t.shaw@herts.ac.uk, j.r.chapman@open.ac.uk
website:
<http://www.ihr.sas.ac.uk/icbh/bulletinboard.html>

September 13-17

The **Air Force Association** will hold its annual national convention at the Marriott Wardman Park Hotel in Washington, D.C. This year's theme is "Up From Kitty Hawk - the 100th Anniversary of Powered Flight." Contact:

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

September 18-21

The **Tailhook Association** will hold its 46th Annual Convention 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 19-21

The United States Branch of the **Western Front Association** will hold its annual national seminar at the Marine Corps University in Quantico, Virginia. Contact:

Len Shurtleff
6915 NW 49th St.
Gainesville, FL 32653-1152
e-mail: lshurtleff@aol.com

September 23-25

The **American Institute of Aeronautics and Astronautics** will host a Space 2003 Symposium and Exhibition in Long Beach, California. Contact:

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

If you wish to have your event listed, contact:

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



THE AIR FORCE HISTORICAL FOUNDATION NEEDS VOLUNTEERS

The Air Force Historical Foundation is seeking volunteers proficient in web development, design, and maintenance, to manage the Foundation's web site: www.afhistoricalfoundation.com.

Since 1953, the Air Force Historical Foundation has published an outstanding quarterly journal, now entitled *Air Power History*—formerly called, *Aerospace Historian* and *The Air Power Historian*. The journal's collection of nearly 1,000 fascinating articles, on virtually every aspect of United States air power history, is available in hard copy. As the Foundation celebrates its Fiftieth Anniversary in 2003, our goal is to place these articles on the web site. Foundation members will enjoy reading these fascinating articles on-line, at no cost. Non-members would be granted access to a representative selection of the articles as an incentive to join the Foundation. We are also considering a Fiftieth Anniversary commemorative set of CDs containing the articles to our members—yet another incentive to apply for membership.

Our second goal is to develop an Airmen's Log, similar to the Navy Memorial Foundation's highly-acclaimed Navy Log to enable veterans to memorialize their Air Force achievements on-line for a nominal fee.

We also plan to establish an Air Force Unit Association Archival Records Center. This initiative would enable Air Force associations, especially World War II and Korean War era unit associations, whose ranks are declining constantly, to centralize their archival records on our web site.

Finally, we seek to establish a "virtual" merchandise outlet, specializing in air power history-oriented merchandise.

Due to its limited resources, the Foundation is unable to incorporate these new initiatives into its existing web site. Foundation members and friends proficient in web site design and development, who are willing to help the Foundation improve its web site, are encouraged to contact the Foundation's Executive Director, Col. Joseph A. Marston, USAF (Ret.) Our office is open Monday through Friday, from 9:00 am to 3:00 pm; telephone (301) 736-1959; or e-mail at afhf@earthlink.net.

We hope to hear from you!





The “What is it?” aircraft in our last issue was the McDonnell XH-20 Little Henry helicopter. Believed to be the first ramjet-powered helicopter to take to the air, the Little Henry made its first tethered flight on May 5, 1947, and its first free flight on August 26 of that year, piloted on both occasions by Charles R. Wood, Jr.

Conceived in 1946 and scarcely more than a frame with a rotor and tail, the XH-20 was powered by two ramjet engines that, like the aircraft, were developed by James S. McDonnell’s new aircraft company in St. Louis, Missouri.

The engines were mounted on the rotor tips.

McDonnell built two XH-20s for the Army Air Forces with serial numbers 46-689/690. They participated in a flight test program that continued after the Air Force became an independent service branch on September 18, 1947. For a period, one of the two XH-20s was operated in a two-seat configuration.

Reader Scott L. Moore of Council Bluffs, Iowa, raised an interesting question. “Little Henry is one of the strangest names for an aircraft I have ever heard. Perhaps when you announce the winner you could enlighten your readers as to the origins of this peculiar name.”

Well, no. No one at Air Power History possessed such enlightenment. However, David Ostrowski of Fairfax, Virginia, editor of *Skyways* magazine and an authority on aviation in St. Louis, had the answer. He explained that the name derived from the children’s book *Henry the Helicopter*, by Eleanor Graham. Even though McDonnell built several other helicopters, including one called the Big Henry, it never received a production contract for a rotary wing aircraft. Instead, for decades the company became the nation’s premier manufacturer of fighter aircraft. Of the two XH-20s built, one was scrapped and the other was retained in the collection of the Air Force Museum in Dayton, Ohio.

