

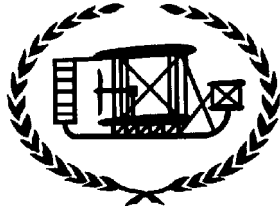
AIR POWER

History

SUMMER 2004 - Volume 51, Number 2

The Luftwaffe and its Allied Air Forces in World War II: Parallel War and the Failure of Strategic and Economic Cooperation <i>James S. Corum</i>	4
Before the D-Day Dawn: Reassessing the Troop Carriers at Normandy <i>Daniel L. Haulman</i>	20
Richard K. Smith: An Appreciation <i>R. Cargill Hall with David Alan Rosenberg</i>	30
Open Skies Policy and the Origin of the U.S. Space Program <i>Lester F. Rentmeester</i>	38
<hr/>	
Book Reviews	46
<i>Milestone of the First Century of Flight</i> by F. Clifton Berry, Jr.	Reviewed by William A. Nardo 46
<i>Turning the Vertical Flank: Airpower as a Maneuver Force in the Theater Campaign</i> by Lt Col Robert P. Givens	Reviewed by Martin L. Rothrock 46
<i>Early Cold War Overflights 1950-1956: Symposium Proceedings Vol. I & II</i> by R. Cargill Hall and Clayton D. Laurie, Eds.	Reviewed by Thomas Wm. McGarry 47
<i>Airwar: Theory and Practice</i> by Philip S. Meilinger	Reviewed by Curtis H. O'Sullivan 48
<i>Arabs at War</i> by Kenneth M. Pollack	Reviewed by Jim Gates 49
<i>Like Sex with Gods: An Unorthodox History of Flying</i> by Bayla Singer	Reviewed by Bruce Ashcroft 50
<i>Forgotten Fields of America, Volume III: World War II Bases and Training, Then and Now</i> by Lou Thole	Reviewed by Tom Alexander 52
<i>They Marched into Sunlight: War and Peace, Vietnam and America October 1967</i> by David Maraniss	Reviewed by George M. Watson, Jr. 53
<i>Women Who Fly</i> by Lynn M. Homan, and Thomas Reilly	Reviewed by Jordan S. Goldberg 54
<i>Lighting the Flame: The Turbojet Revolution Comes to America</i> by James O. Young	Reviewed by Scott A. Willey 54
<i>The Day We Bombed Switzerland: Flying with the US Eighth Force in World War II</i> by Jackson Granholm	Reviewed by William A. Nardo 54
Books Received	56
Coming Up	58
History Mystery	61
Letters, Reunions	62

The Air Force Historical Foundation



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

Officers

President

Lt. Gen. Michael A. Nelson, USAF (Ret)

Vice-President

Gen. John A. Shaud, USAF (Ret)

Secretary-Treasurer

Maj. Gen. John S. Patton, USAF (Ret)

Executive Director

Col. Joseph A. Marston, USAF (Ret)

Advisors

Gen. John P. Jumper, USAF
Lt. Gen. John R. Dallager, USAF
Lt. Gen. Donald A. Lamontagne, USAF
Brig. Gen. Frederick F. Roggero, USAF
CMSAF Gerald R. Murray, USAF
Mr. C. R. "Dick" Anderegg

Board of Trustees

Col. Kenneth J. Alnwick, USAF (Ret)
Mr. F. Clifton Berry, Jr.
Lt. Gen. John B. Conaway, USAF (Ret)
Lt. Gen. Russell C. Davis, USAF (Ret)
Gen. Michael J. Dugan, USAF (Ret)
Gen. Ronald R. Fogleman, USAF (Ret)
Maj. Gen. John P. Henebry, USAF (Ret)
Col. George A. Henry, Jr., USAF (Ret)
Lt. Gen. Bradley C. Hosmer, USAF (Ret)
Brig. Gen. Alfred F. Hurley, USAF (Ret)
Brig. Gen. James A. Jaeger, USAF (Ret)
Mr. John Kreis, USAF (Ret)
Gen. Walter Kross, USAF (Ret)
Maj. Gen. Charles D. Link, USAF (Ret)
Hon. Hans Mark
CMSgt Norman A. Marous, USAF
Gen. Thomas S. Moorman, Jr., USAF (Ret)
CMSgtAF Sam E. Parish, USAF (Ret)
Col. Robert E. Vickers, Jr., USAF (Ret)
Col. George Weinbrenner, USAF (Ret)

Trustees Emeriti

Lt. Col. Maynard Y. Binge, USAF (Ret)
Lt. Gen. Devol Brett, USAF (Ret)
Lt. Gen. William E. Brown, USAF (Ret)
Lt. Gen. Charles G. Cleveland, USAF (Ret)
Gen. Bennie L. Davis, USAF (Ret)
Gen. Howell M. Estes, Jr., USAF (Ret)
Mr. John E. Greenwood
Brig. Gen. Brian S. Gunderson, USAF (Ret)
Gen. Robert T. Herres, USAF (Ret)
Dr. I. B. Holley, Jr.
Maj. Gen. Jeanne M. Holm, USAF (Ret)
Gen. David C. Jones, USAF (Ret)
Lt. Col. Donald S. Lopez, USAF (Ret)
Col. Kenneth Moll, USAF (Ret)
Col. Helen E. O'Day, USAF (Ret)
Hon. Verne Orr
Maj. Gen. John S. Patton, USAF (Ret)
Maj. Gen. Ramsay D. Potts, USAF (Ret)
Gen. Bernard A. Schriever, USAF (Ret)
Gen. W. Y. Smith, USAF (Ret)
MSgt. Charles J. Warth, USAF (Ret)
Col. Sherman W. Wilkins, USAF (Ret)
Maj. Gen. Richard A. Yudkin, USAF (Ret)

Contributing Members

The individuals and companies listed are contributing members of the Air Force Historical Foundation. The Foundation Trustees and members are grateful for their support and contributions to preserving, perpetuating, and publishing the history and traditions of American aviation.

Benefactor

Mrs. Ruth A. (Ira C.) Eaker Estate

Patron

Maj. Gen. Ramsay Potts
Quesada Foundation

Sponsors

Maj. Gen. William Lyon
Maj. Gen. John S. Patton
Gen. William Y. Smith

Donors

Mr. John F. Donahue
Emerson Electric
Rockwell International
Gen. Bernard A. Schriever

Supporters

The Aerospace Corporation
Allied-Signal Aerospace Corporation
Arthur Metcalf Foundation
Lt. Gen. John B. Conaway, USAF (Ret)
CSX Corporation
Gen. Howell M. Estes, Jr., USAF (Ret)
Brig. Gen. Brian S. Gunderson
Maj. Gen. John P. Henebry
Gen. & Mrs. Robert T. Herres
Maj. Gen. Harold E. Humfeld
McDonnell Douglas Foundation
Mrs. Irene W. McPherson
Maj. Gen. Kenneth P. Miles
Northrop-Grumman Corporation
Mr. William O'Rourke
Mr. James Parton
Mr. George Pendelton
Pratt & Whitney
United Technologies
Capt. William C. Ward
Maj. Gen. Richard A. Yudkin

Annual Contributing Members

ANSER
ARX, Inc.
ASTECH/MCI Manufacturing, Inc.
Beech Aircraft Corporation
Boeing Defense & Space Group
General Electric Company
Instrument Systems Corp.
Litton Industries
Lockheed Martin Corp.
The Mitre Corporation
Northrop Corporation
Vinell Corporation

AIR POWER *History*

The Journal of the
Air Force Historical Foundation
Summer 2004 Volume 51 Number 2

Publisher

Brian S. Gunderson

Editor

Jacob Neufeld

Technical Editor

Robert F. Dorr

Book Review Editor

Scott A. Willey

Layout and Typesetting

Richard I. Wolf

Advertising

Mark D. Mandeles

Circulation

Richard I. Wolf

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

Prospective contributors should consult the
GUIDELINES FOR CONTRIBUTORS at
the back of this journal. Unsolicited manu-
scripts will be returned only on specific
request. The Editor cannot accept responsi-
bility for any damage to or loss of the man-
uscript. The Editor reserves the right to
edit manuscripts and letters.

Address **Letters to the Editor** to:

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

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

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

Advertising

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

Copyright © 2004 by the Air Force
Historical Foundation. All rights reserved.
Periodicals postage paid at Lexington, VA
24450 and additional mailing offices.

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

The lead article, by James S. Corum, examines the failure of Nazi Germany's *Luftwaffe*, to cooperate, on strategic and economic levels, with its allied air forces, especially Italy, Finland, Rumania, and Hungary. He asserts that the consequence of this failure to lead an effective "coalition," contributed to Germany's defeat.

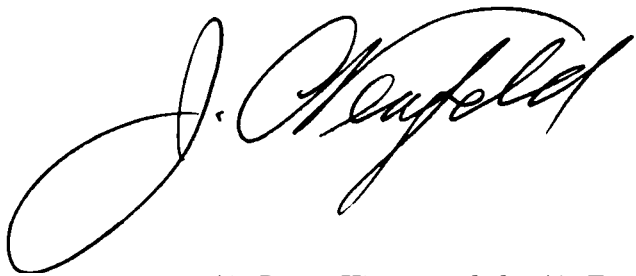
Daniel L. Haulman takes afresh look at the performance of the U.S. Army Air Forces's carriers in delivering the airborne troops at dawn on D-Day, June 6, 1944. He systematically reviews the reasons for their less than perfect record. Yet, the results were much better than what some historical accounts have led us to believe.

Historian Richard K. Smith is memorialized by two other outstanding historians, R. Cargill Hall and David Alan Rosenberg. Although he was not widely known, Smith contributed to aviation history by introducing the role of weight-ratios and structural loading in aircraft performance. And as the authors note, he proved correct in many other areas.

We continue to celebrate the fiftieth anniversary of the Air Force in space and missiles. 1954-2004. Col. Lester F. Rentmeester, USAF (Ret.), reminisces about the origins of the United States's space program and his role in it, while he was a project officer on the Air Staff in the Pentagon. His concentration was in intelligence and reconnaissance and he especially highlights President Eisenhower's the Open Skies program.

Eleven book reviews cover the gamut from air power theory to warfare and technology. Also included is an aviation "juvenile nonfiction book," which (of course) is reviewed by a juvenile. (See page 54.)

The departments section, covers upcoming events, reunions, letters, notices, news, and the ever-popular, "History Mystery."



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. In the case of articles, upon acceptance, the author will be sent an agreement and an assignment of copyright.

