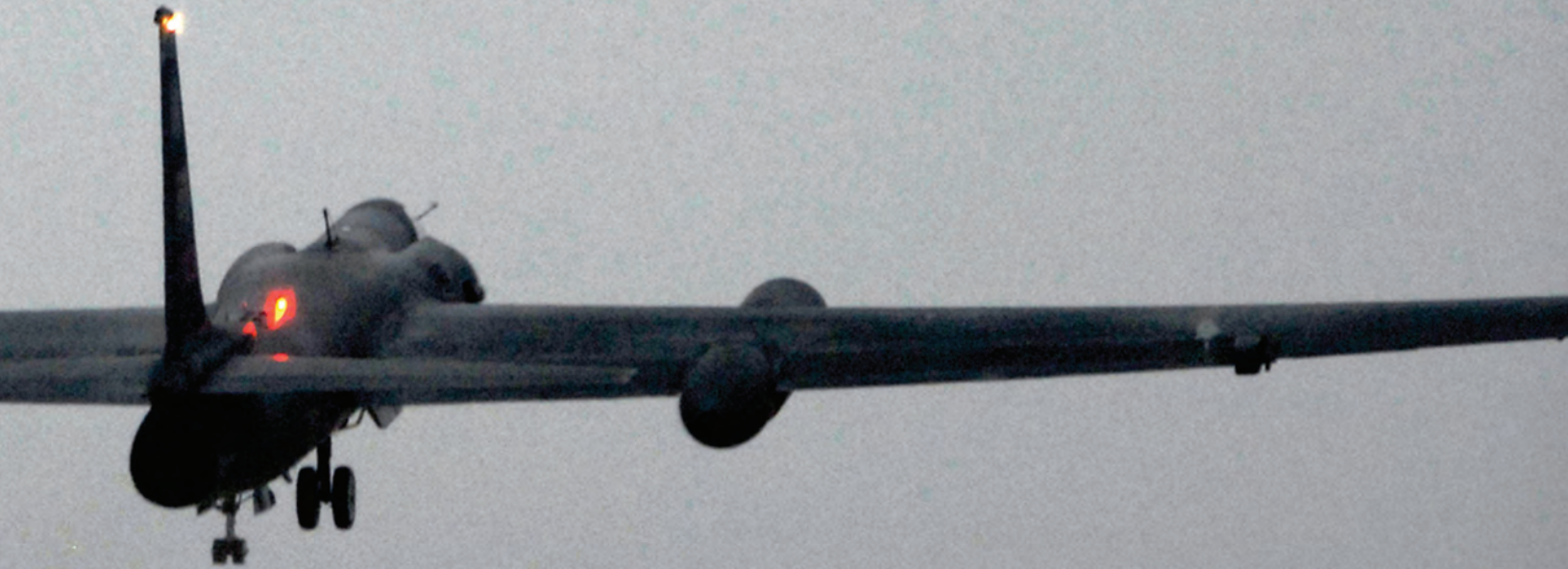


AIR POWER

FALL 2011 - Volume 58, Number 3
WWW.AFHISTORICALFOUNDATION.ORG

History





The Air Force *Historical* Foundation

Founded on May 27, 1953 by Gen Carl A. “Tooeey” Spaatz and other air power pioneers, the Air Force Historical Foundation (AFHF) is a nonprofit tax exempt organization. It is dedicated to the preservation, perpetuation and appropriate publication of the history and traditions of American aviation, with emphasis on the U.S. Air Force, its predecessor organizations, and the men and women whose lives and dreams were devoted to flight. The Foundation serves all components of the United States Air Force—Active, Reserve and Air National Guard.

AFHF strives to make available to the public and today’s government planners and decision makers information that is relevant and informative about all aspects of air and space power. By doing so, the Foundation hopes to assure the nation profits from past experiences as it helps keep the U.S. Air Force the most modern and effective military force in the world.

The Foundation’s four primary activities include a quarterly journal *Air Power History*, a book program, a biennial symposium, and an awards program.

MEMBERSHIP BENEFITS

All members receive our exciting and informative *Air Power History Journal*, either electronically or on paper, covering all aspects of aerospace history

- Chronicles the great campaigns and the great leaders
- Eyewitness accounts and historical articles
- In depth resources to museums and activities, to keep members connected to the latest and greatest events.

Preserve the legacy, stay connected:

- Membership helps preserve the legacy of current and future US air force personnel.
- Provides reliable and accurate accounts of historical events.
- Establish connections between generations.



AIR POWER

History

Fall 2011 - Volume 58, Number 3
WWW.AFHISTORICALFOUNDATION.ORG

Features

U-2 Spy Planes: What You Didn't Know About Them <i>David Reade</i>	6
The N.A.C.A. and Its Military Patrons in the Supersonic Era, 1940-1958 <i>Michael H. Gorn</i>	16
Flight to the Stars: The 1934 Air Corps Alaskan Expedition <i>Kenneth P. Werrell</i>	28
Good Men...Running Around in Circles: Benjamin Foulois, Billy Mitchell, and the Fight for the Future of the Army Air Service <i>Karl R. Schrader</i>	42

Book Reviews

<i>The Vietnam War: A Chronology of War</i> By Raymond K. Bluhm	Review by Dennis H. Berger	54
<i>Hawker Hurricane: From 1935 to 1945</i> By Dominique Breffort	Review by Golda Eldridge	54
<i>Meteor from the Cockpit: Britain's First Jet Fighter</i> By Peter Caygill	Review by Jeffrey P. Joyce	54
<i>Beneficial Bombing: The Progressive Foundations of American Air Power, 1917-1945</i> By Mark C. Clodfelter	Review by Kenneth P. Werrell	55
<i>Gladiator Ace: Bill "Cherry" Vale, the RAF's Forgotten Fighter Ace</i> By Brian Cull	Review by Golda Eldridge	55
<i>Khubilai Khan's Lost Fleet: In Search of a Legendary Armada</i> By James P. Delgado	Review by Curtis H. O'Sullivan	56
<i>B-17 Flying Fortress, 1935 Onwards (all marks) Owners' Workshop Manual</i> By Graeme Douglas	Review by Steven Agoratus	56
<i>Homer Lea: American Soldier of Fortune</i> By Lawrence M. Kaplan	Review by Curtis H. O'Sullivan	57
<i>Fighter Aces of the RAF in the Battle of Britain</i> By Phillip Kaplan	Review by Jerry Hoblit	57
<i>Keep from All Thoughtful Men: How U.S. Economists Won World War II</i> By Jim Lacey	Review by Ira Kaminow	58
<i>Matterhorn: A Novel of the Vietnam War</i> By Karl Marlantes	Review by George M. Watson	59
<i>The War for Korea, 1950-1951: They Came from the North</i> By Allen R. Millett	Review by Stephane Lefevre	59
<i>Freedom Flyers: The Tuskegee Airmen of World War II</i> By J. Todd Moye	Review by Alan L. Gropman	60
<i>Aircraft of World War I, 1914-1918: The Essential Aircraft Identification Guide</i> By Jack Herris and Bob Pearson	and	
<i>Aircraft of the Cold War, 1945-1991: The Essential Aircraft Identification Guide</i> By Thomas Newdick	Review by Michael Rouland	61
<i>The Rucksack War: U.S. Army Operational Logistics in Grenada, 1983</i> By Edgar F. Raines	Review by Curtis H. O'Sullivan	61
<i>A War it Was Always Going to Lose: Why Japan Attacked America in 1941</i> By Jeffrey Record	Review by Jeffrey P. Joyce	62
<i>One Hundred Years of U.S. Navy Air Power</i> By Douglas V. Smith, ed.	Review by Curtis H. O'Sullivan	62
<i>The Grand Design: Strategy and the U.S. Civil War</i> By Donald Stoker	Review by Curtis H. O'Sullivan	62
<i>Military Ethics: International Perspective</i> By Jeff Stouffer and Stefan Seiler, eds.	Review by Golda Eldridge	63
<i>Racing the Sunrise: Reinforcing America's Pacific Outposts, 1941-1942</i> By Glen M. Williford	Review by Steve Ellis	64
<i>Lost in Shangri-La</i> By Mitchell Zuckoff	Review by John Cirafici	65

Departments

Books Received	66
2011 Symposium	4
Letters, News, Reunions, In Memoriam, and History Mystery	67

COVER: A U-2 takes off on a mission. (USAF photo.)



Air Force Historical Foundation

P.O. Box 790
Clinton, MD 20735-0790
(301) 736-1959

E-mail: ofcmgr@afhistoricalfoundation.org
On the Web at <http://www.afhistoricalfoundation.org>

Officers, 2011

**President/Chairman of the Board and
Chair, Executive Committee**

Maj Gen Dale W. Meyerrose, USAF (Ret)

1st Vice Chairman

Gen John A. Shaud, USAF (Ret)

2nd Vice Chairman and Chair,

Development Committee

Maj Gen Silas R. Johnson, Jr., USAF (Ret)

Treasurer and Chair,

Finance Committee

Lt Col Lawrence Spinetta, USAF

Chair, Membership Committee

Col Richard G. Hellier, USAF (Ret.)

Chair, Services Committee

Maj Willard Strandberg, Jr., USAF (Ret)

Chair, Technology Committee

Maj Gen Kenneth M. DeCuir, USAF (Ret.)

Publisher

Brig Gen Alfred F. Hurley, USAF (Ret)

Executive Director

Lt Col Jim Vertenten, USAF (Ret)

Board of Directors, 2011

Col Kenneth J. Alnwick, USAF (Ret)

Lt Gen Russell C. Davis, USAF (Ret)

CMSgt Rick Dean, USAF (Ret)

Maj Gen Kenneth M. DeCuir, USAF (Ret)

Lt Gen Michael M. Dunn, USAF (Ret)

Gen Ronald R. Fogleman, USAF (Ret)

Col Charles J. Gross, USAFR (Ret)

Col Richard G. Hellier, USAF (Ret)

Brig Gen Alfred F. Hurley, USAF (Ret)

Maj Gen Silas R. Johnson, Jr., USAF (Ret)

Lt Gen Timothy A. Kinnan, USAF (Ret)

Mr John F. Kreis

Maj Gen Dale W. Meyerrose, USAF (Ret)

Jacob Neufeld

Gen John A. Shaud, USAF (Ret)

Lt Col Lawrence Spinetta, USAF

Maj Willard Strandberg, Jr., USAF (Ret)

Col Jere Wallace, USAF (Ret)

CORPORATE SPONSORS, 2011

Platinum Level (\$20,000 or more)

Lockheed Martin Corporation

Gold Level (\$10,000 or more)

EADS North America

Silver Level (\$5,000 or more)

Harris Corporation

L-3 Communications

**New Contributing Members,
June 2011 - August 2011**

Kenneth Alnwick

Charles Booth

James Chamberlain

Glenn Kent

Sherman Mullin

Gerald Parshall

Donald Shea

Kenneth Sublett

Avelin Tacon

AIR POWER *History*

The Journal of the
Air Force Historical Foundation
Fall 2011 Volume 58 Number 3

Publisher
Alfred F. Hurley

Editor
Jacob Neufeld

Technical Editor
Robert F. Dorr

Book Review Editor
Scott A. Willey

Layout and Typesetting
Richard I. Wolf

Advertising
Jim Vertenten

Circulation
Angela J. Bear

Air Power History (ISSN 1044-016X)
is produced for Spring, Summer, Fall, and
Winter by the Air Force Historical Founda-
tion.

Prospective contributors should consult the
GUIDELINES FOR CONTRIBUTORS
at the back of this journal. Unsolicited
manuscripts will be returned only on spe-
cific request. The Editor cannot accept
responsibility for any damage to or loss of
the manuscript. The Editor reserves the
right to edit manuscripts and letters.

Address **LETTERS TO THE EDITOR** to:

Air Power History
11908 Gainsborough Rd.
Potomac, MD 20854
e-mail: editor@afhistoricalfoundation.org

Correspondence regarding missed issues
or changes of address should be addressed
to the **CIRCULATION OFFICE**:

Air Power History
P.O. Box 790
Clinton, MD 20735-0790
Telephone: (301) 736-1959
e-mail: ofcmgr@afhistoricalfoundation.org

ADVERTISING

Jim Vertenten
P.O. Box 790
Clinton, MD 20735-0790
(301) 736-1959
e-mail: execdir@afhistoricalfoundation.org

Copyright © 2011 by the Air Force
Historical Foundation. All rights reserved.
Periodicals postage paid at Clinton, MD
20735 and additional mailing offices.

Postmaster: Please send change of
address to the Circulation Office.

This Fall 2011 issue of *Air Power History*, includes four thoughtful articles that are worthwhile reading and contemplating. Leading off is David Reade's "U-2 Spy Planes: What You Didn't Know about Them." Reade follows the evolution of the U-2, first described as a high-altitude atmospheric and meteorological research aircraft, with technical and logistic support by the U.S. Air Force. Not until May 1960, after Francis Gary Powers was shot down while overflying the Soviet Union, was President Eisenhower obliged to concede that the U-2 was also used for reconnaissance.

Next, Michael Gorn completes the second article of his two-part series on the N.A.C.A. and the military, focusing on the period from 1940 to 1958. Readers will recall that during the "Golden Age of Aviation," [Air Power History, Vol. 58, No. 2, Summer 2011, pp 16 -27], from 1915 to 1939, relations between N.A.C.A. and the military services were often strained. During the 1940 to 1958 period, however, the situation improved markedly, in part, as a result of hot and cold wars, but mainly because of the policies of Hugh Dryden.

Kenneth Werrell contributes another useful article on the Army Air Arm. In "Flight to the Stars," he recounts the historic 1934 flight to Alaska. Led by Henry "Hap" Arnold, the formation flight of B-10s achieved many successes, especially a favorable public relations victory, which was sorely needed after the air mail fiasco. Werrell also notes that many of the fliers on this expedition went on to become general officers in World War II.

In the fourth article, "Good Men Running Around in Circles," Col. Karl Schrader spotlights an often overlooked period in the life of Benjamin "Benny" Foulois as Chief of the Army Air Service for the American Expeditionary Forces in World War I from 1917 to 1918. Excerpted from his graduate thesis for the School of Advanced Aerospace Studies at Maxwell AFB, Alabama, Colonel Schrader compares and contrasts Foulois' leadership and philosophy against those of his arch rival, William "Billy" Mitchell. In retrospect, Colonel Schrader asks which would benefit the Air Force more: a "cyber" Billy Mitchell or a "cyber" Benny Foulois to meet the contemporary challenge posed by cyberspace war? [You'll have to read the article; I'm not giving it away.]

The twenty-two books reviewed here offer a good mix of air and space power—biography, technology, a novel, and air combat throughout America's wars in the twentieth century.

Did you enjoy last year's books? John Kreis and his air power literature committee read all of the articles and reviews to rank them in the annual contests for "Best Book" and "Best Article." Turn to pages 67 to 69 to see whether the judges agreed with you

We are deeply saddened to report that Maj. Gen. John R. Alison died on June 6, 2011. He was one of America's greatest heroes of World War II and co-founder of the Air Commandos. See page 71.

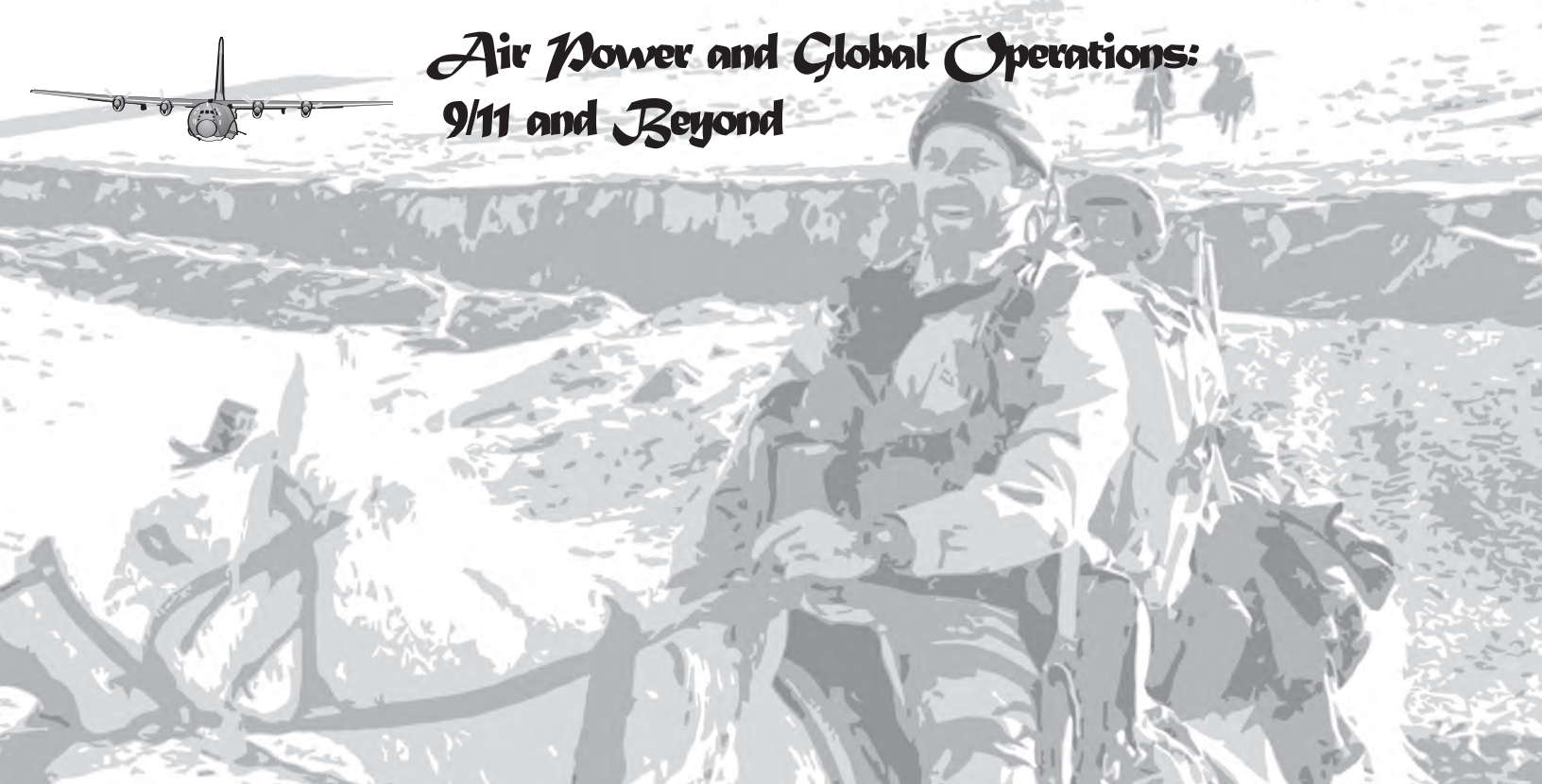
As you undoubtedly know, this year we mark the tenth anniversary of the dastardly attack against the U.S. by al Qaeda on September 11, 2001. The Air Force Historical Foundation and the Air Force Historical Studies Office have joined up to mark this anniversary with a two-day symposium on November 17 and 18, 2011, at Andrews AFB, Maryland. I urge you to make every effort to attend this momentous event. Program and registration information appear on pages 4-5. The Hon. Thomas Ridge, former head of Homeland Security and Governor of Pennsylvania, is the keynote speaker.



Air Power History and the Air Force Historical Foundation disclaim responsibility for statements, either of fact or of opinion, made by contributors. The submission of an article, book review, or other communication with the intention that it be published in this journal shall be construed as prima facie evidence that the contributor willingly transfers the copyright to *Air Power History* and the Air Force Historical Foundation, which will, however, freely grant authors the right to reprint their own works, if published in the authors' own works.



Air Power and Global Operations: 9/11 and Beyond



The Air Force Historical Foundation Symposium

The Air Force Historical Foundation will sponsor its biennial symposium on Thursday and Friday, November 17-18, 2011, on the theme ***Air Power and Global Operations: 9/11 and Beyond***, at the Air Force Conference Center, Andrews AFB, MD. Following the Symposium the Foundation will host its annual presentation of awards at a luncheon at Andrews.

Agenda

November 17

Opening Remarks: Maj. Gen. Dale W. Meyerrose, USAF (Ret)

Keynote Speaker: The Honorable Thomas J. Ridge

Panel 1: 9/11 and Operation Noble Eagle

Panel Chair: Dr. Priscilla D. Jones, AF/HOH

Distinguished Panel Member: Maj. Gen. Larry K. Arnold, USAF (Ret)

Distinguished Panel Speaker: John J. Farmer, Jr., Dean, Rutgers School of Law-Newark, TBD

Distinguished Panel Speaker: Col. Miles L. Kara, Sr., USA (Ret), "9/11: It Was 'Chaos' Out There"

Panel 2: The Global War on Terror and Operation Enduring Freedom

Panel Chair: Dr. John Q. Smith, Director, AF/HOH

Distinguished Panel Member: Lt. Gen. Robert J. Elder, USAF (Ret)

Distinguished Panel Speaker: Dr. Rebecca L. Grant, Director, Gen. Billy Mitchell Institute for Airpower Studies, "Afghanistan: The Grand Beginning"

Dr. Christopher N. Koontz, AF/HOH, "'To Promote Peace and Stability': Airmen, Reconstruction, and the Counterinsurgency Campaign in Zabul"

Panel 3: Operation Iraqi Freedom and Operation New Dawn

Panel Chair: Mr. David A. Byrd, AF/HOH

Distinguished Panel Member: Lt. Gen. Walter E. Buchanan, III, USAF (Ret)

Distinguished Panel Speaker: Dr. Benjamin S. Lambeth, TBD

Mr. George W. Cully, "Adapt or Fail: The USAF Role in the Reconstitution of the Iraqi Air Force, 2004–2007"

November 18

Keynote Speaker: Lt. Gen. David A. Deptula, USAF (Ret)

Panel 4: New Operational Paradigms and Innovations

Panel Chair: Mr. C. R. Anderegg, Director, Air Force History and Museums Policies and Programs

Distinguished Panel Member: Lt. Gen. Christopher A. Kelly, USAF (Ret), "Establishing an Expeditionary Wing in the Former Soviet Union"

Dr. Daniel L. Haulman, AFHRA, "Air War Aberrations"

Mr. Randy G. Bergeron, AFSOC/HO, "New Operational Paradigms and Innovations in Air Force Special Operations"

ONLINE REGISTRATION at **www.afhistoricalfoundation.org**. Tables, continental breakfast, breaks, and the luncheon are available for corporate sponsorships. Further information is available by contacting **Jim Vertenten** at **execdir@afhistoricalfoundation.org** or by calling **(301) 736-1959**.

REGISTRATION FEES

	<u>FOUNDATION MEMBERS</u>	<u>NON-MEMBERS</u>
Presentations and Luncheon	\$75	\$90
Awards Luncheon	\$45	\$60

(Active duty military and civilian, any nation, will be afforded the Membership rate)

PAYMENT BY: CHECK (US FUNDS) [] – VISA [] MASTERCARD [] DISCOVER []

AMOUNT TO BE CHARGED: _____ NAME ON CARD: _____

CREDIT CARD NUMBER: _____

EXPIRATION DATE: ____/____ [MM/YY] SIGNATURE: _____

NAME: _____

ADDRESS: _____

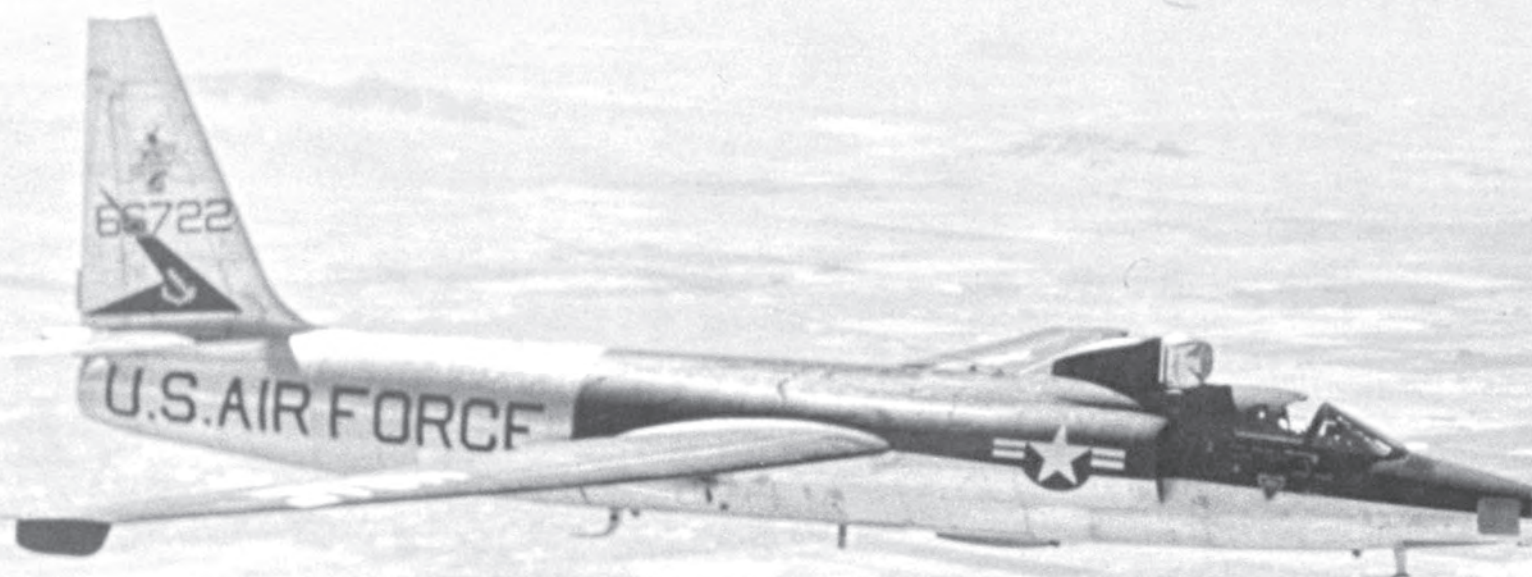
CITY: _____ STATE: _____ ZIP: _____+

PHONE: _____

REGISTER ONLINE OR FILL IN INFORMATION ABOVE, INCLUDE CHECK PAYABLE TO AIR FORCE HISTORICAL FOUNDATION, OR CREDIT CARD INFORMATION (INCLUDE PHONE NUMBER IN CASE WE NEED TO CONTACT YOU), AND MAIL TO:

**AIR FORCE HISTORICAL FOUNDATION
P O BOX 790
CLINTON, MD 20735-0790**

U-2 Spy Planes: What You Didn't Know About Them!





David Reade

(Overleaf) Special scientific research U-2 aircraft from AFMRL/Edwards AFB . (USAF photo)

(Right) Within days of the 1960 Powers CIA U-2 shoot-down, NASA presented the press with a U-2A aircraft in fictitious NASA markings, to bolster the government's cover story that Powers was on a scientific weather research mission. (NASA Photo.)



PUBLIC KNOWLEDGE OF THE U-2 CAME CRASHING INTO THE WORLD'S COLLECTIVE CONSCIOUSNESS ON MAY 1, 1960, WHEN FRANCIS GARY POWERS WAS SHOT DOWN, WHILE FLYING IN HIS U-2C OVER SVERDLOVSK, USSR

We know that U-2 spy planes were designed and built by Lockheed Aircraft for the Central Intelligence Agency (CIA) in the early 1950s, to conduct clandestine overflights of the Soviet Union, China, Cuba, and other denied areas of the world. At that time, these planes became our most important source of intelligence on the Soviet Union. Public knowledge of the U-2 came crashing into the world's collective consciousness on May 1, 1960, when Francis Gary Powers was shot down, while flying in his U-2C over Sverdlovsk, USSR.

Within days of the shoot-down, Dr. Hugh Dryden, director of the National Aeronautics and Space Administration (NASA), reiterated the agency's May, 1956, statements that the U-2 aircraft was a new research tool for high-altitude atmospheric and meteorological research, flown with the logistical and technical support of the United States Air Force.

Historians have pointed to these and subsequent statements by NASA and its predecessor agency, the National Advisory Committee for Aeronautics (NACA) as the U.S. government's first "cover story" to mask the covert operational use of these new U-2 aircraft.

Subsequently, declassified government documents now reveal that at the time Dryden made those proclamations, in May 1956, the first U-2 aircraft were just becoming operational. Within a month, the CIA conducted its first operational overflights of Poland and East Germany. By July 4, 1956, the CIA had flown three more overflights of eastern Europe, including the very first clandestine overflight of the Soviet Union. It is important to note, that the U.S. Air Force would not receive its first five U-2 aircraft until June 1957, and NASA would not get its first two U-2 aircraft until June 1971.

Looking back to when Dr. Dryden announced the peaceful scientific research purposes of the U-2 to the press in May 1960, after the Powers shoot-down, it is now evident that he was not actually lying. By that point, Air Force U-2s were conducting peaceful, high-altitude atmospheric and meteorological research flights throughout the world and would continue to do so until 1968.

U-2 Research Aircraft

Almost from the beginning of the clandestine spy plane program, early U-2 aircraft were utilized for atmospheric sampling and high-altitude weather research. Slightly more than a year after the CIA received their first U-2 the U.S. Air Force received some of its own U-2 aircraft, which became operational in October 1957, and were assigned to the High-Altitude Sampling Program (HASP). Running between 1957 and 1963, the HASP could detect and monitor the scientific advancements being made in Soviet nuclear weapons development and testing. The U-2 was incorporated into this mission with several aircraft specially modified and equipped to collect atmospheric air samples to detect radioactive debris at high-altitude. Known as Operation Crow Flight, five U.S. Air Force U-2As were modified with nose radomes, encompassing a hole or air intake valve mechanism to permit the capture of air gasses for sampling.

Unofficially known as WU-2A, and operating under the guise of weather sampling aircraft, these particular U-2s were additionally equipped with air scoops mounted on the port and starboard sides of the fuselage to collect radioactive particulate debris in the upper atmosphere.

David Reade is an author, writer, freelance journalist, aerospace consultant, and a leading authority on maritime patrol and scientific research aircraft. His book, The Age of Orion, is generally recognized as the most authoritative history on the development of the P-3 Orion. Mr. Reade has written more than 100 magazine articles on military maritime patrol aircraft and research aircraft worldwide. He has worked for some of the leading aerospace companies in North America. His expertise encompasses marketing and strategic business development as well as technical support to aircraft maintenance and modification programs for the U.S. Navy, and various international operators. Reade is currently writing a history of hurricane reconnaissance and research aircraft that specifically examines the developmental use of military aircraft for weather reconnaissance during World War II and their progression into the hurricane reconnaissance and hurricane research aircraft used by various operators today.

Francis Gary Powers (right, with Lockheed's U-2 designer Kelly Johnson in 1966.) (Photo courtesy of the National Museum of the U.S. Air Force.)



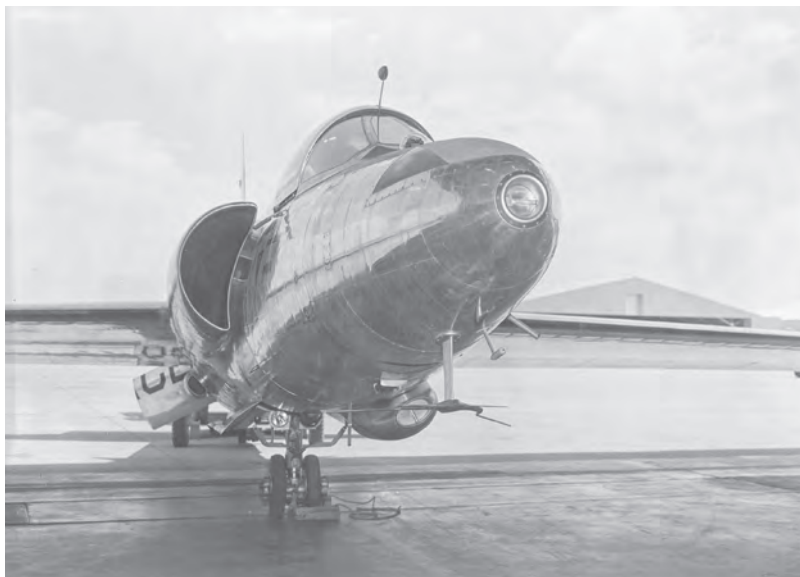
First Lockheed production U-2. (Photo courtesy of the National Museum of the U.S. Air Force.)



One of the U.S. Air Force's early strategic reconnaissance squadrons, the 4028th of the 4080th Strategic Reconnaissance Wing, was involved in flying the U-2 HASP flights. Detachments from the 4028th deployed all over the world, flying HASP missions from bases in the United States, Europe, Alaska, Australia, and Puerto Rico.

HASP sampling flights actually originated with CIA U-2, beginning in 1956, in support of the (then) Armed Forces Special Weapon Project or AFSWP—(later) Defense Nuclear Agency.

These ultra-secret flights, even within the CIA, not only supported monitoring of Soviet nuclear weapons programs, but also supported the establish-



(Above) HASP U-2 aircraft; close-up of nose. Notice the nose air-valve and air intake scoops on the lower starboard and port sides of the fuselage. The scoops collected high-altitude atmospheric debris particles that provided detailed knowledge of nuclear weapons tests conducted by the USSR and other nations. (USAF photo.)

(Above right) HASP U-2 aircraft preparing for take-off. (USAF photo.)

ment of AFSWP worldwide nuclear fallout pattern charts that were developed in association with future nuclear weapons policies and planning.

CIA U-2s carried out covert HASP missions throughout the 1960s, inclusive of the one-known Project Seeker mission, to collect nuclear intelligence data during the French nuclear weapons tests carried out on Mururoa Atoll, French Polynesia, in May 1964.

The Air Force's U-2 HASP flights ended in March 1963, with the signing of the Above Ground Test Ban Treaty between the U.S. and the USSR. In the subsequent U-2 aircraft investigation, in the



wake of the Powers shoot-down, congressional scrutiny revealed that more than 200 U-2 Flights were conducted between 1956-1960, under the auspices of the NACA/NASA weather research "cover" missions.

Although a portion of these 200 flights (including twenty-four overflights of the USSR) were covert CIA flights, the remaining majority of the flights were mostly atmospheric and meteorological research flights flown by the CIA and Air Force for various U.S. government organizations.

Some of these U-2 research flights included milestone high-altitude missions over the tops of typhoons and hurricane in support of the Air Force's Air Weather Service (AWS) and the U.S. Weather Bureau.

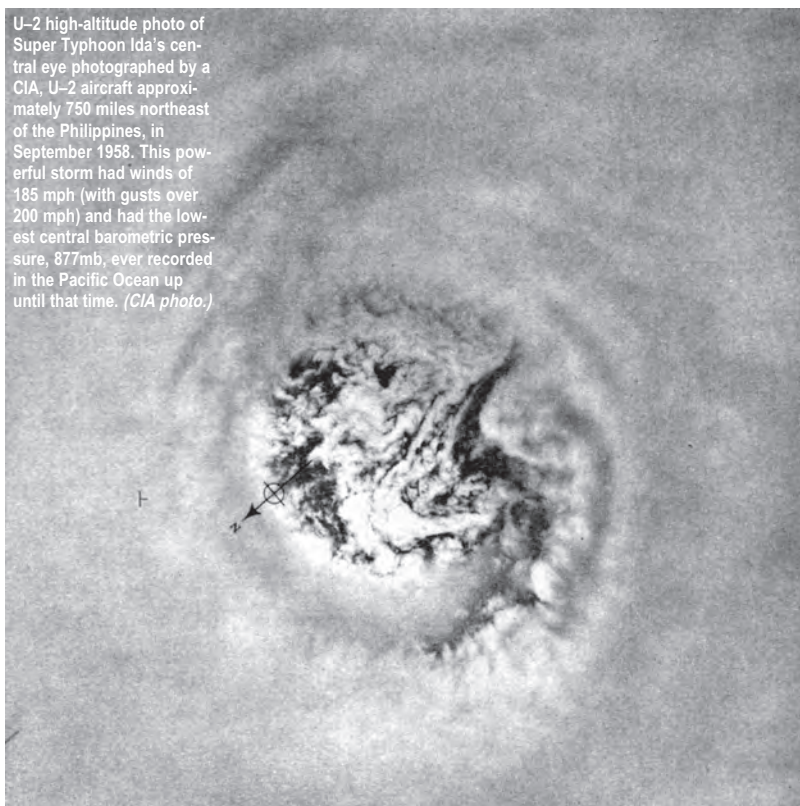
U-2 Typhoon Flights

On November 14, 1957, a U-2 over-flew the top of typhoon Kitt, in the western Pacific Ocean, just north of the Philippine island of Luzon. The aircraft photographed the typhoon's cloud formations and inner eye dynamics from high altitude - looking straight down from approximately 65,000 feet. This U-2 flight produced the first high-altitude, high-resolution images of the upper tropopause region of a tropical cyclone.

Between July 14 and 16, 1958, several more U-2 overflights were conducted into Super Typhoon Winnie off the coast of Formosa - now Taiwan. Winnie had developed into a particularly powerful typhoon with winds in excess of 175 mph, striking the western-most end the island of Taiwan, causing severe damage. The storm continued on across the Formosa Strait and impacted the southeast coast of mainland China. Later in September 1958, additional U-2 flights were flown over the tops of super typhoons Ida and Helen - photographing spectacular cloud features and structures, looking down into the storms' eyes from the lower stratosphere.