The winner of the History Mystery is retired Air Force Lt. Col. Steve Horn of Greenville, S. C.

This Issue’s Mystery Plane

Once more, we present the challenge to our ever-astute readers. See if you can identify this month’s “mystery” aircraft. But remember please, postcards only. The rules, once again:

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

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

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

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

“History Mystery” puzzlers. We will return them.

Bob’s latest book, *Air Force One*, is available in bookstores or directly from Bob.

See the advertisement on page 59.



Letters

I read with particular interest the story, "The United States Air Force and the Bats of Bracken Cave," in the Summer 2002 edition [Vol. 49, No. 2] of *Air Power History*. The San Antonio Water System recently purchased the property that contains Bracken Cave as part of our sensitive land acquisition program. We will now be able to ensure the viability of the bat colony for future generations.

The article as well-written and spelled out many of the issues regarding the bats that are now well known by pilots and citizens of south Texas. We are always working to increase the level of knowledge about the bat colony and the great environmental service that the bats perform.

*Gen. Eugene E. Habiger, USAF (Ret.),
President/CEO, San Antonio Water
System*

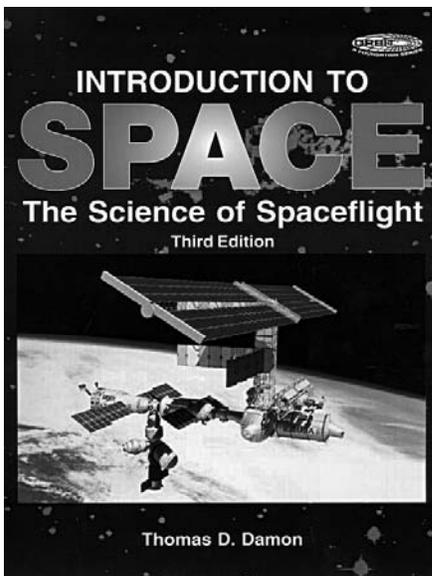
USAF's Space and Missile Population Shortchanged

I have been an occasional reader of the *Air Power History* for approximately 24 years. I offer that you are missing an increasing population of readers and followers. As a member of the Air Force's Space and Missile population, I have rarely, if ever, seen historical writings concerning space and missiles grace your publication. While our history is younger than that of flight, it is no less interesting, compelling and fascinating. I contin-

ue to encourage those CGOs, airmen, NCO and SNCOs under my command to read about their Air Force in pages such as those found in *Air Power History* but it would be helpful if the cover art and articles therein also featured those daring men and their wingless machines that are the heritage of the Air Force as well.

*Col. Mark H. Owen, USAF, Commander,
91st Space Wing, Minot AFB, North
Dakota.*

Editor's reply. Thank you for taking the time to write and comment about the content of Air Power History. I did a quick survey of the past two years—eight issues—and found that we have published missiles/space articles in three of them. The Spring 2001 issue included Frank Jennings's "Genesis of the Aerospace Concept." The cover of the Fall 2001 issue, featured an Apollo 11 astronaut and had two articles devoted to space: Roger Launius's "NASA Looks to the East" and Lionel Alford's "Opportunities and Perils in the Command of Space." This year, in the Spring 2002 issue, we ran Stephen Johnson's "Bernard Schriever and the Scientific Vision." Similarly, I could go back another seven years (when I began to edit the magazine) and demonstrate that a "fair" share of the articles published concern missiles and space. However, as a historian of technology and the author of a history on USAF ballistic missiles, I share your concern. I, too, would like to include more on the "high frontier." Of course, we need authors. I will continue to seek articles and ask that you encourage your command not only to read about missile and space history, but also to write it. Thanks again.



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News

Dr. Murray Green

Murray Green, an Air Force research analyst and historian, died on October 21, 2002, at Sinai Hospital in Baltimore, Maryland. He was eighty-six.

Green was born in the Bronx and was graduated from City College of New York, from which he earned BA and MA degrees. He later earned a Ph.D. from American University, in Washington, D.C.

In the early 1940s, he worked at the Glenn L. Martin airplane plant in Middle

River, Maryland. During World War II, he served in the U.S. Navy as a cryptographer, attaining the rank of lieutenant. Later, he joined the Air Force Reserve, where he rose to the rank of colonel.