A black and white photograph of a military airfield. In the foreground, a large, dark, multi-engine aircraft is parked on the tarmac. In the background, several other aircraft are visible, including a biplane and a smaller propeller plane. The scene is set on a paved airfield with some structures and equipment visible in the distance.

The Luftwaffe and its Allied Parallel War and the Failure of S

An aerial, black and white photograph of a military airfield. Several aircraft are parked on the tarmac. The aircraft in the foreground are large, multi-engine bombers, likely B-24 Liberators, with their distinctive high-wing configuration and tail gun turrets. Other smaller aircraft are visible in the background. The title of the article is overlaid in a white, gothic-style font at the top of the image.

Air Forces in World War II: Strategic and Economic Cooperation

James S. Corum

(Overleaf) Romanian Air Force fighters over an airfield, December 1, 1941. (All photos courtesy of the author.)

THE
LUFTWAFFE
HAD
SEVERAL
IMPORTANT
ALLIES IN
THE AIR WAR

GERMANY'S
DEFEAT IN
THE AIR, WAS
DUE TO THE
THIRD
REICH'S
INABILITY TO
EFFECTIVELY
LEAD A
COALITION
WAR

The coalition aspect of conducting aerial warfare is one of the less explored subjects in the history of the Second World War. The U.S.-British relationship in conducting the strategic bombing campaign is the one subject written about in great detail. Other aspects of coalition air war are beginning to receive appropriate attention. For example, Mark Conversino's *Fighting with the Soviets* provides an in-depth study of U.S. Army Air Forces (AAF) and Soviet Air Force relations in World War II and Air Marshal Probert's book, *The Forgotten Air War*, does a fine job in describing the U.S. and British air cooperation in Southeast Asia.¹

The *Luftwaffe* had several important allies in the air war. In particular, Italy, Finland, Hungary, and Rumania made great sacrifices and took heavy losses fighting alongside the *Luftwaffe*. Yet, despite the thousands of aircraft Germany's allies put into combat, from the far north to the Mediterranean, the relationship between the *Luftwaffe* and its coalition allies has received little attention.² This article is a contribution towards understanding this aspect of the history of aerial warfare.

A full list of Germany's allied air forces, the forces that flew alongside the *Luftwaffe* or under *Luftwaffe* command, would include Slovakia, Croatia and Bulgaria alongside the Italians, Rumanians, Finns and Hungarians. However, this article will concentrate on the latter four air forces and their relationship with the *Luftwaffe*. These four nations not only had moderately large air forces but also had indigenous aircraft industries and significant industrial potential to produce aircraft. On the other hand, the Bulgarian, Slovakian and Croatian contribution to the aerial war was insignificant and none of those nations had an aviation industry that could have made an impact on the war. In this article, I will concentrate on the relationship between the *Luftwaffe* with its major allies (Italy, Finland, Hungary and Rumania) to include the an overview of the battle performance of allied air forces, German assistance to its major allies and the *Luftwaffe's* policy towards the aviation industries of its allies. Germany's allies had the potential to deploy significant forces and production capability to support the German war effort. For the most part, the actual and potential force of Germany's allies was ignored or misused by the *Luftwaffe* throughout the war. Indeed, one of the primary causes for German defeat, and specifically Germany's defeat in the air, was due to

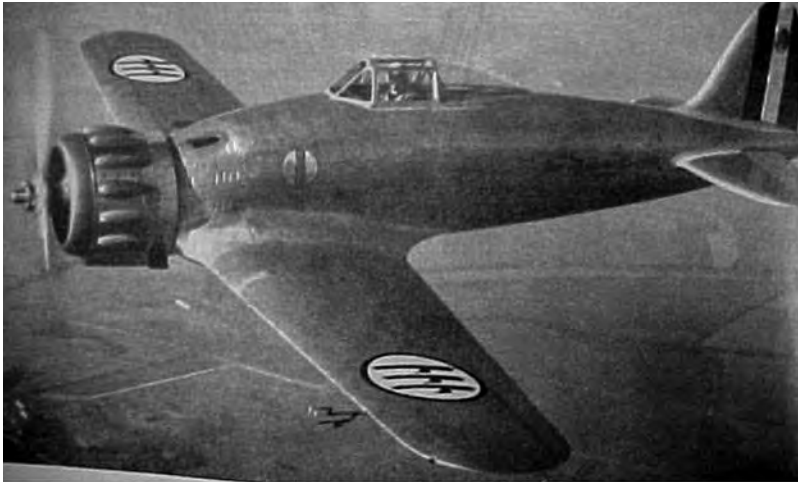
the Third Reich's inability to effectively lead a coalition war.

The *Luftwaffe's* Understanding of Coalition Warfare

Several factors affected the *Luftwaffe's* relationship to its wartime allies and inhibited the *Luftwaffe* from developing an effective relationship with allied air forces. First of all was the influence of *Luftwaffe* and *Wehrmacht* culture. Before the war, *Luftwaffe* officers failed to seriously study coalition operations and the *Wehrmacht* as a whole suffered from a lack of interest in coalition operations within the senior military leadership. Another factor that inhibited Germany's ability to exploit the capability of coalition allies lay in the Nazi concept of *Mittleuropa* that guided German foreign relations. Germany's long-term ambition was to fully control the economy of Central Europe, and this vision had no place for technologically advanced allies with aviation industries that could compete with Germany. Finally, the Germans fought under the concept of parallel war, each allied nation would largely fight its own war in its own sector with little strategic coordination or common direction.

In the 1920s, the German army established a three-year general staff course that provided a thorough education for officers in the operational art, and at the operational level of war. The army general staff course covered tactics from battalion to army levels, military history, operational planning, and joint operations. It was arguably the best education in the world in the operational art of combat command. However, very little emphasis was placed on logistics or the industrial-economic side of warfare in the general staff course, and grand strategy—including coalition warfare—was scarcely mentioned. When the *Luftwaffe* established its general staff academy in 1935, its emphasis—like that of the army's general staff training—was on the operational side of aerial warfare, with little time devoted to grand strategy. War Minister Werner von Blomberg and *Luftwaffe* Chief of Staff Walter Wever recognized the deficiency of both the army and air force general staff curricula in educating officers to serve as strategists and staff officers for the *Wehrmacht*. At the urging of both generals, the war ministry established the *Wehrmachtakademie* in 1935 to educate officers for service on a joint strategic staff. The

James S. Corum is professor of comparative military studies at the USAF School of Advanced Air and Space Studies, Maxwell AFB, Alabama. Dr. Corum holds graduate degrees from Brown and Oxford Universities and a Ph.D. in history from Queen's University, Canada. He teaches air power history and low intensity conflict courses and is a lieutenant colonel in the U.S. Army Reserve where he is on the faculty of the Army War College. His publications include: The Roots of Blitzkrieg: Hans von Seeckt and German Military Reform (University Press of Kansas, 1992), The Luftwaffe: Creating the Operational Air War, 1918-1940 (University Press of Kansas, 1997) and his latest book, with Wray Johnson, Airpower in Small Wars, (University Press of Kansas, 2003). Dr. Corum's articles have appeared in Air Power History, Airpower Journal, The Journal of Military History, and the Journal of Strategic Studies.



Italian Air Force Macchi 200, February 1939.

IN THE PREWAR PERIOD, THE WEHRMACHT AND THE AIR MINISTRY DEVOTED VIRTUALLY NO EFFORT TO COALITION WAR PLANNING

THE AIR MINISTRY'S PRIMARY INTEREST IN THE SMALL NATIONS OF CENTRAL EUROPE WAS AS A MARKET FOR OBSOLETE OR SURPLUS GERMAN AIRCRAFT

one-year course, which was intended for a select group of experienced general staff officers drawn from all services, would emphasize grand strategy, war economics, and politics. From 1935 to 1938, only a handful of officers were sent to the course.³

The death of Wever in 1936, and the dismissal of von Blomberg in 1938, eliminated the German military's strongest advocates for creating a true *Wehrmacht* strategic staff. The *Wehrmacht*akademie was shut down in 1938, largely as a result of interservice rivalry, and of Hermann Goering's dislike of any staff that might interfere with the direction of "his" *Luftwaffe* and air ministry. When the Oberkommando der *Wehrmacht* (OKW) was formed in 1938, it would not be a staff to coordinate grand strategy, but rather a small, personal staff for the Führer. In short, the *Wehrmacht* never developed a program to produce strategists or any coherent vision of grand strategy.⁴

A central goal of Nazi foreign relations was to ensure German domination of the economies of Central Europe to include Czechoslovakia, Hungary, Poland, Rumania, Bulgaria, and Yugoslavia. Through its foreign trade and investment policies of the 1930s Germany made a conscious effort to push out British and French trade and influence in the region and supplant it with German domination. From the German viewpoint, countries like Hungary and Rumania that were mainly agricultural lands should produce food for Germany. The Central European nations were also seen as providers of raw materials to German industry. The Central European nations had many of the vital resources that Germany lacked. For example, Rumania was a major oil supplier to Germany and Hungary developed its oil fields in the 1930s. Hungary was, as well, one of the world's major producers of bauxite.⁵ Besides providing Germany with food and raw materials, the small Central European states were also seen as a market for German industrial goods and machines. Before the outbreak of the war, the German strategy for the economic domination of Central Europe was quite successful. Austria and Czechoslovakia were absorbed into the German Reich and by 1938 Germany had become the dominant economic influence in both Rumania and Hungary.⁶

There was little subtlety in the German policy of asserting its dominance in Central Europe. From the time Hitler took power the Rumanian and Hungarian governments were highly suspicious of Germany. Rumania had been closely linked with France after World War I and maintained its alliance into the 1930s.⁷ Hungary had a strong democratic tradition and valued its trade links with Britain. Nevertheless, from the perspective of the Rumanian and Hungarian governments, Britain and France were far away while Germany was next door. The small nations had to make realistic accommodations with Germany in order to survive so, in 1940 when the Soviet Union occupied the Rumanian province of Bessarabia, the Rumanians had no alternative but to turn to Germany for help in regaining their territory. Hungary could only turn to Germany to adjudicate a return of territory stripped from Hungary by Rumania, Czechoslovakia and Yugoslavia in the aftermath of World War I.