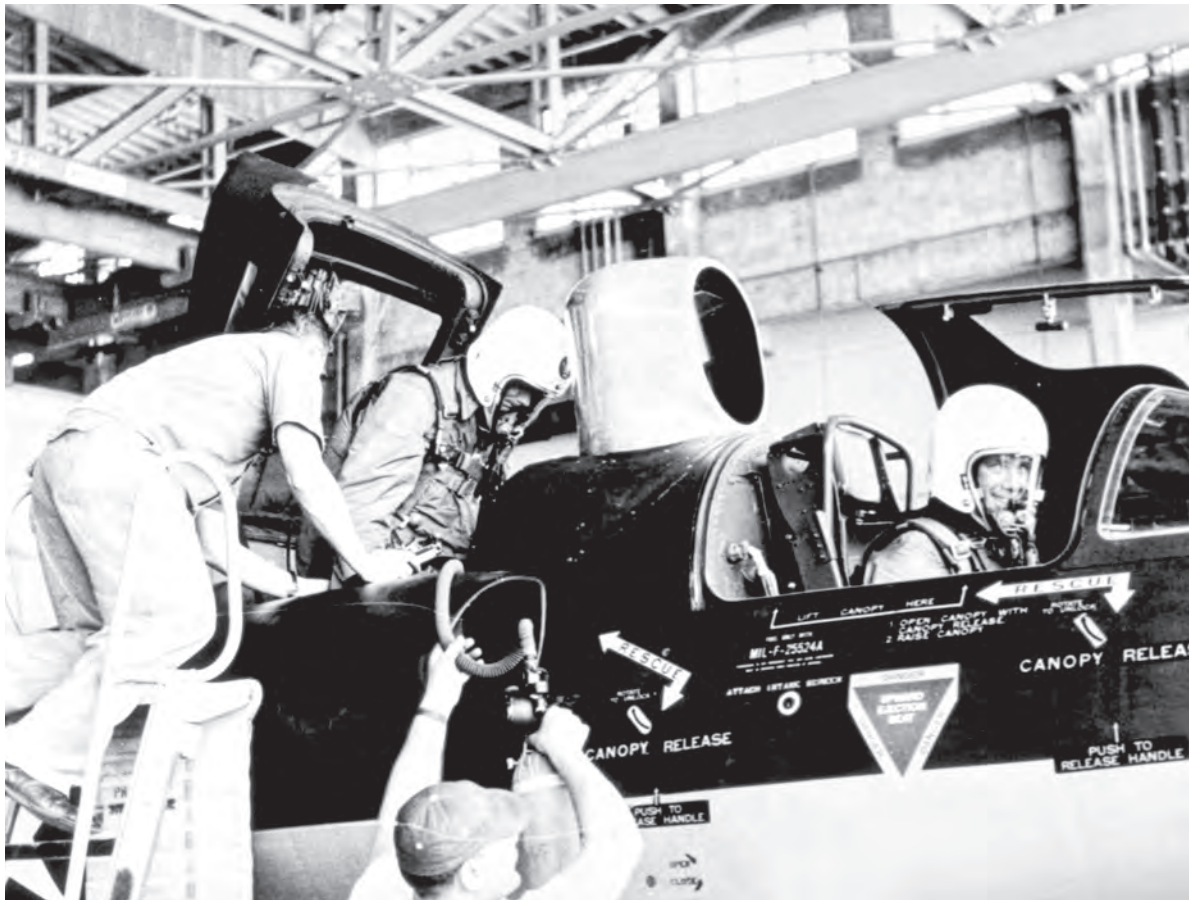
These early Pacific typhoon U-2 overflights were actually flown by the CIA's "Detachment C" (under a fake cover designation as the USAF's 3d Weather Reconnaissance Squadron-Provisional), publicly stated to be supporting AF AWS typhoon research, and based at NAS Atsugi, Japan. The typhoon flights helped in an effort to bolster their *weather reconnaissance* cover story, while providing area tactical reconnaissance coverage of the region,

U-2 high-altitude photo of Super Typhoon Ida's central eye photographed by a CIA, U-2 aircraft approximately 750 miles northeast of the Philippines, in September 1958. This powerful storm had winds of 185 mph (with gusts over 200 mph) and had the lowest central barometric pressure, 877mb, ever recorded in the Pacific Ocean up until that time. (CIA photo.)



IN AUGUST 1958, THE PRC BEGAN SHELLING OFF-SHORE TAIWANESE ISLANDS

CIA U-2s BEGAN OVER-FLIGHTS OF THE REGION TO MONITOR PRC TROOP MOVEMENTS AND NAVAL OPERATIONS... [USING] WEATHER RECONNAISSANCE FLIGHTS OF TYPHOONS AS A COVER STORY IN THE MEDIA



including the “Offshore Island Crisis”; an armed confrontation between the People’s Republic of China (PRC) and Taiwan’s Nationalists Chinese - in the summer of 1958.

In August 1958, the PRC began shelling offshore Taiwanese islands, with U.S. concern that the mainland Chinese would invade Taiwan. As these tensions heated up, CIA U-2s began overflights of the region to monitor PRC troop movements and naval operations. The CIA used the weather reconnaissance flights of Typhoons as a cover story in the media.

AFCRL U-2 Projects

As the U-2s continued their covert reconnaissance missions with the CIA and operational Air Force strategic reconnaissance squadrons, a number of early U-2A aircraft were utilized in various atmospheric and meteorological research projects under the control of the Air Force’s Cambridge Research Laboratory (AFCRL). AFCRL was located at L.G. Hanscom Field, Bedford, Massachusetts, and operated in cooperation with the Air Force’s Geophysical Research Directorate (GRD).

Some of the early AFCRL U-2 science projects encompassed high-altitude atmospheric pressure and air gas sampling measurements, moisture studies, ozone concentration research, electrical field measurements and severe thunderstorms research as well as clear air turbulence research. These AFCRL scientific research U-2s were flown by

flight test crews from the Special Projects Branch (the 6512th Test Squadron) of the Air Force’s Flight Test Center, located at Edwards AFB, California.

A group of early (ex-CIA) U-2As were permanently assigned to the test center at Edwards, specifically for atmospheric systems testing and scientific research projects. One of the Edwards’ research U-2As was utilized in an AFCRL project called Rough Rider (1960-1968). Since 1946, The Rough Rider project was a continuation of previous severe thunderstorm (Tornado) research projects under the direction of the U.S. Weather Bureau. Like the previous thunderstorm research projects, the Rough Rider missions were to collect comprehensive atmospheric and cloud dynamics data of severe thunderstorms and their surrounding environments to advance our knowledge of these powerful storms and develop improved forecasting techniques.

At that time, Project Rough Rider was a new tornado research project of the Weather Bureau’s National Severe Storms Project (NSSP); in cooperation with, and coordination from the Weather Bureau’s Research Flight Facility (RFF), the Air Force’s AFCRL, GRD and Aeronautical Systems Division (ASD) laboratories as well as NASA and the FAA. Additional support was provided by area Air Force Reserve and Air National Guard units and facilities. Under this project, AFCRL U-2 flew in, around, and over severe, tornado-producing, thunderstorms to collect vital high-altitude meteorological research data and take panoramic cloud

This aircraft was one of the first U-2As built for and operated by the CIA in 1956. It later came under the control of the AFCRL and utilized in various scientific research projects throughout the world. It is currently on display at the U.S. Air Force's SAC Museum at Offutt AFB, Nebraska. (USAF photo.)



IN 1956, THE WEATHER BUREAU... RECEIVED CONGRESSIONAL FUNDING TO ESTABLISH THE NATIONAL HURRICANE RESEARCH PROJECT (NHRP), TO CONDUCT RESEARCH ON TROPICAL CYCLONES

photography at levels near the tops of the storm clouds.

Simultaneously, in a related project, called the Lightning Research Project (1964-1966), sponsored by the AFCRL's Cloud Physics Division, in cooperation with the Aeronautical Systems Division of the Air Force's Sandia Corporation laboratory (also in association with the U.S. Federal Aviation Administration) AFCRL utilized a specially-equipped U-2 aircraft to fly in and around severe thunderstorms to study and measure their electrification dynamics and intensity. These Rough Rider U-2s captured impressive lightning photography of these powerful storms.

Another AFCRL U-2 atmospheric research project, conducted in 1961, in support of New York's Dudley Observatory, flew space particle sampling missions for the collection of micro-meteorites at high-altitudes. The AFCRL U-2s were equipped with collection scoops, similar to the HASP that pushed air through very fine mesh filter materials to collect microscopic meteorites that constantly penetrate earth's atmosphere.

Between 1962 and 1967, AFCRL used a specially-equipped U-2 aircraft to verify the heights of cloud tops during the development of the Weather Bureau's WSR-57 Weather Radar Network. The U-2s verified the heights of clouds relative to the heights being reported by the prototype radar units. This type of proof-of-concept verification still goes on today with NASA ER-2 and NOAA aircraft verifying data provided by space-based satellites.

Also, from 1964 to 1966, the Jet Stream Cirrus Research Project was conducted by the AFCRL in support of Sandia Labs. The AFCRL controlled U-2 aircraft investigated the radiation characteristics of high-altitude jet stream Cirrus clouds. In this project, a research U-2 was equipped with three different airborne thermal radiation thermometers or radio-meters and a Rosemont temperature probe. The aircraft was also equipped with various reconnaissance-type cameras. The U-2 flew above, in and below cirrus cloud formations to take thermal temperature measurements and aerial cloud formation photographs. Between April 1964 and February 1966, twenty-three U-2 jet stream cirrus cloud flights were conducted at altitudes over 65,000 feet.

U-2 Hurricane Flights, 1960-1968

In 1956, the Weather Bureau—reacting to the devastation of three consecutive hurricane strikes along the east coast of the United States, received congressional funding to establish the National Hurricane Research Project (NHRP), to conduct research on tropical cyclones that would advance our scientific understanding of these storms and provide the means to improve the accuracy of future hurricane forecasts.

During this process, the NHRP began to ponder the horizontal thermal and vertical wind structures in the upper troposphere/lower stratosphere region of tropical cyclones. At the time, there were no high-altitude aircraft adequate to probe regions over the

U-2 Timeline: Research U-2 Milestones

- 1955** - (Aug) Lockheed delivers the first U-2 spyplane to the CIA after a successful flight test of the “article 1” prototype aircraft.
- 1956** - (May 7) Dr. Hugh Dryden of NACA (the predecessor of NASA) announces the existence of the U-2 aircraft, to be flown by the US Air Force’s Air Weather Services. Dryden reports the aircraft will be used as a high-altitude research tool for meteorological investigations, including: jet stream studies, high-altitude temperature and wind structures (at jet stream altitudes), and cosmic ray research above 55,000 feet. (*Regarded as the first cover story for CIA operations of the U-2.*)
- (June 20) the U-2 flies its first operational clandestine mission over Poland and East Germany for the CIA.
 - (July 2) the U-2 flies its second and third operational clandestine overflight missions of eastern Europe (Czechoslovakia, Hungary, Bulgaria, Romania, Poland and East Germany) for the CIA.
 - (July 4) the U-2 flies its fourth operational clandestine mission for the CIA – the first overflight of the Soviet Union.
- 1957** - (June 11) the USAF’s 4028th Strategic Reconnaissance (Weather) Squadron receives the Air Force’s first six U-2A for operational use.
- (Sept) the USAF’s 4080th Strategic Reconnaissance Wing receives five U-2A aircraft, modified for HASP air sampling - including atmospheric gases and particulate sampling devices.
 - (Oct) U-2 HASP flights begin with detachment units to Ramey AFB, Puerto Rico and Plattsburgh AFB, New York.
 - (Nov 14) a CIA U-2 flies over “typhoon Kitt” conducting high-altitude photographic surveillance of the storm to bolster their weather recon cover story and support the Air Force’s Air Weather Service’s typhoon research.
 - (Nov 28) U-2A #56-6722 is delivered to the Air Force, for modification into the one and only HICAT U-2.
- 1958** - (July 14-16) a CIA U-2 flies over “typhoon Winnie” conducting high-altitude photographic surveillance of the storm to bolster their weather recon cover story and support the Air Force’s Air Weather Service’s typhoon research.
- (Sept 14) a CIA U-2 flies over “super typhoon Helen” conducting high-altitude photographic surveillance of the storm to bolster their weather recon cover story and support the Air Force’s Air Weather Service’s typhoon research.
 - (Sept 24-25) a CIA U-2 flies over “super typhoon Ida” conducting high-altitude photographic surveillance of the storm to bolster their weather recon cover story and support the Air Force’s Air Weather Service’s typhoon research.
 - (Oct) NACA is dissolved; NASA is established and replaced by NASA.
- 1960 – 1968**; AFCRL makes a research U-2 available to the Weather Bureau’s HRP and its component “Stormfury” experimental hurricane modification project. Over the next eight years, AFCRL research U-2 will fly over and into countless Atlantic hurricanes for direct and indirect hurricane research.
- 1960** - (May 1) Francis Gary Powers is shot down over Sverdlovsk, Russia (USSR)
- (May 6) a U-2 aircraft, with fictitious NASA serial number and NASA markings, is shown to the news media to bolster the pre-planned cover story of NASA conducting weather research flights with the U-2.
 - (May 7) NASA Director Dr. Hugh L. Dryden issues a press release stating that a U-2 aircraft, conducting high-altitude weather research, has gone missing during a flight over Turkey – potentially due to oxygen difficulties.
 - (May 22) a second NASA press release is issued with the cover story of a NASA U-2 aircraft gone missing, while operating overseas, and presumed lost.
 - (June) NASA, concerned that its reputation has been damaged in the wake of the Powers U-2 Affair, disengages from the CIA and will no longer provide them the cover story support for their covert U-2 operations.
- 1961** - an AFCRL controlled research U-2 is used for high-altitude space particle (micro-meteorite) collection.
- 1962 – 1967**; AFCRL controlled research U-2 aircraft support the U.S. Weather Bureau’s WSR-57 weather radar network development.
- 1962 – 1966** AFCRL controlled research U-2 aircraft are utilized for the Ozone Research Project and are flown over and into Atlantic hurricanes.
- 1963** - (March) the U-2 HASP program comes to an end with the signing of the Above Ground Test Ban Treaty between the U.S. and USSR.
- (22 Oct) a AFCRL U-2 flies up, over and into the eye of hurricane Ginny. Equipped with specialized ozone instruments, the aircraft conducts Ozone sampling, concentration measurements and cloud photography over the top of the storm and into the hurricane’s eye. (*This is the first ever high-altitude ozone research probe of a tropical cyclone.*)
- 1964 – 1966** AFCRL controlled research U-2 aircraft is used in the Lightning Research Project (in association with Project Rough Rider) and is also utilized for the Jet Stream Cirrus (Cloud) Research Project.
- 1965** - (Feb 15) the HICAT U-2 (#56-6722) conducts its first clear air turbulence research flights.
- 1964** - (Oct 14) AFCRL U-2 flies over hurricane Isbell, and with specialized Ozone instruments, conducts Ozone measurements and cloud photography over the hurricane’s eye.
- 1967** - (Sept 21) the HICAT U-2 flies over and around the eye of hurricane Beulah. Equipped with specialized thermal instruments, the aircraft conducts hurricane surveillance and high-altitude aerial photography of the hurricane’s eye, as it makes landfall in southern Texas.
- 1968** - (Feb) the U-2 flown HICAT Project comes to an end.
- (June) Air Force and AFCRL U-2 scientific research flights come to an end.
- 1971** - (April) NASA gets approval for the use of U-2 spy planes for scientific research.
- (June 3-4) NASA receives two ex-CIA U-2C aircraft (#6681/ N708NA and #6682 / N709NA) for high-altitude research.
- 1974** - (Aug 1) CIA’s U-2 manned reconnaissance operations come to an end, with the advent of improved satellite coverage. All CIA U-2 aircraft, equipment, and logistical support parts are transferred directly to the U.S. Air Force.
- 1981** - (May 11) NASA receives its first of three ER-2 (N706NA) aircraft to replace older U-2C aircraft. The ER-2 is based upon the improved TR-1A, which was later converted to and re-designated U-2S model.

A U-2 aircraft, participating in the AFCRL Ozone Research Project, flew into hurricane Ginny (1963) and over Hurricane Isbell (1964). (USAF photo.)



tops of tropical cyclones, except the U-2.

Beginning in early 1960, the AFCRL made available a U-2 to the Weather Bureau's HRP and its component Project Stormfury, an experimental hurricane modification project, providing high-altitude photographs and meteorological data in the troposphere region over the hurricanes. Storms flown by the AFCRL U-2 included hurricanes Donna (1960), Carla and Esther (1961), Flora and Beulah (1963), Ginny and Isbell (1964), Betsy (1965), and Beulah (1967), to name just a few. Although these U-2 hurricane flights were flown in direct support to hurricane research, several other of these U-2 flights were carried out in association with other research projects not directly related to hurricane research.

Also, between 1962 and 1966, AFCRL research U-2 aircraft were utilized in a high-altitude Ozone Research Project to sample and measure ozone concentrations in the upper atmosphere. As part of this project, a specially equipped U-2 aircraft probed the eye of hurricane Ginny to take the first ever ozone measurements in a tropical cyclone.

On October 22, 1963, the AFCRL Ozone U-2 flew up and over the top of Hurricane Ginny and down into its eye to make Ozone measurements. The aircraft also captured horizontal thermal (temperature) structure measurements and 180-degree panoramic cloud photographs for the Weather Bureau.

A similar ozone sampling, thermal measuring, and cloud photo reconnaissance mission was flown about a year later into hurricane Isbell. The AFCRL U-2 penetrated into the upper region of hurricane Isbell at approximately 55,000 feet - as the storm was off the coast of Florida, near Key

West. The flight plan included a vertical probe of Isbell's eye, similar to Ginny, but was terminated early before a deeper probe of the eye was made, due to a thick layer of dense cirrus-like clouds in the eye's center and increasing turbulence at various flight levels around the storm.

Another U-2 hurricane flight was conducted during hurricane Beulah in September 1967. This research flight was conducted in association with the Flight Dynamics Laboratory, of the Air Force's Systems Command.

The High-altitude Clear Air Turbulence (HICAT) Project (1964-68); was established to provide fine scale, true wind gust, velocity measurements in continuous wave length, clear air turbulence at altitudes between 45,000 and 70,000 feet—as correlated with meteorological and geophysical conditions. This project introduced the U-2 aircraft into another existing Air Force Clear Air Turbulence (CAT) program to scan various areas of the world for clear air turbulence. Operating from U.S. Air Force and allied air bases around the world, the HICAT U-2 flew missions from the U.S., eastern Canada, Alaska, Hawaii, Australia, New Zealand, Puerto Rico, Panama, France, and the UK.

One of the Edwards AFB Flight Test Center's upgraded U-2Ds (aircraft #56-6722) was modified with a specialized nose-mounted, fixed vane, gust probe and a Rosemont Lozeal temperature sensor, connected to a digital pulse code modulation recording system. Of the 285 clear air turbulence flights flown between 1962 and 1968, the U-2 flew 232 flights at HICAT altitudes above 65,000 feet.

On September 22, 1967, this HICAT U-2 flew a hurricane surveillance mission into hurricane

ON OCTOBER 22, 1963, THE AFCRL OZONE U-2 FLEW UP AND OVER THE TOP OF HURRICANE GINNY AND DOWN INTO ITS EYE TO MAKE OZONE MEASUREMENTS

Receiving its first U-2 Aircraft in 1971, NASA nearly duplicated every U-2 research project previously conducted by the Air Force research laboratories including; high-altitude micrometeorite collection, severe storms—lightning research, Ozone concentration measurement studies and tropical cyclone research support. (NASA photo.)



BY 1968, THE U.S. AIR FORCE SLOWLY BEGAN TO PRIVATIZE ITS ORGANIC RESEARCH LABORATORIES AND TO DECREASE ITS DIRECT SUPPORT OF SCIENTIFIC RESEARCH WITHIN ITS OPERATIONAL COMMANDS

Beulah to record the stratospheric conditions around and over the storm—including any clear air turbulence within the surrounding environment. As the hurricane made landfall in southern Texas, the HICAT U-2 made several counter-clockwise descending loops around the top of hurricane Beulah's eye, from 65,000 feet down through 55,000 to 45,000 feet or to the tops of the hurricane's eye wall clouds. The U-2 took detailed temperature, wind, and air motion measurements throughout the flight.

NASA U-2 Aircraft

By 1968, the U.S. Air Force slowly began to privatize its organic research laboratories and to decrease its direct support of scientific research within its operational commands. It was at this point that NASA, cognizant of the capabilities and contributions that the early Air Force research U-2 provided over the years, lobbied the U.S. government for the acquisition of its own U-2 research aircraft to carry on similar research. In 1971, NASA was granted authorization to operate U-2 aircraft for scientific research purposes. On June 3 and 4, 1971, NASA's Ames Research Facility received two ex-CIA U-2C aircraft on permanent loan from the U.S. Air Force, as high-altitude scientific research aircraft.

Fifteen years after it said that it was the U-2 aircraft program manager, and would be operating these new U-2 aircraft as scientific research tools, NASA finally received U-2 aircraft for that very purpose. ■

Bibliographical Source Notes

The bibliographical sources for the U-2 article, comprise those collected during the research effort towards the author's current book project on hurricane reconnaissance and research aircraft. The U-2 information was derived from numerous scientific technical articles, papers and reports issued by several U.S. government agencies, the U.S. Air Force, and professional meteorological technical journals and publications, including:

American Meteorological Society (Publications)
Journal of Applied Meteorology
Monthly Weather Review
Bulletin of the American Meteorological Society
NASA technical reports; on Clear Air Turbulence (CAT Project)
U.S. Air Force Cambridge Research Laboratory (AFCRL) technical reports;
High-Altitude Clear Air Turbulence (HICAT Project)
Project Jet Stream
Ozone Project
U.S. Air Force Geophysical Research Directorate; "A 50 Year Anniversary Retrospective"
CIA Historical Document; "The CIA and the U-2 Program 1954-74"
U.S. Defense Threat Reduction Agency (Defense Nuclear Agency) historical Series (1947-1997)
And a couple of science articles found in scientific publications such as *Discovery Magazine* and *Natural History*.

The NACA and its Military Patron



Planes in the Supersonic Era, 1940-1958



Michael H. Gorn

(Overleaf) A portion of the N.A.C.A.'s flight research fleet in 1952, arrayed in front of an early N.A.C.A. hangar on Edwards Air Force Base. Featured in this photo are the Douglas D-558-2 (foreground), two F-86 chase planes on either side, and at the rear, a Navy P2B-1 Superfortress, equivalent to the Air Force B-29 bomber, used as launch vehicle for the supersonic flights. (All photos courtesy of NASA.)

NO DOUBT UNINTENTIONALLY, THE CHIEF OF THE ARMY AIR CORPS, MAJ. GEN. HENRY H. "HAP" ARNOLD, CONTRIBUTED TO THIS LATENT SENSE OF ILL-WILL

Old Tensions in the Postwar World

During the decade before America's entry into World War II, the proportion of Research Authorizations pursued for the armed forces by the National Advisory Committee for Aeronautics (N.A.C.A.) doubled from 44 percent in 1930 to 88 percent in 1940. Yet, despite the increased contact that this upsurge suggests, longstanding tensions continued between Army aviation and the N.A.C.A. / Navy alliance. During World War II, overt signs of these differences receded due to the pressures of wartime research. But war could not suppress entirely the underlying feelings that persisted. On the one hand, the N.A.C.A.'s engineers at the Langley Laboratory had grown confident, perhaps even cocky, about the superiority of their research, bolstered by increased national and international recognition. On the other hand, many Army Air Forces officers chafed at this state of affairs, still hoping to pursue Billy Mitchell's vision of an independent air arm outfitted with its own, full-scale research establishment.

No doubt unintentionally, the Chief of the Army Air Corps, Maj. Gen. Henry H. "Hap" Arnold, contributed to this latent sense of ill-will. In 1938, Arnold learned from Charles Lindbergh, then touring Germany, that the *Luftwaffe* had developed military aircraft capable of flying at more than 400 miles per hour. Arnold spoke to the N.A.C.A. director, George Lewis, to see whether this claim had substance. Lewis admitted that the technology to fly at that speed and faster existed, but at the same time he reminded the general that the N.A.C.A. had always responded to—and could not be expected to anticipate—the military's requests for research. Arnold was greatly dismayed and could not understand how Lewis could have known about a breakthrough of such magnitude and not commit Langley to investigate it? Arnold also expressed dissatisfaction with the N.A.C.A. for failing to act expeditiously

to perfect the Whittle turbine engine, a technology that he had brought home personally to the U.S. from the U.K. But in a broader sense, the two men simply represented the interests of their respective institutions. Arnold was preoccupied with war planning and projecting the likely capabilities of potential enemies, while Lewis concentrated on engineering research on a broad front, for civilian and military purposes. In practice, however, it made for a tense relationship.

Perhaps as a result of these encounters, Arnold lost confidence in the N.A.C.A. and looked to alternate sources to fill the perceived deficiency. For the time being, he accommodated the situation by cultivating aircraft industry leaders and by relying on the Army Air Forces' own research team. He also sought the counsel of eminent university scientists. Professor Theodore von Karman of Caltech emerged as Arnold's most trusted technical advisor. Near the end of the war, Arnold asked the Hungarian-born scientist to form a team comprising the best minds he could enlist. Additionally, he asked von Karman to gather the most advanced scientific ideas and equipment he could find from German and other national aeronautical laboratories. Finally, Arnold invited von Karman to advise him about the direction of postwar American air power research. Karman's subsequent report, entitled *Toward New Horizons* did just that, and Arnold and his successors enacted two important structural changes implicit in the report: they established a permanent, peacetime UASF Scientific Advisory Board to provide ongoing, high-level technical recommendations; and they initiated an organization devoted to promoting engineering and science, known originally as the Air Research and Development Command. Consequently, when the United States Air Force (USAF) emerged as a separate military service in September 1947, it had already laid the cornerstone for its own in-house research establishment.

Editor's note: This is the second of two articles about the relationship between the National Advisory Committee for Aeronautics and the U.S. armed forces. The first, also by Michael Gorn, entitled "The N.A.C.A. and its Military Patrons during the Golden Age of Aviation, 1915 to 1939," appeared in the summer 2011 issue of Air Power History.

*Because this article covers a time of transition between the Army Air Forces (June 30, 1941–September 17, 1947) and the establishment of the United States Air Force (September 18, 1947), at those places in the narrative where the story crosses both periods it will be designated as Army/Air Force.

Michael H. Gorn is an author and historian specializing in aeronautics and spaceflight. He has published eight books, including the critically acclaimed NASA: The Complete Illustrated History (Merrell Publishers, 2005, 2008) and Expanding the Envelope: Flight Research at NACA and NASA (The University Press of Kentucky, 2001). A federal historian for nearly thirty years, Gorn began his career with the Department of the Air Force in Washington, D.C. He held various staff and management positions, culminating in Deputy Chief Historian of the U.S. Air Force. He also served as the first historian of the U.S. Environmental Protection Agency. Finally, Gorn worked for NASA as the Chief Historian of the Dryden Flight Research Center, Edwards AFB, California. Gorn is the recipient of the Gardner-Lasser Aerospace History Literature Award for Expanding the Envelope, presented by the American Institute for Aeronautics and Astronautics. He has also received the Alfred V. Verville Fellowship from the Smithsonian Institution's National Air and Space Museum (NASM). Gorn is presently a Research Associate at NASM and is at work on a biography of Dr. Hugh L. Dryden.



Commanding General of the Army Air Forces (AAF) Henry H. Arnold (third from left) visits the N.A.C.A.'s Aircraft Engine Research Laboratory in 1944, where he examines ice on a propeller wing. By this time, Arnold had lost confidence in N.A.C.A. Director George Lewis (far left) to pursue the AAF research agenda with the speed and vigor the general felt it demanded.

SHARP DIFFERENCES BETWEEN ARMY AVIATION OBJECTIVES VERSUS THE NAVY/N.A.C.A. POSITION HAD ALREADY HARDENED INTO DOGMA

Thus, before and during World War II, Hap Arnold contributed to the long history of mistrust between the N.A.C.A. and Army aviation. In fact, the tensions deepened as both sides geared up for the ascent on supersonic flight, the next great milestone in aeronautics. Although the formal pursuit of Mach 1 began during World War II, the N.A.C.A.'s research interest in high speed flight dated at least from 1925. At that time, the future Associate Administrator of NASA, Dr. Hugh L. Dryden, co-published with Dr. Lyman Briggs a seminal NACA Technical Report entitled "Aerodynamic Characteristics of Airfoils at High Speeds." Their article predicted the pressure effects associated with supersonic travel. Then, during the late 1920s and early 1930s, Langley engineers Eastman Jacobs and John Stack extended Dryden and Briggs' research. Using a very small-scale high speed wind tunnel and a process known as Schlieren Photography, they made images of air being compressed as a research aircraft approached Mach 1. Unfortunately, further wind tunnel work failed because the higher speeds caused incidental turbulence inside of the bigger tunnels, preventing accurate readings. As an alternative, Stack (who had already designed an experimental aircraft for the purpose) lobbied George Lewis to initiate a research airplane project with the goal of investigating transonic flight—the transition from subsonic to supersonic speed. Lewis agreed in principle, but because he lacked the resources, told Stack to pursue the project informally, at least for the time being. Meanwhile, during World War II the N.A.C.A.'s engineers and pilots accumulated additional data on transonics and supersonics by mounting small airfoils vertically on the wings of a P-51D military aircraft and flying the plane in steep dives. These maneuvers created high speed air flows on the test wings.¹

By the time George Lewis discussed Stack's project with the military, the sharp differences

between Army aviation objectives versus the Navy/N.A.C.A. position had already hardened into dogma. Army Major Ezra Kotcher did much to influence the debate. A civilian engineer later assigned to active duty at the Engineering Division at Wright Field, he (like Stack) pressed his superiors for a research airplane. But there the similarity ended. Kotcher wanted to exceed Mach 1 in the shortest time possible, using a rocket-powered aircraft. Stack pushed for a jet-powered research vehicle capable of transonic flight. Like the differences between Arnold and Lewis at their level, the contrast between Kotcher and Stack stemmed from their institutional orientations. In the midst of a global war, the Army Air Forces and Kotcher sought powerful new weapons capable of making an immediate impact on the tide of battle. Stack and the N.A.C.A., whose research concentrated more on underlying causes rather than immediate results, naturally preferred jet to rocket propulsion because it had the capacity to fly longer and collect far more data.

Ultimately, this division led to two separate but mutually dependent programs. By June 1944 the Army had decided to pursue a rocket-propelled experimental aircraft capable of flying "at least 650 mph at about 20,000 feet altitude." The Navy and the N.A.C.A. had cast their lot with a high-speed, four engine turbojet research vehicle. In October 1944, George Lewis announced that the N.A.C.A. planned to share its blueprints for experimental aircraft with the Army and the Navy, "as the NACA had no intentions of making a final design or constructing such an airplane." He might have said, more accurately, that far from having no intentions, the N.A.C.A. had no money.

By the start of 1945, Army officials began the search for a contractor to build a prototype along the lines laid out by Kotcher (with some important N.A.C.A. design suggestions). Kotcher found no interest among the manufacturers, except for Bell Aircraft of Buffalo, New York. In March, Bell agreed to produce three Experimental [X-1] vehicles. Meanwhile, the N.A.C.A. and Stack called on their old friends in the Navy's Bureau of Aeronautics and Douglas Aircraft. This link dated back decades, personified in the friendship between former Bureau of Aeronautics Chief of Design Jerome Hunsaker (see note 2) and his one-time pupil at M.I.T., Donald Douglas. But in addition to honoring old alliances, the Navy considered practical factors as well. It agreed to fund a transonic research airplane because it had not pursued much related research on its own, and also because the N.A.C.A. discoveries promised dividends that could be applied to the future naval air fleet. No less important was the fact that the sponsorship served to counter Army claims of preeminence in the field. Thus, while the Army negotiated with Bell, between February and April 1945 the Navy and Douglas (advised by the N.A.C.A.) laid the groundwork for their prototypes. In June, they signed an agreement for the fabrication of two models: the Douglas D-558-1 and D-558-2; respectively, the Skystreak and the

Sent expressly to flight test supersonic aircraft, these early arrivals at Muroc Army Airfield (later Edwards Air Force Base) were led by the unit's director, Walter Williams (back row, far right). Williams and four other initial employees came to Muroc in September 1946 from the Langley Memorial Aeronautical Laboratory, Hampton, Virginia.



FLIGHT RESEARCH ON THE BELL X-1 AND THE DOUGLAS D-558s STIRRED CONTENTION BETWEEN THE ARMY AIR FORCES AND THE N.A.C.A.

Skyrocket. In all, the Navy committed itself to purchase six aircraft, all of them initially configured as turbojets, two of which would be modified later for hybrid turbojet/rocket propulsion.²

Flight research on the Bell X-1 and the Douglas D-558s stirred contention between the Army Air Forces and the N.A.C.A. In part, the friction grew out of the main personalities involved in X-1 flight testing. Three formidable individuals gathered at Muroc Army Air Field (later Edwards Air Force Base), which the Army had chosen for the Mach 1 flights. Selecting from a list of 125 candidates, Col. Albert Boyd, Commander of the Flight Test Division at Wright Field, selected Capt. Charles "Chuck" Yeager to be the lead X-1 pilot. Proud and thin-skinned, Yeager showed exceptional ability and courage in combat, completing sixty-one missions and scoring twelve aerial victories during World War II. Bell Aircraft picked an equally headstrong individual as its on-site representative, the brilliant and mercurial Bob Stanley. Not to be outdone, the N.A.C.A. sent Walter Williams, a young, energetic, and tough-minded Langley engineer, to direct its new High Speed Flight Station on Muroc and to oversee its participation in the X-1. Sparks flew whenever these three met. Not unexpectedly, Yeager's impatient, flying ace persona and Stanley's high-handed, superior attitude earned Williams' hearty dislike—and vice versa. For his part, Williams at times seemed bent on conflict. But aside from the personalities, these men had to follow the dictates of the institutions they represented. Williams' mission at Muroc—imposed by his bosses at Langley—required that he safeguard the thirty-year tradition of N.A.C.A. research. It was a process that demanded full and accurate data, acquired through painstaking, incremental steps and thorough instrumentation. In contrast, Stanley represented a business mentality that sought to complete projects expeditiously, in accordance with contractual obligations, and to maximize profits. Yeager,

like Ezra Kotcher, embodied an organization devoted to its wartime mission, and to reaching milestones without undue fretting about the underlying science and engineering. Not unexpectedly, tempers flared when Williams insisted on the highest standards of data collection, a demand he made so that the transonic phenomena could be understood fully, replicated, and published with confidence.³

Initial preparation and flight testing of the X-1 unfolded over a twenty-two-month period, allowing plenty of time for disputes and misunderstandings to arise. Bell's pilot Jack Woolams made ten X-1 glide flights at Pinecastle Army Air Forces Field, Florida, between January and March 1946. Then, from April to June 1947, Bell's Chalmers Goodlin flew the bullet-shaped aircraft nine times after its transfer to Muroc. Finally, Captain Yeager made nineteen glide and powered flights between August and November 1947. In order to head off confrontations—a real possibility after bickering broke out at Pinecastle—the two sides convened in late June/early July 1947 to establish rules of engagement. They needed to decide on two separate flight programs: first, for the Air Force's X-1 model (designated aircraft number one, or X-1-1); and subsequently for the N.A.C.A.'s X-1 (designated aircraft number 2, or X-1-2). They agreed to give the military sway over vehicle number 1s flight research, but with the important proviso that "all activities" had to be coordinated with the N.A.C.A. Furthermore, Walt Williams won key concessions regarding the X-1-1s instrumentation, getting permission to furnish it with the N.A.C.A.'s six-channel telemetry and on-board recorders, and to have N.A.C.A. technicians install and maintain the equipment. Williams' team also scored a victory in getting first access to the test results from the number 1, as well as the number 2 aircraft. But institutional perspectives still prevailed. In concluding remarks at the end of the talks, Colonel Boyd

Six of the principal figures involved in testing the X-1 aircraft at Muroc: the N.A.C.A.'s Head of Operations Joe Vensel, Head of Instrumentation Gerald Truszynski, Director Walter Williams, and Chief Engineer De Beeler (respectively, first, second, fourth, and sixth from the left). The Air Force assigned pilot Chuck Yeager and engineer Jack Ridley (respectively, third and fifth from the left).



YEAGER MADE NO SECRET OF HIS FRUSTRATION WHEN A MISSION HAD TO BE CANCELLED "BECAUSE SOME INSTRUMENT WOULDN'T WORK"

expressed the hope that the X-1-1 program would be brief—that is, not encumbered by the elaborate pursuit of flight data. The N.A.C.A.'s top representative, Hartley Soule, countered that the Air Force should plan for the full complement of N.A.C.A. instrumentation from the start, and delete items as necessary, rather than adding as an afterthought.⁴

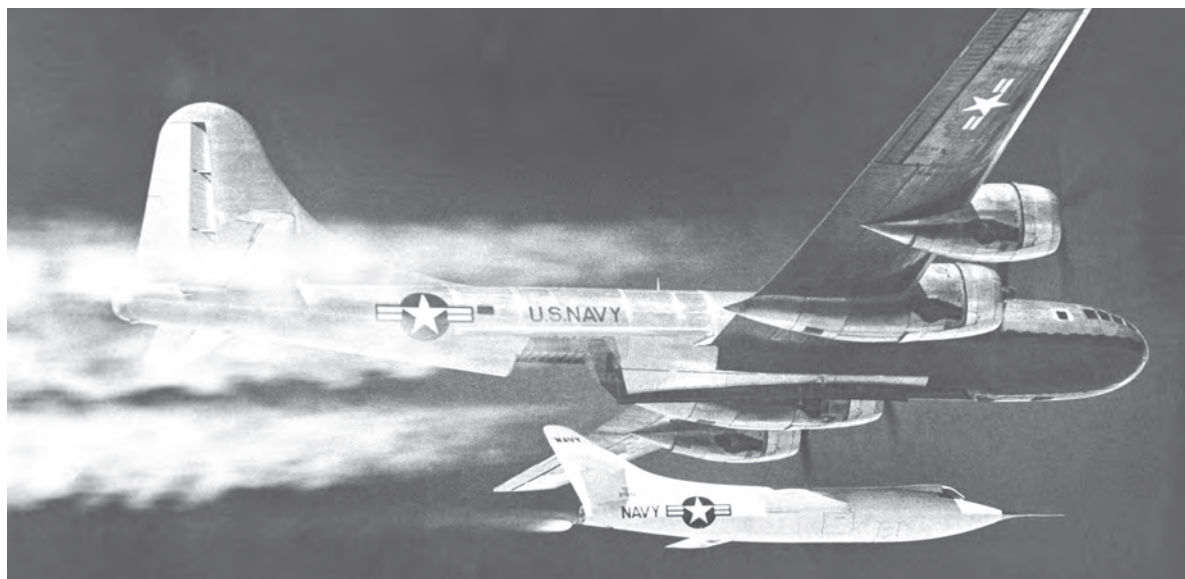
Not surprisingly, these opposing viewpoints manifested themselves on the flightline. Williams and Yeager clashed frequently about the role of the N.A.C.A. devices. Yeager made no secret of his frustration when a mission had to be cancelled "because some instrument wouldn't work." But Williams held firm. "[O]ur problem," he said, "became one of maintaining the necessary balance between enthusiasm and eagerness to get the job completed with a scientific approach that would ensure success of the program." A classic example of the difference occurred in August 1947. True to the N.A.C.A. tradition, each X-1 mission had been choreographed to expand the flight envelope in a premeditated, incremental manner, enabling engineers to observe unexpected or dangerous phenomena before advancing to the next stage. Yeager piloted the first rocket-powered test on August 29, but he failed to adhere to the flight plan, which called for a maximum speed of Mach 0.82. Instead, pressed to his seat and flying almost vertically, Yeager rode the X-1 to Mach 0.85. Not only did Williams refuse to celebrate this milestone or the extra bit of progress towards Mach 1, but insisted that Yeager fly the entire program over again since the telemetry did not capture data between Mach 0.80 and 0.85. Dressed down by Colonel Boyd for his freelance antics, Yeager had no choice but to comply. As a further act of contrition, he found himself attending all-too-frequent technical briefings with Williams and his staff, at which Yeager felt that the N.A.C.A. engineers patronized him. He attributed this behavior, correctly or not, to his lack of a college education.