Dr. Green served as deputy chief of research and analysis for the secretary of the Air Force. During the 1960s, primarily at the time of the Vietnam War, he specialized in assessing the public's reaction to U.S. defense-related matters. In 1970, Dr. Green joined the Office of Air Force History as a senior historian. He concentrated on the study of the life and times of Gen. Henry H. "Hap" Arnold, the famous wartime leader of the U.S. Army Air Forces. After retiring from civil service in 1974, Dr. Green deposited the products of his extensive research on General Arnold at the U.S. Air Force Academy library in Colorado Springs, Colorado.

He is survived by his wife of five years, Elaine Myers Miller; a son, Allen M. Green; a daughter, Suzi Green Owens; and five grandchildren.

R. Gordon Hoxie

Brig. Gen. R. Gordon Hoxie, USAF (Ret.), died on October 23, 2002 at his home in Oyster Bay Cove, on Long Island, New York. He was eighty-three.

Born in March 1919, Hoxie earned a BA from Iowa State Teachers College and advanced degrees from the University of Virginia and Columbia University. He served as an administrator at Columbia, the University of Denver, and C. W. Post College. Since 1954, Dr. Hoxie served at Long Island University. In 1968, he lost his position as chancellor following a dispute involving him, some faculty members, and students. It led to a raucous public scene that resulted in his dismissal. He next founded the Center for the Study of the Presidency, which publishes *Presidential Studies Quarterly*.

Hoxie was a captain in the U.S. Army Air Forces during World War II. Later, as a reservist he became a general officer, serving for a time in the Office of Air Force History. He was also a trustee of the Air Force Historical Foundation.

Dr. Hoxie's wife, Louise L. Hoxie, died in December 1992. He is survived by his second wife, Ada Hoxie.

WW II Pilot Training

I am seeking information about pilot training during the early part of World War II. My uncle, Roman Mierzejewski, of New Bedford, Mass., joined the U.S. Army Air Corps a few weeks after Pearl Harbor was attacked. He was soon attached to the 103d Observation Squadron in Atlantic City, N.J. A few months later, he qualified for the Aviation Cadet Program and became part of Flight Class 42-K. He did his primary at Corsicana, Tex.; basic at Perrin Field, Sherman, Tex., and his advanced at Foster Field, Victoria, Tex. He was commissioned on December 13, 1942. Later, he was in transition training at Marbry Field, Tallahassee, Fla. In the early spring of 1943, he shipped out to North Africa and was assigned to the 325th Fighter Group. He was shot down and killed on June 28, 1943, over Sardinia, while protecting B-26s of the 17th Bombardment Group. I would greatly appreciate any information from readers of *Air Power History* about early flight training, particularly information about bases where my uncle was stationed.

*John B. Mier, 5970 Arthur St.,
Merrillville, IN 46410;
e-mail: Firemier4@aol.com*

The **Fellowship in Aerospace History**, supported by NASA, annually funds one or more research projects for six months to one year. Proposals of advanced research in history related to all aspects of aerospace, from the earliest human interest in flight to the present, are eligible, including cultural and intellectual history, economic history, history of law and public policy, and history of science, engineering, and management. The fellowship is open to applicants who hold a doctoral degree in history or a closely related field, or who are enrolled in and have completed all course work for a doctoral degree-granting program. The stipend is \$20,000. The deadline for application is March 1, 2003. Application forms and information may be found at <http://www.theaha.org/prizes/NASA>. Contact:

Stephen Garber
NASA History Office Code IQ
NASA Headquarters - Room CO72
Washington, DC 20546-0001
Tel. 202-358-0385
FAX 202-358-2866
steve.garber@hq.nasa.gov
NASA History Home Page: <http://history.nasa.gov>

The **Pilot Class 43-D Association** reunion will be held May 7-11, 2003, at the Red Lion, Colorado Springs. Contact:

Col. Jack Patton
4530 Winewood Village DR.
Colorado Springs, CO 80917
(719) 637-3097

or

Frank Dutko
(850) 932-3467
e-mail: duke43d@hotmail.com

The **USS Atule (SS 403)** reunion will be held May 18-21, 2003. Contact:

John R. Rupertus
Cbcruises@aol.com
(410) 360-2852

The **Officer Candidate School (OCS) Classes 63A, 63B, 63C, 63D** reunion will be held May 24-26, 2003, in San Antonio, Texas. Contact:

Col. Bob Karre USAF (Ret.)
(210) 945-2113 FAX (210) 945-2112
e-mail: Icarus@texas.net