In the prewar period, the *Wehrmacht* and the air ministry devoted virtually no effort to coalition war planning or to discuss coordinated military production with coalition partners. After the Nazi accession to power in 1933, fascist Italy was viewed as a natural ally and in 1933-1934 a group of senior German officers visited Italy to discuss the possibility of standardizing some equipment between the two countries. Yet nothing came of the discussions and the Germans never pressed the issue.⁸ Thus, when Italy went to war as Germany's ally in June 1940, none of Italy's major equipment items or their means of communication were compatible with Germany's. Since the *Luftwaffe* failed to plan for a coalition war with its largest and most obvious ally, there was bound to be even less effort to develop Germany's military relationship with smaller powers. Indeed, prior to the outbreak of the war the Air Ministry's primary interest in the small nations of Central Europe was as a market for obsolete or surplus German aircraft. Germany urgently needed foreign exchange for its rearmament program and became a major aircraft exporter by the mid-1930s. Hungary and Rumania, then rebuilding their air forces, were eager to buy the latest German aircraft models and to obtain licenses to build German equipment. However, before 1938 the air ministry refrained either from selling front-line *Luftwaffe* aircraft or from allowing license production of its latest models.⁹ As a consequence, Rumania was offered Heinkel He 51 fighters in 1935. As the He 51 was already known as one of the *Luftwaffe*'s least successful aircraft and was in the process of being replaced so the Rumanians sensibly rejected the German offer and bought better fighters from the Italians.¹⁰ Yet the Rumanians kept trying to buy modern aircraft from Germany and finally in 1939 the *Luftwaffe* allowed the Rumanians to buy 24 modern Heinkel He 112 fighters since it was a model that the *Luftwaffe* had little interest in and was thus approved for export.¹¹ However, a Rumanian request to buy 50 Ju 87Bs was turned down



Italian and German airmen in August, 1940.

GERMANY NEVER DEVELOPED A CLEAR GRAND STRATEGY TO FIGHT A COALITION WAR

IN CONTRAST TO THE BRITISH-AMERICAN ALLIANCE ... GERMANY NEVER FORMED A COMBINED STAFF WITH ITS ALLIES

by the Air Ministry that same year.¹² The story with the Hungarians is similar. Between 1934 and 1940 several Hungarian missions to buy German aircraft resulted in the purchase of some older aircraft considered surplus to the *Luftwaffe's* needs. In 1939 Rumanian overtures to license-build the Me 109 fighter and Junkers Jumo 211 aircraft engine were rebuffed.

As a result of German arms sales policies, Rumania and Hungary turned to Italy, France, and the United Kingdom to purchase and to license-build aircraft for outfitting their fighter and bomber units. Hungary and Rumania considered Germany an unreliable aircraft supplier and, faced with the German attitude, Hungary, Finland, and Rumania all took steps to improve the capability of their indigenous aircraft industries in order to become as self-sufficient as possible. The Hungarian and Finnish governments opted to license-build fighter planes and some bombers. Hungary started licensed production of the Italian Regianne 2000 fighter and the Caproni Ca 135 bomber before its entry into the war. Finland's state aircraft factory entered into an agreement to license-build the Fokker D XXI fighter in 1937. Rumania took a different tack by developing a modern fighter plane, the IAR 80, for production by the Rumanian state aircraft company. Hungary and Rumania also took steps to design and build their own trainers along with light liaison and reconnaissance aircraft. Hungary and Rumania worked to adapt foreign airframe designs to their own engines, usually variations of license-built French aircraft engines although none of the domestic-designed or license-built aircraft or engines made by Rumania, Hungary or Finland were equal to the German aircraft or engines available in 1939 or 1940. However, German sales and licensing policy combined with a distrust of Germany ensured that, for the small nations, self-sufficiency took precedence over efficiency in the prewar rearmament programs.

Parallel War and Germany's Allies

Germany never developed a clear grand strategy to fight a coalition war. Indeed, Germany's

allies had little in common with the Third Reich and each nation allied itself with Germany in order to fulfill very limited war aims. For example, Finland aligned itself with Germany in order to regain the territory it had lost to Russia in the 1939-1940 Winter War. Rumania sought to regain the province of Bessarabia, annexed by Russia in 1940. Hungary served the German cause in repayment for Germany's ensuring the return of formerly-Hungarian territories seized by Rumania, Czechoslovakia and Yugoslavia at the end of World War I. Italy wanted to become the dominant power in the Mediterranean and to expand its empire at the expense of France, Greece, and Albania. Since the Italians believed that Germany was likely to defeat Britain and France in 1940, their best chance to realize Mussolini's ambitions would be to join the war on Germany's side.

In contrast to the British-American alliance and other allied commands formed during World War II, in which the allied nations jointly crafted strategy and closely coordinated their efforts, Germany never formed a combined staff with its allies. Germany and its allies never coordinated efforts through conferences such as the Allies held at Casablanca, Quebec, Teheran and Yalta. Throughout the war, Hitler and the *Wehrmacht* staff dealt with each ally on a purely bilateral basis. Hitler met with Mussolini and the leaders of Rumania, Hungary, and Finland on several occasions, and the *Wehrmacht* exchanged military representatives with coalition partners, but that was the extent of German strategic coordination. Unlike the U.S.-UK alliance, no German forces served under the command or strategic direction of a foreign commander. Hungarian and Rumanian forces served on their own fronts in Russia under the direction of German army groups. The Finns conducted their war alongside the Germans, but without German direction or command. The Italians discussed the possibility of providing forces to serve under German direction against France during the campaign of 1940, but the *Wehrmacht* saw an Italian army in the Rhineland as more trouble than it was worth. When Italy finally joined the war, it was agreed that Germany and Italy fought parallel wars, each nation commanding its own forces on its own front.¹³

Given their size and limited contribution to the war effort, Rumania and Hungary could not expect to be anything but subordinate junior partners. The status of Italy was different. Italy was the major power in the Mediterranean in 1940 and basically saw itself as an equal partner to Germany. On several occasions, Italy proposed the creation of a combined staff or headquarters in which some German forces in the Mediterranean theater might serve under Italian command or direction but this was consistently opposed by the Germans and command arrangements in the Mediterranean remained separate.¹⁴ Italian forces sent to other theaters, such as the air corps sent to Flanders in 1940 to assist the *Luftwaffe* in the Battle of Britain and the Italian army and air

DISTRUST
BETWEEN
THE
GERMANS
AND ITALIANS
AT THE
STRATEGIC
LEVEL WAS
PALPABLE

THE
LUFTWAFFE
GENERAL
STAFF IN MAY
1939
ASSESSED
THE ITALIAN
AIR FORCE
AS "INFERIOR
TO THE
BRITISH AND
FRENCH AIR
FORCES
BY A WIDE
MARGIN."

corps sent to Russia in 1942-1943, served under German command.

From the start of their wartime alliance, the open distrust between the Germans and Italians at the strategic level was palpable. Neither government kept the other informed of major strategic plans or operations. As late as three weeks before the German invasion of Russia, the German foreign ministry informed Count Galeazzo Ciano, the Italian foreign minister, that there were no imminent plans to invade Russia.¹⁵ On the Italian side, Mussolini refrained from informing his German ally in 1940 of his plan to invade Greece.¹⁶ Mutual mistrust was apparently the foundation for Germany's military relations with its allies.

The Italian Air Force: The *Luftwaffe's* Strongest Ally

In 1939-1940 the Italian armed forces were unprepared to go to war. The Italian navy, which possessed some modern battleships, cruisers, and destroyers as well as a sizable submarine fleet, was the best-prepared service. The Italian army of 67 divisions, poorly-trained and very poorly-equipped, was the service least prepared for war. The Italian air force, the *Regia Aeronautica*, was a significant force on paper—in reality, however, scarcely more fit than the army to fight a modern war against major powers.¹⁷ In June 1940 the Italian air force had 1,796 combat aircraft in the Mediterranean: 783 bombers, 594 fighters, and 419 reconnaissance aircraft.¹⁸ There were 84,000 total personnel, including 3,040 officer pilots and 3,300 NCO pilots. Though impressive, the total numbers belie the true state of the *Regia Aeronautica*. Most of the aircraft available in 1940 were obsolete and inferior to the air forces of Britain and France. The primary fighter in 1940 was the CR 42 biplane, a good aircraft for the mid-1930s—but too slow and lightly-armed to face the modern monoplane fighters of France and Britain.¹⁹ Some of the Italian fighter force consisted of Fiat CR 32 biplanes, an early 1930s design that was long outdated.²⁰ The only modern monoplane fighters deployed by the Italians as of June 1940 were 118 Fiat G 50 fighters and 156 Macchi MC 200 fighters.²¹ Although these were adequate aircraft, they were unlikely to confront British Hurricanes and Spitfires on even terms. The Italian bomber force still contained many long-obsolete SM 81 trimotor bombers—276 as of 1939.²² Other bombers, such as the Fiat BR 20, were clearly inferior to the German and British medium bombers of the time.²³ Only in the Savoia-Marchetti SM 79—of which they had 594 available in June 1940—did the *Regia Aeronautica* have an effective bomber.²⁴

The Italian aviation industry was in no state to manufacture aircraft of the quality, or in the quantity required for a major war. The Italian aircraft industry consisted of some twenty-four aircraft firms and four major engine firms.²⁵ Even the largest manufacturers suffered a lack both of working capital and of capacity. In addition, pro-

duction methods were outdated. When the air force ordered a large number of different aircraft models, the planes had to be built, virtually by hand, in small quantities. Unlike the other major powers, that had progressed to building bombers with all metal, stressed-skin fuselages, the primary Italian bomber, the SM-79, still used a steel-tube frame covered with wood and fabric.²⁶

One of the greatest weaknesses of Italian airpower was the state of their engine industry. Italian engines were generally radials, largely adapted from French designs, but Italy was unable to produce large in-line engines equal to those of the Germans or French. Indeed, Italy had trouble producing aircraft engines exceeding 1,000 horsepower. This inability to produce powerful engines forced the Italians to adopt the trimotor design as the only means of obtaining adequate speed for their bombers.²⁷ The lack of large, robust engines doomed the 1939-1940 Italian dive-bomber project: the Breda 88. This twin-engine aircraft was so underpowered and so unreliable under North African conditions, that production was halted after only 105 aircraft had been produced.²⁸ Because the Italian aircraft industry could not produce a dive bomber, in 1940 the Italians negotiated a deal with the Germans to buy Ju-87 dive bombers.²⁹ The German air ministry then sold the Italians well-worn, early-model Ju-87B aircraft, considered surplus since the *Luftwaffe* was being re-equipped with the Ju 87 D and R models.