Despite the hard feelings (which ran in a number of directions, not just between Yeager and the N.A.C.A.), the X-1 team found itself with one major technical obstacle in the path to Mach 1: the loss of elevator control between Mach 0.88 and 0.94. They overcame—or at least mitigated—this danger by letting the tail's horizontal stabilizer move freely (instead of keeping it in its standard, fixed position). Finally, on October 14, 1947, Chuck Yeager and the X-1-1 crossed the supersonic frontier.⁵

As the X-1 evolved, the Bureau of Aeronautics' research airplanes underwent construction at Douglas Aircraft. The Navy actually set out on an even more ambitious experimental program with its D-558s. Its contract with Douglas called for six airframes: three straight winged, turbojet-powered Skystreaks (D-558-1), and three swept-wing, jet and rocket-powered Skyrockets (D-558-2). As conceived, the Skystreaks took off from runways (instead of being dropped from a mothership like the X-1), under the power of General Electric turbojet engines that produced 4,000 pounds of thrust each. This configuration enabled it to fly through the transonic range for relatively long flights. In contrast, the Skyrocket's engineers designed it to fly with the G.E. turbojet; or with a rocket engine like that of the X-1; or with a blend of the two. It flew from the lower transonic range to well above Mach 1, at times from runways, at times by air-launch. And if these varied flight regimes did not demand enough, the Navy also wanted to reserve the option to convert the Skystreak and the Skyrocket for combat service.

Compared to the high drama that attended the design and testing of the X-1, the D-558s almost seemed lackluster. Partly, the difference stemmed from the X-1 itself, in effect a crash program designed to achieve a revolutionary result in a short period of time. Free from these inherent pressures, the N.A.C.A. pursued the D-558s as standard research vehicles, with the modest goal of accumu-

The Douglas D-558-2 Skyrocket, sponsored like the D-558-1 Skystreak by the U.S. Navy. Both programs unfolded without the drama and contention of the X-1, in part because of the longstanding and friendly partnership between the N.A.C.A. and the Navy, dating back as early as 1915. A launch like this one propelled N.A.C.A. pilot A. Scott Crossfield to Mach 2 on November 20, 1953.



**DETERMINED
NOT TO BE
SURPASSED
BY
CROSSFIELD
OR THE
N.A.C.A.,
CHUCK
YEAGER AND
THE AIR
FORCE
QUICKLY
ATTEMPTED
TO REGAIN
THE SPEED
RECORD**

lating reliable data. In addition, the N.A.C.A. and the Bureau of Aeronautics established some simple rules at the start of the Skystreak program calculated to avoid the heated atmosphere that had prevailed during the X-1-1 tests. Instead of following the Army/Air Force example of multiple assignments for each vehicle, the Navy and its partners chose specific roles for each of the three Skystreaks. Consequently, Douglas Aircraft conducted the D-558-1-1 (Skystreak number 1) research on its own, in addition to providing major maintenance on all three Skystreaks. The N.A.C.A. tested the D-558-1-2 and 1-3, as well as performing routine maintenance. The Navy actually assumed a minor role, confined to supporting engine overhauls and replacement. But beyond these straightforward tasks, the long, amicable association between the Bureau of Aeronautics and the N.A.C.A.—not to mention the Bureau's comfortable relationship with Donald Douglas—resulted in a level of trust among the partners not evident in the more turbulent N.A.C.A.-Army/Air Force encounters.⁶

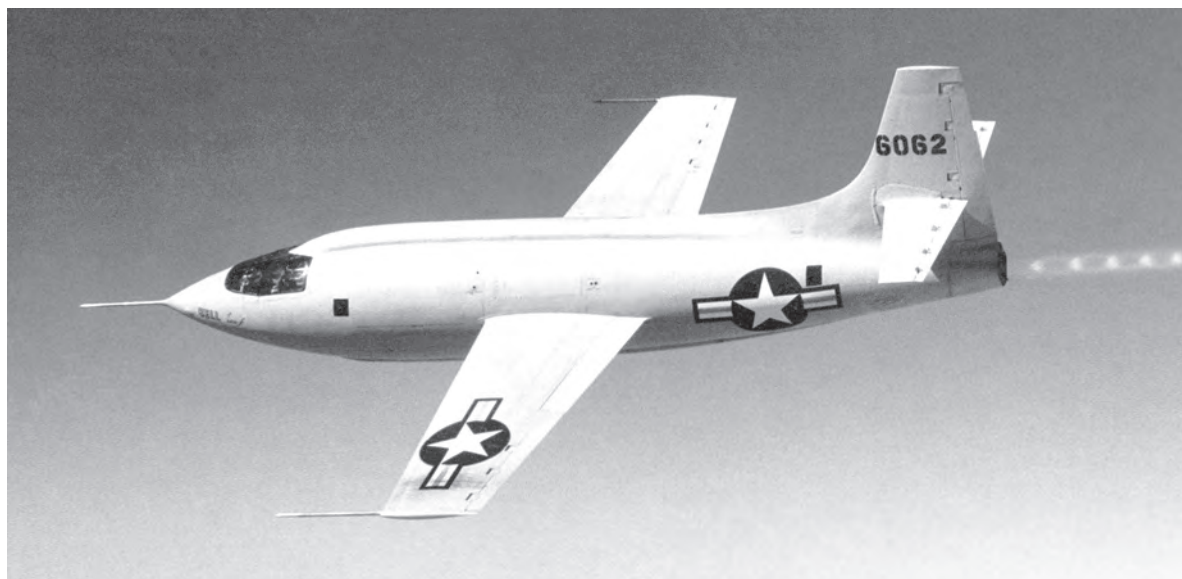
Yet, if the programmatic aspects of the D-558s ran smoothly, both the Skystreak and Skyrocket gave their crews and engineers plenty of technical headaches. The Skystreak flew easily up to Mach .75. Above that speed, whether in level flight or in dives, it experienced increasing and dangerous buffeting and vibration as it approached Mach 1. Clearly, this aircraft had no future in combat. On the other hand, the Skyrocket exhibited good flying qualities below the speed of sound, but at high speeds and high angles of attack it pitched up violently, caused by shock waves stalling the flow of air at the wing tips. From November 1947 to June 1953, and from May 1949 until December 1956, respectively, the Skystreak and Skyrocket underwent hundreds of test flights as N.A.C.A. engineers probed the secrets of transonic and supersonic travel. The published results proved to be invaluable for aircraft manufacturers poised to build newer, faster jet aircraft for the armed forces.

During these tests, the Skyrocket gradually

flew well above Mach 1, prompting a decision about Mach 2, the next great milestone in supersonic flight. Walt Williams felt that this objective should be pursued in order to learn the Skyrocket's limitations. In November 1951, N.A.C.A. pilot Scott Crossfield had flown it to Mach 1.65; in August 1953 he pushed on to 1.878. Then, bearing in mind that December 3, 1953, marked the fiftieth anniversary of the Wright Brothers' first powered flight, Williams and Crossfield concluded that the symbolic importance of attaining this record (as the Army had done for Mach 1) justified the effort. Williams quietly planned for the attempt, with the backing of friends in the Navy. After a run of flights in August 1953, by Marine Corps pilot Marion Carl that broke the unofficial world altitude record at 83,235 miles, Crossfield flew on October 14 to Mach 1.96, within a whisker of the big goal. Finally, on November 20, 1953, he piloted the Skyrocket to 72,000 feet, leveled off, and fired the D-558's four rocket chambers, accelerating wildly for 45 seconds. An engine misfire told him he had gone as fast as he dared, and when he looked down at his gauges, the Machometer read 2.05.

An incident that followed close on the heels of Crossfield's success marked the denouement of the long-smoldering tensions between the N.A.C.A. and the Army/Air Force. Determined not to be surpassed by Crossfield or the N.A.C.A., Chuck Yeager and the Air Force quickly attempted to regain the speed record. On December 12, 1953, Yeager took off in the cockpit of a new X-1A aircraft that the USAF had prepared for the attempt. Five feet longer and 2,500 pounds heavier than the original X-1, the more powerful X-1A had a dangerous flaw known to its designers at Bell. They alerted their counterparts in the Air Force that over Mach 2.3 the aircraft suffered severely reduced directional stability. Although cautioned, Yeager decided to ignore the warning. Flying for the record on December 12th, he experienced violent instability when he reached Mach 2.3, but continued to accelerate anyway. At Mach 2.44 he lost control of the aircraft. It plunged

In flight over the high desert, the X-1, piloted by Captain Chuck Yeager, exceeded Mach 1 on October 14, 1947, despite considerable contention between the Air Force and N.A.C.A. participants during the test program.



THE FLIGHT THAT ALMOST COST CHUCK YEAGER HIS LIFE HASTENED A RE-ASSESSMENT OF THE RELATIONSHIP BETWEEN THE N.A.C.A. AND THE AIR FORCE

for 51 seconds from an altitude of 75,000 feet. As the plane began an inverted spin, Yeager succeeded first in turning the spin upright, and then in returning it to level flight. When he finally recovered from the dive, he had fallen 50,000 feet.⁷

Healing the Schism: the Role of Hugh Dryden and the X-15

The flight that almost cost Chuck Yeager his life hastened a re-assessment of the relationship between the N.A.C.A. and the Air Force. This re-thinking hinged on the reputation and judgment of Dr. Hugh L. Dryden, the Director of the N.A.C.A. In a gradual climb to prominence, Dryden had become one of the world's preeminent figures not only in the technical aspects of flight, but as an administrator of aeronautical research. Dryden was born in 1898 in Southern Maryland, the son of a grocer who later became a streetcar conductor. Despite the lack of family advantages, young Dryden showed advanced intellectual talents, especially in mathematics. He entered high school at age twelve, started classes at Johns Hopkins University at fifteen on a full scholarship, earned a bachelor's degree at eighteen, and a doctorate in physics at twenty. Yet, despite all of the attention that accompanied his school achievements, he had a quiet, unassuming temperament, and strong religious instincts. Dryden's career progressed unobtrusively, but surely. He went to work for the National Bureau of Standards (NBS) straight out of Hopkins and became the chief of the newly formed Aerodynamics Section. He remained at the NBS for twenty-nine years, conducting basic research that won international recognition and eventually rising to the position of Associate Director. As he navigated the NBS bureaucracy, he encountered the N.A.C.A. in a number of ways: through its annual subsidy of NBS's aeronautical research; through a seminal series of N.A.C.A. technical reports (to which he contributed many influential papers); and through his service on N.A.C.A. technical committees. Indeed, upon George Lewis's

resignation from the N.A.C.A. in 1947, it seemed only logical that Dryden should succeed him, considering not only his fame as an aeronautical researcher, but also his familiarity with the N.A.C.A.'s people and practices.

Dryden led the N.A.C.A. on the strength of his management experience at NBS, his vast technical knowledge, and his well known integrity and self-restraint. His novel combination of professional qualifications and personal qualities gained him many friends in the Washington scientific community, and even more in the armed forces, with whom he worked extensively during World War II. Not only did he lead the famous and successful Bat Guided Missile project for the Navy, but his collaboration with Theodore von Karman on the technology forecast *Toward New Horizons* increased his circle of contacts in the government, the private sector, and academia. Dryden directed the N.A.C.A. (neither a well known, well funded, nor powerful government agency) in part using the leverage gained through his wide-ranging acquaintances.

His role in formulating a national wind tunnel policy illustrates his deftness at finding compromise and making allies. To provide the nation with a modern infrastructure of high speed wind tunnels—facilities essential to Cold War aeronautical research—Congress passed the Unitary Wind Tunnel Plan Act of 1949, which made millions of dollars available for these structures. Unfortunately, parochial interests asserted themselves and the Air Force, the N.A.C.A., and the aircraft manufacturers became deadlocked over the location and control of these new facilities. Although a partisan in the discussions, Hugh Dryden broke the impasse. When the Air Force demanded a massive new complex of hypersonic tunnels at Tullahoma, Tennessee, Dryden simply remained silent, even though he realized that acquiescence came at a price—the N.A.C.A. had to abandon any hope of building a similar center of its own. Yet, his restraint not only gained the N.A.C.A. the good will of the Air Force, but also a handsome reward of \$136

The staff of the N.A.C.A. High-Speed Flight Research Station, photographed in 1950. These individuals contributed substantially to the supersonic breakthroughs achieved from 1947 to 1953: the first Mach 1 flight by the X-1, the many and valuable transonic research flights of the D-558 Skystreak, and the first Mach 2 flight by the D-558 Skyrocket.



million to build three supersonic and hypersonic wind tunnels at three of its laboratories. Moreover, although Congress stipulated that the new N.A.C.A. tunnels needed to be available for the aircraft industry use, Dryden guessed (correctly, as it turned out) that in practice the N.A.C.A. researchers would dominate their operating schedules. The subsequent tunnels that rose by the mid-1950s—the Mach 2 at the Lewis Flight Propulsion Laboratory in Cleveland, Ohio; the Mach 3.5 at Ames Aeronautical Laboratory in Sunnyvale, California; and the Mach 5 at Langley Memorial Aeronautical Laboratory in Hampton, Virginia—together played a decisive role in one of the most important projects ever undertaken by the N.A.C.A. Not accidentally, the pursuit of this project also occasioned the healing of the N.A.C.A.-Air Force rift.⁸

After the first Mach 2 flight, scientists and engineers at the N.A.C.A.'s laboratories began to think beyond supersonic to hypersonic travel, classically defined as Mach 5 and above. In fact, in the year before Scott Crossfield's historic achievement, the N.A.C.A.'s Aerodynamics Committee recommended an active hypersonic research program. The Executive Committee in Washington, D.C. responded by instructing the N.A.C.A. labs to investigate aircraft technologies relevant to flight up to Mach 10. Early in 1954, the N.A.C.A.'s Interlaboratory Committee determined that the hypersonic prototype must be a completely new vehicle, not a modification of an existing aircraft. This decision emboldened researchers at Langley to arrive at two initial requirements: that it fly at 6,600 feet per second (4,500 miles per hour), and reach an altitude of 250,000 feet (about 47 miles).

At this point, Hugh Dryden—who not only had a strong institutional interest in high speed flight, but also a keen personal research interest dating back to the 1920s—took center stage in the project and remained there until his death in 1965. On July

9, 1954, he presented the N.A.C.A. concept of a hypersonic prototype aircraft to representatives of the Bureau of Aeronautics and the Air Force research and development establishment. He succeeded in persuading the Navy and the Air Force to fund this costly new project, but he had another motive as well. Dryden also wanted to present the N.A.C.A.'s proposal openly, to all interested parties at once, in order to avoid the repetition of the bitter race to Mach 2 and the deadly consequences that almost resulted. Indeed, during the run up to the record-breaking Skyrocket flight, Dryden had at first insisted that the N.A.C.A. pilots stay under 80,000 feet and below Mach 2, not only because he saw no scientific value in pressing beyond these targets, but also because he did not want to provoke the Air Force. He preferred instead the non-confrontational approach that had worked so well during the Unitary Wind Tunnel negotiations and on other occasions. Eventually, Dryden relented and approved the Mach 2 flight, perhaps heeding the arguments of Bureau of Aeronautics officials sympathetic to Crossfield reaching the milestone first. But now, at this conference in 1954, he saw a chance to avert a head-to-head competition. As a consequence, when he learned at the meeting that both sides had plans to pursue a hypersonic airplane on their own—the Air Force Scientific Advisory Board had already recommended a similar program, and the Office of Naval Research had recently let a contract for a feasibility study—he pressed them to merge their efforts. In the end, Dryden persuaded both of the military services to re-structure their ambitious plans and to join the N.A.C.A. in a tripartite venture to fabricate and fly the legendary X-15 aircraft.⁹

Dryden succeeded in part because of his personal stature and proven negotiating talents, but also because he appears to have cast the X-15 shrewdly as a Cold War project, a characterization well-calculated to gain the approval of the armed forces. Three months later, on October 5, 1954, the N.A.C.A. Committee on Aerodynamics passed a res-

DRYDEN SUCCEEDED IN PART BECAUSE OF HIS PERSONAL STATURE AND PROVEN NEGOTIATING TALENTS, ...HE...CAST THE X-15 SHREWDLY AS A COLD WAR PROJECT

By 1953, the High-Speed Flight Research Station had proven its worth and earned a permanent place on Edwards Air Force Base. Here, Walter Williams pushes a ceremonial shovel into the sand, initiating construction for a new main building for the N.A.C.A. outpost. He is accompanied by Head of Instrumentation Gerald Truszynski, Head of Operations Joe Vensel, Head of Personnel Marion Kent, and California state official Arthur Samet (left to right).



HUGH DRYDEN CONTINUED TO EXERCISE A PROFOUND INFLUENCE OVER THE X-15 FOR MORE THAN A DECADE

olution that expanded the envelope of the prototype to Mach 7 and to several hundred thousand feet in altitude. But just as important, it used the language of the Cold War to make the case for the X-15, declaring that “the necessity of maintaining *supremacy in the air* continues to place *great urgency*” [author’s italics] on flying piloted, hypersonic aircraft. Similar phrasing appeared again, surfacing this time at a meeting of the Research Airplane Committee (a panel that dated back to the X-1 project), convened by Dryden and held in his office on October 22, 1954. The attendees—Dryden; N.A.C.A.’s associate director for research, Gus Crowley; Navy Rear Admirals Lloyd Harrison and Robert Hatcher, and Air Force Brigadier General Benjamin Kelsey; and Dr. Albert Lombard—formulated the governing principles of the X-15 project. They committed themselves to it because “it is feasible and a matter of *national urgency* [author’s italics] to establish a joint project for a new high speed research airplane.”

Just a year before, the Air Force and the N.A.C.A. had faced off in an open competition to win the Mach 2 crown. Now, representatives of both organizations agreed to mutual cooperation and a clear set of responsibilities for the X-15. What had changed? This time, Hugh Dryden became involved, enlisting his own reputation, as well as some Cold War flourishes, to gain the necessary budgetary support on his own terms. Unlike the X-1 working level meetings that took place in June and July 1947 to iron out Air Force and N.A.C.A. roles *after the fact*, the X-15 rules of engagement had been articulated early, and at the highest institutional level. Ultimately, three senior figures in their respective agencies (Hugh Dryden for the N.A.C.A., J.H. Smith, Assistant Secretary of the Navy for Air, and Trevor Gardner, Air Force Special Assistant for Research and Development) signed a Memorandum

of Understanding (MOU). This short document, dated December 23, 1954, made the relationships unambiguous. Hugh Dryden and the N.A.C.A. had the final say regarding the X-15’s research agenda. The MOU ceded to Dryden himself the “technical direction” of the X-15 program (with Research Airplane Committee cognizance), as well as the power to report and otherwise disseminate results as he thought best. It also gave to the N.A.C.A. sole authority to conduct the flight tests and mandated that the contractors chosen to build the prototypes adhere to the N.A.C.A.’s design concepts. Although it delegated oversight of actual contractor fabrication to the Air Force, the MOU stipulated that Dryden had ultimate sovereignty over these matters, too. Almost off-handedly, it designated the Navy and Air Force as the project’s financiers. Finally, the MOU returned to a now familiar Cold War justification, once more referring to the project as “*a matter of national urgency*.” [author’s italics]¹⁰

Hugh Dryden continued to exercise a profound influence over the X-15 for more than a decade. His personal connections with many top Navy and Air Force leaders enabled him to keep his finger on the pulse of the program. For instance, his longstanding friendship with Lt. Gen. Donald Putt, Air Staff Chief of Development from 1954 to 1958, allowed him to move unobtrusively behind the scenes to clarify points of contention and avert open conflicts. In one case, Dryden decided to reconsider the MOU’s provision giving the N.A.C.A. sole control over X-15 flight testing. He now realized that the Air Force and Navy also needed to have some role and asked the Director of the N.A.C.A.’s High-Speed Flight Station—still the hard driving Walt Williams—to include them. Williams responded by convening a local X-15 steering committee, making himself the chair, and populating it with some of his own staff and some from the Air Force Flight Test

Standing in the middle in this 1964 photo is Dr. Hugh L. Dryden, the first Deputy Administrator of NASA and the former Director of the N.A.C.A. Dryden's keen interest in, and direct participation with the X-15 program helped heal the breach between the Air Force and the N.A.C.A., inaugurating an era of close relations that began with the creation of NASA in October 1958. With Dryden is Flight Research Center Director Paul Bikle, and a matured Walter Williams (left and right).



THE NEW NATIONAL AERONAUTICS AND SPACE ADMINISTRATION BEGAN WITH THE FREEDOM TO ESTABLISH ITS TIES TO THE MILITARY SERVICES UNENCUMBERED BY THE ILL-WILL AND INTRIGUES OF THE PAST

Center. Dryden reported these steps to Putt and assured him that he (Dryden) and the Research Airplane Committee—not Williams—still retained the overall technical direction of the project. Putt agreed, but Dryden realized that a man of Williams' strong temperament needed to be cautioned against aggravating relations with the Air Force, so he sent him a warning:

*For the future protection of your position [author's emphasis], it is suggested that you make certain that the Flight Test Center personnel are aware that the apparent scope of the authority to be exercised by the [X-15 steering] committee...goes beyond matters over which the local level has jurisdiction. Any major changes in the scope or intent of the program have to be cleared with NACA Headquarters. It is presumed there are similar restraints on the actions of the Flight Test Center. It should be understood at the outset, therefore, that the steering committee would have jurisdiction only in regard to matters that would normally come under jurisdiction of the Flight Test Center or the High-Speed Flight Station.*¹¹

With a few exceptions, Dryden's charter kept peace among the parties during the duration of the X-15 program (1954 to 1968). In time, the improved atmosphere and close collaboration led to a general reduction in the tensions that had persisted for so long among the National Advisory Committee for Aeronautics, the Air Force, and its predecessors. As a consequence, when the N.A.C.A. closed its doors for the last time on September 30, 1958, the new National Aeronautics and Space Administration began with the freedom to establish its ties to the military services unencumbered by the ill-will and intrigues of the past.

During the succeeding decades, the relationship between the armed forces and NASA became increasingly intertwined. Military officers constituted all of the early astronaut corps, and a substantial part to this day. Many general officers (Samuel Phillips during the Apollo program, NASA Administrator Richard Truly, and the present Administrator Charles Bolden, to name but three) have offered leadership at the highest levels of the agency. Indeed, in some instances, the affiliation between NASA and the DoD has become so enmeshed as to make the institutional boundaries indistinct. Since the year 2000, a series of interagency agreements among NASA and the Defense Department have transformed the landscape of aeronautical research, expanding "cooperation between the two parties and...facilitat[ing] the parties' establishment of an integrated national strategy for the management of their respective aeronautical test facilities." A few years earlier, a White House Office of Science and Technology Federal Laboratory Review found that "coordination and integration among NASA and the other agencies has been particularly close with DoD...." It went on to say that

*At present, there are 356 separate agreements between NASA and DoD on research collaboration and other areas of cooperation. Collocated DoD teams include U.S. Army teams at LaRC [Langley Aeronautical Research Center] (55 persons), ARC [Ames Research Center] (100 persons), and LeRC [Lewis Research Center] (55 persons), all of which are using NASA wind tunnel facilities for rotary wing related research projects. Other work is underway at various levels of security classification.*¹²

Approaching the National Advisory Committee for Aeronautics' centennial, agreements such as these have supplanted the old model of military patronage, a stratified fee for service system that prevailed from

1915 to the 1950s. In its place, a merged civil-military, space and aeronautics complex has emerged, one that is neither wholly military, nor entirely civilian, but an interlocked hybrid of the two. ■

NOTES

In preparing this article, I would like to acknowledge the help of Dr. Von Hardesty, Senior Curator at the National Air and Space Museum, Washington, D.C., and Mr. Karl Bender, Research Librarian at the NASA Dryden Flight Research Center, Edwards, California.

1. Dik Daso, *Architects of American Air Supremacy: General Hap Arnold and Dr. Theodore von Karman* (Maxwell Air Force Base, Ala.: Air University Press, 1997), pp. 70-73; Michael H. Gorn, *The Universal Man: Theodore von Karman's Life in Aeronautics* (Washington and London: Smithsonian Institution Press, 1992), pp. 93-129; Hansen, *Engineer in Charge: A History of Langley Aeronautical Laboratory, 1917-1958* (Washington, D.C.: NASA, 1987), pp. 161, 253-70; Michael H. Gorn, "Who was Hugh Dryden and Why Should We Care?," in *Realizing the Dream of Flight: Biographical Essays in Honor of the Centennial of Flight, 1903-2003*, eds. Virginia P. Dawson and Mark P. Bowles (Washington, D.C.: NASA, 2005), p. 172; Alex Roland, *Model Research: The National Advisory Committee for Aeronautics, 1915-1948*, vol. 2, Appendix B: *Members of the NACA Main Committee, 1915-1958* (Washington, D.C.: NASA, 1985), p. 428.

2. Good relations between the N.A.C.A. and the Navy originated with the formation of the N.A.C.A. in 1915, and lasted through the period covered in this article. This long institutional alliance continued after World War II in part due to the appointment of Dr. Hunsaker to the chairs of the N.A.C.A. Executive and Main Committees in 1941, both of which he held until 1956. Earlier in his career, as a young naval officer, Hunsaker filled prominent positions in the Bureau of Construction and Repair and the Bureau of Aeronautics. For the importance of Hunsaker to the N.A.C.A./Navy relationship, see Michael H. Gorn, "The N.A.C.A. and its Military Patrons during the Golden Age of Aviation, 1940-1958," in *Air Power History*, volume XX. James O. Young, *Meeting the Challenge of Supersonic Flight* (Edwards Air Force Base, California: Air Force Flight Test Center History Office, 1997), pp. 3-10; F.O. Carroll to Commanding General Army Air Forces, Jun. 26, 1944 (first quoted passage); Minutes of Meeting of Committee on Aerodynamics, Oct. 4, 1944 (second quoted passage); Louis Rotondo, *Into the Unknown: the X-1 Story* (Washington and London: Smithsonian Institution Press, 1994), pp. 18-27; William P. Trimble, *Jerome C. Hunsaker and the Rise of American Aeronautics* (Washington and London: Smithsonian Institution Press, 2002), pp. 221-22. Primary documents cited in this note are located in the History Office Archives, Air Force Flight Test Center, Edwards Air Force Base, California.

3. Michael H. Gorn, *Expanding the Envelope: Flight Research at NACA and NASA* (Lexington, Kentucky: The University Press of Kentucky, 2001), pp. 177-96; Flint O. Dupree, *U.S. Air Force Biographical Dictionary*, "Charles Elwood Yeager," (New York: Franklin Watts, 1965), p. 267; Rotondo, *Into the Unknown*, p. 235.

4. Richard P. Hallion and Michael H. Gorn, *On the Frontier: Experimental Flight at NASA Dryden* (Washington and London: Smithsonian Books, 2003), pp. 378-79; Gorn, *Expanding the Envelope*, pp. 192-94 (quoted pas-

sage on 193); Young, *Meeting the Challenge of Supersonic Flight*, pp. 43-44.

5. Young, *Meeting the Challenge of Supersonic Flight*, pp. 50-55; Gorn, *Expanding the Envelope*, pp. 194-99 (quoted passages on 194-95); Hallion and Gorn, *On the Frontier*, p. 13.

6. Gorn, *Expanding the Envelope*, pp. 213-15; Hallion and Gorn, *On the Frontier*, pp. 386-95.

7. Gorn, *Expanding the Envelope*, pp. 215-23; Hallion and Gorn, *On the Frontier*, pp. 64-67, 386-95; Lt. Col. Marion Carl to the Chief of the Bureau of Aeronautics, Oct. 26, 1953 in *Toward Mach 2: The Douglas D-558 Program*, ed. J.D. Hunley (Washington, D.C.: NASA, 1999), pp. 129-35.

8. Gorn, "Who was Hugh Dryden and Why Should We Care?" 163-84; Hansen, *Engineer in Charge*, p. 427.

9. Gorn, *Expanding the Envelope*, pp. 226-29; Scott Libis, *Skystreak, Skyrocket, Stiletto: Douglas High-Speed X-Planes* (North Branch, Minnesota: Specialty Press, 2005), p. 76; Hallion and Gorn, *On the Frontier*, pp. 63-64; National Advisory Committee for Aeronautics, Langley Aeronautical Library, *Research Airplane Committee Report on Conference on the Progress of the X-15 Project: A Compilation of the Papers Presented, October 25-26, 1956*, "General Background of the X-15 Research Airplane Project," by Dr. Hugh L. Dryden, xvii, Historical Reference Collection, NASA Dryden Flight Research Center, Edwards Air Force Base, California.

10. Hansen, *Engineer in Charge*, pp. 361-65; Gorn, *Expanding the Envelope*, pp. 229-32; "Resolution Adopted by NACA Committee on Aerodynamics," Oct. 5, 1954 (first quoted passage); Major General James McCormack to AFDDC, AFOCS, OSAF, Dr. Lombard, Oct. 28, 1954 (second quoted passage); Hugh L. Dryden to N.A.C.A. Langley, Ames, Lewis, HSFS, Dec. 23, 1954 with Memorandum of Understanding—Principles for the Conduct by the NACA, Navy and Air Force of a Joint Project for a High Speed Research Airplane, Dec. 23, 1954 (third quoted passage). Primary documents cited in this note are located in the Historical Reference Collection, NASA Dryden Flight Research Center, Edwards Air Force Base, California).

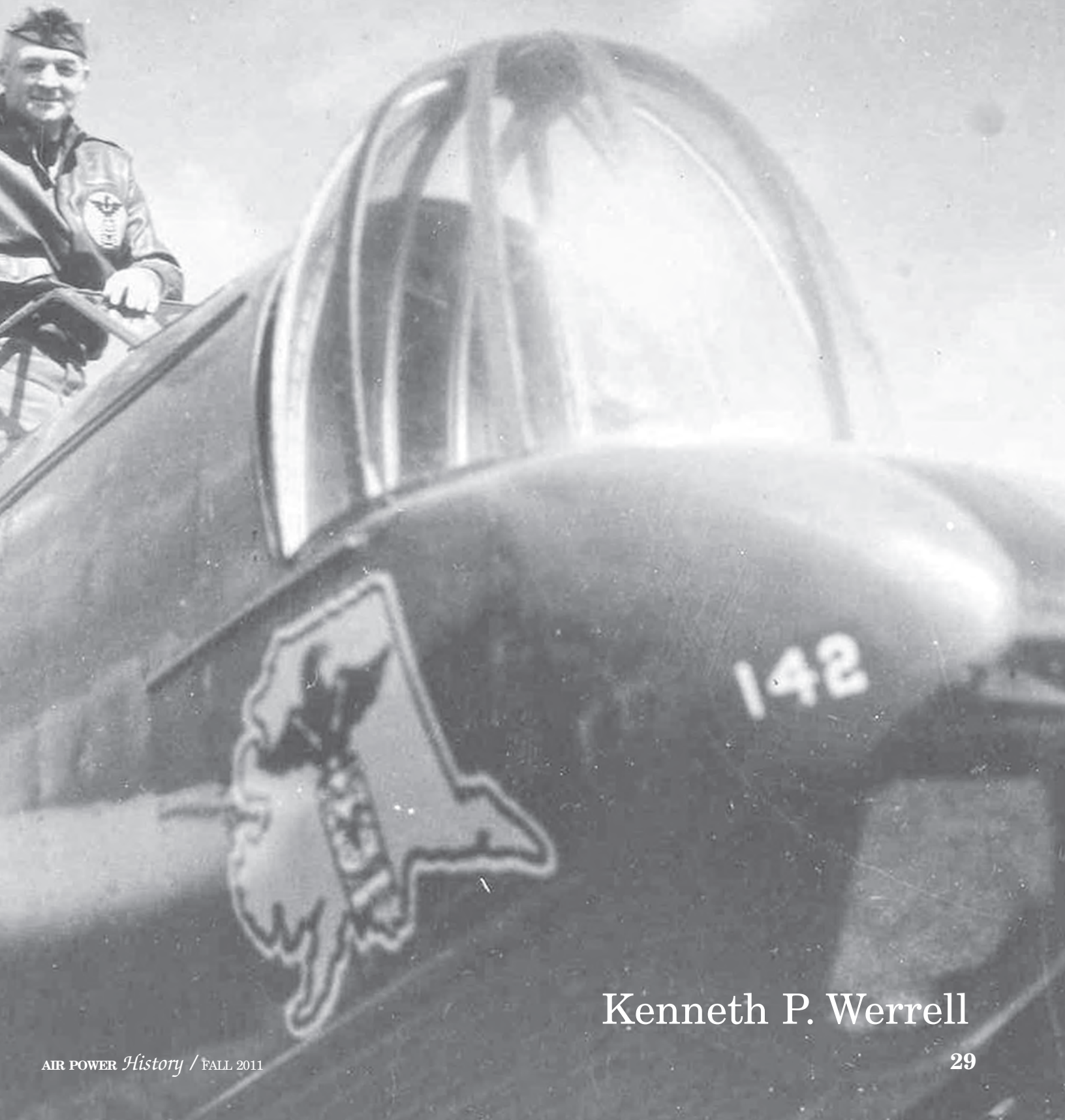
11. Hugh L. Dryden to Lieutenant General Donald Putt, Oct. 2, 1957; Lieutenant General Donald Putt to Dr. Hugh L. Dryden, Oct. 28, 1957; Walter C. Williams to Director, N.A.C.A., Jun. 21, 1957; Walter C. Williams to Director, N.A.C.A., Jun. 5, 1957; Hugh L. Dryden to Walter C. Williams, Oct. 2, 1957 (quoted passage). Documents cited in this note are located in the Historical Reference Collection, NASA Dryden Flight Research Center, Edwards Air Force Base, California.

12. Office of the Secretary of Defense, *Memorandum of Understanding Between the National Aeronautics and Space Administration and The Department of Defense for a National Partnership for Aeronautical Testing*, January 2007, available from <http://www.acq.osd.mil/trmc/publications/NPAT%20MOU%20DoD%20NASA.pdf>, Internet, accessed Jan. 24, 2011 (first quoted passage); White House Office of Science and Technology Policy, *Status of Federal Laboratory Reforms: NASA Implementation Report*, August 23, 1996, available from <http://www.fas.org/irp/offdocs/pdd5status-d.html>, accessed 24 January 2011 (second and third quoted passages).

FLIGHT TO THE STARS: THE 1934



AIR CORPS ALASKAN EXPEDITION



Kenneth P. Werrell

(Overleaf) Lt. Col. Henry H. "Hap" Arnold in the cockpit of his B-10. Note the Alaska emblem on the nose. (All photos courtesy National Museum of the Air Force.)

THE INTER-WAR AIR CORPS OFFICER CORPS WAS SMALL AND WITH THE MASSIVE EXPANSION OF THE AIR ARM DURING WORLD WAR II, A GOOD NUMBER OF THESE OFFICERS... ADVANCED TO FLAG RANK

Officers who achieve flag rank are a small and select group. The interwar Air Corps officer corps was small and with the massive expansion of the air arm during World War II, a good number of these officers who served in the war pinned on stars. These men advanced to flag rank through a combination of ability, ambition, aggressiveness, connections, and luck, although being at the right place, at the right time certainly helped. In 1934 the Air Corps brought together a score of its officers, presumably their very best, for a special operation. This assessment of their ability was borne out by their further service, for within a decade, most were generals. This operation was the 1934 formation flight to Alaska.

In 1934 Alaska was an even more exotic place than today, an American territory many miles from the forty-eight contiguous states and boasting a population of just over 59,000.¹ The vast territory was probably of little interest to most Americans, although some saw it as a northern wasteland and others as a great treasure storehouse. It was also perceived as an important strategic location, especially in the aviation age, particularly valuable for potential bases in the Pacific to counter the growing threat of the one perceived rival in the region, Japan. Air power advocate William "Billy" Mitchell made much of Alaska seeing it as a key to an aviation future, and crucial to the U. S. in what he saw as a coming conflict with Japan.²

Aviation figured prominently in the exploration and development of the far north. The first flights across the North Pole were in 1926, the second of which in the airship *Norge* landed near Nome.³ Therefore, it was not surprising that both U.S. military services saw aviation as a part of their plans for operations involving Alaska.

The U.S. Navy had dispatched aerial surveys to the northern territory beginning in 1926. In 1934, it sent three expeditions north, the first consisting of six fleet submarines and two tenders bound for Alaskan ports as far west as Dutch Harbor in the Aleutians.⁴ There were also two Navy aviation efforts that year, one that consisted of six float planes that departed San Diego in April headed for the Aleutians, and returned to San Diego in August.⁵ The other employed patrol bombers (flying boats) in a flight that summer. This expedition was seen, at least by some, to compete with a contemporary Army Air Corps flight to Alaska.⁶

The Army also was interested in Alaska and was involved in aviation operations in the far north. In 1920, Billy Mitchell pushed for a flight from the forty-eight states to Alaska via Canada. On July 15, four DH-4Bs, the World War I workhorse, departed Mitchel Field, New York, on this mission and

reached Nome on August 23, after fifty-four flying hours and about three dozen stops. The airmen managed to avoid any major mishaps, but were hampered by mechanical problems, poor weather, and maps that were frequently inadequate or inaccurate. The return was uneventful with the aviators arriving back in New York on October 20, having logged some 112 flying hours.⁷

Four years later, the Army aviators flew another memorable formation flight that involved Alaska, an around-the-world flight. It began from Seattle on April 6, 1924, and refueled at five Alaskan locations on its westward flight. Certainly this was to showcase the airmen, but also was flown to test an air route to Alaska and obtain information on possible locations of bases. Two of the four original aircraft returned to Seattle on September 28, 1924, to complete the 26,300-mile, 175-day flight.⁸ In July 1929, Ross Hoyt flew a Curtiss P-1C pursuit plane solo from New York to Nome and crashed in British Columbia on his return, having flown 6,000 miles of the planned 8,500 mile route.⁹ Five years later the Army airmen mounted another expedition to Alaska.