The **Recon Rendezvous 2003** reunion will be held September 3-6, 2003, in Fairborn, Ohio. Co-sponsored by the USAF Museum and 55th SRW Association, all USAF units that flew or supported reconnaissance during the Cold War are invited. Contact:

John H. Kovacs
564 Satrell Dr.
Fairborn, OH 45532
e-mail: Jla2c3k@aol.com

or

Bill Ernst
410 Greenbriar Ct.
Bellevue, NE 68005
e-mail: BillErnst@aol.com

If you would like to have your reunion listed here, contact:

Editor, *Air Power History*
P.O. Box 10328
Rockville, MD 20849-0328
e-mail: jneufeld@comcast.net

Dr. John L. McLucas
Secretary of the Air Force
1920–2002



Dr. John L. McLucas who served as under secretary of the Air Force from 1969 to 1973, as secretary of the Air Force 1973 to 1975, and as administrator of the Federal Aviation Administration from 1975 to 1977, died on December 1, 2002 of respiratory failure at Mount Vernon Hospital in Alexandria, Virginia. McLucas, eighty-two, had suffered from poor health since undergoing heart surgery some ten years ago, but remained active as a writer, lecturer, and consultant. He was proud to be considered a “technocrat.”

Born on August 22, 1920, in Fayetteville, North Carolina, McLucas was raised on a farm in South Carolina. After high school, he returned to North Carolina, where he graduated from Davidson College in 1941 with a BS degree in physics. In 1943 he earned an MS degree in physics from Tulane University and in 1950 a Ph.D. in physics with a minor in electrical engineering from Pennsylvania State University. During World War II, McLucas served in the U.S. Navy, including a two-year stint at sea in the Pacific theater as a radar and operations officer. He would often refer to his wartime work experience as being so secret that it had to be spelled backwards. When pressed about the delicate nature of his job, he would respond that it was something called radar.

In 1948, while still in graduate school, he began working part time for Haller, Raymond, and Brown (HRB) Inc., an electronics research firm in State College, Pennsylvania. Two years later he became its vice president and technical director. He was responsible for all technical work of the company, including forward planning, supervision of technical personnel, proposal preparation, research, development, and manufacturing. When the firm merged with the Singer Company in 1958 to form a subsidiary, HRB-Singer, Inc., McLucas became its president. The new ancillary company continued to specialize in military electronic systems. In the twelve years he was affiliated with HRB-Singer, McLucas increased the number of engineers from ten in 1950 to several hundred in 1962. In addition to his work at HRB, McLucas in 1953 helped found one of the nation’s first cable television companies.

In early 1962 Dr. McLucas went to work in the Pentagon as a deputy to Harold Brown, the director of Defense Research and Engineering. As head of an office called Tactical Warfare Programs, it was McLucas’s job to oversee research and early development of non-nuclear weapon systems of the three services, including vehicles, warships, and aircraft. McLucas spent part of his time working with Air Force officials, such as secretary of the Air Force Eugene Zuckert, Chief of Staff Gen. Curtis LeMay, and Air Force System Command’s Gen. “Bennie” Schriever. In addition to working with key personnel in the military departments and their laboratories, he had almost daily contacts with defense industry executives and made frequent visits to industrial and military installations. Regular contacts with other government agencies and groups like the President’s Scientific Advisory Committee and the Defense Science Board also marked his schedule.

In July 1964 McLucas moved to Paris to work for the North Atlantic Treaty Organization (NATO) as assistant secretary general for scientific affairs and chair the NATO science committee. He was responsible to the NATO secretary general for the administration of programs in the fields of pure science and defense technology. In that capacity, he headed a committee of defense directors from all NATO countries to encourage the cooperative development of common weapons for use by the allies in the event of war in Europe. He was a founding member of the steering committee for the international Advisory Group for Aeronautical Research and Development (AGARD) that had been established by Dr. Theodore von Kármán. McLucas also maintained contacts with ministries of foreign affairs, science, and defense, and with NATO delegations to develop common points of view on science and defense matters.

In 1966 he returned to the United States to become president and chief executive officer of the MITRE Corporation in Bedford, Massachusetts. MITRE, a nonprofit corporation, had been organized by the Massachusetts Institute of Technology at the request of the United States Air Force in 1958 to assist in procuring and installing the Semi-Automatic Ground Environment defense system. McLucas oversaw MITRE's growing support of military operations in Southeast Asia and aggressively pursued diversification of its clients to include other government agencies. While at MITRE, McLucas also chaired the USAF Scientific Advisory Board ad hoc panel on infiltration interdiction in 1967-68; the Defense Science Board summer 1968 study on tactical aircraft; and the Defense Science Board Task Force on management of military research and development in 1968-69.