The aircraft industry remained a weak link in the Italian war effort. There was a significant disconnect between the grandiose plans of the Fascist leadership and their inability to acquire sophisticated equipment. In late 1938, the Italian leadership called for 12,885 aircraft and 22,542 engines to be produced for 1939 yet the actual production figures were 1,750 aircraft and 4,191 engines. In 1940 production increased to 3,257 aircraft and 5,607 engines, but this was only a quarter of the equipment required.³⁰ Of all the major powers, Italy had, by far, the weakest aviation industry. The condition of the Italian industry and infrastructure also assured a very low serviceability rate for aircraft because the aircraft industry could not provide an adequate supply of spare parts and the air force possessed few facilities for aircraft repair. Moreover, the air force suffered from a severe shortage of trained mechanics and an inadequate training program. Owing to these factors, the squadrons committed to combat—especially the squadrons fighting at the end of a long supply line in North Africa or Russia—normally had less than half of their aircraft in flyable condition.

The weakness of the Italian air force and aircraft industry was well-known to the *Luftwaffe* leadership when Italy entered the war. A study by the *Luftwaffe* general staff in May 1939 assessed the Italian air force as "inferior to the British and French air forces by a wide margin."³¹ Italian aerial rearmament was proceeding very slowly and, although their fighter pilot training was rated to be good, but Italian bomber pilots were mediocre

THE
LUFTWAFFE
INSISTED
THAT ...
ITALIAN AIR
UNITS BE
PLACED
UNDER
GERMAN
DIRECTION

and had poor night and bad-weather flying and navigation skills. In addition, the Italian anti-aircraft force was thoroughly obsolete. Essentially, the *Luftwaffe* viewed Italy as a weak nation that would likely hinder the German war effort. Nevertheless, Italy served two strategic purposes: first, the Italians could disrupt British and French transport in the Mediterranean; secondly, the Italians could help divert French and British sea power. Little more could be expected.³² Perhaps because of Italy's weak position, the *Luftwaffe* general staff devoted no effort to plan to work with the Italians if war broke out. Thus, when Italy joined the war there were no arrangements for liaison or cooperation between the two air forces. Three months after Italy became a German ally, the *Luftwaffe* sent General Ritter von Pohl to serve as liaison officer between the two air staffs. The first instance of coalition air operations came in October 1940, when the Italians committed an air corps to the Battle of Britain, placing their force under the command of General Kesselring's *Luftflotte 2*. It was a short and disappointing campaign for the Italians. Though the Italian air corps flew only a few raids, they suffered heavy losses when their bombers and fighters proved no match for British defenses.

The Italian air force proved no match for the RAF in North Africa, either. In late 1940 the Italian army in North Africa was virtually destroyed by the British. Although the *Regia Aeronautica* outnumbered the RAF, with 327 combat aircraft to 197 in the theater, the RAF won air superiority because its two Hurricane squadrons were superior to the Italian fighters.³³ With the situation in North Africa collapsing, Germany decided to aid its ally by sending the Tenth Air Corps to the Mediterranean. Throughout 1941 the German effort in the Mediterranean broadened. One primary mission of the Tenth Air Corps was providing air escort for the ships that brought reinforcements and supplies to the Afrika Corps and the Italian forces in Libya. Axis shipping suffered heavy losses from British air and naval units based on Malta. The *Luftwaffe* insisted that a single air command be created for convoy protection, and that Italian air units be placed under German direction. The Italian air force refused, promising to cooperate with, but not to serve under the Germans.³⁴ The lack of a unified command resulted in mediocre protection of the convoys.³⁵

From 1940 through Italy's surrender in 1943, cooperation between the German and Italian air forces remained fairly ineffective. While the German and Italian higher air force staffs in the Mediterranean theater had liaison officers, there were no liaison officers at the wing or group level.³⁶ German and Italian air units that shared airfields or were stationed in close proximity worked out arrangements for mutual support. Italian fighters often flew escort for German bombers.³⁷ In the battle for Tobruk in June 1942, Italian Stuka units flew alongside German Stuka units to support Rommel's attack.³⁸ At the tactical

level, the *Regia Aeronautica* showed a willingness to work with the Germans. Although the courage and fighting ability of the Italian army and navy were often disparaged by German accounts of the war, the courage and aggressiveness of Italian air force pilots in aerial combat was often praised.³⁹ The Italian problem was equipment. It was not until November 1941, when the Macchi Mc 202 fighter was deployed to North Africa, that the Italians had an aircraft capable of meeting the RAF Hurricanes and P-40s on equal, even superior terms.⁴⁰

In any event, the Italian aircraft industry could not supply enough of the new fighters, such as the Macchi Mc 202 or Fiat G 55, to make a difference against the ever-increasing Allied air superiority. The low production levels of Italian aircraft firms could not meet the demand posed by heavy combat attrition. On 2 March 1943, with the situation in North Africa rapidly approaching catastrophe, the Italian High command sent Hitler a long message outlining Italy's precarious position and demanding a large quantity of modern equipment from the Germans, to include modern aircraft for the air force. Hitler replied the next day promising large quantities of German material to include reequipping the hopelessly obsolete Italian bomber force with Ju 88 bombers.⁴¹ As usual, Hitler's grandiose promises meant little. In the six months before the Italian surrender, the *Luftwaffe* managed to provide only 40 Ju 88s to reequip one Italian bomber group. By the time of the Allied landings in Sicily in July 1943, the *Regia Aeronautica* had a paper strength of 1,042 aircraft. Official strength returns belied the reality. The Italian bomber force of 400 planes was considered so inferior to the Allies that it could not be used in combat. Much of the fighter arm was obsolete and, of the 530 modern fighters (Macchi 200s, 202s and 205s), only 130 were operational when the Allies landed.⁴² The Italians could only play a minor role in defending their own homeland. By Italy's surrender in September 1943, the *Regia Aeronautica* possessed only 1,306 combat aircraft, less than half the number with which they had started the war.⁴³

Italian-German cooperation was hampered by other factors. For instance, since German and Italian radios were incompatible, Italian aircraft flying missions with the *Luftwaffe* could not communicate with their partners.⁴⁴ In North Africa, no system existed for joint control of fighter operations, partially due to *Luftwaffe* reluctance to share technology with the Italians. For example, the *Luftwaffe* in North Africa had Freya radar units for early warning and aircraft control, but the Germans did not provide the Italians with radar, or radar operators, until the Tunisian Campaign of 1943.⁴⁵

German-Italian Production Cooperation

The Italian aircraft industry had some very capable aircraft designers but the problem with the Italian aircraft industry was its inability to

THE
GERMANS
DID NOT PRO-
VIDE THE
ITALIANS
WITH RADAR,
OR RADAR
OPERATORS



Italian and German pilots at dinner, December 1, 1941.

AFTER THE SURRENDER OF ITALY THE LUFTWAFFE SEIZED SOME SAVOIA MARCHETTI SM 82 TRANSPORTS

RUMANIA ... BUILT SEVERAL FRENCH MILITARY AIRCRAFT UNDER LICENSE

keep up with the British, Americans, and Germans in the production of large, powerful engines.⁴⁶ The best Italian fighters in 1940 were the Macchi Mc 200 and Fiat G 50. These modern, maneuverable metal monoplanes were handicapped by their Fiat A.74RC38 engines, capable of only 840 horsepower, while their contemporary, the Me 109E, was powered by the Daimler Benz DB 601, an engine capable of 1,050 horsepower. The Alfa Romeo 126 R3 34 engines in the SM 79 bomber produced only 780 horsepower, while the Junkers Jumo engines in the Ju 88 produced 1,200 horsepower.⁴⁷

The initiative to employ German technology in Italian fighters came from the Italian engineers. One of Italy's top aircraft designers, Mario Castoldi of Macchi, arranged in 1940 for a DB 601 A-1 inline engine to be bought from Germany and installed in an Mc 200 fighter. The Italian airframe was tested with the German engine in August 1940, and the resulting aircraft was such an improvement over the Mc 200 that it was ordered into immediate mass production as the Macchi Mc 202 (Folgore).⁴⁸ Italy finally had an aircraft that could match the Me 109. Alfa Romeo obtained a license to produce the DB 601 engines, but ran into numerous production problems. By early 1942, Alfa Romeo was still unable to deliver more than 50 engines per month and Germany was willing only to provide a few engines surplus to its own needs.⁴⁹ The lack of adequate engines was so serious that the *Regia Aeronautica* continued production of the Mc 200, an aircraft already recognized as obsolete.⁵⁰ The Macchi Mc 202, with a maximum speed of 372 mph, finally went into service in November 1941. It had little impact on the air war, since its production levels remained low and only 1,100 Mc 202s were produced between 1941 and 1943.⁵¹ By Italy's surrender in 1943, only 122 Folgore were on the books of the *Regia Aeronautica*, and of these, only 53 were operational.⁵²

Combining Italian airframes with German engines proved a winning formula in developing other aircraft. In 1942 Mario Castoldi mated an Mc 202 fuselage with a German DB 605 1,475-horsepower engine, creating the Macchi Mc 205 Veltro: a maneuverable fighter with a top speed of more than 360 mph.⁵³ Fiat obtained the license to

build the Daimler Benz 605 A engine. As with the Mc 202, engine production and import problems ensued. Only 262 Mc 205s were produced before Italy's surrender.⁵⁴ Only in 1943 did the German air ministry begin to seriously examine the possibility of producing aircraft for the *Luftwaffe* in Italy. In early 1943, the *Luftwaffe* ordered eighty-five Caproni Ca 313s, a variation of the Caproni Ca 310 light bomber designed in the late 1930s.⁵⁵ The *Luftwaffe* envisioned the Ca 313 as a multi-engine trainer and light transport aircraft and it was suitable for both roles. Production arrangements broke down, however, and of the 905 Ca 313s ordered by the *Luftwaffe*, the Italian factories produced only 271.⁵⁶

When Field Marshal Wolfram von Richthofen arrived in Italy in mid-1943 to assume command of Luftflotte II he reported that the Italian aviation industry was underutilized and recommended that the *Luftwaffe* obtain Italian-designed and produced aircraft. One aircraft he had in mind was the Fiat G 55, another Italian airframe married to a German engine, that approximated the performance the American P-51. In early 1944, von Richthofen wrote to the Air Ministry of the possibility for Italian production of spare parts, attack aircraft and trainers for the *Luftwaffe*.⁵⁷ Von Richthofen's sensible recommendations met with a remarkable lack of interest. The *Luftwaffe's* response was to send an officer to Italy to serve as a contact point between Richthofen and the *Luftwaffe* staff on issues of Italian aircraft production but little came of this effort.⁵⁸ After the surrender of Italy the *Luftwaffe* seized some Savoia Marchetti SM 82 transports (SM 81 converted bombers) and Fiat G 12s as transport aircraft and by May 1944 the Fourteenth Air Corps had four transport groups equipped with 143 Italian aircraft.⁵⁹ By all accounts, Italian aircraft served the *Luftwaffe* effectively as transports.