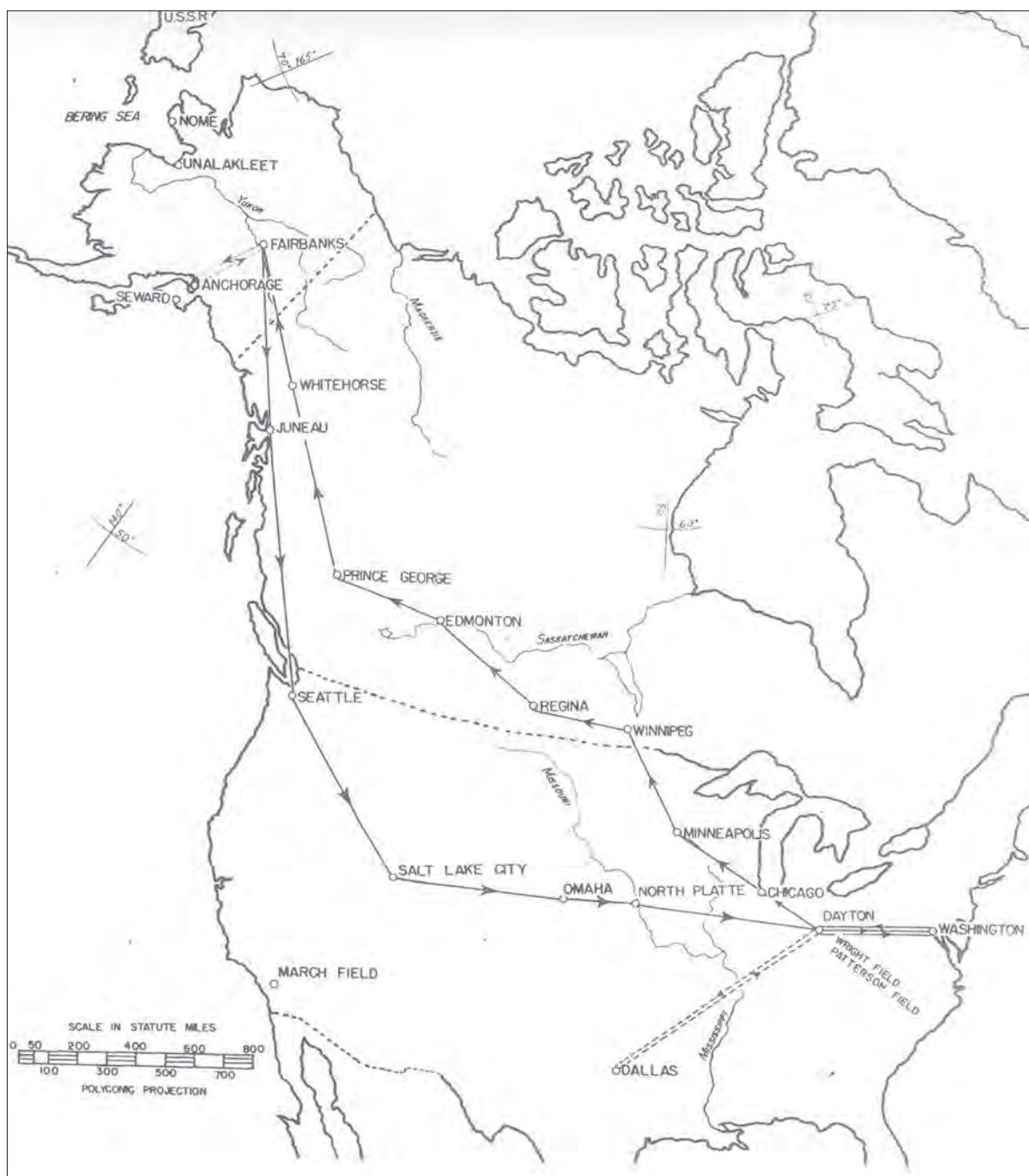
Air Corps Plans

The first six months of 1934 were not good for the Air Corps. A well publicized scandal involving the air mail led President Franklin Roosevelt to cancel the airlines' air mail contracts and order the Air Corps to carry the mail. The resulting operation resulted in over sixty accidents and a dozen deaths. This experience revealed severe Air Corps deficiencies, the poor state of the Army's air arm, and was a major public relations embarrassment.¹⁰

This failure prompted the Alaskan flight. Although it is unclear—and undocumented—the idea for the flight probably originated in the headquarters of the Air Corps.¹¹ An expedition to Alaska was intended to capture the public imagination by covering a considerable distance, over wild territory, made even more noteworthy as it would consist of a formation of the most advanced bombers in the world. The *Washington Post* wrote that "Sympathetic observers believe that the successful completion of this hazardous mission will go a long way to disprove the charges that...the Air Corps is 'inefficient.'"¹² There can be little doubt that this flight was about image, although the Air Corps stated that the official mission was to 1) test the practicality of sending an air force to Alaska, 2) photograph strategic and landing areas in Alaska, and 3) formulate a plan for the defense of Alaska.¹³ The Air Corps designated Washington as the start and finish point, a location that would garner more atten-

Kenneth P. Werrell graduated from the USAF Academy in the class of 1960, and served in the USAF for five years, mostly as a WB-50 pilot. He went on to earn his PhD in history from Duke University and then taught history at Radford University, Virginia. He has authored numerous articles and several books on aviation history, the most recent of which is Death from the Heavens: A History of Strategic Bombing (Annapolis, Md.: U.S. Naval Institute Press, 2009).

The solid line indicates the flight between Washington and Fairbanks, an estimated 7,400 miles roundtrip. (Map courtesy Fourth Air Force, Army Air Corps Alaskan Flight, U.S. AFHRA.)



tion and have greater symbolic meaning than any other. Ten bombers would fly to Fairbanks, conduct photo reconnaissance missions, and then return.¹⁴

The Martin B-10

The Air Corps' newest bomber, the Martin B-10, would help make this flight notable and newsworthy. It was an aircraft on the cutting edge of aviation technology in sharp contrast to the World War I vintage aircraft near the end of their operational lives aircraft employed in the earlier Army and Navy Alaskan flights. The B-10 evolved from an Army design directive issued in December 1929. When Martin's first attempt to fulfill this requirement proved inadequate, the company reworked the design and incorporated most of the

elements that were revolutionizing aviation and added two new features that would become standard on bombers, gun turrets (in this case a forward turret) and an enclosed bomb bay.¹⁵ The bomber made its initial flight in October 1932 and demonstrated superior performance. It was the fastest bomber in the world, able to exceed 200 mph, and almost as fast as the fastest U. S. fighters of the day.¹⁶ The B-10 earned Martin the prestigious Collier Trophy (perhaps the highest aviation award) for the greatest aeronautical achievement of 1932. In January 1933, the Air Corps awarded the company a production contract. Fourteen planes were built as YB-10s for service evaluation and saw well-publicized service in the 1934 Air Mail operations.¹⁷ The Air Corps now had an advanced aircraft, a tool that offered them many opportunities.

THE MARTIN B-10 WOULD HELP MAKE THIS FLIGHT NOTABLE AND NEWS-WORTHY

The flying element of the Alaskan flight posed for this official photograph prior to its departure. Front row, left to right: Capt. John D. Corkille, Capt. Harold McClelland, Capt. Ray A. Dunn, Capt. Westside T. Larson, 1Lt. Ralph A. Snively, 1Lt. Nathan F. Twining, 1Lt. John S. Mills, 1Lt. Hezekiah McClellan. Back row, left to right: 1Lt. Lawrence J. Carr, 1Lt. Charles B. Howard, Maj. Malcom C. Crow, Maj. Hugh J. Knerr, Lt. Col. Henry H. Arnold, Maj. Ralph Royce, 1Lt. John S. Griffith, 2Lt. Leonard F. Harman, Lts. Mills and Twining were alternates who did not make it to Alaska.



ARNOLD TOOK COM- MAND OF THE OPERA- TION ON JUNE 25

Preparation

The Alaskan flight would be led by Lt. Col. Henry H. "Hap" Arnold. Maj. Gen. Oscar F. Westover, Assistant Chief of the Air Staff and second in command of the Air Corps, had been scheduled to lead the flight, but at the last minute Arnold got the job.¹⁸ No explanation is to be found in the documents for this change. Perhaps Westover's lesser experience in heavier-than-air aircraft compared with Arnold's (he earned his wings a decade after Arnold), was a factor. More likely the situation in Washington where the Air Corps was under a cloud following the Air Mail fiasco and the Air Corps chief was under fire from congress for contracting policies, account for the shift.

Arnold was well qualified to lead the operation. He was a 1907 West Point graduate, one of the early military flyers, who had been taught to fly by the Wrights. He already had achieved considerable distinction as the first recipient of the highly regarded Mackay Trophy in 1912, and had risen to the rank of colonel in World War I, although he did not see overseas service. Arnold was associated with the flamboyant, controversial, and maverick Billy Mitchell, which may have hindered his career. However, he performed well in the 1934 Air Mail episode, where he demonstrated many talents, including a keen appreciation for public relations.¹⁹

Arnold was to lead an operation that was

hastily thrown together. He relates that following the air mail assignment, he and his wife were en route to Jackson Hole, Wyoming, for a fishing trip when they were intercepted in Salt Lake City by "a barrage of telegrams and telephone calls [that] summoned me back." Arnold later observed that the flight's hurried timetable created "a great deal of unnecessary worry, labor, and money. Months of warning should have been given to responsible authority instead of a few days."²⁰ This rush could be attributed to a desire to quickly restore the Air Corps' reputation, but certainly was driven by the limited season when flying could best be conducted in Alaska.

Arnold took command of the operation on June 25. He insisted on a number of things, most already decided: handpicked crews, modification of the bombers, and a sound logistics base along the route.²¹ After consulting with the Chief of the Air Corps on the 27th, Arnold altered the mix of personnel who would fly the aircraft from twenty officers and ten enlisted men to fourteen and sixteen, respectively, to permit more mechanics to accompany the flight. Another four officers and four enlisted men would support the B-10 fliers, and two other officers would serve as alternates. These officers were clearly exceptional as their later careers make clear.²² There were a number of would-be participants as newsmen and "a politically potent veterans' organization functionary" attempted to join

Air Corps officers unloading supplies in Fairbanks. Maj. Hugh Knerr on the left, Lt. Col. Arnold pushing the hand cart.



THE *EL AGUARI* DEPARTED ON JULY 8 AND WAS MET IN SEWARD BY AN ANGRY, JEERING CROWD

the expedition. Arnold vetoed these, telling Westover "I prefer mechanics to joy riders."²³ Arnold recognized that the enlisted men were working hard on their tasks and, in his words "were a mighty fine bunch."²⁴ However he also noted that the officers were less involved. To encourage them, Arnold assigned each a specific aircraft "as I want them to take more interest in the repairs and alterations being made."²⁵

The ten YB-10s required considerable engineering work at the Dayton depot to prepare for the long flight. The most significant was to add a 165 gallon fuel tank aft of the nose turret and a 65-gallon fuel tank in the rear cockpit.²⁶ The other work included making provision for cameras, radios, navigation equipment as well as completely tearing down the engines to install new oil rings. This forced the mechanics to work nights, on the weekend, and even on the July 4th holiday, "all the while handicapped by the [newly enacted New Deal] legal restrictions of a forty-hour week."²⁷ Despite the modifications the airmen were able to keep the aircraft weight within design limits.

A major issue involved the transport of supplies to Alaska, a task compounded by the compressed time schedule and the sparse aviation support facilities in the territory. "Due to the difficulties of transportation and storage," Arnold wrote, "commercial aviation activities [in Alaska] live a more or less hand-to-mouth existence."²⁸ The airmen estimated that the Alaskan portion of the flight and photo operations required 35,000 gallons of gasoline and 3,500 gallons of oil. To complicate matters, the Alaskan rail system could only haul the gas in fifty-five-gallon drums. In addition, the efforts to provide

fuel and oil for the flight initially were "greatly handicapped" by the requirement for secrecy. (The need for secrecy is not explained.) It was not until June 25 that the ban was lifted and the gas and oil companies were contacted.

A further problem was a west coast maritime strike. This prevented the supplies from being shipped out of Seattle on commercial vessels and required the Air Corps to fly the items to Rockwell Field (San Diego) where they were crated for shipment, moved by rail to San Francisco, and then transported aboard a government ship to Seward, Alaska. The Air Corps attempted to borrow a Navy vessel for this task, but failed. (We are left to speculate whether this was due to interservice rivalry or to a shortage of ships or time.) The airmen were able to obtain a small and old Army transport, the *El Aguari*, a flat bottom vessel of dubious seaworthiness that the Army used to carry water to Alcatraz and other posts in the San Francisco Bay area. Capt. George Goddard, in charge of the supply effort (and the expedition's photography officer), described it as "little larger than a fair-seized tug boat and whose age put it somewhere in the Roman trireme class."²⁹ The *El Aguari* departed on July 8 and was met in Seward by an angry, jeering crowd of striking longshoremen who vowed that the ship would not be unloaded. "Soldier boy," Goddard was told, "you ain't unloadin' that cargo here!"³⁰ Undeterred, the captain cooled the crowd by waving the American flag. He then appealed to the Chamber of Commerce and was able to get some 200 citizens backed by the police to unload the cargo. Despite all this drama and problems, the six rail railroad cars of supplies arrived in Fairbanks a

"SOLDIER BOY," GODDARD WAS TOLD, "YOU AIN'T UNLOADIN' THAT CARGO HERE!"

ON JULY 18,
1934,
ARNOLD
BROUGHT
HIS TEN B-10
BOMBERS TO
WASHINGTON



day after the B-10s arrived, a remarkable achievement considering the obstacles.³¹

Another necessary preparation was training to acquaint the flyers with the B-10s that were just being introduced into Air Corps service. This was hampered by the hurried nature of the operation. The ten planes assigned to make the flight arrived at Patterson Field, Dayton, Ohio, in early July, and as they were being modified, their availability for crew training, familiarization, instrument, and navigation flights, was limited. One expedient was to use three B-12s (essentially B-10 aircraft with slightly more powerful engines) that were passing through Dayton en route to the west coast. In all the airmen logged some 230 flying hours before beginning the Alaskan flight.³²

While the Air Corps modified the B-10s, trained their crews, and moved parts and fuel northward, another support effort was underway. An advanced party consisting of Captains Ross G. Hoyt and Edwin B. Bobzien and two mechanics surveyed various points for their suitability for the much larger and heavier B-10s and made arrangements for the flight. They departed on June 26 and 27, in two O-38 observation aircraft and reached Alaska on July 21, only shortly before the expedition launched from Washington.³³

B-10s to Alaska

On July 18, 1934, Arnold brought his ten B-10 bombers to Washington. Aside from consulting with his superiors, Arnold took Assistant Secretary of War Harry Woodring aloft for a ten-minute flight over the city. Among the other well wishers who

viewed the B-10s were the Chief of the Air Corps, Maj. Gen. Benjamin Foulois, and one of the President's sons, Elliott Roosevelt.³⁴

The reception in the nation's capital foreshadowed one aspect that lay ahead for the Alaska fliers: lots of ceremony, celebrities, speeches, news coverage, and public relations. This was, after all, a goodwill tour intended to generate maximum attention. That evening Washington notables, including the President's son Elliott and aviation celebrity Glenn Martin, jammed a reception for the airmen. There were other receptions that evening as well.³⁵

The Alaskan expedition launched from Bolling Field on July 19.³⁶ The expedition got off to a rocky start as there were immediate problems, fortunately none serious. One B-10 aborted when one of its engine cowlings was ripped off by severe engine backfiring. Another bomber had a generator burn out but reached Dayton with the other eight B-10s shortly after noon. An hour and a half later, the B-10s took off for Minneapolis, Minnesota. Shortly after takeoff, one aircraft was forced to return with oil problems, determined to be an overfilled tank.³⁷ Both aborting aircraft rejoined the formation prior to the group's departure from Minneapolis the next day.

The morning of July 20 the B-10s took off, flew under a low ceiling and through light rain, and reached Winnipeg, Manitoba, before noon. The aviators were well treated, and quite busy. The mayor of the city met them at the airfield and entertained them at the Royal Air Corps Flying Club. Later Arnold and two of his officers, along with the American Consul, called on the Premier and Lieutenant Governor of the province, the mayor,

(Left and right) Aircraft number 145 being recovered from its ditching in Cook Sound.

THE 665-MILE FLIGHT TO WHITE HORSE WAS OVER SOME UNSURVEYED AND UNINHABITED TERRITORY, MADE MORE HAZARDOUS BY SEVERE THUNDER SHOWERS



and two Canadian military officers. The Princess Patricia's Light Infantry Regiment hosted a dinner for the American flyers at the Fort Osborn Barracks mess.

After breakfast with the mayor on the 21st, the expedition proceeded with one passenger, the Premier of Manitoba. The War Department and Arnold agreed to waive their "no passenger" rule to perform this diplomatic courtesy.³⁸ The formation landed two hours later at Regina, Saskatchewan, where it was met by some 2,500 people including the American Vice Consul and the mayor. The fliers had lunch sponsored by the United Service Institute and attended by the Premier and acting Lieutenant Governor of the province and the mayor of the city.³⁹ Again the flyers were well treated, the officers at the United Service Institute, the enlisted men at the Royal Canadian Mounted Police Sergeants' mess. The stay was brief and, despite some problems with soft ground, the bombers took off in mid afternoon for Edmonton, Alberta.

In Edmonton the aviators were met by the mayor, the Commandant of the Edmonton garrison, and the American consul. After attending a reception hosted by the mayor, the flyers were guests of the Edmonton garrison for dinner. One awkward moment arose when a Canadian general made a toast that included the words, "You are flying to Alaska which should be Canadian country."⁴⁰ The city's mayor apologized for this undiplomatic statement. The airmen spent the next day performing periodic maintenance and preparing to cross the Canadian Rockies.

The flight on July 23 presented the airmen with some minor obstacles. One aircraft was mired briefly in the soft ground prior to takeoff, and then after getting airborne, another bomber had problems retracting its landing gear that took him twenty minutes to correct. The B-10s were now flying over what was considered the most menacing terrain of the flight, and encountered poor weather: driving rain, heavy winds, with thunder storms. They flew through the pass at Jasper and landed at Prince George, British Columbia, at noon.⁴¹

The landing strip at Prince George was the shortest used on the entire flight. Arnold designated Maj. Ralph Royce to lead this leg, which meant that he would make the first landing. Royce tried to decline that honor, as he explained to Arnold that most of his flying was in fighter aircraft, and suggested that it might be better if one of the more experienced bomber pilots landed first. Arnold responded that the reason he selected Royce to land first was that if he could land successfully, then so could the others.⁴² The landing was tight due to trees near the landing field, but negotiated safely. After a lunch hosted by the Board of Trade of the city and attended by the mayor, the Americans took off in early afternoon.

The 665-mile flight to White Horse was over some unsurveyed and uninhabited territory, made more hazardous by severe thunder showers. There was a near accident on this leg when Arnold turned on the wrong fuel valve and both of his engines quit. He radioed, "I'm going down." But fortunately, he had enough altitude to give him time to find the cor-

The airmen were involved in greeting ceremonies at almost all of their stops. Upon their arrival on July 24 at Fairbanks, Lt. Col. Arnold (center) was presented the key to the city from Mayor E. B. Collins.



rect valve and restart the fuel starved engines.⁴³ The B-10s reached White Horse and landed on the narrow, tree enclosed air field. The reception here was not the gala affairs that thus far had been the norm; there was no official reception, as this was but a small trading post with a population generously estimated at 200. One account records that "The fliers were met at the field by a cosmopolitan group of persons, including a few white inhabitants, several members of the [Royal] Canadian Mounted Police, native Indians and Eskimos."⁴⁴ Early on July 24 the ten bombers took off for Fairbanks, Alaska. The fliers flew through excellent weather until just twenty-five miles short of their destination where they encountered rain. The men observed that this was probably the most scenic portion of their entire flight, flying by glaciers, the Yukon River, as well as some mountains as high as 20,000 feet and over flying mountain sheep, moose, bear, and caribou.

The bombers reached Fairbanks just before noon on the 24th. Over the course of their flight the expedition had averaged a ground speed of 170 mph and logged thirty-three hours and fifteen minutes of flying time. The fliers were met by the city's mayor as well as by many of the town folk. It was quite an occasion as the mayor had declared a two day holiday: stores were closed, hundreds of cars lined up, and the city band greeted the airmen. Shortly after their arrival, Arnold and some of his officers spoke on a fifteen-minute nationwide radio broadcast.⁴⁵

Fairbanks was a remote, small, backwater town in 1934. One of the aviators wrote: "We find Fairbanks still a frontier town of about 2,500 people with most of the buildings frame or log and no paved streets." He went on, "The people here seem to eat at irregular hours, sleep at irregular hours, and have no respect for time as a result of the long days and short nights. Everyone is most hospitable but prices are very high." Two O-38s scouted the 500-statue air miles between Fairbanks and Nome, and found that the only airfield suitable for the bombers west of Fairbanks was at Nome. On their return, the two aircraft were forced to land at Unalakleet. There, an "interesting old-timer" who provided lodging also gave them a sled dog puppy, which was quickly named "Nome," and became the first mascot of the flight. The B-10s did not get to either Nome or Siberia.⁴⁶ Meanwhile, in Fairbanks the crews waited for the low clouds and rain to clear to permit the planned aerial photography. During this period the airmen flew in the area, surveying for potential airfields.

On August 2, the ten B-10s and two O-38s flew to Anchorage where they were met by the city's mayor and the Anchorage Aeronautic Commission. The next day six of the B-10s fitted with cameras took off to photograph the area between Anchorage and Fairbanks. Captain Bobzien lost power on take-off when he failed to properly operate the fuel system, forcing him to ditch in Cook Inlet (Bootleggers

**THE B-10s
DID NOT GET
TO EITHER
NOME OR
SIBERIA**

Cove). Flying an O-38 on the expedition, Bobzien had logged fewer than twenty flying hours in the B-10, and unlike Arnold's similar experience with the fuel system, did not have enough altitude, and time, to correct his error. Neither Bobzien nor Hoyt (flying as navigator) were injured, however; Sergeant Samuel Bush, the photographer, badly sprained an ankle. The aircraft came to rest some 100 feet off shore, and when the tide went out, rested on the bay's mud. (There was a 16-foot tide in the inlet.)

The airmen then performed a remarkable recovery operation. When the tide came back in, the airmen were able to float the downed bomber on pontoons constructed of empty fifty-five-gallon gas drums, and then used a fishing boat to tow the bomber four miles to a beach adjacent to a railroad track. When the tide receded, they mounted the B-10 on a sheet metal skid, and then hauled it off the beach using a railroad wrecking crane named "Big Goliath." The airmen removed the aircraft engines and carried the fuselage about one and a half miles to a railroad yard, where the Anchorage Fire Department hosed off the silt. After cleaning out the corrosion from the bomber's 12 hours immersion, they thoroughly inspected the wings and fuselage. The mechanics removed the wings from the aircraft to allow it to be hauled through the main streets of Anchorage to the airfield where they reassembled the aircraft and installed new engines and propellers. The repairs were completed on August 9, after which the bomber was test flown for fifteen minutes. The next day it flew to Fairbanks to rejoin the formation.⁴⁷

Meanwhile, the other five bombers performed the photographic mission. Flying at 16,000 feet in excellent weather, in three days—August 3-5—the B-10s were able to photograph 21,000 square miles between Anchorage and Fairbanks. Inclement weather, low clouds, and rain, hindered further photography. Therefore, when Foulois contacted Arnold on August 8, proposing to extend the unit's stay to complete the original photography plan, Arnold responded that as the weather was unsuitable, a longer stay was not justified.⁴⁸ Nevertheless, the airmen did fly photo missions in the Valdez, Fort Yukon, Hot Springs, and Cordova areas. It was now time to conclude the expedition. On August 11, the airmen planned to return home beginning on the first day of suitable weather.⁴⁹

The weather did not cooperate and it was not until August 16 that the B-10s flew through poor weather to Juneau, where they were met by the mayor and a representative of the territorial governor. More public relations ensued. The next day the citizens presented a totem pole to the airmen. Arnold responded by having one of the aircraft christened by the mayor's wife, "City of Juneau."⁵⁰ In fact Arnold had all the bombers named after Alaskan communities and these names painted on the nose of the bombers. Again, the airmen were well treated by the locals who hosted fishing trips, dances, and a picnic. The fliers also were able to obtain numerous souvenirs. Hoyt bought a part of a

mastodon tusk, on which he had the crewmembers signatures etched. Several members were presented letter openers from the beast's ivory, and Maj. Hugh J. Knerr, ate steak from it, which he related "tasted like old rancid bacon—very old—in fact 20,000 years [old]."⁵¹ In Fairbanks someone added a two-month old "northern" pup named "Smokey" to the airmen's baggage. A Juneau newspaper wrote that three or four dogs were taken back by the airmen, but the offer of four bears was "gently but firmly refused."⁵²

The expedition left the territorial capital late on the morning of the 17th and reached Seattle less than six hours later. This 943-mile leg was the longest of the expedition, almost entirely over water, avoiding Canadian air space. Before noon the next day the B-10s took off from Seattle and flew to Salt Lake City. Here they were greeted by the Chamber of Commerce. The unit was then split into two sections, with one flight of four bombers commanded by Royce flying to North Platte, Nebraska, while the other six led by Arnold flew to Omaha, Nebraska, both sections landing on the morning of August 19. (There is no indication why the unit was divided.) The two sections then rendezvoused over Omaha and flew on to Wright Field. (Carburetor problems delayed the takeoff of one bomber and forced it to make an unscheduled landing at Fort Leavenworth, Kansas, before it rejoined the others.) At 1030 on August 20, the expedition landed as directed at Bolling Field, Washington, District of Columbia. The triumphant arrival was almost spoiled when the landing gear on Knerr's bomber would not extend. Fortunately, the crew was able to hand crank the balky landing gear down.⁵³

The unit was met by the Secretary of War George Dern, the Assistant Secretary of War Harry Woodring, the Chief of the Air Corps Benjamin Foulois, other military and civilian leaders, and a large crowd. The officials had planned an impressive, formal ceremony, "But whatever military formality they had mustered disappeared quickly when a half-pint size Eskimo pup piled out of one of the big ships and broke into the crowd of officers."⁵⁴ Unpacking the totem pole from Juneau posed a problem, and almost required that aircraft to be dismantled. Arnold presented the totem pole, signed by the fliers, to General Foulois.⁵⁵

The bombers then flew westward and homeward; nine B-10s landed at March Field, California on August 25. The fliers were greeted by California Governor Frank Merriam, film star Clark Gable, and celebrity Amelia Earhart. The glitz was fitting for the flight's conclusion and southern California, for this well, if not over publicized flight. The next day the B-10s flew on to Rockwell Field, their home station.⁵⁶

Conclusion

The flight to Alaska was a great technical and public relations success that accomplished most of the goals set out by the Air Corps. The airmen demonstrated competence, overcame nagging prob-

Officers Connected with the 1934 Alaskan Flight

	1934 rank	final rank
Main Party		
Arnold, Henry H.	LTC	General of the Air Force
Carr, Lawrence J.	1Lt	Brigadier General
Corkille, John D.	Capt	died of natural causes 1943
Dunn, Ray A.	Capt	Brigadier General
Griffith, John S.	1Lt	Colonel
Grow, Malcolm C.	Maj	Major General
Harman, Leonard F.	2Lt	Brigadier General
Howard, Charles H.	1Lt	killed in flying accident Oct 1936
Knerr, Hugh J.	Maj	Major General
Larson, Westside T.	Capt	Major General
McClellan, Hezekiah	1Lt	killed in flying accident May 1936
McClelland, Harold M.	Capt	Major General
Royce, Ralph	Maj	Major General
Snively, Ralph A.	1Lt	Brigadier General
Advance Party		
Bobzien, Edwin B.	Capt	Colonel
Hoyt, Ross G.	Capt	Brigadier General
Support Party		
Goddard, George W.	Capt	Brigadier General
Ridenour, Caryle H.	Capt	Brigadier General
Deselected		
Chauncey, Charles C.	Capt	Major General
Eubank, Eugene L.	Capt	Major General
Fenander, Walter	2Lt	unknown
Freeman, Richard S.	2Lt	killed in flying accident Feb 1941
Henry, Draper F.	2Lt	Colonel
Kelsey, Benjamin S.	2Lt	Brigadier General
McCormick, Harlan T.	1Lt	Colonel
Mills, John S.	1Lt	Major General
Smith, Andrew W.	Maj	Colonel
Twining, Nathan F.	1Lt	General

lems, and received extensive press coverage that certainly helped to restore the Air Corps' reputation. The Juneau paper editorialized that the expedition "should go a long way toward demonstrating to the country at large that the Army Air Corps . . . is technically trained and practically experienced enough to meet any demand that may be made upon it."⁵⁷ The *Washington Post*, which had a greater influence due to its key location and greater circulation, reported that the flight accomplished its mission to concentrate an air force in a distant and lonely corner of American territory, in a "mobilization [that] was swift, sure, and efficient."⁵⁸

While the flight was not picture perfect, it left a positive image. On the negative side, the airmen experienced some problems with their aircraft and had some close scrapes. There were some disap-

pointments; the Army fliers didn't get to Nome and the photography was cut short. These downsides were heavily outweighed by the positive aspects of the expedition. The Army demonstrated that it could fly great distances over difficult terrain with minimal support and that its new B-10 performed well, proving easy to fly and maintain.⁵⁹ And the press, across both the U. S. and Canada, gave the expedition considerable attention and focused on these positive elements. The Alaskan flight won the Mackay Trophy, one of the most prestigious aviation distinctions that had been awarded annually since 1912 for the most meritorious Army flight of the year.⁶⁰

The flight's success, however, cannot disguise two sour notes. First, the Navy took umbrage, seeing it as an infringement on its role in coast defense. (The Army had agreed to limit its offshore role in the 1931 MacArthur-Pratt agreement.) This perceived assault on the Navy's mission quickly surfaced. When the Air Corps aviators were feted in Seattle on their return, a Navy speaker, Capt. Ernest J. King, Chief of the Navy's Bureau of Aeronautics, made clear the Navy's objections.⁶¹

Second, there was an intra Army dispute over awards. Arnold was the only airman who received official recognition for the expedition. This, along with his award of the Mackay Trophy, was seen by some of the participating airmen as evidence of his ambition, ego, and selfishness. In fact, Arnold had recommended his officers for the Distinguished Flying Cross (DFC), a recommendation that received approval through the Air Corps chain of command, but was rejected by the Army hierarchy. General Douglas MacArthur, Army Chief of Staff, not only accepted his staff's disapproval, he personally edited the letters of commendation to lessen their impact.⁶² Arnold appealed this decision all the way up to the Deputy Chief of Staff of the Army. He unsuccessfully argued that the Alaskan flight was as significant as other aviation feats for which the DFC had recently been awarded, for example, the medal given to the Italian Italo Balbo's for his 1934 from Italy to Chicago and to three Air Corps airmen who parachuted out of a balloon in July 1934.⁶³ When Westover (who became Chief of the Air Corps in December 1935) learned in 1936 that Arnold had not received the DFC, he pushed through the paperwork, a bit easier as MacArthur had retired and left Washington to take up a position as Field Marshal in the Philippines. Arnold got the medal. According to an historian who has investigated the incident, the reason for this dust up was that both the Army and Navy hierarchy wanted to keep the Army airmen in their place, and the long, Juneau to Seattle over water flight disrupted the agreement the two services had concluded on coastal defense. The request for DFCs for the Alaskan Flight airmen was reopened in the early 1971, but was again rejected.⁶⁴

Another result of the flight was to draw attention to Alaska. Mitchell had harped on the importance of this territory for years, and now advances in aviation technology and the rise of Japan made



(Above) Maj. Ralph Royce's aircraft was named city of Juneau. Note the totem pole presented to the airmen resting on the aircraft's number one (left) propeller.

(Below) B-10 in flight. Aircraft number 143 was assigned to Capt Harold McClelland. Note the Alaskan emblem on the nose.



the U. S. built up forces to expel the invaders and then defend the territory, it quickly became a backwater theater. Probably more significant to the outcome of the war was Alaska's role as one of three conduits for delivery of Lend-Lease aircraft to Russia.⁶⁶ The airmen established a ferry route from Great Falls, Montana to Fairbanks where Soviet pilots accepted and flew out the Lend-Lease aircraft. In all, 7,800 of the 14,700 Lend-Lease aircraft that the Soviets received during the war went by way of Alaska.⁶⁷

Much has changed over the past seventy-five years, and today the 1934 Army flight to Alaska is largely forgotten. Since then aviation has become commonplace, replaced in the public mind by space as the glamour industry. It should be stressed that aviation has been important to the development of Alaska in many ways, as it has brought Alaska closer to the U.S., helped Alaska achieve statehood, and brought in many tourists.

What should be remembered from this flight? It was a major event of the day, prominent in the press throughout the summer of 1934. The flight drew positive attention to the aviators, demonstrated the advances in aviation, and put Alaska into the public spotlight. And it brought together a select group of airmen who in a few short years would rise to top air force leadership roles during World War II.

The flight was certainly "career enhancing" for the participants, as an astounding eighteen of twenty-five officers connected with the flight pinned on general's stars. Remarkably, ten of the eleven officers who flew the B-10s and went on to serve in World War II rose to general rank as did three of the four in the advance and support parties. The ten men bumped from the flight to Alaska also cut an amazing record, as half achieved flag rank. It would be an exaggeration to conclude that this flight was the major reason for this achievement for surely the abilities and records of these airmen were more important. But this experience had to have advanced their promotion chances, for their direct service under Arnold for two months allowed him to form an opinion on their value to the service.