In early 1969, newly appointed secretary of the Air Force Robert C. Seamans, Jr., asked McLucas to become his undersecretary. Seamans wanted as a deputy, someone who would take charge and make decisions in his absence. The two men made a very close and compatible team. As undersecretary, McLucas concentrated on satellite communications, fire control, and electronic warfare, whereas Seamans served as the lead on such weapon systems as new airplanes. McLucas also greatly admired secretary of defense Melvin Laird and his deputy, the renowned David Packard. He had worked for them and director of Central Intelligence Richard Helms in a (then-secret) parallel duty managing the National Reconnaissance Office. McLucas and Seamans strongly supported Laird in implementing the Nixon administration's policy of reducing U.S. involvement in the war in Southeast Asia. Even so, the continuing war remained a divisive issue. Seamans and McLucas wrestled with the problems of maintaining an effective force when the US military was unpopular at home and Soviet power and influence were expanding abroad. It was a time of decreasing defense budgets, rapidly shrinking manpower, and replacement of the selective service system with the all-volunteer force.

In July 1993, McLucas became secretary of the Air Force, just after the United States completed the withdrawal of forces from Vietnam. In addition to maintaining morale in the post-Vietnam era, he perceived his most important jobs as investing in a new generation of advanced equipment and helping the Air Force adapt to changes in American society, such as expanding opportunities for women and minorities. The YF-16/YF-17 flyoff and the Air Force selection and subsequent sale to NATO of the F-16 were among the highlights of his tenure as secretary. Along with Bob Seamans, he strongly supported prototyping to avoid the costly blunders that were made with the C-5A and the FB-111 during the 1960s.

McLucas enjoyed a great relationship with Melvin Laird and had the utmost respect for his management practices, particularly the close rapport Laird cultivated with the three service secretaries and their undersecretaries. McLucas also got along well with Laird's successors: Eliot L. Richardson and James R. Schlesinger. During his six and a half years with the Air Force, McLucas's aggressive support of weapons systems modernization helped produce a new array of aircraft—the F-15, E-3 (AWACS), A-10, F-5E, B-1A, and F-16—as well as precision guided weapons and various space-based systems. In later years, he was especially proud of his early advocacy of the Global Positioning System. His last action as secretary of the Air Force was to open aircrew training to women, a controversial decision at the time.

At the personal behest of President Gerald Ford, in November 1975 McLucas became the administrator of the Federal Aviation Administration, where he remained for two years. From 1977 to 1985 he served as executive vice president of COMSAT, president of COMSAT General, and president of COMSAT World Systems. During his final year there, he also served as president of the American Institute of Aeronautics and Astronautics (AIAA).

After retirement, McLucas remained active on the boards of directors of private companies and pro bono organizations and as a consultant to several government agencies and educational institutions. He was especially active in promoting civilian uses of space technology. For example, McLucas helped establish the International Space University at Strasbourg, France, and served as chairman of the Arthur C. Clarke Foundation of the United States. In 1991 he authored a book titled *Space Commerce*, which was published by Harvard University Press. Author of many scientific articles, McLucas also held ten U.S. patents. He was proud to be considered a "technocrat."

Dr. McLucas was an active member and supporter of the Air Force Historical Foundation. Since 1994, he was working on his autobiography, which will be completed posthumously by Col. Kenneth Alnwick, USAF (Ret.) and Larry Benson, a retired Air Force historian. A memorial service for Dr. McLucas was held in his honor at the Old Presbyterian Meeting House in Alexandria, Virginia, on December 21, 2002.

He is survived by his wife of twenty-one years, Harriet McLucas of Fort Belvoir; four children from his first marriage, Pam Byers of San Francisco, Susan of Boston, John C. of Baltimore and Rod of New York; five stepchildren, Mathew Black of Washington, Bruce Black of Yardley, Pa., Elizabeth Black of Falls Church, Va., Beverly Roca of Haymarket, Va., and Robert Black of Alexandria, Va.; a sister; and nine grandchildren.

Tribute by George M. Watson, Jr., and Larry Benson.

THE AIR FORCE

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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.