The Rumanian Air Force

By 1940-1941, the Rumanians had developed one of the most advanced aviation industries in Eastern Europe. The Rumanian national military strategy was to develop self-sufficiency in armaments production. To this end, three aircraft companies were set up, with government support, in the 1920s and 1930s. IAR, (*Industria Aeronautica Romana*), which also manufactured aircraft engines, was a state-owned company. SET and ICAR also produced a variety of aircraft. During the 1920s and 1930s, the Rumanians had produced various trainers, observation planes and fighters. Rumania was allied with France in the interwar period and IAR built several French military aircraft under license. More importantly, Rumania obtained the rights to build the Gnome-Rhône 14K engine, which developed over 700 horsepower. During the 1930s the Rumanians would modify and develop the Gnome-Rhône engine as the IAR 14K 1000 A engine, which would attain 1,000 horsepower.⁶⁰

WHEN
RUMANIA
ENTERED THE
WAR
AGAINST
RUSSIA IN
1941, IT
FIELDER AN
AIR FORCE
OF OVER 400
AIRCRAFT

RUMANIA
REQUESTED
THE RIGHTS
TO BUILD THE
ME 109 AND
WAS TURNED
DOWN

In the late 1930s, the Rumanians developed light bomber-reconnaissance biplanes: the IAR-37, IAR-38 and IAR-39. The Rumanian-designed and built IAR-37 series aircraft were slow and obsolete, even by the standards of the 1930s, but would remain in production until 1944, seeing service first in combat roles and later, as liaison aircraft. In 1938, in order to build up its bomber force, Rumania obtained a license to build redesigned twin-engine versions of the Italian Savoia-Marchetti SM 79 bomber, known as the JRS.79B. The JRS.79Bs turned out to be inferior to the Italian version and, by 1941, was already obsolescent. However, it remained in production until 1944.⁶¹ The greatest accomplishment of the Rumanian aviation industry was the design and production of the IAR 80 fighter plane, which first flew in 1939. The IAR 80 was a fairly advanced aircraft powered by a 930 horsepower Rumanian engine. A low-wing metal monoplane with retractable landing gear, the IAR 80 was fairly fast for its time, about three hundred miles per hour. The IAR, however, was lightly-armed, unarmored, and underpowered. By the standards of the Eastern Front in 1941, the IAR 80 was an effective aircraft. It was, nevertheless, inferior to the new Russian fighters by 1942. Since the Rumanians had no reliable source of supply for modern aircraft, the IAR 80 and its variants remained in production until 1944. From 1939 to 1944, approximately 450 IAR 80s were built, making it one of the most numerous Rumanian aircraft.⁶²

When Rumania entered the war against Russia in 1941, it fielded an air force of over 400 aircraft. It was an eclectic mix of modern and obsolete aircraft, including not only Rumanian-built and designed aircraft but also Italian, British, German, and French aircraft. The Rumanian air force had also absorbed ninety-three planes of the Polish air force, which had taken refuge in Rumania during the German invasion of 1939. The combat force included IAR 80s, twelve British Hurricanes, thirty-eight British Bristol Blenheim bombers and twenty-one French Potez 63 bombers.⁶³ The Rumanian air force suffered from deficiencies in training, aircraft armament, communications equipment and ground infrastructure. While potent on paper, it would be hard-pressed to carry out its two primary missions — supporting the Rumanian field army in Russia and air defense of the homeland.

The Rumanian air force was firmly drawn into the German orbit in Fall 1940, when a large *Luftwaffe* military mission headed by Lt. Gen. Speidel arrived. Speidel's mission was to ensure the air defense of the Rumanian oil fields, vital to the German war effort and to train and reorganize the Rumanian air force.⁶⁴ Speidel initially reported directly to the commander of the *Luftwaffe* and by 1941 the *Luftwaffe* force in Rumania had grown to approximately 50,000 men, including a reinforced flak division, two flak regiments, one Me 109 fighter group (III/JG 52), and special units for fighting oil fires, and providing

ground support and communications.⁶⁵ Before the war in the east started, the *Luftwaffe* had essentially assumed control of Rumanian air defense. The other part of the mission, training the Rumanians, went less smoothly. Rumanian resentment of the Germans was never far below the surface. After all, Rumania, which had been Germany's enemy in World War I, had been overrun and occupied by German troops in 1916. *Luftwaffe* officers who wanted to visit Rumanian air bases or to observe training were regularly denied access.⁶⁶

When the war broke out in June 1941, relations with the Rumanians improved and the *Luftwaffe* mission to Rumania came under the command of *Luftflotte IV*. The two Rumanian army corps in Russia were provided with *Luftwaffe* liaison officers, who passed information gained from Rumanian reconnaissance and battle reports to *Luftflotte IV*, and passed *Luftwaffe* intelligence to the Rumanians.⁶⁷ The Rumanian army came under the strategic direction of the German army and several squadrons of the Rumanian air force deployed to Russia and flew in support of the Rumanian army. Generally, the two air forces flew in their respective zones of the front. The Rumanian air force, however, did receive some fuel and support services from *Luftflotte IV*.⁶⁸ As the campaign in Russia progressed, Rumanians flew more often in combined operations with the Germans, at times supporting German troops. In 1942 Field Marshal von Richthofen, commanding *Luftflotte IV*, reinforced the *Luftwaffengruppe Kaukasus* with the 20th Rumanian Reconnaissance Squadron and the 43rd Rumanian Fighter Squadron.⁶⁹ At the tactical level, co-located German and Rumanian units worked out direct coordination procedures. The *Luftwaffe* had a group of seaplanes and flying boats stationed on the Black Sea coast for search and rescue and naval patrol. The Rumanian naval air units, equipped with Italian and German seaplanes and flying boats, willingly supported German naval air operations.⁷⁰

The Rumanians were well aware that their own aircraft designs could not hold their own in battle with a major power. In 1939, Rumania requested the rights to build the Me 109 and was turned down. As Rumanian aircraft engines were mostly variations on the Gnome-Rhone 14 cylinder radial and could not be developed to produce more than 1,000 horsepower, Rumania asked the *Luftwaffe* for rights to build the BMW 801 radial engine that powered the FW 190 fighter—and was turned down again. Even a 1940 request to build the small Fiesler 156 "*Storch*" was turned down. Only when the war started to turn against Germany did the *Reichsluftministerium* (Reich Air Ministry) revise its policy and in March 1942 Rumania was granted a license to build the Fiesler "*Storch*". In November of that year the German air ministry sold the Rumanians the rights to build the Daimler Benz DB 605 engine, which was rated at over 1,400 horsepower. Finally, in 1943, Germany

THE
SHORTAGE
OF MACHINE
TOOLS IN
RUMANIA
DELAYED
PRODUCTION
OF GERMAN
AIRCRAFT
AND ENGINES

DESPITE THE
COMMON
STRATEGIC
INTERESTS,
THE GERMAN-
FINNISH
RELATION-
SHIP ONLY
BEGAN
AFTER
FINLAND'S
DEFEAT IN
THE WINTER
WAR

GERMANY
REMAINED
ALOOF AND
REFRAINED
FROM
EXPORTING
ARMS TO
FINLAND

granted the Rumanians a license to build the Me 109, with the first 75 to be assembled in Rumania using German-made components.⁷¹

All of these licensing agreements came too late in the war to have much of an effect on Rumanian production. The shortage of machine tools in Rumania delayed production of German aircraft and engines. Some Me 109 components were delivered in 1944 but local production broke down and none were assembled before the Rumanian armistice of August 1944. Production of the DB 605 engine was scheduled for 1944 but never began.⁷² Although the Fiesler *Storch* license was granted in May 1942, two years later only 10 had been built.⁷³ The Rumanians were forced to adapt in various ways in order to cope with the German policies. When Germany refused Rumania a license to build the Ju 87 in 1939, the Rumanians initiated a program to modify the IAR 80 fighters as dive bombers and fifty of the modified fighters, the IAR 81, were delivered in 1941 and 1942. The IAR 81, not a very good dive bomber, saw service with two squadrons at the front.⁷⁴ Only when the Rumanian-German alliance was formalized did the Germans sell the Rumanians some first line aircraft. In 1940-41 the Rumanians received 30 He 111s that became the backbone of their bomber force and enough Ju 87s in 1941 to equip three squadrons. Like the Italians, the Rumanians received the "B" model that was going out of service with *Luftwaffe* squadrons.⁷⁵

In 1941, Rumania's primary defense force for the oil fields was a squadron of Hawker Hurricanes. Lieutenant General Speidel, chief of the *Luftwaffe* mission to Rumania, requested that the *Reichsluftministerium* send the Rumanian Air Force the Hurricanes and spare parts that the *Luftwaffe* had just captured in Yugoslavia. In a letter of July 5, 1941, Speidel noted that the Rumanian Hurricanes had excelled by shooting down 18 Russian bombers attacking the oilfields with no losses to themselves. The Rumanians, Speidel said, needed reinforcement and support for their premier fighter unit and that, as the captured equipment cost Germany nothing, the Hurricanes should be immediately turned over considering the importance of the oilfields.⁷⁶ The German Air Ministry held firm to the policy of providing no equipment except for payment.⁷⁷ As the war worsened on the Eastern Front, Germany loosened its policy about selling modern equipment to the Rumanians. In 1942, Germany agreed to sell 64 Me 109s to Rumania and in 1943, Germany sold the Rumanians enough Me 109Gs to equip four squadrons.⁷⁸ The Rumanian ground attack group was able to replace its ineffective IAR 80 fighter-bombers with Henschel 129B attack aircraft in 1943.⁷⁹ That year Ju 88 bombers were sold to Rumania to replace the worn out Blenheims and SM 79s of its bomber fleet. However, the flow of aircraft to Rumania in 1943 could not replace the heavy attrition of the air units at the front. The Me 109 losses were so heavy in 1943 and 1944 that by 1944 the four Me 109 squadrons had been reduced to one.⁸⁰

Finland

Legally speaking, Finland was never a formal ally of Germany during world War II. As a democratic nation, the Finns viewed the Nazi regime with distaste and never signed a formal alliance with Germany. The Finns entered into the war against Russia determined to regain the territory lost to the Soviets during the 1939-1940 Winter War. Finland allowed the Germans to place military units in their territory but refrained from putting Finnish army or air units under German command. Neither did the Germans and Finns ever form a formal command relationship, nor develop a common strategy. German troops in Finland were referred to as "comrades in arms" rather than as "allies."