Individually, Arnold was the most immediate beneficiary. He received national exposure and even a brief audience with the President. In short order, in February 1935, he was promoted two grades to brigadier general, and in September 1938 appointed to lead the Air Corps, after Westover was killed in an aircraft accident. Arnold commanded the renamed Army Air Forces throughout World War II and until his retirement in 1946. In May 1949, he was promoted to five-star rank. The most prominent of the other airmen connected with the Alaskan flight was Nathan Twining. He was a young first lieutenant when he was moved from principal to alternate, and only made it as far as Minneapolis with a spare aircraft. Nevertheless, he went on to four-star rank and the post of Chief of Staff of the Air Force (June 1953) and Chairman of the Joint Chiefs of Staff (August 1957).⁶⁸

The 1934 Air Corps Alaskan Expedition truly was a flight to the stars. ■

1. U. S. Department of Commerce, *A Statistical Abstract Supplement: Historical Statistics of the United States, Colonial Times to 1957* (Wash., D.C.: GPO, 1961), p. 7.
2. For a recent discussion of Mitchell's views and actions regarding Alaska, see Galen Perras and Katrina Kellner, "A perfectly logical and sensible thing": Billy Mitchell Advocates a Canadian-American Aerial Alliance against Japan," *Journal of Military History*, Jul 2008.
3. In 1928, George Wilkins flew an airplane from Point Barrow to Spitzbergen, and three years later the Lindberghs made two stops in Alaska on their New York to Tokyo flight. Donald Jackson, *The Explorers* (Alexandria, VA: Time-Life, 1983), pp. 27,39,65.
4. Adrian O. Van Wyen, Office of the Chief of Naval Operations, Aviation History Unit, Memorandum to Commander C. A. Van Dusen, 22 Dec 1949 National Naval Aviation Museum [NNAM]; Navy Press Room, Jul 25, 1934, 1-2 NNAM.
5. San Diego Flying Days, chapter 194, 5 and photo chapter 197 San Diego Aerospace Museum [SDAM]; "Navy Planes Hop to Sacramento; Eugene Next Lap," *San Diego Union*, Apr 21, 1934, p. 3; "Four Navy Planes Arrive Here from Alaska Survey," *San Diego Union*, Aug 22, 1934, p. 1; "Planes Bound for Aleutian Survey Arrive," *Seattle Post Intelligencer*, Apr 23, 1934, p. 3; "Four Navy Planes Arrive Here from Alaska Survey," *Seattle Post Intelligencer*, Aug 22, 1934, p. 1.
6. John Breihan, *Martin Aircraft, 1909-1960* (Santa Ana, Calif.: Narkiewixz/Thompson, 1995), p. 42.
7. Nancy Fogelson, *Arctic Exploration and International Relations, 1900-1932* (Fairbanks: University of Alaska, 1992), pp. 82-83; Clifford Nutt, "Blazing the Aerial Trail to Alaska," pp. 221-26 in C. V. Glines, *Polar Aviation* (Eau Claire, WI: E. M. Hale, 1967); "Four Airplanes Off on Alaskan Flight," *New York Times*, Jul 16, 1920, 5; "Nome Flyers Plan Crossing to Siberia," *New York Times*, Aug 26, 1920, p. 13; "Army Fliers Home from Alaska Trip," *New York Times*, Oct 21, 1920, 10; "Minneola Fliers Arrive at Nome," *Washington Post*, Aug 25, 1920, p. 2.
8. One of the seaplanes slammed into a mountain in Alaska without injury to the two man crew, a second aircraft was rendered unairworthy when dropped into the sea after a ship's boom broke. Henry Wallhauser, *Pioneers of Flight* (n.p.: Hammond, 1969), pp.72-73. Perras, *Stepping Stones to Nowhere*, p. 16; Maurer Maurer, *Aviation in the U. S. Army, 1919-1939* (Washington: Office of Air Force History, 1987), pp. 187-88, map 7.
9. Alaskan Air Command, The Air Force in Alaska, pt. 1, pp. 29-35,43,46.
10. These accidents were caused by the fierce winter weather and the Air Corps' lack of adequate aircraft, proper bad weather equipment, suitable training, night flying aids, and experienced pilots. On the air mail incident see my "Fiasco' Revisited: The Air Corps and the 1934 Air Mail Episode," *Air Power History*, Spring 2010.
11. The Chief of the Air Corps, Maj Gen Benjamin Foulois took credit for the idea. However, Henry "Hap" Arnold believed the idea came from the General Staff, but why they would promote the Air Corps defies explanation. DeWitt Copp, *A Few Great Captains: The Men and Events That Shaped the Development of U.S. Air Power* (Garden City, NY: Doubleday, 1980), p. 239.
12. Harris Hull, "Planes Warm for Flight While Air Chief Battles Charges," *Washington Post*, Jun 24, 1934, p. E1.
13. [Henry H. Arnold] Report on the Alaskan Flight, 2 USAF Academy [USAF A], MS 33, Add. 1, Ser. 4, Bx. 13, Fld. 1. Hereafter cited as Arnold Report.
14. Long Distance Telephone Call, Office, Chief of the Air Corps and Wright Field [Westover and Arnold] Jul 6, 1934, "Diary Alaskan Flight, United States Army Air Corps, 25 Jun 1934 to 11 Sep 1934, incl.," 11A in Arnold Report, Annex B National Archives, RG 18, File 373, Box 705; Diary Alaskan Flight, Jul 19, 1934, p. 22.
15. These elements included all-metal construction, monoplane configuration, retractable landing gear, enclosed crew positions, and engine cowlings. One new technology not on the B-10s flown to Alaska was constant speed propellers, which the final Arnold report considered "absolutely necessary." Annex E, Engineering, 2 in [Henry H. Arnold] Report on the Alaskan Flight, National Archives, RG 18, File 373, Box 705.
16. The Boeing P-26 initially flew in March 1932, with first deliveries to the Air Corps in December of the next year. Although slowed by an open cockpit, fixed landing gear, and external wire bracing, it could reach a top speed of 234 mph. Gordon Swanborough and Peter Bowers, *United States Military Aircraft since 1908* (London: Putnam, 1971), pp. 83-84.
17. The YB-10 could reach a maximum speed of 207 mph and a service ceiling of almost 22,000 feet. With its maximum bomb load of 2,200 pounds it had a range of 520 miles. The B-10 was built in large numbers for its day, over 150 for the Air Corps and almost 190 for foreign air forces. It was a competitive bomber into the late 1930s, but at best only marginal when it saw action in the Pacific theater early in World War II. Walt Bohl, "Martin B-10 Series Bomber," *Journal of the American Aviation Historical Society*, summer 2005, pp. 82-84,92; Walter Boyne, "Martin B-10," pp. 86,90,91,98 in *The Best of Wings* (Washington: Brassey's, 2001); Richard Marmo, "B-10," *Airpower*, Nov 1976, 30; Glenn L. Martin Company, "History and Development of the Martin Bomber," Jan 1938, 4-5, Table 1, National Museum of the Air Force [NMAF]; Ray Wagner, 3rd ed., *American Combat Planes* (Garden City, NY: Doubleday, 1982), p. 196.
18. As late as June 20 a newspaper reported Westover would lead the flight. Frank Waldrop, "Air Squadron to Try Long Hop to Nome," *Seattle Post Intelligencer*, Jun 21, 1934.
19. Office of History, Alaskan Air Command, The Air Force in Alaska, pt. 1 Early Flights and Strategic Importance, 1920-1940, 43 USAF Historical Research Agency [HRA] K168.155-3.
20. Arnold Report, 9,7-8; H. H. Arnold, *Global Mission* (NY: Harper, 1949), p. 145.
21. Murray Greene, Arnold biography, manuscript 1st draft, 30 Sep 1975, chapter 18, 2 USAFA MS 33, Add. 1, Sec. 2, Bx. 12, Fld. 5. Hereafter cited as Greene, Arnold manuscript.
22. The original plan called for 20 officers to fly the B-10s, 3 officers to serve in an advance team, and 3 officers as alternates. Arnold replaced Major A. W. Smith the original flight surgeon with Major Malcolm C. Grow and added his adjutant from March Field, Captain Ray A. Dunn, before he downsized the officer complement. Four of these officers had already earned one of the nation's most noted aviation awards, the Mackay Trophy. War Department, Statement by the Secretary of War, 21 Jun 1934 AFM; Arnold, Report, 2-4,16; Foulois to Col. H. H. Arnold, 22 Jun 1934 HRA film #28304; "The Alaskan Flight," *Air Corps News Letter*, Jan 15, 1935, p. 14; www.oldbeacon.com/beacon/mackay_throphy.htm.
23. Long Distance Telephone Call, General Westover and Colonel Arnold, Diary Alaskan Flight, Jul 14, 1934, p. 19B; Diary Alaskan Flight 5 Jul 1934, 10B; 12 Jul 1934, 17; Greene, Arnold manuscript, 11,4,31n12; Diary Alaskan Flight, 14 Jun 1934, 19, 27 Jun 1934, 2, 30 Jul 1934.
24. Greene, Arnold manuscript, p. 11.
25. *Ibid.*
26. The documents do not detail why the bomb bay was not used to carry the extra fuel. It was not a weight and balance issue, but probably due to the need to install the cameras internally.
27. Arnold Report, 7; Greene, Arnold manuscript, 6. Later when a brake problem required attention, the 40-hour work week prevented work on the weekend. Greene,

- Arnold manuscript, 10.
28. Arnold Report, 8.
29. George Goddard, *Overview: A Life-Long Adventure in Aerial Photography* (Garden City, NY: Doubleday, 1969), p. 226; Greene, Arnold manuscript, p. 7. Greene implies that the Navy would not lend a ship to the Air Corps as it saw the Army's Alaskan flight as an intrusion into its coastal defense mission. Greene, Arnold manuscript, p. 7-8, 32n25.
30. Goddard, *Overview*, 227; Greene, Arnold manuscript, 9.
31. Greene, Arnold manuscript, p. 15; Arnold Report, 9; Goddard, *Overview*, pp. 226-27; George Watson, "A Flight Surgeon's Diary: Malcolm C. Grow's 1934 Alaskan Flight Account," *Air Power History*, summer 1992, pp. 20-21.
32. Arnold Report, p. 16; Diary Alaskan Flight, Jul 5, 1934, pp. 13, Jul 1934, 22; Fourth Air Force, Army Air Corps Alaskan Flight, p. 5.
33. Arnold Report, p. 16.
34. Elliott Roosevelt was an aviation writer. He served in the Army Air Forces in World War II, rose to the rank of Brigadier General and command of a reconnaissance unit. "Fliers Hop Today for Alaska," *Washington Post*, Jul 19, 1934, p. 1; "F. D.'s Son and Daughter-in-Law Bid Alaska Flight Chief Good-By," *The Washington Daily News*, Jul 19, 1934; Diary Alaskan Flight, Jul 18, 1934, p. 23.
35. Greene, Arnold manuscript, p. 12.
36. The basic source for the flying portion of the expedition is "The Army Alaskan Flight," HRA 168.3952-155, unless otherwise noted.
37. Two backup aircraft were posted in Minneapolis, a move that proved unnecessary. Fourth Air Force, Army Air Corps Alaskan Flight, p. 6; Diary Alaskan Flight, Jul 19, 1934, p. 24; Ralph Royce Diary, p. 1 NMAF.
38. Diary Alaskan Flight, Jul 21, 1934, p. 26; Fourth Air Force, Army Air Corps Alaskan Flight, p. 8.
39. C. M. Gerrity, Vice Consul, "Arrival in Regina, Canada, of Army Alaskan Fliers," HRA 167.6132-2.
40. Greene, Arnold manuscript, p. 14; Diary Alaskan Flight, Jul 21, 1934, p. 26.
41. Diary Alaskan Flight, Jul 23, 1934, p. 28; Fourth Air Force, Army Air Corps Alaskan Flight, pp. 9-10.
42. Royce Diary, p. 1.
43. Royce Diary, p. 2.
44. Diary Alaskan Flight, Jul 23, 1934, p. 28.
45. Greene, Arnold manuscript, p. 14; Fourth Air Force, Army Air Corps Alaskan Flight, 11; Diary Alaskan Flight, Jul 24, 1934, p. 29; "10 U. S. Army Planes End 4,000 Mile Trip to Alaska," *Seattle Post Intelligencer*, Jul 25, 1934, p. 1.
46. It is unclear when and how the Nome to western Siberia flight idea emerged. Fourth Air Force, Army Air Corps Alaskan Flight, p. 12.
47. The B-10 had a respectable safety record up to this time. All of its six previous accidents involved the landing gear without injury to the crew. Technical Report of Aircraft Accident Classification Committee, HRA 200.3912-1; Alaskan Air Command, *The Air Force in Alaska*, pt. 1, pp. 53-55; "Bomber Has to Alight in Cook Inlet," *Fairbanks Daily News-Miner*, Aug 4, 1934. The recovery and restoration of the ditched B-10 is best described in Arnold Report, pp. 10-14 and Leonard Harman, "Creation of the United States Air Force," 32-38 HRA 168.7303-5.
48. Diary Alaskan Flight, Aug 8, 1934, pp. 44.
49. Arnold Report, pp. 23-24.
50. Apparently Ralph Royce and Mayor Oscar Gill drank the champagne meant for the aircraft christening and substituted a bottle of soda for the ceremony. Copp, *A Few Great Captains*, p. 246; Greene, Arnold manuscript, p. 19; Diary Alaskan Flight, Aug 16, 1934, pp. 52, Aug 17, 1934, p. 53.
51. Fourth Air Force, Army Air Corps Alaskan Flight, pt. 1, pp. 58-59.
52. "Army Bombers in Juneau Overnight," *The Daily Alaska Empire*, Aug 17, 1934, p. 2; "Arnold Stresses Alaska Air Needs," *Fairbanks Daily News-Miner*, Aug 18, 1934, p. 1.
53. Three young dogs were photographed in Washington at the conclusion of the flight. "Prize Pups," *Washington Herald*, Aug 21, 1934. Another newspaper wrote that six Malamute Eskimo Husky puppies were aboard the returning B-10s. "Alaska Fliers Reach Bolling at End of Hop," *Washington Post*, Aug 21, 1934, p. 1.
54. Arnold Report, p. 25; Greene, Arnold manuscript, p. 20; Diary Alaskan Flight, Aug 19, 1934, p. 55.
55. "Alaska Fliers Reach Bolling at End of Hop," *Washington Post*, Aug 21, 1934, p. 1.
56. Greene, Arnold manuscript, p. 20; Fourth Air Force, Army Air Corps Alaskan Flight, pt. 1, pp. 58, 60.
57. The tenth B-10, the bomber that had ditched in Cook Inlet, had diverted to Dayton for inspection. Greene, Arnold manuscript, p. 20; Diary Alaskan Flight, Aug 26, 1934, p. 62.
58. "Army Ends Successful Flight," *The Daily Alaska Empire*, Aug 22, 1934, p. 4.
59. "Flight to Alaska," *Washington Post*, Aug 22, 1934, p. 8.
60. The airmen did note, however, two problems. During the expedition 18 generators had to be replaced along with fuses for two of the radios. Engineering Report, Annex E, 2 Arnold Report.
61. Arnold Report, p. 10.
62. King served as the Chief of Naval Operations during World War II and became the Navy's only five star admiral. Murray Greene, "The Alaskan Flight of 1934—A Spectacular Official Failure," *Aerospace Historian*, Mar 1977, 18; Hugh Knerr, "Washington to Alaska and Back: Memories of the 1934 U. S. Air Corps Test Flight," *Aerospace Historian*, Mar 1972, p. 24.
63. These included the following changes: "your splendid services: became "your service"; "The untiring energy, courageous leadership" became "The energy, leadership"; "In the most creditable performance" became "In the performance"; "outstanding service" became "service." Greene, "The Alaskan Flight of 1934," 17.
64. Balbo commanded 24 sea planes on the 6,000 mile flight and three Army airmen parachuted out of a disabled balloon from 61,000 feet in July 1934. The Army General Staff insisted it was establishing a standard and further noted that the Navy had considered its flight to Alaska as routine, not justifying the award. First Lieutenant Hezekiah McClellan, one of the pilots on the 1934 flight, made extended flights over Alaska (153 flying hours in 38 days) the next year for which he was awarded the DFC. Flint DuPre, *U. S. Air Force Biographical Dictionary* (NY: Watts, 1965), p. 149; Greene, Arnold manuscript, pp. 22-23, 35n74.
65. H. H. Arnold memo for General Drum, Nov 13, 1934 HRA film #28304; Greene, Arnold manuscript, pp. 26-28; Greene, "The Alaskan Flight of 1934," pp. 15-19; [Murray Greene] The Issue of Suitable Recognition for the Alaskan Fliers of 1934, HRA film #43796.
66. Arnold Report, pp. 25, 27.
67. The other two were the northern route to Archangel (the infamous Murmansk run) in northwest Russia and the Persian Gulf route through Iran to southern Russia.
68. Frank Craven and James Cate, *The Army Air Forces in World War II*, vol. 7 *Services Around the World* (Chicago: University of Chicago, 1958), pp. 153, 164; Office of Statistical Control, *Army Air Forces Statistical Digest, World War II*, Dec 1945, p. 127.
69. Two of the Alaska flyers were killed in aircraft accidents in 1936 (Charles H. Howard and Hezekiah McClellan) and another (Richard S. Freeman) in 1941. Airfields were named for the three. A fourth B-10 flier died during World War II as a Colonel. Arnold, Report, 2-3; Robert Fogerty, Biographical Data on Air Force General Officers, 1917-1957, USAF Historical Study number 91, 1953; DuPre, *U. S. Air Force Biographical Dictionary*; Foulois to Col. H. H. Arnold, Jun 22, 1934, HRA film #28304; "The Alaskan Flight," *Air Corps News Letter*, Jan 15, 1935, p. 1934; www.af.mil/information/bios/index.asp.

“Good Men...Running Around in Benjamin Foulois, Billy Mitchell, and the F



Circles”

Fight for the Future of the Army Air Service



Karl R. Schrader

(Overleaf) 148th American Aero Squadron field at Petite Sythe, France, August 6, 1918. The machines are lined up and the pilots and mechanics test their planes.

(Right) Maj. Gen. Benjamin Foulois.

Benjamin Foulois never set out to become a key figure in the history of American aviation. In fact, his first encounter with a flying machine did not occur until he was twenty-eight years old. As one of America's original military aviators, he flew the U.S. Army's first dirigible balloon and its first airplane, learning to fly from early aviation pioneers, including the Wright Brothers and Glenn Curtiss. He began thinking about the military uses of air power in 1907, years before the publication of the theories of William Mitchell, Giulio Douhet, and Hugh Trenchard. Foulois twice led the Army's air forces, as Chief of Air Service for the American Expeditionary Forces in World War I from 1917 to 1918 and again as Chief of the Air Corps from 1931 to 1935. After retiring from the Army, he continued his advocacy of air power through many speeches and lectures, and as head of the Air Force Historical Foundation. Foulois died in 1967, making him one of the few eyewitnesses of military aviation from its beginnings with the Wright Flyer to the technological triumphs of the Mach 3+ SR-71 and the globe-spanning intercontinental ballistic missile.

A majority of the scarce literature on Foulois' military career focuses on his years as the Chief of the Air Corps, and for good reason. His role in the infamous airmail fiasco of 1934 had many ramifications for both Foulois and the Air Corps, culminating in the creation of the General Headquarters Air Force in March 1935 and Foulois' dismissal as Chief of the Air Corps at the end of that same year.¹ Other mentions of Foulois in aviation literature mainly center on his early aviation experiences from 1908 to 1913 and his role in the Mexican Punitive Expedition of 1916.

The few references to Foulois' performance as Chief of Air Service during World War I are generally limited to his clashes with Mitchell, who famously disparaged Foulois' incoming staff by referring to them as carpetbaggers.² This statement was indicative of the animosity between the two early aviation pioneers, who continued to clash throughout the rest of the war and into the interwar years. The two men could not have been further apart in both upbringing and personality. Mitchell was born into wealth, the son of a United States Senator, and used his family connections to agitate for an independent air force in the court of public opinion. Foulois, in contrast was the son of an immigrant plumber and worked his way up the enlisted ranks to twice become the chief of army aviation, where he used bureaucratic maneuvering in the



War Department and the halls of Congress to work toward the same result.

In *Airmen and Air Theory*, Philip Meilinger states, "All of us have a deep interest in knowing how others, perhaps like ourselves, have met challenges, dealt with failure, and accommodated themselves to victory and fame."³ The story of the conflict between these two aviation greats during World War I and beyond can provide insight into the current debate over parallels between the early days of air power theory and the ongoing development of comparable theories of cyber power.

Taking Command in France

When Foulois took command of the fledgling Air Service in November 1917, he inherited an organization that suffered from internal confusion and division of responsibility. Gen. John Pershing gave Colonel Mitchell, acting as the Aviation Officer for the Expeditionary Forces in France, jurisdiction over the front-line areas known as the Zone of the Advance, and assigned Maj. Raynal C. Bolling jurisdiction over the Zone of the Interior. This arrangement effectively divided the responsibilities of the Air Service between two men, resulting in inefficiencies and confusion about the chain of command. On September 3, Pershing rectified the situation by appointing Brig. Gen. William Kenley, an artillery

THE FEW REFERENCES TO FOULOIS' PERFORMANCE AS CHIEF OF AIR SERVICE DURING WORLD WAR I ARE GENERALLY LIMITED TO HIS CLASHES WITH MITCHELL, WHO FAMOUSLY DISPARAGED FOULOIS' INCOMING STAFF

Lt. Col. Karl Schrader, USAF, is an Electronic Warfare Officer with more than 2,500 flying hours on the AC-130U gunship and the RC-135V/W RIVET JOINT, and has participated in multiple overseas contingency operations, including Operations JOINT GUARD, JOINT FORGE, ALLIED FORCE, SOUTHERN WATCH, IRAQI FREEDOM, and ENDURING FREEDOM. His academic awards include the Air Force Historical Foundation Thesis Award from the School of Advanced Air and Space Studies, and both the Tau Beta Pi Award and the Cyberspace Research Excellence Award from the Air Force Institute of Technology. He is currently the Chief of Cyber Strategic Studies for the Directorate of Plans, Programs, and Analyses at Headquarters, Air Force Space Command. This article is based on his thesis for the School of Advanced Air and Space Studies, Maxwell AFB, Alabama, "A Giant in the Shadows: Major General Benjamin Foulois and the Rise of the Army Air Service in World War I," June 2010.

Maj. Gen. John J. Pershing
astride his horse at
Chaumont, France, in 1918.



**AFTER HIS
ARRIVAL ON
NOVEMBER
12, FOULOIS
SPENT TWO
WEEKS
INSPECTING
AIR SERVICE
FACILITIES
AND UNITS
THROUGH-
OUT FRANCE
...AND THEN
OFFICIALLY
TOOK OVER
FROM
KENLEY AS
CHIEF OF AIR
SERVICE ON
NOVEMBER
27**

officer, as the Chief of Air Service, with command authority over both Mitchell and Bolling.⁴ Pershing also moved the Air Service's headquarters to Chaumont, where it would be co-located with the headquarters of the American Expeditionary Forces.⁵

After his arrival on November 12, Foulois spent two weeks inspecting Air Service facilities and units throughout France to assess the state of the Service, and then officially took over from Kenley as Chief of Air Service on November 27. Pershing also named Foulois a member of the Joint Army and Navy Aircraft Committee in France, his representative to the Inter-Allied Expert Committee on Aviation of the Supreme War Council, and the Commandant of Army Aeronautical Schools in France.⁶ On December 12, Foulois announced the composition of his new headquarters, which he divided into eight sections: Policy, Administration, Technical, Training and Organization, Operations (Zone of the Advance), Balloon, Personnel, and Supply.⁷ As part of the reorganization, Foulois removed Bolling from his position as Assistant Chief of Air Service, Lines of Communication, and appointed him as the chairman of the Joint Army and Navy Aircraft Committee, where he worked to coordinate industrial, military and naval activities in Europe and the United States.⁸

Foulois' reorganization of the Air Service marked the first of many conflicts with Mitchell, who noted in his memoirs, "A more incompetent lot of air warriors had never arrived in the zone of active military operations since the war began."⁹ Foulois rejected Mitchell's inference that the Air Service needed experienced pilots in the headquarters positions rather than executives with direct commissions by noting, "We had no planes to fly, no

organization to train them, and no facilities to sustain air operations."¹⁰ Foulois' first priority was to build a supply and training infrastructure in France, and he built his staff with this goal in mind. Mitchell also states, "The competent men, who had learned their duties in the face of the enemy, were displaced and their position taken by these carpetbaggers." Again, Foulois disputes Mitchell's assertion, noting that the only officer that he displaced was Mitchell himself, whom Foulois replaced with Col. Robert Van Horn, a nonflyer with extensive experience in the Spanish-American War and the Philippine Insurrection. Foulois states that he placed Mitchell in command the Air Service components of the 1st Corps in order to place him under the tight disciplinary control of the 1st Corps commander, Gen. Hunter Liggitt, and to give Mitchell a chance to prove himself as the commander of a corps-level aviation unit.¹¹

Foulois and his group of "carpetbaggers" did the best they could at the monumental task organizing, training, and equipping the Air Service, considering their many handicaps including shortages in materiel, manpower, facilities, and most importantly aircraft. Even before he left for France, Foulois knew that he would have to populate his staff with many non-flying officers who possessed the necessary executive experience to put together a giant logistics and training organization from scratch. As Foulois explained:

The lack of knowledge on the part of the General Staff, A.E.F., of the many complex problems involved in the technical, industrial, and tactical organization and development of the Air Service activities, both in the Service of Supplies and in the Zone of the Advance, made it absolutely imperative that the Air

THESE CONFLICTING VIEWS ON THE OPTIMAL COMPOSITION OF THE AIR SERVICE STAFF WERE AMONG THE GREATEST PHILOSOPHICAL DIFFERENCES BETWEEN FOULOIS AND MITCHELL DURING THE WAR



Service representatives charged with the co-ordination of our Air Service activities with the policies of the Commander-in-Chief, as announced from General Headquarters, should be men of broad military experience, with General Staff training, and men whose reputations in the Army were such that their views and opinions would carry weight, and receive full and serious consideration.¹²

Foulois was loath to place pilots on his staff because experienced aviators were in short supply at the beginning of the war, and he felt that they could better serve the Air Service as commanders of tactical units on the front. However, Foulois did recruit two pilots for his staff, Lt. Cols. Townsend Dodd and Charles Chandler. His selection of Dodd to head the Supply Section was "absolutely necessary during the first few months of our development, due to the fact that he was at that time the only officer in the Air Service, A.E.F. (Flying or non-flying) who had had practical experience in the problems of supply, maintenance, and repair of aeroplanes, engines, transportation, etc."¹³ Similarly, Foulois recognized Chandler's skills and experience as a balloon officer and placed him in charge of the Balloon Section of the Air Service.

These conflicting views on the optimal composition of the Air Service staff were among the greatest philosophical differences between Foulois and Mitchell during the war. Mitchell firmly believed that non-aviators had no business commanding flying activities either in the Zone of the Advance or in the Zone of the Interior. In a memorandum to Foulois, Mitchell states, "As to the non-flying officers of superior rank in the Air Service, these in fact have and are exercising direct command over the training and practical use of tactical air units. This is well known to be wrong..."¹⁴ In addition, he also objected to Foulois' use of non-aviators as Section heads on the Air Service, stating "In my opinion, non-flying officers should not be entrusted with

work they cannot possibly know anything or very little about. It puts the lives of all in the air in jeopardy and creates an extremely bad morale among the flying personnel who have to do the fighting."¹⁵ Mitchell, like many of the other aviators in the Zone of the Advance, believed that "the men who actually did the work in the air were the younger ones, who had not yet reached the positions they were entitled to in accordance with their ability. So it happened that the upper positions were filled by incompetents from the army and a few from civilian life."¹⁶

Foulois agreed with Mitchell that in a perfect world, aviators should man the Air Service from the Chief of Air Service down to the pilot fighting the Germans on the front. However, Foulois knew that he did not live in a perfect world, and he had to make compromises in order to build up a staff organization while simultaneously manning tactical squadrons at the front with experienced aviators. In order to place experienced aviators on the front as quickly as possible, Foulois insisted, "that all trained flying officers employed on Air Service activities in the Service of Supplies, would be relieved of such work as rapidly as non-flying officers could be trained to efficiently take their places, and that the flying officers, so relieved, would be sent into the Zone of Advance to command tactical units on the front."¹⁷ Foulois also attempted to alleviate Mitchell's concerns about non-flyers commanding tactical units by directing, "That if it became necessary to assign non-flying officers to actual tactical command of Air Service units on the front, such non-flying officer[s] would be required to do a sufficient amount of flying...in order to gain actual air experience, as well as to gain and hold the confidence and respect of the personnel under their command."¹⁸ Neither of these directives closed the rift between the two men, and their rivalry only intensified when Pershing assigned Foulois as Mitchell's direct superior in the 1st Army.

Although Foulois made great efforts to build up the Air Service during his first six months in command, Pershing could not ignore Foulois' lack of progress in getting combat squadrons to the front to support the eighteen American divisions that had arrived in France by May 1918.¹⁹ In fact, by May only seven American combat squadrons had made it to the Western Front, including the 1st Aero Squadron that Foulois led during the Mexican Punitive Expedition in 1916.²⁰ The individual abilities of Foulois' staff members, while excellent, did not make up for their inexperience in military staff work. Internal strife within the Air Service took many forms. The air officers already in France when Foulois showed up were for the most part Regular officers, while most of Foulois' new staff was composed of recently commissioned civilians who held higher ranks than the regulars.²¹ The initial groups of furloughed pilots who were working as cooks and chauffeurs while awaiting the beginning of flight training in Issoudun were outraged when pilots who had graduated from the recently constructed schools in the United States began showing up in France with higher ranks and better training. Pilots

ON MAY 29, 1918, PERSHING RELIEVED FOULOIS AS CHIEF OF AIR SERVICE AND REPLACED HIM WITH BRIGADIER GENERAL MASON PATRICK



on the front were loath to take direction from staff officers who refused to even step foot in an airplane. Ground officers on the staff accused the pilots of being temperamental and lacking a sense of teamwork and self-discipline.²²

Change of Command

To make matters worse, on March 28, Bolling was ambushed and killed by German troops while inspecting combat operations in preparation for his transition to command of II Corps' air arm later that spring. Pershing had been using Bolling's extensive logistical experience to "take some of the pressure off Foulois and bring form and structure to the acquisition of aircraft and air-related materiel."²³ The Air Service staff's inability to form an effective organization, combined with the loss of key personnel and production delays in both France and the United States, threatened to derail the American Expeditionary Forces' aviation program. On May 29, 1918, Pershing relieved Foulois as Chief of Air Service and replaced him with Brigadier General Mason Patrick, who was the senior Corps of Engineers officer in France.²⁴ However, why Pershing replaced Foulois with Patrick depends on whom you ask.

Foulois, in his writings, insisted that he asked to be relieved of his duties as Chief of Air Service in order to focus on leading combat operations at the front. By May, the primary duties of the Chief of Air Service consisted of managing construction and logistics programs, and Foulois knew that once American squadrons entered into combat in quantity, he would have little time to oversee the fighting on the front in the Zone of the Advance.²⁵ Foulois notes in his memoirs, "My value, as I analyzed the

situation, lay in my practical experience with planes and pilots—not as a manager of construction projects."²⁶ On May 11, Foulois asked Pershing to be relieved of his duties and reassigned as Chief of Air Service for the 1st Army. Foulois' other reason for requesting relief as Chief of Air Service was his increasing concern about Mitchell's lack of progress in the Zone of the Advance. Foulois later described the Zone of the Advance as "a bunch of disorganized men, a bunch of disorganized airplanes—somebody had to put them together, and that was my job, I put them together [sic]."²⁷ In his new position as Chief of Air Service, 1st Army, Foulois was determined to "put [his] tactical experience to work and get the coming air squadrons whipped into shape."²⁸

Mitchell took a very different view of Foulois' actions as Chief of Air Service. From the beginning of their confrontational relationship in France, Mitchell had based most of his opinions about Foulois on rumors. When Foulois first arrived in France, Mitchell noted, "Foulois, I am told, had orders from the President to General Pershing to put him in charge of aviation in Europe, even though he was no longer an active pilot. They say he announced before leaving the United States that he would command not only the American services but in a short time that of all the Allies as well."²⁹ Later, when Patrick replaced Foulois, Mitchell made his opinion clear on Foulois' leadership abilities when he commented, "things had become such a mess in the interior that it was necessary to put somebody in charge of things there in whom General Pershing had confidence."³⁰ Mitchell's criticism that Foulois was no longer an active pilot was both wrong and ironic. It was wrong because Foulois was an active flyer throughout his staff tour at the War Department, and ironic because at the time of his

WHY PERSHING REPLACED FOULOIS WITH PATRICK DEPENDS ON WHOM YOU ASK

**FOULOIS'
DESIRE TO
SECURE GEN-
ERAL COOP-
ERATION
MADE HIM A
VALUABLE
ASSISTANT
AND BUT FOR
HIS EXPERI-
ENCE AND
HIS EFFORTS
WE MIGHT
NOT HAVE
AVOIDED SO
MANY OF THE
PITFALLS
THAT LAY IN
OUR WAY**



statement, Mitchell was not officially a pilot in the Air Service. Despite his misgivings, Mitchell was initially unconcerned when Foulois became his immediate superior officer as Chief of Air Service for the 1st Army, "As there were no air units in the First Army...he would not have very much to do."³¹

Pershing, as Commander of the American Expeditionary Forces, could no longer ignore the aviation production delays, the lack of coordination between the Air Service staff and his General Staff, and the friction between Foulois and Mitchell. In his memoirs, Pershing notes as early as January 1918, "In the A.E.F., differences of opinion and the consequent lack of cooperation among aviation officers upon whom rested the task of organization and training caused confusion and loss of time."³² According to Patrick, Pershing's frustrations culminated in May, when he called Patrick to his headquarters and told him, "In all of this Army there is but one thing which is causing me real anxiety. And that is the Air Service. In it there are a lot of good men, but they are running around in circles. Somebody has got to make them go straight. I want you to do the job."³³ Pershing, however, confirms Foulois' claim that he requested to be relieved as Chief of Air Service and praises him for his service, "Brigadier General Foulois, at his own request and in order to assume charge of aviation in the First Army, was to be superseded by Brigadier General Patrick. Foulois' desire to secure general cooperation made him a valuable assistant and but for his experience and his efforts we might not have avoided so many of the pitfalls that lay in our way."³⁴ Pershing's selection of Patrick to succeed Foulois was a shrewd choice. Pershing had known Patrick for years, beginning with their time together at West Point, and he reasoned that Patrick's seniority would enable him to stand above the conflicts between the many ambitious air officers in the Air Service, almost all of whom (including Foulois and Mitchell) were under the age of forty.³⁵

In his six months as Chief of Air Service, Foulois made great strides toward creating a smooth running organization that could produce combat squadrons to support Pershing's ground troops, but shortages in personnel, materiel, and aircraft ultimately frustrated his best efforts. Foulois did his best to adapt his plans to accommodate these shortages, but external strife between his staff and the General Staff and internal strife between his recently commissioned non-flying staff and Billy Mitchell's old guard of pilots doomed his efforts and led to Foulois' and Pershing's mutual agreement that he should step down as Chief of Air Service. The ongoing animosity between Benny and Billy would soon reach its climax when Foulois finally received his chance to satisfy his "personal desire to lead America's combat arm in battle," in his next assignment as the Chief of Air Service for the 1st Army, making him Mitchell's direct supervisor.³⁶

Clash on the Western Front

On June 3, 1918, Foulois arrived in Toul as the Chief of Air Service for the newly formed 1st Army of the American Expeditionary Forces. Foulois' new position effectively demoted Mitchell, then serving as Chief of Air Service of the 1st Corps, and placed Mitchell in the position of having to report directly to a man whom he intensely disliked. The first meeting between superior and subordinate did not go well. In his memoirs, Foulois described the encounter:

When I entered his luxurious (for those days) office, he greeted me coldly, like a school principal being visited by the head of the PTA.

"There's no use beating around the bush, Billy," I told him. "I'm here to take over your office, your files, and your job. You are relieved as of this moment."

**FOR
FOULOIS,
MITCHELL'S
PETULANT
BEHAVIOR
DURING THE
TRANSFER
OF COM-
MAND WAS
THE LAST
STRAW**

The expression on Mitchell's face was pathetic. He turned gray and his jaw sagged open in shock as if I had kicked him in the groin...He began a loud monologue about how I had been out to get him ever since I had been promoted to brigadier general. When I tried to interrupt to refute his allegations, he babbled on almost incoherently and burst in to tears like an immature child. [Lt. Col. Frank] Lahm and I were embarrassed for him, but his actions only proved to me that he was indeed unfit to command.³⁷

Lieutenant Colonel Frank Lahm, who flew with Foulois during the first days of army aviation in 1908, and who Foulois had selected for his staff as the new air chief for the 1st Army, describes the incident in his diary and seems to back up the essence of Foulois' claims,

We went to Mitchell's office—he was pretty sick over the proposition, but said he would move out at any time...Mitchell and Heintzelman came in from lunch and the transfer took place—it was almost tragic. Gen. Liggett's instructions were definite. Everything was to be turned over that was needed. F[oulois] interpreted it to mean practically everything. Mitchell first named one thing, then another—then the personnel...Finally it came down to his own desk which he said he had had for some time—he was told to keep it, but the men broke it up in trying to move it, so Mitchell finally said he did not want it.³⁸

For Foulois, Mitchell's petulant behavior during the transfer of command was the last straw. The next day, June 4, Foulois wrote a memorandum to General Pershing in which he requested that Mitchell be immediately relieved of duty and returned to the United States for observation and medical treatment. In his memorandum, Foulois notes, "Colonel Mitchell, during the past year, has had considerable hard field service in France, and from my personal knowledge, has on numerous occasions performed excellent service, particularly during the past month. His actions during the past two days, however, firmly convince me that his is either mentally unfitted for further field service, or is incapable of working in harmony with myself, in carrying out the policy of the Commander-in-Chief."³⁹ Four days later, Foulois received a reply from Brig. Gen. J. W. McAndrews, Pershing's chief of staff, which stated that Pershing had spoken personally to Mitchell about the matter, and that further insubordination toward Foulois would not be tolerated. In addition, McAndrews relayed Pershing's wishes that Foulois "meet Colonel Mitchell more than half way on this matter," and "The fact that you have been his junior and are now his senior makes it possible for you to afford to do this."⁴⁰ Though the two would never be friends, they at least managed to establish a truce, and Foulois decided to give Mitchell a chance to prove his theories and talents as an air commander during the approaching Chateau-Thierry operation.

**PERSHING
HAD SPOKEN
PERSONALLY
TO MITCHELL
ABOUT THE
MATTER, AND
THAT FUR-
THER INSUB-
ORDINATION
TOWARD
FOULOIS
WOULD NOT
BE TOLER-
ATED**

In mid-June, Foulois formed the 1st Air Brigade, composed of all the tactical units under his command, and placed Mitchell in command of the Brigade. He then ordered Mitchell to proceed to Chateau-Thierry "for duty in connection with the tactical and technical supervision of all Air Service units designated for service in that area."⁴¹ Once again, Foulois had to rein in Mitchell's propensity to take personal control of all Air Service units he encountered, and in a memorandum on July 1, Foulois warned him that, "Your own position as Brigade Commander is not construed...as giving you control over the Air units of the Corps except as directed by the Corps commander."⁴² In his memorandum of July 4, Mitchell professionally responded to Foulois' instructions, in which he acknowledged Foulois' concerns, provided reasons for his actions, and promised, "The Air Service Brigade now attached to the Corps will work as directed by the Corps Commander under the tactical orders of the VI French Army, with which it has established [and] maintains close liaison."⁴³ After reviewing Mitchell's actions at Chateau-Thierry, Foulois found that Mitchell had overruled the orders of tactical Air Service commanders on several occasions, and had given orders directly to subordinate units without following his established chain of command. However, after taking into account the inexperience of Mitchell's subordinate commanders and the fluid nature of the air war over the front, Foulois concluded that he would probably have taken the same actions, and subsequently defended Mitchell's actions to Pershing's Inspector General, who was investigating the matter.⁴⁴

For the Good of the Service

During the Chateau-Thierry campaign, Foulois also encountered many problems with the Air Service's efforts to keep his squadrons at the front supplied with replacement airplanes and personnel. He saw great wastage in both airplanes and engines, with insufficient back shop capacity for the salvage and repair of damaged airplanes and motor vehicles.⁴⁵ Patrick's headquarters, by this time, had also informed Foulois that the Air Service's next operations were to commence later that summer in the Toul sector. If the Service of Supply was having so many problems resupplying his forces at Chateau-Thierry, located only 45 miles from major supply centers, how could his squadrons at the front possibly receive adequate support when they would soon be 300 to 400 miles from Air Service supply depots? Foulois knew, based on his experiences as Chief of Air Service, that the Service of Supply needed to build additional depots and repair shops closer to the front in the Toul sector in order to rein in the wastage and delay in resupplying frontline units. He also knew that he was the best man to take on this responsibility.⁴⁶

On July 25, Foulois wrote a memorandum to Pershing in which he requested relief as Chief of Air Service, 1st Army, and recommended that Mitchell take his place. In the memorandum, Foulois praised

Mitchell's performance, stating, "I am glad to say that the technical and tactical supervision exercised over these units by Colonel Mitchell has resulted in a minimum loss of life, a maximum effective use of material available, and a high fighting spirit of morale which will be most beneficial in establishing the standard of efficiency for all new Air Service units now organizing and to be organized in the future."⁴⁷ Foulois gives three reasons for his recommendation of Mitchell to replace him. First, he wanted to show Mitchell that in spite of their different leadership styles, he still appreciated and recognized Mitchell's talents as an air commander. Second, he recalled Pershing's request to "meet Colonel Mitchell more than half way," and determined the needs of the Air Service were best served with Mitchell in command of the 1st Army's Air Service and Foulois returning to the staff to work logistics and training issues. Finally, and most importantly, Foulois realized that the Service of Supply's progress in building the Air Service's infrastructure was "not up to the point where they should have been at that date...*The responsibility for this lagging in development of Air Service activities rests fully upon myself*, and not upon General Patrick (Author's emphasis)."⁴⁸ Foulois felt personally responsible for the Service of Supply's failures, and he wanted a chance to fix them and finish what he started in 1917.