Finland was important to Germany for its exports of copper, nickel and lumber. Finland also offered strategic advantages to Germany with its proximity to the vital Soviet port of Murmansk and the industrial center of Leningrad. Yet, despite the common strategic interests, the German-Finnish relationship only began after Finland's defeat in the Winter War. Significantly, the earlier Finnish experience with a German alliance had not been especially positive. German troops had helped the Finns defeat and expel the Soviets from Finland during the war for independence in 1918 but the Germans soon began to act more as occupiers than allies and the Finns were happy to see the German army depart in 1919.⁸¹ In the 1920s, the Finns established the State Aircraft Factory in Tampere. It was a small, modern facility capable of manufacturing small series of foreign designs under license. During the 1920s, the State Aircraft Factory manufactured several French models under license as well as the British Gloucester Gamecock fighter.⁸² The aircraft produced at the State Aircraft Factory contributed greatly to the Finnish air strength. In the years before the 1939 Winter War the State Aircraft Factory acquired the rights to build the Dutch Fokker D XXI fighter and the Bristol Blenheim bomber—both fine aircraft for their time. For trainers, the Finns relied on their own designs.

During the Winter War with Russia in 1939-1940 the Finns received considerable aid from the Western powers. Britain, France, Sweden and even Italy donated aircraft and military equipment. Germany remained aloof and refrained from exporting arms to Finland in compliance with the German-Soviet pact of 1939. The small but well trained Finnish Air Force had a superb combat record during the Winter War. With fewer than 200 combat aircraft, the Finns had faced thousands of Soviet aircraft and made 200 confirmed air to air kills for a loss of 67 aircraft. The Finns destroyed another 105 Soviet aircraft on the ground while 314 Soviet planes were shot down by flak.⁸³ At the end of the Winter War, the Finnish Air Force was equipped with a diverse collection of aircraft from Britain (Hawker Hurricanes, Gloster Gladiator fighters, Bristol Blenheim bombers), Italy (Fiat G

FINNISH
INDUSTRIES
WERE CON-
TRACTED TO
DESIGN AND
BUILD
WOODEN
PROPELLERS
... RATHER
THAN RELY
UPON PUR-
CHASING
PROPELLERS
FROM
GERMANY

IN MARCH
1942 ... THE
FINNS ASKED
THE
LUFTWAFFE
FOR AIR SUP-
PORT AND
WERE DENIED

50 fighters) and the United States (Brewster 239 fighters). France had donated 30 Morane Saulnier MS 406 fighters and Britain 30 Gloucester Gladiators. A variety of aircraft from the Netherlands, Sweden, Czechoslovakia and Germany made up the training, reconnaissance and liaison aircraft. In March 1940 the Finns had 196 combat aircraft (fighters, bombers, reconnaissance).⁸⁴ Rearming and enlarging the air force became a high priority for the Finnish high command. Germany was willing to sell the Finns aircraft that had been captured in France and Norway during 1940-41. Germany supplied 44 U.S.-built Curtis Hawk 75 fighters along with 4 Dornier Do 22 Flying boats, 15 Do 17 bombers and 30 Focke Wulf FW 44 Steglitz trainers.⁸⁵

During 1941 and 1942 the Finns bought 57 French Morane Saulnier MS 406s from the German stock of war booty. The MS 406 was one of the mediocre fighters of the day and in the 1940 campaign the plane proved clearly inferior to the Me 109. Although the Finns wanted better equipment they took what they could get. Thus, the MS 406 became one of the primary fighter planes of Finland. In 1943 the State Aircraft Factory embarked on a program to rebuild and redesign the MS 406s in order to maintain an effective fighter force against a Soviet air force that was quickly improving in the quality and quantity of aircraft. Forty MS 406s were modified to accept a larger Soviet Klimov engine, which was readily available from stocks of captured Soviet equipment. The rebuilt MS 406s were delivered in 1944 and were known officially as the Myrsky I and II although the Finns also nicknamed them the Morko-Moranés. As Finland's involvement with the war ended just as the Morko-Moranés were delivered, a combat test of the aircraft was never made.⁸⁶ Finland took other measures to ensure self-sufficiency and reduce dependence upon German purchases. For example, Finnish industries were contracted to design and build wooden propellers for their air force rather than rely upon purchasing propellers from Germany.⁸⁷

The Finnish aerial rearmament program after the Winter War was fairly successful, considering the small monetary and industrial resources of the Finns. By June 1941 the Finnish air force had 471 aircraft; approximately half of these were combat aircraft.⁸⁸ The Finns were able to design and produce several basic and advanced trainers including the Tuiska (31 made), the Viima I and II (24 made), and the Pyy I and II (41 made).⁸⁹ The Finnish air force went to great lengths to maintain as much self-sufficiency as possible. One example is the Fokker D XXI fighter. In 1936 Finland acquired seven of the Fokker D XXI fighters along with a license to manufacture the model.⁹⁰ The D XXI was a good fighter by late-1930s standards but was clearly obsolete by 1941. However, with modern combat aircraft difficult to procure and Germany unwilling to provide Me 109s or Me 110s, the Finns kept the D XXI in production and delivered 50 to the air force in 1941.⁹¹ The Finns

also built 55 Bristol Blenheim bombers, one of the better medium bombers of its day, under license between 1941 and 1944.⁹² The inability of the Finns to produce large aircraft engines led to some exercises in ingenuity to keep the force flying. A shortage of the Mercury engines used by the Blenheims and D XXIs was solved by modifying the D XXIs to take the 825 horsepower Pratt and Whitney Twin Wasp engines that could be imported from Sweden.⁹³

Finnish-German Cooperation

The Finnish and German air forces conducted combined operations on only a few occasions during the course of World War II. The war waged by the two nations was kept highly separate. In the far north, where the German army advanced on Murmansk, the air operations were conducted by the German Luftflotte 5 with its headquarters in Oslo, Norway. South of Finland, on the Baltic and on the Leningrad Front, the air operations were carried out by the German Luftflotte 1. The Finnish air force operated between the two German air fleets, mostly in southern Finland. Occasionally German and Finnish ground units were intermixed but, in general, it was truly a parallel war.

Marshal Mannerheim, the Finnish commander in chief, repeatedly requested *Luftwaffe* support for Finnish operations as the Finnish Air Force was usually overtasked with too few aircraft for too much front. However, the *Luftwaffe* was reluctant to provide support to the Finns because the German air fleets were also stretched thin. Reluctant support was provided by the *Luftwaffe* for the Finns only after intervention by Mannerheim at the top levels of the German command.⁹⁴ Indeed, the only liaison that existed between the two air forces was at the general staff level and no *Luftwaffe* liaison officers were assigned to the Finnish air groups or army corps. This practice of parallel war resulted in many lost opportunities for an effective use of airpower on the battlefield. One case of non-cooperation that infuriated Marshal Mannerheim was the *Luftwaffe's* refusal to interdict Russian forces retreating from the Finns by boat across Lake Ladoga in August 1941. The chance to destroy large Russian forces was passed up by the *Luftwaffe*.⁹⁵

In March 1942 the Finns mounted an air and ground operations to capture islands held by the Russians in the Gulf of Finland. Again, the Finns asked the *Luftwaffe* for air support and were denied. After Mannerheim intervened with the German headquarters some *Luftwaffe* assistance was finally provided and the Finnish offensive was successful.⁹⁶ One of the primary concerns of the Finnish Air Force was defense of the homeland from Soviet air attack. Helsinki and other Finnish cities had been heavily bombed during the Winter War and the Finns had made strengthening their air defenses a top priority after the conclusion of the first peace with Russia in 1940. The Finns



A Finnish Air Force Brewster in December 1941.

GENERAL LUNDQUIST ... WON A GERMAN COMMITMENT TO SUPPLY THE FINNS WITH RADAR AS WELL AS WITH ME 109G FIGHTER PLANES

THE FINNISH ME 109 SQUADRONS DESTROYED 663 SOVIET AIRCRAFT AGAINST COMBAT LOSSES OF 27 AIRCRAFT

acquired 700 anti-aircraft guns from Germany and built up their fighter force.⁹⁷ The Soviets were in no position to bomb the Finnish cities in 1941 but by 1942, a revitalized Soviet air force was able to mount increasingly larger bombing raids against Helsinki and other cities.⁹⁸ The Soviet air attacks were severe enough that Mannerheim appealed directly to Goering and the *Luftwaffe* staff for radar equipment to protect the Finnish cities.⁹⁹ The Finnish demand, coupled with a realistic fear that the Finnish resolve to continue the war was weakening, convinced the *Luftwaffe* to supply the necessary equipment to the Finns. The Finnish air force commander, General Lundquist, visited Goering and the *Luftwaffe* staff in Berlin in January 1943 and won a German commitment to supply the Finns with radar as well as with Me 109G fighter planes to replace the worn out and obsolete Brewster Buffaloes and Fokker fighters.¹⁰⁰

Between March 1943 and August 1944, the *Reichsluftministerium* sent 162 Me 109s to the Finnish Air Force, enough aircraft to fully equip more than two squadrons and assure replacement aircraft.¹⁰¹ Twenty-four Ju 88s were provided in 1943 to reequip the Finnish bomber units.¹⁰² The infusion of new material revitalized the Finnish Air Force, which was having an increasingly difficult time facing a larger and better-equipped Red Air Force with its collection of old Moranes, Fokkers and Brewsters. The combat record of the Finns as they faced overwhelming odds in 1943 and 1944 is impressive. The Finnish Me 109 squadrons destroyed 663 Soviet aircraft against combat losses of 27 aircraft.¹⁰³ Only in 1944 did the *Luftwaffe* make a significant attempt to support the hard-pressed Finnish air force. From June to August 1944 an experienced *Luftwaffe* ground attack force of 23 Ju 87s and 23 FW 190s was deployed to the Finnish front in Karelia to support the Finnish army which was facing a massive Soviet offensive. The *Luftwaffe*'s "Battle Group Kuhlmeier" provided valuable support to the Finns by interdicting and destroying whole Soviet motorized columns.¹⁰⁴ However, even at this late stage of German-Finnish relations the two air forces would not fly together. Only once did the Finns provide fighter cover for a *Luftwaffe* operation.¹⁰⁵ Yet, even successful air

operations could not hold off the Soviet ground forces and in September 1944 the Finns concluded a separate peace with the Russians and expelled the Germans from their country.