After Pershing granted his request for relief as Chief of Air Service of 1st Army, Foulois spoke with Patrick and lobbied for a position as the Assistant Chief of Air Service in charge of logistics. Foulois saw the excessive losses both in combat and in ferrying aircraft between depots and the front, and he calculated that the Air Service could not execute the upcoming St. Mihiel and Argonne operations with the remaining equipment. From his time as Chief of Air Service, Foulois knew all the aircraft manufacturers in France, England, and Italy, how much materiel they could produce, and how much additional materiel he could squeeze out of them in order to provide supplies for the upcoming American offensives. Ultimately, Foulois wanted the job because while Patrick was an outstanding leader, like Mitchell he knew nothing about aviation logistics, and Foulois believed he was needed on the staff to fix the supply lines.⁴⁹

Throughout this trying period, Foulois showed great personal integrity. In July 1918, as the Inspector General was investigating Mitchell's actions during the Chateau-Thierry operation, Foulois on his own initiative went to the investigators and informed them he felt that Mitchell had taken appropriate actions and he would have done the same under similar circumstances. As Foulois notes, "But my sense of justice and fair play would not allow me to take such a course of action [withholding his recommendation from the Inspector General], although I have been told on numerous occasions since then, that I was too generous and should have allowed Mitchell to eliminate himself by his own actions."⁵⁰ By the end of the war, Foulois had developed a great admiration for Mitchell's tac-

tical skill, culminating in his decision to step down as Chief of Air Service, 1st Army, to make way for Mitchell, "something that neither Mitchell nor most officers would have done."⁵¹ DeWitt Copp neatly sums up the episode: "Whether he made the move as a tactical retreat in the face of what he realized were superior forces or because he believed his talents were better suited to solving the difficulties of training and supply is not known. Poker was a game Benny Foulois played well."⁵² Based on Foulois' many statements on the matter, the answer is most likely "all of the above."

Postwar Conflicts

After the war, Foulois spent the next decade agitating for independence of the air arm, and slowly reestablishing his credentials as a commander and a logistician. In December 1931, he achieved his goal of heading the Army's air arm a second time, and spent the next four years preparing the Air Corps for the next war with Germany, which he believed was inevitable.

Both during this period and throughout his career, Congressional legislation and testimony were Foulois' preferred method of overcoming bureaucratic opposition to accomplishing his goals, and he won more battles than he lost. Foulois constantly volunteered to testify before congressional committees, and he appeared before both the House and the Senate dozens of times throughout his career. He also did not hesitate to exert direct influence on the legislative process; on several occasions during his career, he surreptitiously crafted and submitted legislation to congressional members sympathetic to his cause. By confining his dissent with War Department policies to the halls of Congress, he was able to take advantage of the rules of the bureaucracy in order to criticize the War Department General Staff without fear of official retribution. Foulois' mistake at the end of his career was his failure to understand that the rules work both ways, and that the General Staff could freely criticize him in the halls of Congress, eventually leading to Congressman William Roger's crusade to have Foulois fired as Chief of the Air Corps after the airmail fiasco of 1934.

This method of registering dissent with War Department policies was perhaps the greatest difference between Foulois and Billy Mitchell; after all, they were both after the same goal, an independent air arm co-equal with the army and navy. Mitchell, with his important family connections and (apparent) wealth, chose to use the court of public opinion to press his views on the incompetence of the army and navy, and the army retaliated with a court of its own. Although Mitchell had the backing of the public during his court martial in 1925, he had made many enemies within military circles, and even his highly placed Washington connections could not save him from conviction. Mitchell's status as a maverick haunted him for the rest of his life; when Congress formed the Baker Board to examine the Air Corps and make recommendations for improve-

Billy Mitchell stands at his court-martial hearing.



**SPAATZ
FLEW WITH
FOULOIS
DURING THE
MEXICAN
PUNITIVE
EXPEDITION,
AND FOULOIS
LATER
ENTRUSTED
THE YOUNG
MAJOR WITH
COMMAND
OF THE
TRAINING
CENTER AT
ISSOUDUN**

ment, several senators and congressmen asked Secretary of War George Dern to name Mitchell as a member. Dern refused to let him get anywhere near the panel, stating that the board's task was technical, not political, and that he wanted no Mitchell-like tirades or headline grabbing.⁵³ Foulois, on the other hand, used congressional testimony, legislation, boards, and appropriations battles to persuade Congress to impose change on the War Department, culminating in the creation of General Headquarters Air Force in 1935. The General Headquarters Air Force was the practical result of Foulois' decision to compromise between his ultimate goal of independence and the then-reality of full control by the General Staff. Ultimately, Foulois knew when to push for independence, and when to substitute compromise for total victory.

Protecting the Future

Foulois also used his positions as Chief of Air Service and later as Chief of the Air Corps to nurture and protect the next generation of air power leaders in the army. Many of the officers he mentored throughout his career were members of the North Island Flying School and the 1st Aero Squadron in Mexico. In a 1916 photograph of the 28 officers of the Flying School, 13 would go on to become general officers later in their careers.⁵⁴ Foulois took many other officers under his wing during his tenure as Chief of the Air Corps, and he provided protection from the General Staff for several officers who testified on Mitchell's behalf during his court martial. Many of Benny's disciples went on to hold critical positions during World War II and beyond.

Carl "Tooe" Spaatz flew with Foulois during the Mexican Punitive Expedition, and Foulois later entrusted the young major with command of the training center at Issoudun during the war. Foulois kept his career on track after Spaatz testified at

Mitchell's trial, and he served as Foulois' Chief of Training and Operations in the Office of the Chief of the Air Corps. Spaatz went on to command 8th Air Force during World War II, and after the war became the first Chief of Staff of the Air Force.⁵⁵ Henry "Hap" Arnold was another promising officer who testified at Mitchell's trial and was subsequently ejected from Washington for continuing Mitchell's crusade for independence. Foulois salvaged his career by giving him command of March Field in 1931, and Arnold subsequently served as one of three regional commanders during the Air Corps airmail operation.⁵⁶ Arnold eventually became the Chief of Army Air Forces during World War II, and was the only airman to ever win a fifth star.⁵⁷ Frank Andrews, another Mitchell supporter, served as Foulois' executive officer for several years in the Office of the Chief of the Air Corps, and was held in high regard by both his Air Corps colleagues and the General Staff.⁵⁸ Later, the General Staff selected Andrews as the first commander of General Headquarters Air Force, and he went on to a distinguished career in World War II, culminating in his selection as Commanding General of the United States Army in Europe in 1943. Many believe that were it not for his untimely death in an airplane accident, he might have become Supreme Allied Commander instead of Dwight Eisenhower.

The most notable event during Benny Foulois' tenure as Chief of the Air Corps was his failure during the air mail fiasco to take his combat-trained air force and deploy them on short notice as commercial airmail carriers, a mission they were neither trained nor equipped to execute. Foulois retired on the last day of 1935, under a cloud of controversy courtesy of the Rogers subcommittee, and refused to have anything to do with the military for the next two-and-a-half decades. In 1959, he once again "joined" the Air Force, and spent the remainder of his life passing on his hard-won lessons about air power to future generations. His message was sub-

(left to right) Brig. Gen. Benjamin Foulois, Maj. Gen. James Fechet, and Brig. Gen. Henry Pratt.



PERHAPS, HOWEVER, WHAT THE AIR FORCE NEEDS IS NOT A "CYBER BILLY MITCHELL," ...BUT A "CYBER BENNY FOULOIS"

tle yet important: "But General Foulois always had a deeper message for his audiences than to remind them of their aviation heritage. He warned again and again about the dangers of complacent thinking, of letting the disease of communism spread, of resting on the laurels of past wars won."⁵⁹

Conclusion

Today, the United States Air Force faces a new set of challenges, this time in cyberspace. With the rapid proliferation of ever-more effective cyber weapons, several military and civilian experts have called for "a Billy Mitchell to sound the alarm" about America's unpreparedness to wage a cyber-war.⁶⁰ Perhaps, however, what the Air Force needs is not a "cyber Billy Mitchell," with the attendant accusations of criminal negligence in the under appreciation and misuse of cyber capabilities, but a "cyber Benny Foulois," working patiently within the system to establish new cyber capabilities and missions in order to counter the growing cyber threat.

To accomplish this goal, the Air Force will need visionary officers to develop creative solutions, just as Foulois showed creativity in developing (eventually) an effective logistics infrastructure for the Air Service and working within the system to advance new concepts of air power employment. Although Foulois had very little respect for Mitchell as an

officer, he continued to nurture the careers of the supporters of Mitchell's theories, including Arnold, Spaatz, and Andrews, so that a new generation of visionary air power advocates would be in place to command the Army's air arm in the next war. Foulois' actions were the prototype for subsequent Air Force generals developing like-minded advocates for technological and doctrinal innovations, and resonated through the decades with Generals Curtis LeMay and the nuclear bomber, Bernard Schriever and the intercontinental ballistic missile, and Charles Gabriel and the AirLand battle.

In his introduction to the book, *The Paths of Heaven: the Evolution of Airpower Theory*, Colonel Phillip S. Meilinger wrote, "Library shelves are crammed with books about the aerodynamics of flight, technical eulogies to specific aircraft, and boys' adventure stories. Less copious are good books on air power history or biography....Much needs to be done to fill such gaps."⁶¹ One of these gaps is the story of an unsung hero of the Air Service in World War I, Major General Benjamin Delahauf Foulois. Though not as famous as the combat hero Eddie Rickenbacker or the maverick theorist Billy Mitchell, Benny Foulois is unmatched in his contributions to the success of the American Air Service in France, and a study of his failures and success during the war and beyond can be of great use in addressing the problems of today's Air Force. ■

NOTES

1. John Shiner, "Benjamin D. Foulois: In the Beginning," in *Makers of the United States Air Force (USAF Warrior Studies)*, edited by John L. Frisbee (Washington, D.C.: Office of Air Force History, U.S. Air Force, 1987), p. 33.
2. See for example, John H. Morrow, Jr., *The Great War*

- in the Air: *Military Aviation from 1909 to 1921*, (Tuscaloosa: The University of Alabama Press, 1993), p. 272.
3. Philip S. Meilinger, *Airmen and Air Theory: A Review of the Sources*, (Maxwell AFB: Air University Press, 2001), p. 3.

4. James J. Hudson, *Hostile Skies: A Combat History of the American Air Service in World War I*, (Syracuse, NY: Syracuse University Press, 1968), p. 52.
5. "Final Report of the Chief of Air Service, A.E.F. to the Commander in Chief American Expeditionary Forces", (Washington, D.C.: Government Printing Office, 1921), p. 24.
6. Official Biography—Major General Benjamin D. Foulois. www.af.mil/information/bios/bio_print.asp?bioID=5445 (accessed January 2010).
7. War Department, Office of the Director of the Air Service, "Brief History of the Air Service, American Expeditionary Forces," Jul 1, 1920, p. 4.
8. "Final Report of the Chief of Air Service, A.E.F.," p. 28.
9. William Mitchell, *Memoirs of World War I*, (New York: Random House, 1960), p. 165.
10. Benjamin D. Foulois with C. V. Glines, *From the Wright Brothers to the Astronauts: The Memoirs of Major General Benjamin D. Foulois* (New York: McGraw Hill Book Company, 1968), p. 161.
11. Benjamin Foulois, *From the Wright Brothers to the Astronauts*, p. 161. This is an interesting justification, given that Foulois himself had never commanded an organization larger than a squadron prior to his selection as Chief of Air Service.
12. Maj Benjamin D. Foulois, "Personal Service Record for Period 1898 to 1919," to Lt Gen Robert L. Bullard, President of Infantry Efficiency Board, War Department, memorandum, 14 October 1919, p. 130.
13. Maj Benjamin Foulois, "Personal Service Record," p. 130.
14. Brig Gen Benjamin D. Foulois, "The Air Service, American Expeditionary Forces (1917-1918)," 1919, attachment D, p. 9.
15. Brig Gen Benjamin Foulois, "The Air Service, American Expeditionary Forces," attachment D, p. 9.
16. William Mitchell, *Memoirs of World War I*, p. 176.
17. Maj Benjamin Foulois, "Personal Service Record," p. 129.
18. Maj Benjamin Foulois, "Personal Service Record," p. 129.
19. *The Official Record of the United States' Part in the Great War*, (New York: Parke, Austin, and Lepscomb, 1923), p. 111.
20. John J. Pershing, *My Experiences in the World War*, vol. 2 (New York: Frederick A. Stokes Company, 1931), p. 125.
21. John F. Shiner, *Foulois and the U.S. Army Air Corps 1931-1935*, (Washington, D.C.: Office of Air Force History, 1983), p. 9.
22. James Hudson, *Hostile Skies*, p. 56.
23. James Cooke, *Billy Mitchell*, (London: Lynne Rienner Publishers, 2002), p. 70.
24. Wesley Craven and James Cate, eds, *The Army Air Forces in World War II*, vol. 1, *Plans and Early Operations, January 1939 to August 1942*, (Chicago: The University of Chicago Press, 1948), p. 11.
25. Brig Gen Benjamin Foulois, "The Air Service, American Expeditionary Forces," p. 35.
26. Benjamin Foulois, *From the Wright Brothers to the Astronauts*, p. 171.
27. Donald Shaughnessy, "Flight Interview," interview with Maj Gen Benjamin D. Foulois, p. 20 January 1960, p. 38.
28. Benjamin Foulois, *From the Wright Brothers to the Astronauts*, p. 171.
29. William Mitchell, *Memoirs of World War I*, p. 165.
30. *Ibid.*, p. 205.
31. *Ibid.*
32. John Pershing, *My Experiences in the World War*, vol. 1, p. 285.
33. Mason M. Patrick, *The United States in the Air*, (Garden City, New York: Doubleday, Doran and Company, 1928), p. 6.
34. John J. Pershing, *My Experiences in the World War*, vol. 2, p. 50.
35. Alfred Goldberg, editor, *A History of the United States Air Force 1907-1957*, (Princeton, NJ: D. Van Nostrand, 1957), p. 22.
36. Benjamin Foulois, *From the Wright Brothers to the Astronauts*, p. 175.
37. Benjamin Foulois, *From the Wright Brothers to the Astronauts*, p. 172.
38. Lahm, Frank P. "The World War I Diary of Col. Frank P. Lahm, Air Service, A.E.F." Unpublished diary. Maxwell AFB, Alabama: Air University Historical Research Division, 1970.
39. Maj Benjamin D. Foulois, "Personal Service Record for Period 1898 to 1919," to Lt Gen Robert L. Bullard, President of Infantry Efficiency Board, War Department, memorandum, 14 October 1919, p.146.
40. Maj Benjamin Foulois, "Personal Service Record for Period 1898 to 1919," p. 147. Mitchell had outranked Foulois before the latter's temporary promotion to brigadier general and arrival in France.
41. Maj Benjamin Foulois, "Personal Service Record for Period 1898 to 1919," p.148. This organization, where Mitchell commanded all the combat units in the 1st Army and Foulois and his staff commanded the support and logistics units, became the prototype for the latter reorganization of the Air Corps in 1935 into a General Headquarters Air Force that operated separately from the Office of the Chief of the Air Corps.
42. Maj Benjamin Foulois, "Personal Service Record for Period 1898 to 1919," p. 149.
43. Maj Benjamin Foulois, "Personal Service Record for Period 1898 to 1919," p. 151.
44. Maj Benjamin Foulois, "Personal Service Record for Period 1898 to 1919," p. 152.
45. Brig Gen Benjamin Foulois, "The Air Service, American Expeditionary Forces," p. 36.
46. Brig Gen Benjamin Foulois, "The Air Service, American Expeditionary Forces," p. 37.
47. Maj Benjamin Foulois, "Personal Service Record for Period 1898 to 1919," p. 152.
48. Maj Benjamin Foulois, "Personal Service Record for Period 1898 to 1919," p. 155.
49. Albert F. Simpson Historical Research Center, "U. S. Air Force Oral History Interview," interview with Maj Gen Benjamin D. Foulois, 9 December 1965, pp. 41-42.
50. Maj Benjamin Foulois, "Personal Service Record for Period 1898 to 1919," p. 155.
51. DeWitt Copp, *A Few Great Captains: The Men and Events that Shaped the Development of U.S. Air Power*, (New York: Doubleday and Company, 1980), p. 21.
52. DeWitt Copp, *A Few Great Captains*, p. 21.
53. James Cooke, *Billy Mitchell*, p.267.
54. Maurer Maurer, *The U.S. Air Service in World War I*, vol. 2, (Washington, D.C.: Office of Air Force History, U.S. Air Force, 1978), p. 60.
55. Official Biography—General Carl A. Spaatz. http://www.af.mil/information/bios/bio_print.asp?bioID=7210 (accessed March 2010).
56. Donald Shaughnessy, "Flight Interview," p. 46.
57. Official Biography—General Henry H. Arnold. http://www.af.mil/information/bios/bio_print.asp?bioID=4551 (accessed March 2010).
58. DeWitt Copp, *A Few Great Captains*, p. 121.
59. Benjamin Foulois, *From the Wright Brothers to the Astronauts*, p. 298.
60. John Osterholz, "Data Bombs Away," www.armed-forcesjournal.com/2009/09/4232646/ (accessed March 2010).
61. Col Philip S. Meilinger, ed, *The Paths of Heaven: The Evolution of Airpower Theory*, , (Maxwell AFB: Air University Press, 1997), p. xii.

The Vietnam War: A Chronology of War. By Raymond K. Bluhm. New York: Universe Publishing, 2010. Illustrations. Photographs. Index. Pp. 288. \$50.00 ISBN: 978-0-7893-1897-8

Coffee table books go in and out of vogue; some often validate the lack of importance of the genre while others defy that perception. This book is an example of the latter. Continuing the series of books sponsored by the services' historical foundations, *The Vietnam War* provides the reader with a sense of the magnitude of that war, if not the complexity. In order to accomplish this, according to the editor, the contributors used "a sequential approach to describe the key events that led up to, comprised, and finally ended the Vietnam War."

The book is divided into three large segments, each comprising a significant time period of the war. Each segment is broken down by year, then further by month, and then by day. If an entry pertains to one of the services, that is noted. *Cold War—Hot War* covers the years 1950 to 1964. *A War Transformed* covers the years 1965 to 1968, when American involvement began in earnest and massive numbers of personnel and hardware entered the war. *A Fight to the End* concludes the war years from 1969 to 1977, including the American withdrawal, the Geneva Accords, and the eventual fall of South Vietnam to communist forces.

The book's strengths might not be readily apparent, but they are there. For example, the discussion of the end of French involvement in Vietnam aptly demonstrates the growing American involvement. Also, the editors do not restrict themselves to Southeast Asia alone. Rather, in an attempt to place the war and its origins in a proper and easily understood context, they point out other events taking place both in east Asia and in the United States that were relevant to the war's origins, progress, and eventual conclusion. Events such as the Quemoy and Matsu crisis and the creation of SEATO are woven into the dialogue, as are establishment of the Army's Special Forces Groups, the Air Force Academy, and the initial flights of various aircraft that participated in the war. Later pages include other events such as increased anti-war demonstrations and President Johnson's decision not to seek reelection in 1968. The book ends much more quickly than it began. After a long explanation of the war's beginnings, only two pages chronicle its final days. Fittingly, it ends with President Carter's blanket pardon of the war's draft dodgers in 1977.

Woven throughout the text is an

increasing sense of American involvement. The book's prose informs the reader about the events of the war, but the accompanying photographs put a face on the people and help identify the hardware that sometimes are confused or overlooked. That said, and in spite of its obvious strengths, the book suffers from a few defects. For instance, one photo caption notes that it is an Air Force C-123 aircraft, but the photo shown is actually of an American soldier on an armored personnel carrier. Thankfully, such bloopers are few, but it's inexcusable to find them in a volume sponsored by military organizations.

Overall, *The Vietnam War* is a volume that should be on every interested person's bookshelf—or even coffee table. To be accompanied by the other books in the series would make it that much more interesting and informative.

MSgt. Dennis H. Berger, USAF (Ret.), Doctoral Candidate, Texas Tech University, Lubbock



Hawker Hurricane from 1935 to 1945.

By Dominique Breffort. Paris: Historie & Collections, 2010. Tables. Diagrams. Illustrations. Photographs. Pp. 82. \$19.95 ISBN: 978-2-915239-87-4

This is the fourteenth book in the *Planes and Pilots* series from Historie & Collections publications out of France covering World War II and later fighter and attack aircraft. I found a review of an earlier P-51 book by Breffort that wasn't terribly complimentary, but I thought this book on the Hurricane was well done. It is primarily a colors and markings book with a comprehensive collection of profile views of Hurricanes from the earliest models to the last flown. While the text is really just a primer on the aircraft, its development, and operations, it is full of photographs, tables of specifications, and diagrams showing the various modifications made to the Hurricane during its ten-year career. The book covers all versions and users from the British, to the Russians, to the Iranians. A very quick read, visually delightful, and modestly priced, it is well worth the money for anyone serious about the Hurricane, whether as an aficionado of the plane or, more particularly, a model builder.

The book is arranged in chapters by aircraft Mark, or type, including one each on the seaborne version and foreign users. All include a short discussion of that type's development and its operational use. The end of each chapter includes a collection of profile views showing the aircraft in the

various paint schemes and markings unique to that Mark. The detail in these profile views is excellent, and the captions highlight unique items in either the markings or aircraft equipment. The information in the text is quite good given the very short space allotted. The end of the book shows plan and profile views of the various official paint schemes and markings used throughout the aircraft's career.

I could find nothing on the author beyond the fact he has written numerous other titles in this genre. I noted a few typos and one instance of disagreement between a caption and the plane shown (picture showed four cannons, two in each wing, while the caption said *two* total). The author is obviously biased in favor of the Hurricane and its, in his opinion, underappreciated role throughout the war. Having a soft spot for the Hurricane myself, I'm inclined to overlook this. The book is of fine quality and would be a good addition to any aviation bookshelf.

Lt. Col. Golda Eldridge, USAF (Ret.), Ed.D.



Meteor from the Cockpit: Britain's First Jet Fighter.

By Peter Caygill. Barnsley, UK: Pen & Sword Books Ltd., 2010. Photographs. Appendix. Glossary. Index. Pp. 148. \$39.95/£19.99 ISBN: 978-1-84884-219-9

Meteor from the Cockpit is a pilot's view of the first British jet fighter to enter service. Written by Peter Caygill, a leading British aviation author, the book is one in a series he has written describing not only the design and operational history of historic British fighters but also their flying characteristics through detailed test reports and firsthand accounts by pilots.

The Gloster Meteor design dates to 1940, and was planned from the beginning to be powered by the then revolutionary gas turbine engine developed by Frank Whittle. Though the Meteor was of conventional design (not incorporating swept wings, for example), it proved to be a rugged, though somewhat underpowered, fighter affectionately nicknamed the *Meatbox* by her pilots. Entering service with the Royal Air Force (RAF) in 1944, the Meteor was the only Allied jet fighter to see combat in World War II, though it never faced the *Luftwaffe's* Me 262 jet over western Europe. Initially based in England, the early Meteors were sent on "anti-Diver" patrols against the V-1 flying bombs the Germans had aimed at London. As related by Meteor pilot Dennis Barry, problems with the Meteor's 20-mm nose-mounted cannons forced some pilots to use

their wingtips to flip the V-1 into an uncontrolled dive before it reached its target.

Though quickly superseded by more advanced jet fighters, the Meteor served in a variety of roles with the RAF and the air forces of other countries, including as a night-fighter, trainer, and test bed. Royal Australian Air Force (RAAF) Meteors saw combat during the 1950-1953 Korean War. Unfortunately, as combat reports included in the book show, the Meteor was generally outclassed in Korea by the swept-wing MiG-15. The Meteor proved to be much more effective for ground attack than escorting USAF B-29 bombers or RF-80 reconnaissance jets over North Korea. Despite its shortcomings, the Meteor soldiered on for decades. Even today, nearly seventy years after the Meteor's first flight, the aircraft is still used by Martin Baker in England to test ejection seats.

Meteor from the Cockpit includes details on the design, development, testing, and service history of this classic aircraft. Early mishaps and structural failures are also described in detail. One sobering fact is that in 1952 it was estimated a Meteor pilot had a one-in-sixteen chance of not surviving an eighteen-month tour! However, the first-person accounts by former Meteor pilots are the heart of the book. Caygill has provided the reader with an in-depth account of the thrill (and danger) of flying the *Meatbox*. Readers will gain an appreciation of the early days of jet flight, when the sight of an airplane without a propeller was something to marvel at.

*Maj. Jeffrey P. Joyce, USAF (Ret.), Docent,
NASM's Udvar-Hazy Center*



Beneficial Bombing: The Progressive Foundations of American Air Power, 1917-1945. By Mark Clodfelter. Lincoln: University of Nebraska Press, 2010. Photographs. Notes. Bibliography. Index. Pp. xii, 347 pages. \$40.00 ISBN: 978-0803233980

Mark Clodfelter is a leading air power historian, most noted for his trailblazing book *Limits of Air Power* (1989) and also for his numerous, well-received articles on the subject. With a Ph.D. from the University of North Carolina, Chapel Hill, and teaching experience at the USAF Academy, Air University's School of Advanced Air and Space Studies, and the National War College, he is well qualified to deal with this subject.

Clodfelter narrates the history of strategic bombardment theory and prac-

tice beginning in World War I, through the course of World War II, up through the present conflicts in Iraq and Afghanistan. Although his focus is at the top military level, he does not neglect the tactical aspects. He shows how airmen fought for independence and how they shifted during World War II from their prewar theory of precision bombing toward area bombing. His emphasis is on how the pressure on the air leaders of timetables to end the war as quickly as possible with the fewest American casualties had an adverse impact on both the air crews delivering the bombs and the civilians being bombed.

While there is little new here, Clodfelter adds detail and brings together material derived from both primary and secondary sources. His writing is lively, making some of the less exciting (although important) material easier to deal with. The brief biographies of leading participants are quite good: Clodfelter covers all major, and many minor figures with vivid and concise sketches. Most significantly, he lays out a reasoned, sharp, and balanced critique of the airmen's theory and operations. Little is missing. His overall assessment of the use of bombing is skeptical, summed up by his comment that, "In many respects [the] political chiefs have found air power's siren song even more enticing than have the airmen."

There are criticisms. Clodfelter does not use a strict chronological organization, instead beginning each chapter with a dramatic event. Although this reads well, the disjuncture of the chronology may confuse those unfamiliar with the flow of events. I found his repeated use of the term "progressive" annoying, confusing, and distracting. He never gives a clear definition of the term, and its meaning seems to change as the book unfolds. Likewise he never defines or explains the meaning of the title's "beneficial bombing." A question mark following the main title would seem to be appropriate. Clodfelter's statement that the airmen who advocated strategic bombing were reformers is questionable. As they claimed air power alone could win wars quickly and cheaply and, thus, render armies and navies superfluous, were they not revolutionaries? As to be expected in such a wide-reaching study on a controversial topic, he gets a few details wrong and makes some arguable assertions; however, his overall treatment is on the mark. Regrettably a number of issues were not addressed or were only casually mentioned. The impact of bombing, intelligence issues, and collateral damage were short changed—hopefully subjects for a future Clodfelter publication.

Clodfelter has delivered a solid and impressive study that will enlighten those

interested in the formation of bombing theory (Douhet through Warden) and especially its practice in World War II. It is a worthy addition to the existing literature.

Kenneth P. Werrell, Christiansburg, Virginia



Gladiator Ace: Bill "Cherry" Vale, the RAF's Forgotten Fighter Ace. By Brian Cull with Ludovico Slongo and Hakan Gustavsson. Newbury Park, Calif.: Haynes, 2010. Photographs. Notes. Appendices. Bibliography. Index. Pp. 256. \$34.95. ISBN: 978-1-84425-657-0

This book is an interesting history of the Royal Air Force's (RAF) and Allied operations in the eastern Mediterranean in the early years of World War II. It claims to be a biography of "Cherry" Vale; but it is more of an operational history, using the inconsistent vehicle of one man to move the story forward. That said it is still an interesting look at an often overlooked part of the war.

Cull starts in a conventional manner with a discussion of Vale's childhood and the path he took to becoming an RAF pilot. Up to his first posting in the Middle East, this is a standard biography. When the war begins, Cull switches gears and begins much more of a campaign history of the RAF in the eastern Mediterranean. Vale shows up periodically, often with information about his personal life as much as his flying exploits, but this is uneven and almost haphazard. Cull's discussion of the air war in Greece, centers on Squadron Leader "Pat" Pattle more than Vale. Following Vale's escape from Crete as that island was falling to the Germans, Cull disposes of the rest of Vale's life fairly quickly and with very little depth. Overall while an entertaining primer for the neophyte in this phase of the war, as either a biography or operational history, the book falls far short.

Cull never really seemed to settle in on his subject matter, although he is obviously very knowledgeable about both. He could probably have written a solid operational history and had several other titles covering other aspects of the Mediterranean war that attest to this. I suspect he had more information available to him on Vale's life and could have written a much fuller biography of the man but, for his own reasons, chose not to. The reader is poorer for it as Vale seems a fascinating character, and his career following his early flying exploits begs for further discussion and explanation.

This lack of follow up by Cull is the book's biggest failing. Although his true

kill total will never be known for sure, Vale certainly ranks among the top RAF aces of the war. Why did he end up in a backwater training assignment in England as armaments officer in a training wing when his contemporary “Johnny” Johnson was a wing commander actively flying until the end of the war? Pattle progressed to Squadron Leader and one suspects would have gone further had he not been killed. Was there a reason Vale didn’t follow a similar path leading flyers in battle and passing on his experience? He is listed as attending the senior leader’s course following the end of the war, but no leadership assignment followed and he quickly retired. Cull provides a thumbnail sketch of Vale’s troubled personal life after the war, but this adds little to our understanding of the man or his wartime accomplishments. A more even and consistent biography would have addressed the pertinent questions about his career and focused less on unsavory personal details.

Still, the book has much to recommend it. Cull does a thorough job discussing air combat victory claims and compares records such as they are between the opposing sides. Doing this allows him to develop a better understanding not only of Vale and others’ true kill totals but also a better appreciation for the difficulties of this sort of accounting. Cull is a good writer and the narrative moves along quickly. Even though he doesn’t focus on Vale as much as a true biography should, the author’s use of personal anecdotes and information brings the story to life.

Finally, although Cull is not a professional historian, he has researched this era and area of operations and seems qualified to write such a book. His collaborators are not trained historians either but bring a different perspective that benefits the work overall. Formal training might have produced a better book. Asking questions of the why and how of Vale’s career and systematically seeking and presenting answers. For the price, the average reader is better served finding this book at their local library or second-hand bookstore.

Lt. Col. Golda Eldridge, USAF (Ret.), Ed.D.



Khubilai Khan’s Lost Fleet: In Search of a Legendary Armada. By James P. Delgado. Berkeley, Calif.: University of California Press, 2008. Maps. Illustrations. Photographs. Notes. Bibliography. Index. Pp. xi, 225. \$20.00 ISBN: 978-0-520-26585-1

This is a multi-level work that moves

between the present and the past and back again. It is interwoven with the history and culture of different periods. The main theme is the thwarted naval ambitions of the Grand Khan who controlled the largest empire in the world from the China Sea to the plains of Hungary but couldn’t rule the sea against the Divine Wind—the *Kamikaze*. His greatest achievement was the unification of China. He was the first to make the transition from a nomadic conqueror to a sedentary ruler of a domestic economy. But the end of expansion came with the failure of his attempted overseas invasion.

The book is also about the development of ships and maritime trade in Asia from prehistoric time to today. There had long been a pattern of seagoing activity as far as India, the Persian Gulf, Red Sea, and Africa, but the arrival of the Mongols brought a new era of aggression. Counter to common opinion, Japan was not an isolated, unknown, closed entity. There was considerable trade with the mainland of Korea, China, and Indo China with an exchange of not only goods, but also of ideas and culture.

At the time of the main story, there were still new lands to conquer not too far away, but over water that the thundering Mongol hordes and their fabled horses could not easily cross. However, Khubilai had inherited and seized the world’s greatest navy, of a size and with vessels not yet known to the West. But defeats in Java, Vietnam, and a first attack on Japan suggest the Chinese hadn’t mastered sea power. The Spanish Armada and Hitler’s Operation Sealion come to mind. The author mentions Operation Overlord, but I was thinking more of Olympic, as both my father and I were slated for that invasion of Japan and the fanatic resistance of the Samurai.

As a well-known nautical archeologist, Jim Delgado personally dove to retrieve and examine the remains of the Lost Fleet and explain the use of science as a tool for historic research. The climax of the tale is that the fleet is not really lost! Though perhaps only 1 percent of the now underwater battlefield has yielded its secrets, it has been discovered where it sank off the shores of Japan and is revealing treasure in the form of artifacts for historic reconstruction.

So many subjects are covered that it is difficult to forecast the potential readership. I picked the book in part because I know Delgado’s reputation as a military historian and had enjoyed his previous work; I wasn’t disappointed. As a student of different types of warfare, I was caught by the title. Considering the book’s short length, it contains a wealth of varied infor-

mation to explore by others with similar interests.

Brig. Gen. Curtis H. O’Sullivan, ARNG (Ret.), Santa Rosa, California



Boeing B-17 Flying Fortress, 1935 onwards (all marks) Owners’ Workshop Manual. By Graeme Douglas. Minneapolis, MN: Zenith, 2011. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Index. Pp. 160. \$28.00 ISBN: 0-7603-4077-3

If the figures in this book are accurate, there are about fifty B-17s extant in various states of repair in the world today. As the once ubiquitous crew chiefs and factory reps have faded from the scene, it falls to the devoted band of private owners, museum curators, custom industrial shops, and enthusiasts to preserve the body of knowledge regarding the care and feeding of these nearly seventy-year-old aircraft. Now, one of those devotees has recorded some of that knowledge. Douglas worked as a groundcrew member on the UK’s airworthy B-17, *Sally B*, for 30 years and volunteered 15 years part time restoring the Imperial War Museum’s *Mary Alice* at Duxford.

Owner’s Manual Workshop is a highly readable and enjoyable book for the historian, buff, or warbird owner. The historical section refreshes the reader’s memory as to the aircraft’s achievements in all theaters of war. The anatomy chapter describes each B-17 component, from nose to tail, in great detail, with color and vintage photos showing each item—wing, tail, radio room, bomb bay, engine nacelles—as they appeared in World War II and as they do now. The portions describing defensive positions compare favorably with the thorough coverage in such monographs as 2001’s *Gunner*.

The book is an insight into owning, restoring, servicing and flying the B-17 in the 21st century. Douglas thoroughly covers the mechanical skills, responsibilities, and costs of maintaining a long-out-of-production, elderly warbird. The book’s photo-illustrated, step-by-step essays on operational and maintenance aspects are unique, clear, and especially helpful to comprehending not only how to maintain and fly a B-17 today, but also to understanding the heroic efforts of wartime ground crews who kept the planes flying in combat conditions. It rounds out information in such publications as Robin Higham’s *Flying Combat Aircraft of the USAAF*, and the original *B-17 Pilot’s Manual*. Douglas bases his information on well-practiced and proven techniques by

the master mechanics of the European-based warbird B-17s *The Pink Lady*, *Mary Alice*, and *Sally B*. To assure nothing is missed, Douglas walks the budding warbird owner or restorer through the restoration of *Mary Alice* from acquisition, to transportation, assessment of condition, repair and reconstruction planning, and final preparation for display.

Heavily illustrated, full-color, and detailed descriptions along with blown-up drawings and schematics of engines, fuel systems, wing construction, and cockpit layouts abound. The pilot's instrument panel is called out by number. Appendices are chock full of information needed by aircraft owners, including names, addresses, and contact information of companies that maintain vintage R-1820 engines, electrical and hydraulic components, propellers, and almost every other part on the plane. At times it seems as though the author intends the reader to have it open on the workbench while working on the plane. For instance, step-by-step illustrated instructions show how to change an engine or how to replace landing gear retractors. Advice on the frequency of phase inspections and where to watch for corrosion along with pre-flight and pilot checklists, instructions on how to start the engines, and operating limits are included.

This book is a must-have for the private B-17 owner. Enthusiasts and historians will find it valuable as a description of the knowledge, experience, skills and resources—as well as the not inconsiderable funds!—needed to maintain a heavy bomber. I appreciated the efforts of wartime ground crews all the more after absorbing it.

Steven Agoratus, Hamilton, New Jersey



Homer Lea: American Soldier of Fortune. By Lawrence M. Kaplan. Lexington: University Press of Kentucky, 2010. Maps. Photographs. Notes. Appendices. Bibliography. Index [include all of these that apply]. Pp. x, 314. \$34.00. ISBN: 978-0-8131-2616-6

There are few today who remember Homer Lea and the impact he had on our national thinking and policy. He deserves more attention, and this work attempts to do that. He was an amazing, almost unbelievable, figure. How could a young, handicapped American with a modest background, become a lieutenant general in a twentieth-century foreign army? More importantly, what was the power of his intellect and convictions, as expressed in his writings and presentation, that

impressed and influenced both U.S. and foreign decision makers?

I read his books in our library at home when I was young and was fascinated by his story; but, more significantly, I became aware that he was a respected advocate of policy, much as Emory Upton and Alfred Mahan also were in the military field, and Henry George, Frank Norris, and Jack London were in their realms. I was impressed by the fact that he was a lieutenant general in a foreign army. At that time, only fourteen men had held that grade in the U.S. Army starting with George Washington during the quasi-war with France in 1788 (and only seven four-star generals, again starting with Washington). I had met only the two-star commanding generals of the IX Corps and 40th Division who came to our home in San Francisco, so this was pretty impressive for a young lad to contemplate.

In August 1900, Lea was appointed a lieutenant general in the Chinese Reform Army of the Pao Huang Hui, a revolutionary movement with a would-be government abroad rather than a functioning one at home with diplomatic recognition. In some eyes, the title had dubious legitimacy; but it was far from a Ruritanian commission or a Kentucky colonelcy.

The title gave credibility to his later writings and presentations, but it was the content that influenced such as Kaiser Wilhelm, Admiral Yamamoto, MacArthur, Patton, et al. He was an unquestioned spokesman for the China revolutionary movement and the trusted advisor of Sun Yat-sen when he became the first president of the new Republic of China.

The book separates much of the mythology from the truth about an extraordinary and influential individual. Parts of the work may have limited current interest, but it has enough new material to make it worth reading. The arrival of the Information Age helps fill a gap in our knowledge of a critical period in our history.

The only downside to the book is that the map is dark and not too relevant and some of the illustrations are of little interest. Otherwise, I recommend this book for those who want to learn more about policy formation at the start of the twentieth century.

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



Fighter Aces of the RAF in the Battle of Britain. By Philip Kaplan. UK: Pen and Sword Aviation, 2007. Photographs. Bibliography. Index. Pp. x, 203. £19.99

ISBN 978-1-84415-587-3

The Battle of Britain is the benchmark defensive air battle in history. Its participants were virtually all legendary and subjects for school children's study and admiration. Kaplan focuses his book on anecdotes relative to five RAF Aces: Al Deere, Geoffrey Page, Peter Townsend, Brian Kingcome, and Sailor Malan.

Al Deere had some difficulty with his instructors and was prone to ignore station regulations. He showed little patience in peacetime training that emphasized formation flying with little work on individual aerial gunnery practice. Early in this section, Kaplan gives a good description of the development and characteristics of the Spitfire as well as the groundbreaking Command and Control (C&C) system used in conjunction with early radar systems that gave the RAF the required edge in their duel with the *Luftwaffe*. The last days leading up to the Battle and Deere's first day in the fifteen-week conflict are well described and might become classic prose in aerial warfare. This series of events was marked by sometimes tragic failures of the new C&C system; improvements were hastily worked out under German fire.

Geoffrey Page made three kills before being shot down over the English Channel. He was horribly burned but managed to bail out in the Channel and was recovered. Fifteen operations and two years later, he returned to flying. Hate-filled from his ordeal by German fire, he was assigned to the Air Fighting Development Unit, whose mission included access to the newly arrived P-51 Mustang. Another wounded pilot and he cooked up a scheme to mount two-ship, low-level attacks on German night-flying and bomber fields as far south as Paris. The idea was to surprise aircraft returning from their missions. On their first attempt, the two men accounted for six German kills. This brought Page satisfaction in his quest for vengeance but seemed to increase his need for revenge and lust for killing the enemy.

Peter Townsend was ecstatic when selected as a fighter pilot, a role for which he was well suited, having the mentality and temperament of a loner. Not long after his first kill, Townsend was patrolling over Scapa Flow when he was signaled to return to base. Instead he turned off his radio and went on with the search in which he shot down another Heinkel. At that point, he realized that he had performed with no emotion and had become a "case-hardened fighter pilot and killer." Later, as commander of No. 85 Squadron, he flew the squadron's first mission of the

Battle and was shot down into the Channel. He was recovered and flew another mission that day. Townsend finished twenty months of constant day- and night-operations with an assignment as Wing Commander-Night Operations.

Brian Kingcome's war experience, which included a Fighter Wing command, is somewhat glossed over. He saw his first combat over Dunkirk, but the personal anecdote to illustrate that experience was that of another pilot, Hugh Dundas. We learn very little of Kingcome's personal experiences against the Germans in the Battle and very little of his war record. However, in his section are included anecdotes and quotes of others that illuminate the environment of the Battle and its participants.

Sailor Malan's contributions to the development of RAF formations and tactics are very worthwhile. Malan did not fit the general mold of most of the pilots in the Battle. He was much older and was a believer in close-range firing to the point that he said no one ever gained a kill by maneuvering, but rather by close-in deflection firing. He thought that shotgun practice was the best ground training a fighter pilot could have. Malan helped the RAF move from the rigid three aircraft "vic" formation to the four aircraft "fingertip," thereafter evolving to the "fluid four" formations seen for the next half century in the USAF. His ideas drew the attention of the chain of command all the way to Prime Minister Churchill. It was Malan's enthusiastic promotion of nearly halving the gun harmonization range and adopting the De Wilde version of the tracer bullet that caused most RAF pilots to adopt von Richtofen's habit of closing to near point-blank range before firing.

Kaplan notes that post-war investigation discovered that the Luftwaffe's aims for the Battle were, first, to interdict shipping in the Channel, and, second; to destroy the RAF. Later he states that the Luftwaffe's priorities were 1) gain air superiority, 2) cripple the British war economy, 3) blockade shipping, 4) attack the Royal Navy, 5) attack British troop ships and transports, and 6) carry out the invasion. This inconsistency is not irrelevant. The one statement puts a counterforce targeting plan as the cornerstone of German strategy, while the other lays out a contrary, countervalue strategy. No discussion or citations are offered to support either claim.

While he has published a number of books, Kaplan's latest effort reads like he had data left over and put them together from miscellaneous notes. The book appears disjointed and incomplete; his editor didn't help much. I was entertained but

only peripherally enlightened, because the anticipated experience of reading to learn was frequently distracted by the lack of consistency and organization. However, the book has much information of value.

Col. Jerry Hoblit, USAF (Ret.), Willis, Texas



Keep from All Thoughtful Men: How U.S. Economists Won World War II. By Jim Lacey. Annapolis, Md.: U.S. Naval Institute Press, 2011. Notes. Photographs. Index. Pp. 288. \$34.95 ISBN: 978-1-59114-491-5

Jim Lacey's point is this: Before and during World War II, thoughtful, innovative civilian analysts cautioned that economic analysis is essential to determine the country's capacity to produce defense goods and that setting infeasible production goals could be catastrophic to the war effort. Their counsel was at first fiercely resisted by elements of the military who were eventually forced to come around to the civilian view. The book's punch line can be found in its very last sentence:

Thus the army's chief of staff had no choice but to postpone his plans to invade northern Europe in 1943 for at least a year—not because of any change in the strategic situation or in his own ideas of how to win the war, but because the economists had forced him to do so.

Lacey persuasively makes the case that economists demonstrated that the military first asked for too little spending and later for more than the economy could deliver in the early 1940s. Furthermore, elements in the military (particularly General Brehon Somerville, head of the Army Service Forces) obstinately refused to listen until they had no choice but to do so. Lacey has hit upon a story that is well worth telling, and much of it is told well. He is at his best in his narrative descriptions of the conflicts between the civilians and the military, the personalities, the establishment of myriad government agencies, the maneuverings of President Roosevelt and the effect of the president's list of military equipment "musts". The book is weakest in its economics. The short section on monetary policy, for example, will be difficult for historians to follow because it is so technical and for economists to read because of its rookie mistakes. It's best to skip it.

The book is well-documented. An excellent series of appendices containing relevant source documents from the period will fascinate economists and historians alike. The bibliography is a treasure trove

of readings relating to World War II economic history; some of the more important citations point the reader to sources on the internet. The early chapters on the long-sweep history of wartime economics and the misjudgments of Major Albert Wedemeyer's Victory Program, while not essential to the book's main thrust nevertheless provide informative background material.

The heroes of the book are three economists/statisticians (Nobel laureate Simon Kuznets and two colleagues, Robert Nathan and Stacy May) and one statistic, the gross national product (GNP) which had recently been developed by Kuznets. The central role for the three men is well deserved. As Lacey demonstrates, their careful analysis of the limits on production as well as the passion with which they delivered their message made an incalculable contribution to the war effort. Lacey's focus on GNP at the expense of other economic indicators, however, was a mistake and detracts from the book's achieving its full potential.

There is no question that Kuznets's GNP data—a measure of the economy's total output—was a useful framework for wartime planning and later was an enormously important and lasting aid to the empirical study of economics. But GNP data were probably not essential for reaching the economists' main conclusion that there would be severe constraints on production for 1943 that the military could not ignore. In hindsight, the actual data point to the conclusion that the GNP analysis was in a sense redundant. It is a shortcoming of the book that Lacey never examines the extent to which the GNP analysis, which he praises so highly and unreservedly, turned out to be correct or even useful.

In the fall of 1942, Kuznets, Nathan, and May developed estimates of maximum 1943 defense spending by first calculating total output (GNP) and then determining the maximum share that could go for military production. That was surely an extremely valuable exercise. But the actual data show that that it was not GNP that put the lid on 1943 war-related production. As it turned out, GNP in 1943 was higher than the economists had predicted yet spending on national defense was lower than the calculated maximum based on GNP. Moreover, civilian consumer expenditures in 1943 were the highest they had ever been in the nation's history, so there was room to further expand military production by cutting civilian spending.

The binding constraints on production were more likely bottlenecks in specific raw materials supplies and in the right kind and location of production facilities

and manpower skill-sets, all of which might have been identified without reference to GNP. Lacey ignores these almost entirely in the text. Kuznets, however, wrote that he (rightly) expected that bottlenecks would make it a challenge to reach even his estimates of maximum military output based on GNP alone. The book would have more accurately reflected historical realities with a more balanced treatment of the macro constraints imposed by limitations total output on the one hand and micro constraints caused by specific bottlenecks on the other.

The excessive focus on GNP can be forgiven as can the errors in the economic analysis. This book tells an important story about the struggle between civilian specialists who were among the world's most highly skilled in their area of expertise and the military establishment. The techniques of how the economists developed their estimates matters less for the book's purposes than that their estimates of production feasibilities differed sharply from the military's requirements.

Dr. Ira Kaminow, former president of Capital Insights, Washington, D.C.



Matterhorn: A Novel of the Vietnam War. By Karl Marlantes. New York, Atlantic Monthly Press, 2010. Glossary of Weapons, Technical Terms, Slang and Jargon. Pp. 598. \$24.95 ISBN-13:978-0-8021-1928-5

This novel follows a U.S. Marine infantry platoon *cherry* lieutenant named Mellas who in 1969 maneuvered his troops in and around the demilitarized zone (DMZ) that separated the two Vietnams. The novel touches almost every human emotion and wartime experience—pain, exhaustion, sorrow, guilt, fear, hatred, disease, starvation, wounds large and small, and, finally, death, slow and quick. The author shows the dreariness of life in the boonies, with the confining triple-canopied jungle and the often incomprehensible decisions of rear echelon leadership juxtaposed against the reality of the situation at the battlefield. Besides enduring murderous enemy gunfire and mortars, the Marines had to cope with nature—mosquitoes, leeches, humidity, cold, tigers, other wildlife, and unrelenting torrential rains.

The reader has a front row seat into the reality of battle in the bush, where the enemy might not be even discernable when confronted; where those Marines not killed, maimed, or wounded, fire back into

the dark impenetrable jungle hoping against hope to blast some human target to Hades. These daring and heroic souls venture well beyond their artillery coverage to confront ambushes laid down by some of Asia's most seasoned and professional troops from the North Vietnamese Army (NVA). All this to capture, abandon, and then recapture a strategically situated hill called Matterhorn, which offered a clear view of some close-in valleys and small streams along the Laotian and Vietnamese border. The marines planned to use Matterhorn as a firebase for launching artillery.

The Marines, exhausted from many days of conducting operations in outlying areas without adequate food or water, were ordered to build substantial sandbagged bunkers and holes, to establish a protective berm, and to create an essential line of fire. That they were then directed to dismantle their bunker works and move off Matterhorn led to serious grumblings from the troops and junior officers. After a stand-down in base camp that lasted less than forty-eight hours and that included drinking bouts and marijuana smoking, the Marines were ordered out to the jungle again to assault the recapture Matterhorn.

By this time, however, the hill had been occupied by NVA regulars who were making use of the partially composed and or destroyed encampment the U.S. Marines had so rapidly constructed, and abandoned even more hurriedly, just days before. The loss of life and limb involved in the recapture of this hill for the second time in two weeks exemplifies the insanity of war. Such a portrayal illuminates the faulty decision making of higher headquarters, which was perhaps prompted to act by political pressures in Washington to present results through exaggerated body counts. The strategy of the North Vietnamese was to bob and weave for decades while the U.S. Marines and the other services were pressured to beat and destroy the enemy and return home, leaving an independent South Vietnam under competent leadership and free from attacks from the Communist North.

When trapped or surrounded by the NVA, the courageous U.S. Marines held and defended their ground against all enemy assaults, calling in air strikes from courageous F-4 pilots who had to negotiate the forbidding weather and fog that often covered the jungle with a protective camouflage. The author also respectfully awards a badge of courage to the helicopter pilots for their heroic efforts, expertly maneuvering their planes into minuscule landing zones under heavy enemy mortar fire and horrendous weather con-

ditions to resupply troops, remove the dead, and evacuate the wounded.

Also clearly depicted is the class system of order and rule between the officers and enlisted personnel. There is nothing new about this differential in the military—it has existed for centuries. But there is something worse than this class struggle. There is ample verbiage of the hatred even among the enlisted hierarchy, which becomes further exacerbated by racial unrest, mistrust, and bickering, especially between blacks and whites. Fraggings incidents bring these festering hatreds to the surface and expose the controversial emotions, if not the culprits. And there is the consistent concern about the balance between performance and promotion, especially among the senior officers in the rear. "We have to show results to get promoted." But all of this discord disappears and is quieted when the platoons are dropped off by helicopter and marched farther into the boonies. Then their marine training takes over, and combatants become a single unit again, supporting each other in battle and in death and making sure that no one is left behind, even the dead.

Although this is a novel, it is a realistic portrayal of the tortuous experience of jungle warfare. The author, who served as an on-line marine lieutenant has changed names to protect both the guilty and the innocent. It is a well written and brutal description of the experience of a Marine unit in the Vietnam War that firmly holds the reader's attention. Perhaps the most instructive analysis of the war is provided by a dying Marine, who asks his lieutenant, "Why are we here?" There were many who served in this war who would ask the same question, one that would never be fully answered. Awesome read!

George M. Watson, Jr. PhD, Senior Historian, Air Force History Support Office, Bolling AFB, D.C.



The War for Korea, 1950-1951: They Came from the North. By Allan R. Millett. Lawrence: University Press of Kansas, 2010. Maps. Illustrations. Photographs. Notes. Appendices. Bibliography. Index. Pp. xx, 644. \$45.00 ISBN-13: 978-0-7006-1709-8

The Korean conflict is often forgotten in the minds of Americans and glossed over in their history classes. Hopefully, Dr. Millett's magisterial contribution will help turn the tide in favor of renewed interest in its study. Highly scholarly and exact in both tone and form, Millett has written

what is likely to be the definitive history of the war for some years to come. In this volume, the second of a trilogy, he takes the reader from the invasion of the South by the North in June 1950 to MacArthur's relief in April 1951 and the Fifth Offensive by Chinese and North Koreans of the following month. In doing so, he builds a solid evidentiary base to support his narrative by methodically and rigorously combing through a wealth of U.S. and foreign archival materials, memoirs, books, and other documents. This phase of the overall Korean conflict was, from a military point of view, certainly the most active and costly in human lives. Several aspects of Millett's narrative deserve mention:

The role intelligence played in this phase of the conflict, in particular through interactions that intelligence staffs had with one another and, more importantly, with the commanders of Eighth Army (Walker) and Far East Command (MacArthur). How intelligence really played out reinforced, in my opinion, the notion that it was very much a human activity influenced by the preferences, biases, and personalities of all involved. This is well illustrated by Millett's discussion of the effort by the various intelligence staffs to pinpoint when and where the offensive would start, and later on whether China and the Soviet Union would intervene.

While the narrative largely focuses on the ground war and predominantly unfolds from a U.S. perspective, it always situates developments on the ground into their wider strategic context, and looks at their effects on the U.S. and its allies, as well as on the North Koreans, the Chinese and the Soviets. The policies and actions taken by the U.S. Navy and the U.S. Air Force are fully taken into consideration, although naval and air force enthusiasts may argue that much more could have been said of their efforts. Millett chose to be parsimonious instead but kept a high degree of rigor in his analysis of air and naval operations.

Millet's all-encompassing story, and in particular his attention to rear area operations, highlights one of his key assertions: "that the Korean War is an example of the one great lesson of twentieth century warfare: that no conflict should be categorized as simply an interstate war or civil war or even a limited insurgency. Understanding the Korean War will provide even more relevant examples of a war that embodies almost every aspect of contemporary conflict." To wit, the conflict, a Maoist "template for wars of national liberation and post-colonial succession," started with political agitation, turned

into an insurgency, which failed, and then morphed into a conventional war of *liberation* or *aggression*.

With respect to the role played and results achieved by American allies, Millett had few, but incisive comments. Too often a hindrance (on logistics, for example), if not for politics, they probably could have been dispensed with. Given that allied contributions were at brigade and (mostly) battalion levels, a fuller account of their performance will have to be found in these countries' own official and unofficial histories.

This is a massive book. But as the Korean War played a major role "in shaping American relations with postwar Japan and the People's Republic of China, both consequential for twenty-first-century America," it is well worth the effort.

Stéphane Lefebvre, Canadian Defence Scientist-in-Residence, Canadian Centre for Intelligence and Security Studies, Carleton University



Freedom Flyers: The Tuskegee Airmen of World War II. By J. Todd Moyer. Oxford: Oxford University Press, 2011. Illustrations. Notes. Bibliography. Index. Pp. 241. \$24.95 ISBN: 978-0-1953-8657-4

Freedom Flyers is the best book to date about the Tuskegee Airmen. Dr. Moyer nailed the saga, punctured numerous myths, and provided the whole story, including the significance of the Tuskegee Airmen for United States domestic politics and culture. Among many things to admire is the front of the dust jacket (something seldom, if ever, mentioned in a review). Moyer represents the Tuskegee Airmen by displaying five enlisted airmen maintaining an aircraft or searching the skies for the return of their warbirds. Seldom does any author writing about black aviation units mention the *indispensable* enlisted personnel. About 990 pilots graduated from Tuskegee Army Airfield. They served in four combat fighter squadrons and four B-25 squadrons that did not fly in combat. Another several hundred officers were trained at bases other than Tuskegee to be navigators and navigator-bombardiers.

More than 13,000 enlisted men supported the crews. When the Tuskegee Airmen received The Congressional Gold Medal from President George W. Bush, its engraved face had three individuals: a fighter pilot, a bomber officer crewmember, and an enlisted man between them. Thank you Dr. Moyer for recognizing the

enlisted personnel. This book tells the reader about *all* Tuskegee Airmen.

Moyer, better than virtually all who have published on this subject, recognizes the connection between American domestic politics and President Roosevelt's election-politics-driven promise in 1940 to open Army aviation to blacks, and President Truman's similarly motivated 1948 Executive Order 9981 calling for equal opportunity—not racial integration—in the armed forces. Furthermore, Moyer appreciates the essential nature of Col. Noel Parrish's leadership skills to the success of the training of the pilots and their maintenance crews. He, moreover, displays in appropriate detail the combat success of the Tuskegee Airmen in North Africa, Sicily, and Italy. Moyer perceptively analyzes the Freeman Field Mutiny in 1945, telling the story objectively. He is sensitive to the role the Tuskegee Airmen played in armed forces racial integration and the nuanced activity of President Truman (although I believe he is overly generous to Truman). Moyer gives the proper credit for Air Force racial integration to Lieutenant General Idwal Edwards, Air Force Deputy Chief of Staff for Personnel. Edwards drove this reform from start to finish and has never received proper credit in a general history of the Tuskegee Airmen. Moyer has plumbed the depths of primary sources at the National Archives, Air Force Historical Research Agency archives, Library of Congress, and elsewhere. He uses many pungent quotations to brighten the story.

The last point in the previous paragraph is also a weakness. Moyer is a truly professional historian, but I believe he has overused oral history. I interviewed many people he cites, and the stories they told me were often slightly different, and sometimes factually wrong. Memory, it is said, seems to improve with age; but we all know memories fade with age. Oral history is almost always self-serving and must be used with care. The fundamentals are not distorted by oral history, but more care needed to be taken. For one example, he used interviews to describe the purpose of Army Regulation 210-10 promulgated in late 1940. The Tuskegee Airmen assert (as does Moyer) it was written to permit blacks officers to use Officer's Clubs. There were, however, only two black operational officers in the Regular Army then, and the purpose was to ensure the various branches (artillery, infantry, cavalry, etc.) did not exclude officers from other specialties from officer's club annexes. Minor point, but it is an issue needing to be made. There are other examples where Moyer relies on the Tuskegee Airmen to cite motivation or erroneous facts but, as I said previously,

the fundamentals of the account are sound.

Finally, Moye sensitively and accurately portrays the current noisy discussion on the accuracy of the claim that Tuskegee Airmen escort fighter pilots never lost a friendly bomber to an enemy fighter. The assertion by the men of the 332d Fighter Group and many historians is sixty years old, and Moye objectively puts the matter in perspective. I leave it to the readers of *Freedom Fliers* to make their own judgment. If you were to own one history of the Tuskegee Airmen, it should be this one.

Dr. Alan L. Gropman, Col, USAF (Ret.), wrote the history of Air Force racial integration and edited the U.S. Army Center of Military History's account of armed forces racial integration. He has also written extensively on the Tuskegee Airmen.



Aircraft of World War I, 1914-1918. By Jack Herris and Bob Pearson, and **Aircraft of the Cold War, 1945-1991.** By Thomas Newdick. Both London: Amber Books, 2010. Map. Tables. Diagrams. Illustrations. Photographs. Index. Pp. 192. \$34.95 each ISBNs: 978-1-906626-66-2 and 978-1-906626-64-8, respectively

Both of these books are part of *The Essential Aircraft Identification Guide* series and are valuable for aviation enthusiasts, historians, and modelers. *Aircraft of the World War I* provides a welcome addition to the literature on the First World War. Written and illustrated by two specialists on World War I aviation, the book is an attractive and comprehensive guide to the aircraft of the Great War.

It is arranged chronologically and regionally with solid detail and concise descriptions. During World War I, military planners deployed aircraft on a large scale for the first time, as the focus shifted from reconnaissance to fighters and bombers. Pilot aces became popular heroes, and their aircraft come to life in this book.

Pearson's drawings are particularly commendable. His attention to detail with unit markings and his representation of historically significant aircraft are noteworthy. Few are able to bring the early aircraft to life as capably as Pearson. Herris's historical survey is a useful compendium of information on early military aviation and the genesis of air combat. He clearly articulates the move beyond reconnaissance as well as the arrival of early pushers to the full-fledged dogfighters and night bombers.

The work highlights key aircraft such

as the Nieuport 11, Royal Aircraft Factory SE.5, Sopwith Camel, SPAD XIII, and Fokker D.VII. The roles and significance of early bombers, such as the Sikorsky Ilya Muromets, Gotha G. IV, Caproni Ca.4, Breguet Br14, and Airco DH9, are given their due. The authors also explore lesser-known aircraft such as the Blériot XI, Caudron G.4, Aviatik B.1, Farman MF.11, Rumpler C.1, Curtiss H-16, Armstrong-Whitworth F.K.8, and AEG G.IV.

Aircraft of the Cold War offers a visually engaging and thematic introduction to the global confrontation of air forces for anyone interested in learning more about the militaries of the Cold War. Newdick, an authority on modern military aircraft and assistant editor of *Combat Aircraft Monthly*, contributed a readable and informative text that covers quite a lot of territory for a series of conflicts that are hard to group. The first half of the monograph is grouped by themes: European aviation, naval aviation, and strategic bombers. The second half focuses on the air forces of regional conflicts during the Cold War.

The text complements the primary thrust of the book: 250 unique profile drawings with appropriate plane markings alongside occasional historical photographs. The color drawings, provided by Art-Tech/Aerospace, reveal the diversity of Cold War aircraft from the well-known British, American, and Soviet fighters to the lesser known Canadian, Chinese, and French aircraft. Technical specifications and orders of battle are listed throughout.

The real strength of the book is the introduction to the air forces of the smaller, regional conflicts, such as the 1956 Suez Crisis, the Six-Day War, the Malayan Emergency, as well as British conflicts in Borneo and the Falklands. Newdick's description of the military aircraft of Africa as well as the hodgepodge of aircraft in the India-Pakistan conflicts will provide many readers with first exposure to many of the front lines of the Cold War.

The uneven coverage of conflicts, uncertain chronologies, unreliable technical specification data, and the less-than-systematic choices of aircraft for the volume were the only drawbacks. The work provides significant coverage to the wars in Korea and Vietnam, but much detail and artwork is missing for the regional conflicts. It is a useful guide to NATO, Warsaw Pact, and additional aircraft of the Cold War

Michael Rouland, Air Force Historical Studies Office



The Rucksack War: U.S. Army Operational Logistics in Grenada,

1983. By Edgar F. Raines, Jr. Fort Leslie J. McNair D.C.: U.S. Army Center of Military History, 2010. Maps. Tables. Diagrams. Illustrations. Photographs. Glossary. Bibliography. Index. Pp. xxviii, 649. \$86.00 (\$62.00 paperback) ISBN: 978-0-16-084182-8

URGENT FURY was a relatively brief operation lasting only a few days on a little-known and not-too-important island. However, there was a lot of action in that short time (and inaction of the hurry-up-and-wait variety). This is a meaty work that is not for the casual reader. The subtitle is operational logistics, but the account is not narrowly limited. It is an excellent history of the total campaign that still fulfills the advertised goal.

Logistics is the stepchild among military functions, less dramatic and exciting than strategy and tactics but, nevertheless, essential. Between the four combat air outfits I commanded as a colonel was a Maintenance and Supply Group where I learned the nuts and bolts of combat service support. After the Command and General Staff College and before the Army War College, I completed four courses from the Industrial College of the Armed Forces, which gave me a broad appreciation of the field. I mention these to explain my background and interest in this book's subject matter.

This is a readable account of a complex operation that identifies a number of issues and problems that have relevance today and may enter into the planning and execution of future short-notice contingency expeditions. Though there is much about mundane things such as the contents of a rucksack versus the "A" Barracks Bag, the narrative moves along like an exciting adventure thriller. While you know the happy outcome, you wonder about each emergency or glitch and how it will come out. There is extensive use of names at all levels, some repeatedly, which helps to humanize the story. The numerous pictures help here too.

The tale begins with the National Security Council after the Commander-in-Chief starts the ball rolling by a directive to intervene. It continues down to the grunt and dogface on the ground and their problems, such as, body bags and compatible fuel nozzles. Though this is primarily about the Army, Raines places everything in the joint context. While he is not enamored with some of the key players on the Navy side, he obviously admires a number of the Army players (down to a second lieutenant at the Fuel Supply Point). However, he isn't reluctant to criticize when called for.

It took a bit of time to read the book

and absorb its material, but it was both enjoyable and worthwhile. I strongly recommend it for those with a genuine interest in operational logistics, especially in an emergency, contingency situation. *Rucksack War* is a textbook for that.

Brig. Gen. Curtis H. O'Sullivan, ARNG (Ret.), Santa Rosa, California



A War It Was Always Going to Lose: Why Japan Attacked America in 1941. By Jeffrey Record. Sterling, Va.: Potomac Books, Inc., 2011. Maps. Notes. Bibliography. Index. Pp. xiii, 167. \$24.95. ISBN: 978-1-59797-534-6

A War It Was Always Going to Lose is a careful analysis of why Imperial Japan chose to attack the United States in 1941 despite all indications it could not win. Written by prolific author Jeffrey Record, a professor of strategy at the Air War College, Maxwell AFB, Alabama, whose doctorate is from Johns Hopkins University, the book is one of several he has published in the past decade investigating the causes of war from World War II to Vietnam to Iraq in 2003.

Japan's attack on Pearl Harbor on December 7, 1941, was the culmination of years of increasing tension between Imperial Japan and the United States over Japan's war in China, alliance with Nazi Germany and Fascist Italy, and move to secure natural resources in Southeast Asia. By 1941 Japan believed war with the United States and her allies (including Great Britain) was inevitable. Why Japan took that fateful step, knowing it could not realistically defeat the United States and likely would be destroyed in the process, has perplexed historians since World War II.

Record first discusses the foreign policy interaction between Imperial Japan and the United States, reviewing the historical sources of tension between the two countries before focusing on Japanese aggression in China and the United States' responses in the late 1930s and early 1940s. After setting the stage, he then analyzes Japanese assumptions and decision making in the months leading up to war and why neither Imperial Japan nor the United States were deterred by the other in the months leading up to Pearl Harbor. Lack of cultural understanding, bad assumptions, and miscalculations on both sides eventually led to a belief that war was inevitable. Imperial Japan, overwhelmed by ambition to dominate Asia but fearful of economic ruin from sanctions by

the United States, decided to strike first.

The final chapter looks at enduring lessons from 1941 that apply in today's national security environment, including the United States' 2003 attack on Iraq. Though readers may not fully agree with Jeffrey Record's comparison to recent events, his historical analysis demands attention from policy makers and leaders. Decisions to go to war are not always rational, and an assumption that a war is inevitable can become a self-fulfilling prophecy.

Maj. Jeffrey P. Joyce, USAF (Ret.), Docent, NASM's Udvar-Hazy Center



One Hundred Years of U.S. Navy Air Power. By Douglas V. Smith, ed. Annapolis Md.: Naval Institute Press, 2010. Photographs. Index. Pp. xv, 373. \$52.95 ISBN: 978-1-59114-795-4

For those who expect tales of carrier warfare, this is not the answer, but there are plenty of excellent works that serve that purpose. This is a collection of essays that start with the first naval air flight, the early pioneers, the struggle to survive and find a mission in the labyrinth Naval Department. It covers the development of both aircraft and the doctrine to use them in 16 chapters written by 14 authors.

There is necessary overlap but not redundancy, as parts of the total story are told from different angles. Some figures appear more than once such as Bureau of Aeronautics chief RADM Moffett (1921-1933, until killed in the crash of the *USS Macon*) and "Bull" Reeves, the father of carrier aviation.

The book stresses the importance of the Naval War College in both developing doctrine and war gaming future combat commanders in its application. There is good coverage of 21 fleet problems (including four surprise attacks on Pearl Harbor) where theories were tested in real-life situations and World War II in the Pacific rehearsed. The most recent history is perhaps the least known, so coverage of the Cold War, Korea, Vietnam, Desert Storm, and Gulf II and Afghanistan is welcome.

As is not uncommon with a collection such as this, the index is incomplete and frustrating. The photographs are well selected to tell the various stories. There is no bibliography, but the notes at the end of each essay adequately show sources as well as provide supplemental material. There is some detailed technical information; but, for the most part, the story is told in layman's language. The essentials can

be extracted by those who don't want too much detail.

This is an appropriate work for those interested in military subjects and for aviation enthusiasts. It's not necessary to be a Naval Aviator to appreciate the wealth of information. I certainly did, although I hold only the campaign star for Air Offensive Europe to go with the seven for ground operations. I highly recommend this book to anyone concerned with US military history in the past century. It brings together facts scattered in other locations that are not well known—but should be.

Brig. Gen. Curtis H. O'Sullivan, ARNG (Ret.), Santa Rosa, California



The Grand Design: Strategy and the U.S. Civil War. By Donald Stoker. New York: Oxford University Press, 2010. Maps. Notes. Index. Pp. xi, 498. \$27.95 ISBN: 978-0-19-537305-9

Stoker claims that none of the thousands of books about the U.S. Civil War is dedicated to the strategy—the larger use of military power to achieve the political aims of the government. I've read only a fraction of those works but certainly don't think that the matter was neglected, although no book may have used the exact title. Much depends on the definition accepted and adapted. There is continuing confusion about the meaning of grand strategy, strategy, operational art, and tactics. As there is no sharp line between these, much may depend on the war college from which doctrine was learned. I had the benefit of the Army, Navy, and Air Force colleges, so I know of the wide range of approaches.

At the time of the Civil War, the theories of Clausewitz and Jomini were most influential among American officers, though Caesar, Napoleon, and even Sun Tsu may have entered the picture. This book is not intended to be a complete history of this conflict as a blow-by-blow account of the battles. The battles discussed are used to illustrate the principles employed and lessons learned (pro and con) in connection with the use of armed force to reach national objectives. Military action, of course, cannot be separated from other determining factors such as those in the political, economic, cultural, and social realms.

Stoker tends to over-simplify the gospel that the center of gravity is the Army alone. This is misleading in that geography, weather, logistics, and compar-

ative training and equipment all have a major impact on outcomes. He doesn't hesitate to give his opinions on actions that should have been taken or on changes in command that should have been made. He has somewhat different evaluations of Lincoln, Davis, Lee, Johnston, McClellan, and Grant. Abe gets a mixed report as he grows into his role as commander-in-chief. Lee is given a human dimension, able to make mistakes and blame them on others and to minimize or ignore the needs of other theaters. He doesn't spare the Union leaders either, though he gives McClellan more credit than most for having a Grand Plan for the entire continent, though he lacked the resolution to get it accepted. This, of course, was based on Scott's "Anaconda" Plan which was eventually largely foiled and for which "Old Fuss and Feathers" is usually given credit.

There is no bibliography, but the abbreviations and notes give a less convenient idea of the sources. The fairly numerous maps are of varying value and quality but do show the strength of opposing forces and names of commanders. However, it may be necessary to use the index to find out what lesser leaders were doing. There are no illustrations.

In summary, this work may be of interest to Civil War buffs. It has little new

but may have a different perspective on some commanders and campaigns. I didn't feel that it filled any gap in the understanding of the strategy pursued in that war.

Brig. Gen. Curtis H. O'Sullivan, ARNG (Ret.), Santa Rosa, California



Military Ethics: International Perspective. By Jeff Stouffer and Stefan Seiler, eds. Kingston, Ontario: Canadian Defense Academy Press, 2010. Illustrations. Notes. Glossary. Index. Pp. v, 307. \$25.00. Paperback. ISBN: 978-1-100-16318-5

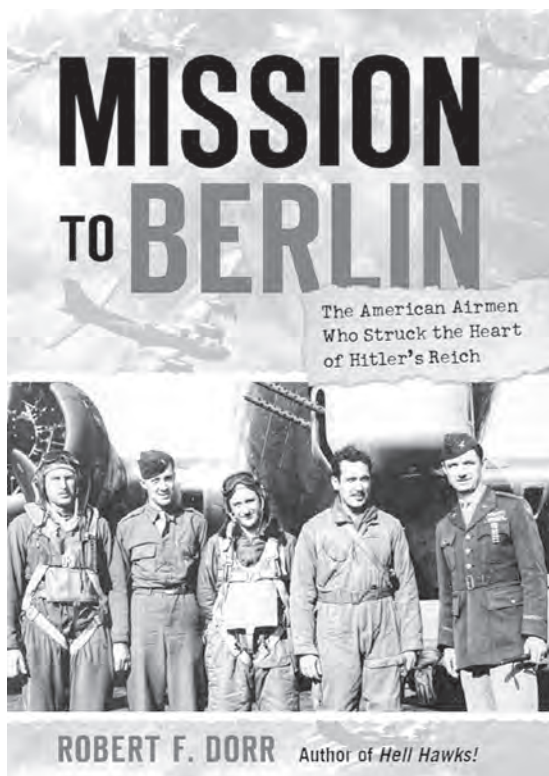
Unconventional foes using decidedly unorthodox methods pose unique threats requiring conventional militaries to focus even more attention on roles and responsibilities. Understanding ethics and their role is a crucial component of preparing today's warriors to ensure they can fight to win without compromising societal values they are sworn to protect. The International Military Leadership Association sponsored by the Canadian Defense Academy launched a series of books delv-

ing into contemporary military issues; this is the fifth in that series. Its purpose is to "illuminate how the various militaries represented in this book study, prepare for and approach ethical situations or, in other words, how military personnel are developed to effectively respond to the numerous and diverse situations encountered at home and in theatres of operation."

This is a collection of essays and reports from a variety of contributors in The Netherlands, Canada, Singapore, Australia, and Indonesia. It offers a broader perspective on ethics issues in today's militaries than a work covering only one country. This gives the book a unique value in helping broaden the viewpoint of military members trying to grasp the issues of multiculturalism prevalent in coalition operations in diverse regions such as Iraq and Afghanistan.

The book's diversity is both its greatest strength and biggest weakness. The variety of viewpoints forces the reader to consider many issues from perspectives they might not encounter in their own experience. In that sense, it is very useful. But the editors did not stick closely enough to their purpose: to focus on training and education. Topics range across a broad spectrum from a discussion of morals and ethics training, to analysis of

Recently Released



The book "MISSION TO BERLIN" by Robert F. Dorr was published April 15. This is a general-interest World War II history that focuses on the B-17 Flying Fortress crews who attacked Berlin on February 3, 1945, in the largest mission ever flown against a single target. The book also includes a new look at the entire bombing campaign in Europe.

The young men who flew and maintained the B-17 are at the center of the story but "MISSION TO BERLIN" also has lengthy passages about Americans who flew and maintained the B-24 Liberator, P-47 Thunderbolt and P-51 Mustang.

Bob Dorr is technical editor and co-creator of this journal and was recently honored by the Foundation for his work on Air Power History. Bob describes "MISSION TO BERLIN" as a "Stephen Ambrose-style popular history of the triumphs and tragedies of everyday Americans who did something no one had done before. They fought giant battles several miles up in the sky across vast distances inside aircraft where oxygen was always needed and the temperature was almost always below freezing."

"MISSION TO BERLIN" is available from on-line sources and at bookstores. You can order a signed copy directly from the author by contacting Robert F. Dorr, tel. (703) 264-8950, robert.f.dorr@cox.net

ethical behavior among military members, to developing a personal moral compass to guide one in making decisions in combat, to guidance for a researcher on ethical research practices. While all have value, the coverage is too diffuse. The editors could have focused on one area such as ethics training or ethical issues in current practice. They offer a little for a lot of people but not enough of anything to hold someone's attention in a particular facet of training, education, research, or application. The editors obviously saw a benefit to the articles they chose, so a more expansive discussion outlining their reasons for their selections would have provided a clearer path. The book lacks a consistent theme beyond the fact that all the articles mention ethics and the military.

The contributors are a distinguished group, most of them Ph.D.s or doctoral candidates. They are all knowledgeable, as one would expect, and seem well chosen to discuss their topics. The list of contributors at the end is especially useful for anyone who might want to follow up on further reading or contact the authors for further discussion.

The articles themselves are well written although necessarily limited by space

in their discussions of some very involved issues. There were some minor editing issues with translations, but these were not serious. Some of the articles were very compelling, Brigadier General Davies on command issues being the most interesting and pertinent to me as an operator. The language tends toward the academic but not so much as to put off the average reader.

Taken in total I would recommend this to those looking to expand their perspective on military ethics issues. The different perspectives make it a useful primer for military trainers and educators looking to expose their students to ideas and issues beyond their normal experience. The price is a bit steep, so I recommend looking for this one in the library or as a used book.

Lt. Col. Golda Eldridge, USAF (Ret.), Ed.D.



Racing the Sunrise: Reinforcing America's Pacific Outposts, 1941-1942. By Glen M. Williford. Annapolis: Naval Institute Press, 2010. Maps. Tables.