Hungary

After World War I, Hungary was virtually disarmed by the Allied powers and, like Germany, was not allowed to have an air force. However, during the 1920s, Hungary developed a small aircraft industry capable of producing light civilian aircraft and trainers. When Hungary began to rearm in the mid-1930s the government planned to build an air force by purchasing the best available foreign aircraft. An important consideration was the possibility of licensed aircraft production by Hungarian firms. A Hungarian Defense Ministry delegation visited the *Reichsluftministerium* in 1935 to discuss aircraft purchases. When the Germans offered to sell the Heinkel He 51 fighter, a thoroughly mediocre aircraft already being pulled from *Luftwaffe* service, the Hungarians sensibly declined. However, the Hungarians concluded a deal to buy 67 Junkers Ju 86 bombers—a good aircraft but also seen by the Germans as approaching obsolescence. Unhappy with the German Air Ministry's attitude towards sales, the Hungarians turned to Italy to obtain fighter planes. In 1936 the Royal Hungarian Air Force (RHAF) ordered more than 70 Fiat CR 32 biplane fighters. The CR 32 was a good aircraft for its time but, like the Ju 86, it was verging on obsolete when delivered.¹⁰⁶ Eager to build up their air force, the Hungarians bought a large number of short and long-range reconnaissance aircraft from Germany before the outbreak of the war. In 1936 the RHAF bought 36 Heinkel He 46 tactical reconnaissance planes. Some He 45 tactical observation biplanes and 18 Heinkel He 70 long-range reconnaissance aircraft were also ordered in 1936.¹⁰⁷ None of these aircraft were considered first-line *Luftwaffe* material when sold.

Faced with the German reluctance to sell current fighter and bomber models the RHAF turned to Italy. The RHAF began receiving the Fiat CR 42 fighter in 1939 and ordered 36 Caproni Ca 310 light bombers in 1938. Given the competition with Italy, in 1939 the German Air Ministry finally allowed the sale of more modern equipment to Hungary. The Hungarians ordered 16 Heinkel He 112 fighters and the defense ministry wanted to purchase the rights to manufacture the plane but the Germans declined the offer.¹⁰⁸ Again, Hungary turned to Italy in order to obtain a modern fighter for licensed production and in 1939 concluded a deal to buy 70 Reggiane RE 2000 fighters and to build the model in Hungary. Production of the Hungarian version, known as the *Heja* (Hawk) began late in 1941. The *Hejas* were adapted to take Hungarian-made K-14 Gnome-Rhone radial engines.¹⁰⁹ The RE 2000 was essentially an Italian copy of the American Seversky P-35 with a maximum speed of 329 mph and an armament of two

THE ME 109 AND ME 210 AGREEMENTS STIPULATED THAT MOST AIRCRAFT BUILT UNDER LICENSE IN HUNGARY WERE TO BE DELIVERED TO THE LUFTWAFFE

IN APRIL 1944, THE GERMANS OCCUPIED HUNGARY IN RESPONSE TO HUNGARIAN ATTEMPTS TO NEGOTIATE A SEPARATE PEACE

machine guns. By the standards of 1939 it was an acceptable combat plane but the *Heja* was limited by the light armament and the lack of engine power. None of the engines available to the Italians or Hungarians could provide more than 1,000 horsepower. By the time the *Heja* went into combat in 1941, it was underpowered and underarmed compared to the average contemporary fighter.¹¹⁰

The Manfred Weiss Company was the primary producer of aircraft in Hungary and during the 1930s the company obtained the rights to manufacture French Gnome-Rhone engines. The Hungarians developed and manufactured some light civilian aircraft as well as a few military aircraft. A series of trainers, including the *Levente*, a high-wing monoplane, was developed in Hungary but production capacity was very small and only 70-80 *Leventes* were built.¹¹¹ The only combat aircraft to be designed and manufactured in Hungary was the WM 21 reconnaissance plane/light bomber and the WM 21 was unimpressive even by the standards of the 1930s. The WM 21 was made by the Manfred Weiss Company in Budapest as well as the MAVAG (Hungarian Rail Coach and Machinery) factory in Gyor. Production of the WM 21 began in 1939 and 128 were delivered by 1942.¹¹² The Hungarian aircraft firms also modified foreign aircraft, such as the He 70, to take Hungarian-built engines.

When Hungary allied itself with Germany for the war against Russia, the Germans finally granted the Hungarians permission to build late-model *Luftwaffe* aircraft. In 1941 the Hungarians bought the rights to build the Focke Wulf FW 58 as a twin-engine bomber/trainer. The most important production agreements reached were licenses to build the Me 109 fighter and the Me 210 fighter-bomber. In 1941 the Hungarian defense ministry concluded a deal with the German air ministry to build the Me 109 at the MAVAG plant. At first the Hungarians would produce the fuselage and landing gear while the Germans provided engines, radios, armament and instruments and eventually all components of the Me 109 would be made in Hungary.¹¹³ In June the Hungarians agreed to build the Me 210, the *Luftwaffe's* replacement for the Me 110.¹¹⁴ The Me 109 and Me 210 agreements stipulated that most aircraft built under license in Hungary were to be delivered to the *Luftwaffe* with the Hungarians retaining approximately one-third of production for the RHAF. Other licensing agreements were concluded, including a program to build Ju 52 transports at the PIRT factory in Budapest.¹¹⁵ Me 109 production began in late 1942 and by late 1944 approximately 800 had been built in Hungary although production was disrupted by U.S. AAF bombing raids in 1944. In addition to the Me 109, the Hungarian firms built 27 Ju 52s, 271 Me 210s and 70 FW 58 trainers.¹¹⁶ Total production of Hungarian and licensed foreign aircraft during the war was 1,556. It took a long time for Hungary to achieve serial production of any aircraft. Of the military aircraft produced, 960 were

manufactured in 1944: 213 Me 210s, 720 Me 109s, and 27 Ju 52s.

Given its small size and lack of experience at the start of the war, the Hungarian aircraft industry did a credible job of producing airplanes from 1941 to 1944. The Hungarians built 128 WM 21 reconnaissance bombers and 87 indigenous trainers during the war and 180 RE 2000s in 1942-1943 although there were constant production problems. For example, due to the difficulty of redesigning the RE 2000 to accept Hungarian engines and adapting an Italian design for Hungarian-made, guns, radios and landing gear, the first *Heja* did not come off the assembly line until three years after the licensing agreement had been ratified.¹¹⁷ By the time the *Hejas* were in full production, the aircraft was already obsolete.

During 1941, the RHAF's primary mission was to support the army corps that Hungary committed to the Russian campaign. With its RE 2000 and Fiat CR 42 fighters, W 21 reconnaissance planes and its Ju 86 and Ca 135 bombers, it was a weak and obsolete force. However, the RHAF performed adequately in the first year of the war as the Soviet Air Force also had mostly obsolete aircraft and in 1941 the RHAF managed to shoot down most of the Soviet aircraft that it encountered.

After the start of the war, the RHAF received a few modern German aircraft such as Do 17 bombers and He 111s for long-range reconnaissance. In 1942 the air battle intensified when the Hungarians committed their Second Army to the campaign in Southern Russia. By late 1942, the RHAF no longer faced a weak Soviet air force. With the enemy air force growing stronger, re-equipping the RHAF became an urgent matter. During 1943 the RHAF received JU 87s, Me 109s and Ju 88s from Germany and was able to send its surviving WM 21s, CR 42s and *Hejas* back to Hungary to serve as trainers or in the air defense role. By the Spring of 1944 the American bombing offensive reached Hungary and the RHAF did what it could to oppose the American onslaught. Me 109s, Me 210s and even the hopelessly obsolete *Hejas* were thrown into the battle against the U.S. bombers and their escorts.¹¹⁸

The last stages of the war were a hopeless struggle for the RHAF. In April 1944, the Germans occupied Hungary in response to Hungarian attempts to negotiate a separate peace. The RHAF came under German command for the rest of the war and was quickly decimated in the attrition battle against the U.S. bomber offensive. The attrition was far worse than had been experienced in the worst days in Russia. On one day in June, 1944 28 RHAF fighters attacked the U.S. bombers and escorts for the loss of 13 fighters and five pilots killed.¹¹⁹ In the end, there was little that the RHAF could do. By late 1944, it was an ineffectual force.

Conclusion

The *Luftwaffe's* relationship with its coalition allies illustrates the lack of any coherent strategic

Milch and Valle in Berlin during the summer of 1939.



GERMANY'S ALLIES HAD A CONSIDERABLE POTENTIAL FOR AIRCRAFT PRODUCTION THAT THE LUFTWAFFE ... NEVER SERIOUSLY CONSIDERED USING

GERMANY'S ALLIED AIR FORCES CONSISTENTLY FOUGHT WELL

vision or ability to plan for a long war. All of Germany's allied air forces performed well with the resources they had, although they entered into the war with air forces composed of mostly obsolete aircraft and weak infrastructures. For Finland, Hungary and Rumania, flying on the Eastern Front, their generally obsolete aircraft sufficed for the first year and a half of the Russian campaign when the Red Air Force was weak. The Italian Air Force, flying mostly in the Mediterranean, was outclassed from the start. In 1941, the *Luftwaffe* took over the brunt of the air war in that theater and the large, but poorly-equipped *Regia Aeronautica*, was generally relegated to secondary missions.