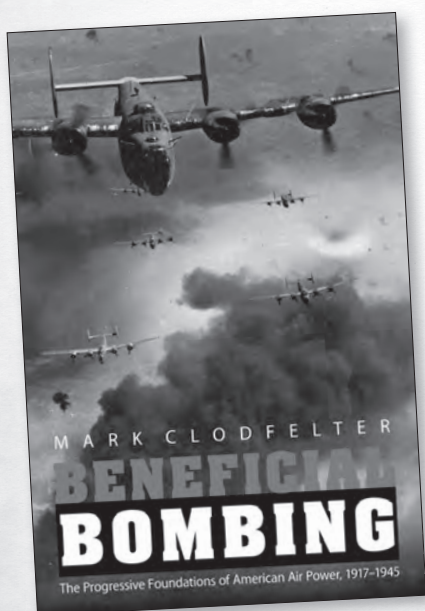
Photographs. Notes. Bibliography. Index. PP. xviii, 394. \$37.95 ISBN: 978-1-59114-956-9

For more than thirty years, Williford has studied and researched the coastal defense of the United States and its possessions. He also has investigated the importance of logistics. In this book he has concentrated his interests on the final months of peace and the first months of war. In 1941, coast-artillery units also handled land-based air defense. Thus, these units were deemed vital to the reinforcement of the Philippines. However, the work goes far beyond the desperate attempt to ship these specialized units more than 6,000 miles across the Pacific.

In the latter half of 1941, diplomatic tensions with Japan rose rapidly. Gen. Douglas MacArthur, commanding the Commonwealth of the Philippines military forces, increased his requests for weapons, supplies, and men. Washington agreed. Whereas MacArthur for some inexplicable reason anticipated war with Japan no earlier than April 1942, others in Washington believed conflict was much more imminent. None, of course, anticipated the devastation of Pearl Harbor that would make large-scale reinforcement impossible after December 7.

"A thoughtful and well written account of a central thread in the thinking of American airpower advocates and the way its implementation in two world wars took place at the time, was seen afterwards, and has come to be enormously influential in the decision process of our country's leaders into the twenty-first century."

—GERHARD L. WEINBERG, professor emeritus at the University of North Carolina at Chapel Hill and winner of the Pritzker Military Library Literature Award



Beneficial Bombing

The Progressive Foundations of American Air Power, 1917-1945

MARK CLODFELTER

The Progressive Era, marked by a desire for economic, political, and social reform, ended for most Americans with the ugly reality and devastation of World War I. Yet for Army Air Service officers, the carnage and waste witnessed on the western front only served to spark a new progressive movement—to reform war by relying on destructive technology as the instrument of change. In *Beneficial Bombing* Mark Clodfelter describes how American airmen, horrified by World War I's trench warfare, turned to the progressive ideas of efficiency and economy in an effort to reform war itself, with the heavy bomber as their solution to limiting the bloodshed.

\$40.00 hardcover

STUDIES IN WAR, SOCIETY, AND THE MILITARY SERIES

For more information about this book and to read an excerpt, visit us online!

UNIVERSITY OF
NEBRASKA PRESS



WWW.NEBRASKAPRESS.UNL.EDU
800-848-6224 • publishers of Bison Books

Overcoming a shortage of shipping, the Army and Navy cobbled together one convoy after another. Without question, this is the strength of the work. Relying on information gleaned from the National Archives, Williford offers a detailed account of each convoy from September 1941 into early 1942. Despite overestimating the impact, planners recognized the flexibility of air power with the deployment of almost all available P-40 fighters and B-17 bombers.

As the title suggests, the work covers not only the Philippines, but also Hawaii and numerous smaller possessions (e.g., the Marine garrisons on Wake, Midway, Johnston, and Palmyra) as well as those of the British Commonwealth once the United States was at war.

Williford discusses in some detail the construction of a network of airfields around the world, but especially across the Pacific, that would allow efficient movement of multi-engine aircraft over thousands of miles to Australia and India. It's easy to forget that Pan American Airways had first linked Manila with San Francisco in 1935. Partly because of political constraints, service between New Zealand and Hawaii began only in 1940. Even though Army crews lacked open-ocean navigation experience, the early ferry flights were surprisingly successful.

As the Japanese rolled through the Philippines, American forces focused on defending the Dutch East Indies, primarily Java, as a buffer before Australia. Single-engine aircraft were shipped to Australia and then ferried north. While vastly outnumbered Americans rapidly saw their numbers dwindle in combat, non-combat losses among the very inexperienced pilots also proved to be quite high. Despite the inability to save the Philippines and the Dutch East Indies from Japanese conquest, the evolving transportation network allowed movement of large quantities of men and materials. In the fall of 1942, American and Australian forces would halt Japanese expansion in the Southwest Pacific in New Guinea and the Solomons.

Those charged with meeting the logistics challenges of the 21st century or anyone who wishes to gain a greater appreciation of timely strategic deployment should find the experiences of 70 years ago insightful. For those seeking a detailed account of the first months of the air war

in the Philippines and Java, Walter Edmonds' *They Fought with What They Had*, originally published shortly after the war, is tough to beat.

Lt. Col. Steve Ellis, USAFR (Ret.), docent, Museum of Flight, Seattle, Washington



Lost in Shangri-La, by Mitchell Zuckoff, 2011. Index. Photographs. Notes. Map. 384 pages. ISBN 978-0-06-1988 34-9; hardcover; \$26.99

This fascinating story comes out of World War II in the southwest Pacific. It's a story of a tragic air crash in the uncharted interior of New Guinea; about injured survivors among "stone age" tribes people; of the heroism of a squad of Philippine-American paratroopers; and the ingenuity and bravery of pilots who extracted them from an otherwise inaccessible valley.

The story begins in May 1945, at an Army airfield in Hollandia, Dutch New Guinea, immediately after the war has ended in Europe. Thoughts for many are on the possibility that the Pacific war will soon end and all can go home. As a diversion to the boredom of base life the wing commander organized C-47 flights over an intriguing hidden valley he discovered during reconnaissance flights for an *en route* airfield site. It was nearly hidden in clouds and mist and surrounded by mountains reaching over 15,000 feet in elevation. Amazingly, the valley was inhabited by almost 100,000 people, the single largest concentration of natives in New Guinea—people who had absolutely no contact with the world beyond their immediate surroundings. The only information on the valley and its people came from aerial observations.

On May 13, 1945, twenty-two "sightseers"—nine of them WACs (Women's Army Corps)—boarded a C-47 and headed for the valley. Neither pilot had ever been there before and, consequently, lacked firsthand experience to execute the difficult valley penetration. Only one pilot was in the seat as the approach began; he was unable to properly correct for rapidly rising terrain and impacted on a slope. The impact and fire killed nineteen passengers and both pilots.

Five stories wrapped up in one follow:

(1) The three survivors, Cpl. Margaret Hastings and TSgt. Kenneth Decker, who have nasty burns and other injuries; and Capt. John McCollom, a base civil engineer, injured as he escaped the burning aircraft. (2) The tribes people, who see the Americans as spirits playing a role in their mythology and not humans like themselves. (3) Ten Philippine-American volunteers and their leader Captain C. Earl Walters who parachuted into the unknown to save lives. (4) The glider and tow plane pilots and winch operators who overcame daunting obstacles and risk to life in order to extricate all fifteen people on the ground. And (5) Alex Cann, the self-promoting correspondent who later parachuted into the valley with camera equipment to document the rescue. Besides those directly involved were base personnel who supported the effort and correspondents who fed the rescue story every day to thousands of newspapers. Ironically, while the ongoing rescue was featured in newspapers all over the United States, the biggest battle in the Pacific, Okinawa, was in its final phase and would take the lives of over 12,500 American Marines and GIs.

This is an incredible World War II story, unconnected to actual combat. Yet, it has many similar elements including fear of the unknown, heroism, death, and media attention. Perhaps, the story's hook is the surviving WAC. The media disproportionately concentrated its reporting on Hastings, dubbing her "Queen of Shangri-La" (a correspondent dubbed the valley Shangri-La after the popular movie *Lost Horizon*). The press called her the most celebrated woman of the war and number-one adventure girl in World War II—one must wonder how, when thousands of WASPs (Women Airforce Service Pilots) continually risked their lives.

The book is an enjoyable, interesting, and easy read. The only criticism is the one small, blurry, six-inch map of the 1,500-mile long island of New Guinea is essentially useless. I went to Manchester's *American Caesar* to use his excellent map of New Guinea.

Col. John Cirafici, USAF (Ret.), Milford, Delaware



Books Received

Fogg, Richard and Janet Fogg. *Fogg in the Cockpit: Howard Fogg: Master Railroad Artist and World War II Fighter Pilot — Wartime Diaries, October 1943 to September 1944.* Philadelphia and Newbury: Casemate, 2011. Photographs of artwork. pp. 360. \$ 32.95 ISBN: 978-1- 61200—4-6

Liepack, Otfried G., Ed. *History of Rocketry and Astronautics: Proceedings oh the Thirty-Seventh History Symposium of the International Academy of Astronautics, Bremen, Germany, 2003.* [AAS History, Vol. 34, IAA History Symposium, Vol. 23,] San Diego, Calif.: Univelt Inc., 2011. Notes. Photographs. Index. Pp. xiii, 560 Paperback. \$75.00 ISBN: 978-0-87703-564-0

Muth, Jorg. *Command Culture: Officer Education in the U.S. Army and the German Armed Forces, 1901-1940, and the Consequences for World War II.* Denton: The University of North Texas Press, 2011. Notes. Bibliography. Index. Pp. x, 366. \$29.95 ISBN: 978-157441-303-8

Scearce, Phil. *Finish Forty and Home: The Untold World War II Story of B-24s in the Pacific.* Denton: University of North Texas Press, 2011. Notes. Photographs. Bibliography. Index. Pp. xiv, 373. \$29.95 ISBN: 978-1-57441-316-8

Skoog, A. Ingmar, Ed. *History of Rocketry and Astronautics: Proceedings oh the Thirty-Eighth History Symposium of the International Academy of Astronautics, Vancouver, British Columbia, Canada, 2004.* [AAS History, Vol. 35, IAA History Symposium, Vol. 24,] San Diego, Calif.: Univelt Inc., 2011. Notes. Photographs. Index. Pp. xiii, 544 Paperback. \$75.00 ISBN: 978-0-87703-568-8

Wise, Jr., James E. and Scott Baron. *The Fourteen-Hour War: Valor on Koh Tang and the Recapture of the SS Mayaguez.* Annapolis, Md., Naval Institute Press, 2011. Maps. Notes. Photographs. Index. Pp. xix, 295. \$34.95 ISBN: 978-1- 59114-974-3

Zimm, Alan D. *Attack on Pearl Harbor: Strategy, Combat, Myths, Deceptions.* Philadelphia and Newbury: Casemate Publishers, 2011. Maps. Photographs. Illustrations. Notes. Appendices. Bibliography. Index. Pp. 464. \$32.95 ISBN: 978-1-61200-010-7

PROSPECTIVE REVIEWERS

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

Col. Scott A. Willey, USAF (Ret.)
3704 Brices Ford Ct.
Fairfax, VA 22033
Tel. (703) 620-4139
e-mail: scottlin.willey@gmail.com

Exciting New Book on the Tuskegee Airmen



The Tuskegee Airmen, An Illustrated History: 1939-1949, by Joseph Caver, Jerome Ennels, and Daniel Haulman, is a comprehensive account of the pioneering group of African-American pilots beginning prior to World War II. Using many never-before-published photographs, the exploits of the pilots—as well as their support personnel—are chronicled in fine detail. An important feature of this book is a chronology detailing missions flown. The facts presented here debunk some of the myths and legends surrounding this exceptional group. A complete pilot roster is also included.

Available from NewSouth Books: www.newsouthbooks/tuskegeeairmen, (334) 834-3556, ISBN 978-1-58838-244-3, \$27.95

Letters

I have enjoyed reading *Air Power History*, especially the article, "PAVE NAIL: There at the Beginning of the Precision Weapons Revolution," by Darrel Whitcomb. [Vol. 58, No. 1, Spring 2011, pp. 14-27.] During the Vietnam War, I was at Phan Rang Air Base in 1968. We had a squadron of B-57 Canberras, which flew a mission named TROPIC MOON. They would fly at night, using low-level television cameras to find their targets. It was a classified mission flown by the 8th/13th Tactical Bombing Squadrons of the 35th Tactical Fighter Wing (Seventh Air Force/PACAF). I would offer to research and write an article on this subject, but am prevented from doing so because of my physical disability.

Lt. Col. Peter J. Anderson, USAF Reserve (Ret.)

Notices

Clark-Yudkin Research Fellowship at USAF Academy Library

The Friends of the Air Force Library have established the Clark-Yudkin Research Fellowship in order to promote increased awareness and use of the rich materials on air power history that are available in the Academy library's special collections branch. Grants awarded under this fellowship will be in the range of \$1,000 to \$15,000, and are intended to help defray the cost of travel, housing, and per diem expenses for visiting researchers. The amount of a given grant will be determined by the relevance of the research proposal to the library's holdings, the merit and significance of the project, and the applicant's scholarly qualifications. Recipients will be expected to complete their fellowship research within one year from the date of the award. The inaugural Clark-Yudkin fellowships will be tenable from May 2012 to April 2013. The deadline for applications is March 1, 2012. To apply, log on:

<http://www.friends.usaflibrary.com/clark-yudkin.htm>

79th ANNUAL MEETING OF THE SOCIETY FOR MILITARY HISTORY

The Army Historical Foundation will host the next meeting of the Society for Military History in Arlington, Virginia, on May 11-13, 2012. The meeting will be held

in the Hyatt Regency Crystal City Hotel, in Arlington, Virginia. For additional information, contact: www.armyhistory.org

The conference theme is, "The Politics of War," highlighting the transition from war to peace, civil-military relations, the dynamics of coalition warfare and the problems of military government and occupation. We encourage a diverse group of participants and especially encourage junior scholars to present their work and serve on panels. As always, the program committee will consider all panel and paper proposals dealing with important questions of military history.

Panel proposals must include a panel title, contact information for all panelists, a brief description of the purpose and theme of the panel, a one-paragraph abstract of each paper, a one-page curriculum vitae of each participant. [All must be members of the SMH]

Submit proposals to Mr. Matt Seelinger: matt.seelinger@armyhistory.org. Deadline for proposals is November 1, 2011.

News

Air Power History Best Book Award for the Year 2010

Robert S. Ehlers's *Targeting the Third Reich, Air Intelligence and the Allied Bombing Campaigns* won the Foundation's Best Air Power History Book award for 2010. The award is given annually after a three-judge panel carefully considers and rates all of the books reviewed in the Foundation's journal, *Air Power History*, during the year. Criteria for selection call for the book to be of high quality, contribute to an understanding of air power, and for the author or authors to have had a connection to the U.S. Air Force or be a member of the Air Force Historical Foundation. Mr. Ehlers is professor of military history at the School of Advanced Air and Space Studies at Maxwell Air Force Base, Alabama. The judges voted unanimously to name this the best air power history book of 2010.

Targeting the Third Reich examines the development of the intelligence capabilities in the European theater of the U.S. Army Air Forces and the Royal Air Force, from the RAF's intelligence roots following World Wars I, to their early development in the face of the rising German threat in the 1930s, to the help and guidance given the Americans beginning in 1940, and then to a fully cooperative air intelligence

operation that guided the air campaign in western Europe until the end of World War II. Professor Ehlers examines several ways in which the Allied air intelligence operation supported the ground armies on both the Eastern and Western Fronts during the war, selected targets for cutting fuel supplies and transportation in the West, and striking the transportation lines in the East. On the Eastern Front, moreover, the Germans encountered progressively greater resistance in their battles against the Soviet Red Army because Allied air bombardment on oil production and transportation facilities hampered the Germans' ability to move their forces quickly enough to contend with the Soviets; the air forces of the Western Allies particularly attacked targets that would give maximum aid and support to Stalin's military until the fall of Germany in April 1945.

Achieving an air intelligence capability worthy of the name was not a simple task. Much of what the Allies had learned during World War I, they abandoned during the inter-war years. In the late 1930s, with the winds of war approaching, the British formed a purportedly private company to run aerial reconnaissance of Germany. Beginning with only a handful of aircraft and a few pieces of the most advanced aerial photography and photo-analysis equipment available, the British rebuilt their air reconnaissance and analysis organization. With the opening of hostilities, this tiny organization quickly became the RAF's intelligence core. In mid-1940, some USAAF officers visited Britain to learn about air intelligence operations. The Americans brought back to the United States the know-how that became the basis of American air intelligence operations. Once the U. S. became involved in the European war, the USAAF and RAF quickly combined their intelligence and operational assets to form the most powerful strategic and tactical air forces in history. The principles and procedures established by the Western Allies are still used in air intelligence.

The judges included Dr. Walton Moody, long a member of the staff at the Air Force history office at Bolling AFB, now retired; Bill Strandberg, an Air Force Historical Foundation member and a member of the Foundation's board of directors; and Dr. Karl Mueller of the RAND Corporation. These three had a particularly difficult job, as several of the books considered scored highly. The runner-up in the judging was James S. Corum's *Wolfram von Richthofen: Master of the German Air War*. This von Richthofen was a cousin of the Red Baron, had flown in his cousin's squadron during World War I, and

then went on to become the most able German air commander of World War II.

Two books by air force leaders scored second and third runners up, and they make a good pair in contrasting the air leadership of the United States and its primary opponent. Very little is known about Air Marshall Manfred von Richthofen today. Diagnosed with a brain tumor in 1944, he died shortly after the war ended; he left little in the way of a public record. Yet, Manfred was clearly the most able of Germany's senior air commanders. He grew up as part of the Prussian ruling elite, served as a cavalry officer and combat pilot in the first war, and obtained a doctorate in engineering in the early 1920s. Richthofen represented the core product of German education of the time (the best in the world then), and flowered into one of the key leaders of Germany's aerial rearmament and air operations during the war. Hubert R. Harmon's United States Air Force career was, in many ways, anything but stellar. Serving in a variety of jobs, he did not achieve the fame of his West Point classmates Dwight Eisenhower, Omar Bradley, James Van Fleet, George Stratemeyer, and Joseph McNarney. He was, however, a most accomplished air officer, and his experience gave him an understanding of duty, honor and country that became the center of his vision of the Air Force Academy; Lt. General Harmon was the driving spirit in its organization and its first Superintendent.

I am most grateful to the three judges, who spent many hours on this task, and to the several authors and those who supported and advised them during the time they spent researching, writing, contemplating their projects, and revising the texts.

The award will be presented at the annual Air Force Historical Foundation's awards banquet in November.

The complete list of the books nominated for this award follows, and the judges and I recommend all, as well as those mentioned above, to anyone who has an interest in air power and the Air Force:

Robert V. Brulle, *Engineering the Space Age: A Rocket Scientist Remembers*
James S. Corum, *Wolfram von Richthofen: Master of the German Air War*
Robert W. Duffner, *The Adaptive Optics Revolution*
Perry D. Jamieson, *Khobar Towers: Tragedy and Response*
Bob Korkuc, *Finding a Fallen Hero: The Death of a Ball Turret Gunner*
Mark D. Mandeles, *Military Transformation Past and Present*

Phillip S. Meilinger, *Hubert R. Harmon: Airman, Officer, Father of the Air Force Academy*

Kenneth P. Werrell, *Death from the Heavens: A History of Strategic Bombing*

John F. Kreis, *Chairman, Publications Awards Committee*

Air Power History's Best Article Award for the Year 2010

The Best Article to have appeared in *Air Power History* during 2010, is Benjamin S. Lambeth's "Reflections on the Balkan Wars." The article appeared in the spring issue, Vol. 57, No. 1, pp. 30-43. Dr. Lambeth is a highly respected Senior Research Associate at the RAND Corporation, with extensive experience in analyzing air power in general and American air operations in particular. The article is a superb analysis of how the application of American air power has evolved in the past twenty years.

The Balkan air campaigns of the 1990s, culminating in the seventy-eight day Operation Allied Force in the spring of 1999, are critical in that they very significantly influenced and formed the foundation of the United States' use of air power, particularly in Afghanistan in 2001 and then Iraq in 2003. Dr. Lambeth points out that success in the Balkan air operations served to reinforce the understanding of modern air power's capabilities that some had belittled after the 1991 Gulf War where air power was the key to defeating Saddam Hussein's army (although it was not the only factor).

Lambeth notes that America's approach to war has changed considerably in recent years, directed by a number of new factors: gradualism, proportionality, noncombatant immunity, collateral damage avoidance, the need for legitimacy, plus what Lambeth cites as "the CNN [Cable News Network] factor," as well as the battle of narratives that determines who wins and who loses in the end. This important article examines how the use of transformed American air power evolved through the first decade of the 21st Century. This effort did not begin well, and Lambeth describes two years of useless effort in Operation Deny Flight against Bosnian Serbs that started in 1993 and was a reminder of the futility we imposed on ourselves in Vietnam. Following the frustrating and ineffective United Nations-controlled operation, matters were much improved in Operation Deliberate Force, mounted in response to a Bosnian Serb attack on civilians in Sarajevo in 1995.

Lambeth points out that probably the most significant outcome of the Deliberate Force and then the 1999 Allied Force air operations was the ability to deliver very precise strikes—and the future expectation that such exact targeting will be expected and demanded despite the nature and conditions of the conflict underway. Today, even a single, perceived error in weapon delivery, no matter how well disciplined the force, can undo all other positive accomplishments; this is a substantial constraining factor for any military commander, and a cause for serious concern. Additionally, the manifold complexities of NATO's command structure caused even the air power capabilities of Allied Force to be expended in ways that for several weeks greatly hampered the eventual successful outcome.

"Reflections on the Balkan Wars" is an article that should be read by any policy maker contemplating the United States' engaging in armed conflict, no matter how simple that task might seem.

The judges—John Shaud, Lawrence Spinetta, and Ken Alnwick, all members of the Foundation's Board of Directors—praised several other articles as well. The competition was extremely close, with two articles tied for second place just one point behind the winner. All of the articles nominated related incidents and circumstances important in the development of air power. One of the second place articles dealt with the disastrous decision to use the Army Air Corps to carry the nation's air mail in 1934. The other article analyzed a plan by the Strategic Air Command to use trains to carry Minuteman missiles, the purpose being to greatly increase targeting problems for the Soviet Union should their be a war with that country.

Carrying the U.S. air mail was an expedient, highly political solution to a problem of apparent contract mismanagement that seemed like a good idea at the time. As the author, Kenneth P. Werrell, points out, "It is a story of controversy, drama, and death overlaid with allegations of corporate misconduct, heated congressional hearings, questionable government practices, and inadequate Air Corps performance." One might also add improper insider stock trading and cronyism. Virtually forgotten today, this botched episode, replete with failures to assess correctly problems and risks associated with forcing a Service to undertake a mission for which it has not been trained and equipped, was one of the most important events in the Air Corps' interwar history. The article reflects events of more than 75 years ago, but that remain relevant in looking at today's governance practices.

There was, at one time, a plan to have American Minuteman missiles on the Earth's surface, moved about by trains and ready to be launched from hundreds of different sites, rather than placing them in heavily fortified underground silos. The government spent more than 30 years researching costs and benefits of mobile Air Force missiles, expended large sums of money, then dropped the idea. Today, Russian, Chinese, and Indian forces all use operational mobile missiles, as does the U.S. Navy, for survivability protection as well as deployment transport. In "Highball!! Missiles and Trains," Steven A. Pomeroy engagingly explores why we don't use the concept for our land-based intercontinental ballistic missile force. The complex interplay of factors that had to be satisfied to employ mobile missiles was tailor-made for the supervision of the brilliant and politically adept general Bernard A. Schriever, commander of the Air Force's Ballistic Missile Division and who was in charge of missile development. In the end, the Air Force and Secretary of Defense Robert McNamara concluded that mobile basing of Minutemen would be too expensive and not provide the expected survivability probabilities. In 1961, the plan was cancelled, but the concept remained alive.

All of the articles published in 2010 were excellent, and each author should be proud of his or her accomplishment.

In addition to the wide variety of outstanding articles published in *Air Power History*, are the many reviews of books that are relevant to air power and the Air Force. As in past years, we wish to recog-

nize a greater scope of accomplishment, to acknowledge the authors of books that were reviewed in our journal. These include scholarly works as well as accounts of personal exploits by airmen, which are highly informative and entertaining. Later this year, we will honor several books written by airmen and announce our choice for the "Best Book Award for 2010."

We encourage any reader who has a special favorite, to let us know. Send an e-mail via execdir@afhhistoricalfoundation.org to my attention.

John F. Kreis, Chairman, Publications Awards Committee

In Memoriam

Col. Harry D. Yoder, USAF (Ret.) 1916-2011

Born and raised in Boyertown, Pennsylvania, Harry D. Yoder was a 1939 graduate of the University of Maryland. He served in the Army Air Forces and the U.S. Air Force during three wars: World War II, the Korean War, and the Vietnam War. Altogether, Colonel Yoder served in the military for more than thirty years. He died on May 8, 2011, at the age of ninety-five. A B-24 pilot, he flew combat missions against the Ploesti oil fields and on D-Day 1944. At war's end, Colonel Yoder flew the

U.S. Secretary of War to the peace treaty talks that ended the war in the Pacific. He flew transports during the 1948-1949 Berlin Crisis. He also flew in both Korea and Vietnam. He served in the Pentagon and on the staff of the Joint Chiefs of Staff. Among his awards and decorations were the Legion of Merit with oak leaf cluster, the Distinguished Flying Cross, and Air Medal with eight OLCs. After retiring in 1969, he worked for Lockheed Martin in Georgia until 1971. He then bought the Boyertown Auto Body Works, which he operated until 1988. He was also a contractor and consultant. Colonel Yoder was a long-time member of the Air Force Historical Foundation. He is survived by his wife, Ardath D. Yoder; a son, Rev Keith D. Yoder; daughter Natasha Barbara Icehour; and three grandchildren.

John Kelly "Buddy" Lewis, Jr. 1916-2011

Born on August 10, 1916, in Gaston County North Carolina, John Kelly "Buddy" Lewis, Jr. became a professional baseball player, playing third base and outfield for the Washington Nationals. He entered the Army Air Forces in November 1941. He served as a C-47 pilot, flying 368 missions "over the Hump," the Himalayas. He was awarded the Distinguished Flying Cross. After the war, he resumed playing baseball until 1949, and had a lifetime batting average of .297. He is survived by his wife Frances Oates Lewis, three children, five grandchildren, and two great-grandchildren.

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. Most Word processors can be accommodated including WordPerfect and Microsoft Word. 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*, 11908 Gainsborough Rd., Potomac, MD 20854, e-mail: editor@afhhistoricalfoundation.org.

Reunions

836th Engineer Aviation Battalion (Army) Fairborn, Ohio, September 8-12, 2011. Contact:

Evelyn Midkiff
361 Graystone Court
Miamisburg, OH 45342
(937) 847-0948
emm1628@gmail.com

63rd Officer Candidate Wing Association. September 11-15, 2011 Fairborn, Ohio. Contact:

Col. (Ret) Tom Hansen
97D Chinook Lane
Steilacoom, WA 98388
(253) 380-5261
C130hans@msn.com

American X-POWs (WWII-Korea) September 13-18, 2011 Dayton, Ohio. Contact:

Linda Irving
50721 State Highway 410 East
Greenwater, WA 98022
(360) 663-2521
linda@thereunionbrat.com

349th Troop Carrier Group, Sept 14-18, 2011, Dayton Ohio, Contact:

Linda Sparks
1201 Progress Drive - Apt 37
Medford OR 97504

98th Air Refueling Sq. September 20-23, 2011 Fairborn, Ohio. Contact:

Col. (Ret) James L. Lee Jr
8323 Scarsdale Drive
Indianapolis, IN 46256
(317) 842-8737
jlee411@comcast.net

The 355th Tactical Fighter Wing September 23-25, 2011 Dayton, Ohio. Contact:

Gene Carlson
1944 Tanglewood Drive
Lafayette, IN 47905-4183
(765) 448-1960
grc46250@juno.com

Berlin for Lunch Bunch (7405-7580th Operations Squadron) September 23-25, 2011, Fairborn Ohio. Contact:

Michael Hushion
2017 Sumac Court
Beavercreek OH 45431
(937) 259-4808

Laredo Escadrille (PTC-66E) September 24-26, 2011 Fairborn, Ohio. Contact:

J Stewart Mosbey
PO Box 653
Williamson, GA 30292
(770) 584-2272
firstflysqn@aol.com

Pilot Training Class 62A September 26-29, 2011 Fairborn, Ohio. Contact:

William Kehler
2718 Gray Fox Lane
Jacksonville, AR 72076-2627
(501) 985-0547
bbkehler@aol.com

7505th USAF Hospital Group September 28-October 2, 2011. Contact:

Delores Liska
6462 Alexandria Drive
Parma Heights OH 44130
No Email

A-1 Skyraiders September 29-October 1, 2011 Ft. Walton Beach, Florida. Contact:

Rocco DeFelice
(210) 659-5965
rdefelice1@satx.rr.com
or
John Larrison
(830) 779-2000
jonlarr@lavernnia.net

51st Munitions Maintenance Sq. Assn September 29-October 2, 2011 Fairborn, Ohio. Contact:

Joseph Harker, Jr.
7316 Scotts Place NE
Albuquerque, NM 87109
(505) 821-6399
delaser@msn.com

5th Bomb Group September 28- October 2, 2011 Dayton, Ohio. Contact:

Laura Scharer
4363 Marian Waldo Road
Marion, OH 43302
(740) 389-1250
waldowoods@earthlink.net

12th Fighter Maintenance Sq. September 30-October 2, 2011 Dayton/ Fairborn, Ohio. Contact:

James and Marilyn Hawkins
1293 Mac Drive
Stow, OH 44224
(330) 655-2909

907th Tactical Airlift Group October 1-2, 2011, Dayton/Fairborn Ohio. Contact:

Louis Salerno
1117 Hyannis Drive
Beavercreek OH 45434
(937) 426-8897
louis.salerno@att.net

Air Force Vietnam Security Police (National) Fairborn, Ohio October 5-9, 2011. Contact:

Phil Carroll
PO Box 8
Gladstone, OR 97027
(503) 353-0443
k9knightfighter@msn.com

2012

B-52 Association Dayton/Fairborn, Ohio August 9-12, 2012. Contact:

Wayne Pittman
PO Box 340501
Beavercreek, OH 45434-0501
(937) 426-1289
kwavn@earthlink.net

3500th Pilot Training Squadron September 20-23, 2012, Fairborn Ohio. Contact:

Ed Mentzer
2734 Pheasant Run Lane
Beavercreek OH 45434-6664
(937) 426-8807
edmentzer@aol.com

355th Fighter Group Association Fairborn, Ohio October 4-8, 2012. Contact:

William Cook
811 Old Forge Road
Kent, OH 44240
(330) 541-2653
bigbilldot@aol.com

The Association of Air Force Missileers Great Falls, Montana, October 10-14, 2012. Contact:

Col Charlie Simpson
AAFM
PO Box 5693
Breckenridge, CO 80424
(970) 453-0500
www.afmissileers.org
aaf@afmissileers.org

2013

The B-52 Defensive Fire Control System Association June 13-16, 2013 Fairborn Ohio. Contact:

Sharon Lemanek
1326 Town Hall Road
Beavercreek, OH 45432
(937) 426-8557
kenamel.s.j@fuse.net

510th Fighter Sq. September 4-8, 2013 Mason, Ohio. Contact:

Guy Wright
1701 Mall Road Apt. 14
Monroe, MI 48162
(734) 740-3164
guywright@chartermi.net

List provided by:

Rob Bardua
National Museum of the U.S. Air Force
Public Affairs Division
1100 Spaatz Street
WPAFB, OH 45433-7102
(937) 255-1386

**Maj. Gen. John R. Alison, USAF (Ret.)
(1912-2011)**



One of the greats of the “greatest generation,” Maj. Gen. John R. Alison, died at his home in Washington, D.C., on June 6, 2011. He was ninety-eight.

He was born on November 21, 1912, in Micanopy, Florida. A 1935 graduate of the University of Florida, he tried to enlist in the Navy but was rejected as “too short.” Alison lost little time joining the Army and learning to fly. During World War II, he helped train British and Soviet airmen to fly the P-40 pursuit (fighter) planes they had acquired through the Lend-Lease program. Alison served with the famous 75th Fighter Squadron, the Flying Tigers, led by Claire Chennault. Credited with seven aerial victories, Alison earned the designation fighter ace. In 1943, Gen. Henry H. “Hap” Arnold assigned him and Philip Cochran to a top-secret mission that involved supporting British guerrilla forces fighting the Japanese in Burma. Launched at night on March 5, 1944, “Operation Thursday,” was a revolutionary form of warfare. While British Maj. Gen. Orde Wingate and his “Chindits” practiced hit and run tactics against much larger Japanese forces, Alison and Cochran

delivered supplies, ammunition, pack animals, and whatever else Wingate needed. Flying at night, the American *air commandos* employed gliders and made the first use of helicopters in combat. In six days, they transported more than 9,000 troops, 1,500 horses and mules, and 500,000 pounds of supplies; they also evacuated the wounded—saving many lives.

U.S. Air Force special forces grew out of this experience. Later, Alison briefed Gen. Dwight D. Eisenhower on the use of gliders for the planning of D-Day. Alison went on to fly and fight in the Philippines and Japan. Among his awards and decorations were the Silver Star, two Legions of Merit, the Distinguished Service Cross, the Distinguished Service Order, the Distinguished Flying Cross, and the Purple Heart.

After World War II, President Harry Truman appointed him Assistant Secretary of Commerce for Aeronautics. Alison served as a military adviser for the Strategic Air Command in Korea and Vietnam. Following retirement from the Air Force in 1972, he was named president of the Air Force Association and also became senior vice president of Northrop Grumman. In 2008, the Air Force Historical Foundation honored General Alison with the General Carl A. “Tooe” Spaatz Award for his outstanding contributions in making Air Force history.

General Alison’s first marriage, to Louise Muncie, ended in divorce. He is survived by his wife, Kathleen Acidno Alison; sons John R. Alison III and David Alison; and three grandchildren.



The mystery aircraft in our Summer issue was the U.S. Navy's Vought F6U-1 Pirate, an early jet fighter of the immediate post-World War II period. The Pirate harkens back to the late 1940s, when jet engines were far from fully reliable and it was not yet clear that jet-powered warplanes would replace those pulled through the sky by propellers.

Chance Vought Aircraft's first jet, designed by Rex Biesel's F6U Pirate, was conservative and not much of a departure from the propeller-driven fighters of the period.

In December 1944, while the war in the Pacific was still under way, the U.S. Navy issued contracts to several airplane makers for the service's first jet-powered fighters. However, by the time the first XF6U-1 Pirate was trucked from Stratford to Muroc Dry Lake, California, the war had ended. The plane's first flight, on October 2, 1946, piloted by Boone Guyton, was a fiasco. The Westinghouse J34 engine seized and Guyton had to make a dead-stick landing. The need to repair the plane's lubrication system, coupled with uncharacteristic flooding at Muroc, delayed flight-testing for months.

Vought built three XF6U-1s. One was used for static tests and never flew. After Navy air ace Paul Thayer joined the program, two Pirates were flight-tested. In 1948, the first XF6U-1 was modified to become the first Navy aircraft with an afterburner. Also in 1948, the two airworthy XF6U-1s went to Patuxent River, Maryland, to be evaluated by Navy pilots. By then, even though flight result demonstrated that the Pirate was not a stellar performer, the Navy ordered thirty production F6U-1 Pirates, each armed with four 20-mm cannons. One of these became the sole F6U-1P photo reconnaissance version.

In what Vought officials called the largest move ever made by American industry, the company relocated from Stratford to Grand Prairie, Texas, near Dallas area, over a fourteen-month period in 1948 and 1949. By the end of the move, Biesel's design team was completing work on its second jet-powered aircraft, the F7U Cutlass. The move occurred in the middle of production runs of the F6U Pirate and F4U Corsair.

The Corsair remained in production until 1953; the last propeller-driven fighter manufactured in the West. The Cutlass achieved limited success as an operational Navy fighter in the 1950s, but never saw combat. After arriving in Texas, Vought began design work on one of the *great* Navy fighters, the F8U Crusader—called the F-8 after 1962.

As for the F6U Pirate, the plane was simply obsolete before it rolled out of the factory doors. Vought completed production of thirty F6Us, but the Navy never formed a squadron of the planes. Test pilot Thayer went on to become chief executive of Vought and its successor company, LTV (Ling-Temco-Vought).

Our "History Mystery" winner is Earl Lock of Lexington, Kentucky. Lock recently entered his tenth decade and is a longtime supporter of APH and of the Air Force Historical Foundation. His prize is a copy of the just-published book "Mission to Berlin," a history of B-17 Flying Fortress crews in one of the largest air battles of World War II.

This Issue's Mystery Plane

Responding to several reader requests to make this contest easier (this is the fun part of the magazine, remember), we'll challenge you this time around to write a sentence about our new "History Mystery" aircraft. Remember the rules:

1. Submit your entry via e-mail to robert.f.dorr@cox.net. Entries may also be submitted on a postcard to Robert F. Dorr, 3411 Valewood Drive, Oakton VA 22124.

2. Write a sentence about the aircraft shown here. Include your address and telephone number. One contest entrant had to be disqualified this time around because she did not include a phone number.

3. A winner will be chosen at random from among correct entries and will receive an aviation book.

And let's get serious about those historical treasures in your attic or basement. Some readers say

they just don't remember where their color slides are. That's not a good way to assure the preservation of history. Dig out your slide or snapshot of a rare aircraft and lend it to *Air Power History* for this contest.





Air Force *Historical* Foundation
P.O. Box 790
Clinton, MD 20735-0790



To: Air Force *Historical* Foundation
P.O. Box 790
Clinton, MD 20735-0790

Visit Us Online at:
afhistoricalfoundation.org



AIR FORCE HISTORICAL FOUNDATION MEMBERSHIP FORM

NAME _____ PHONE _____ E-MAIL _____

STREET ADDRESS _____ CITY _____ STATE _____ ZIP _____

☐ **Associate Membership (\$25/year) (on-line magazine access)** (Visit our Web site at www.afhistoricalfoundation.org)

☐ **Sustaining Membership (\$45/year)**

GIFT FOR (NAME) _____

☐ **Gift Membership (\$45/year)**

☐ **Life Membership (Inquiries to the Foundation)**

ADDRESS _____

Become a Patron or Contributor (Please ask)

CITY _____ STATE _____ ZIP _____

* Non-US recipients please add \$8.00 for postage (See Web site for additional membership options)

☐ **Check enclosed, payable in US Funds to Air Force *Historical* Foundation**

☐ **Please charge my credit card (VISA/MasterCard/Discover)**

CARD NUMBER: _____ EXPIRATION DATE: _____

SIGNATURE: _____ DATE: _____

Send form, along with your remittance to:
Air Force *Historical* Foundation
P.O. Box 790
Clinton, MD 20735-0790