Germany's allies had a considerable potential for aircraft production that the *Luftwaffe* high command never seriously considered using. Rumania produced fewer than 1,000 aircraft from 1941-1944 and its primary aircraft factory was underutilized. Italy, which started the war with one of the world's largest air forces, produced only 13,253 aircraft from 1939-1943.¹²⁰ In its best year, 1941, the Italians managed to manufacture only 3,503 aircraft—about what the British aviation industry could make in a month.¹²¹ The problem for all of Germany's allies was a lack of machine tools and technical assistance. The Italian, Rumanian and Hungarian programs to license-build German engines were slow to get started and suffered from low production due to a lack of machine tools, capital and technical assistance—all things that the German Air Ministry could have provided fairly easily. By means of comparison, one can look at Canada's aircraft production during World War II. In 1939 Canada had a minuscule aircraft industry which produced 60 light military aircraft that year. With a massive infusion of British and American capital and technical assistance, Canada became a major aircraft producer by 1942 when 3,622 aircraft were manufactured (more than Italy that year). The Canadian aircraft companies mass-produced a variety of American and British aircraft to include thousands of trainers but also Lancaster and Mosquito bombers, Hurricane fighters and Helldivers for the U.S. Navy. In 1939, Canada had no means to produce large aircraft engines, propellers or instruments. By the middle of the war, aircraft built in Canada had all Canadian manu-

factured components. Canadian military aircraft production from 1939 to 1945 totaled 15,828.¹²² Rumania and Italy both started the war with larger aircraft industries than Canada. With a small amount of German assistance, those countries could have easily doubled or tripled their aircraft production.

It is notable that the *Luftwaffe* paid little attention to the state of its allied air forces before 1942 and 1943 when the war situation began to obviously deteriorate. Licensing agreements were finally forthcoming but had little effect. Only in 1943 when the political will of its allies started to collapse did the *Luftwaffe* find supplies of modern aircraft to ship to its allies. As with the licensing agreements, the shipments of Me 109s and Ju 88s to allied nations were too small and applied too late to reverse the downward trend.

Germany's allied air forces consistently fought well. Rumanian units flew direct support for the German army and Hungarian and Rumanian air force units aggressively defended their homeland against Allied bombers. The Finns put up probably the best sustained performance of any small air force in history. Armed with a small number of mostly obsolete aircraft, the Finns accounted for thousands of Soviet aircraft. Even the Italian air force did well considering its equipment and infrastructure. The German Air Ministry's relationship with its allied air forces illustrates the "short war" mentality that prevailed in the German leadership until the debacle at Stalingrad. The relationship with the German allies indicates that the *Luftwaffe* leadership was obsessed with fighting a "war on the cheap". Actions such as selling obsolete captured aircraft to German allies for a high price as well as a reluctance to share technology such as radar contributed to an attitude of distrust among Germany's partners. Reichsmarshal Goering and State Secretary Erhard Milch seem to have been oblivious to any requirement to maintain cordial relations with coalition partners. This level of distrust helped push Germany's allies into maintaining production lines of locally-designed aircraft or obsolete licensed aircraft rather than accept too much German control or influence in their defense industries.

The *Luftwaffe*'s greatest problem from 1941 on was a severe shortage of pilots. Although Germany's coalition partners represented a reserve of thousands of trained pilots, the Reichsluftministerium demonstrated little interest in exploiting this valuable resource. If coalition air forces had been equipped with first line German equipment early in the war, it would have made a major difference in the Mediterranean and Russian theaters. One need only to look at the very effective use of aviation manpower of the Western powers in which Free French and Polish pilots along with thousands of British Commonwealth pilots were organized into units and flew into battle with the first rate British and Americans equipment.

In summary, the relationship of the *Luftwaffe* with Germany's coalition partners indicates not

only the lack of a strategic vision in the *Luftwaffe's* senior leadership but also a lack of understanding of basic economics. The *Luftwaffe's* operational commanders at the front, men like Speidel and von Richthofen, consistently argued for better relations with Germany's partners. The Air Ministry was urged to consider purchases of suitable foreign aircraft, such as some Italian aircraft that met *Luftwaffe* requirements admirably,

and to provide more support to the coalition partners in the form of equipment and infrastructure. The *Luftwaffe's* senior leadership repeatedly ignored such advice. In ignoring the combat potential of its allied air forces, the German Air Ministry committed a huge strategic error. Given the nature of the Nazi regime and mentality, it was a case of arrogance and ideology that overrode common sense. ■

VON
RICHTHOFEN,
CONSIS-
TENTLY
ARGUED FOR
BETTER
RELATIONS
WITH
GERMANY'S
PARTNERS ...
THE
LUFTWAFFES
SENIOR
LEADERSHIP
REPEATEDLY
IGNORED
SUCH ADVICE

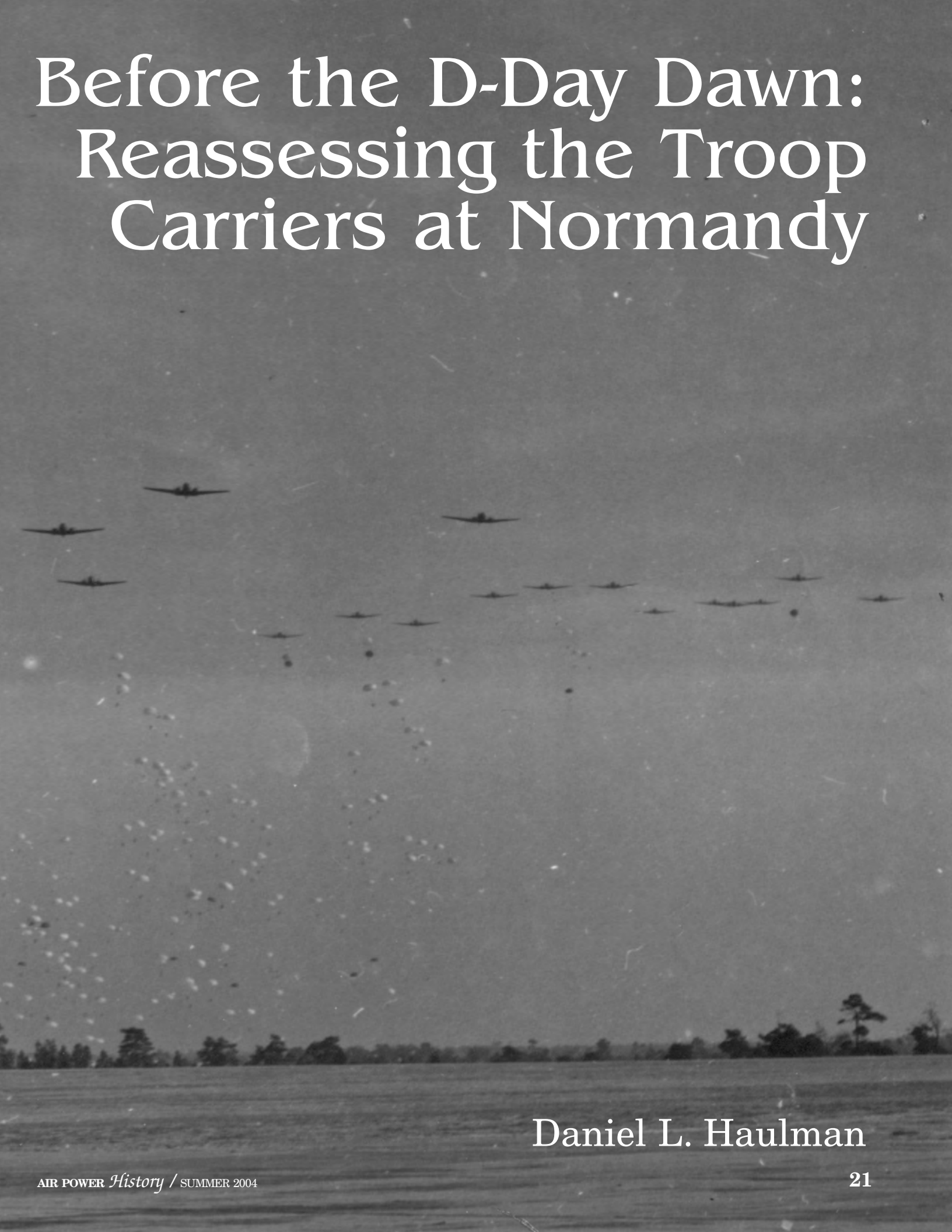
NOTES

1. Mark Conversino, *Fighting with the Soviets*, (Lawrence, Kans.: University Press of Kansas, 1996). Henry Probert, *The Forgotten Air War*, (Washington, D.C.: Brassey's, 1994).
2. For the best general overview of the *Luftwaffe's* relations with its allies see R.J. Overy, "The *Luftwaffe* and the European Economy 1939-1945" *Militärgeschichtliches Mitteilungen*, No. 21 (1979), 55-78. This article provides information about the aircraft production of Germany's allies. However, the main thrust of the article is about the *Luftwaffe's* use of captured industrial assets. Another useful article on this subject is Richard DiNardo, "The Dysfunctional Coalition: The Axis Powers and the Eastern Front in World War II," *Journal of Military History* (Oct. 1996), 711-30. DiNardo discusses the German coalition command relationships in detail but his emphasis is on ground operations.
3. Hans-Georg Model, *Der deutsche Generalstabsoffizier*, (Frankfurt a.M.: Bernard und Graefe Verlag, 1968), pp. 105-7.
4. See James Corum, *The Luftwaffe: Creating the Operational Air War 1918-1940*, (Lawrence, Kans.: University Press of Kansas, 1997), pp. 253-54.
5. On German-Hungarian economic relations see Mario Fenyo, *Hitler, Horthy and Hungary: German Hungarian Relations, 1941-1944*, (New Haven, Conn.: Yale University Press, 1972) 93-95. In 1937 Hungary produced 13.3 % of the world's bauxite and in 1942 exported 962,123 tons to Germany. See Fenyo, p. 92.
6. For a good overview of the Mitteleuropa concept and German strategy see Gerhard Schreiber, "Political and Military Developments in the Mediterranean Area, 1939-1940", 5-302 and "Germany, Italy and South-East Europe: From Political and Economic hegemony to Military Aggression", 302-448 in *Germany and the Second World War*, vol. 3, ed. Militärgeschichtliches Forschungsamt, (Oxford: Clarendon Press, 1995). The influence of Germany on the Hungarian economy grew steadily through the 1930s. In 1937 54% of Hungary's exports went to Germany, Austria, and Italy. By 1939 the percentage of both imports and exports to Germany exceeded fifty percent. See Fenyo p. 82.
7. See Martin Thomas, "To Arm an Ally: French Arms Sales to Romania, 1926-1940," *Journal of Strategic Studies*, vol. 19, no. 2 (June 1996) 231-59.
8. Maj. Gen Burkhardt Mueller-Hillebrand, *Germany and Her Allies in World War II: A Record of Axis Collaboration Problems*, parts I and II, Historical Division, U.S. Army Europe (1954). reprinted in *World War II German Military Studies*, vol. 20, (New York: Garland Publishing, 1979), part I, p. 102.
9. On the German Air Ministry policy of restricting sales to the Central European nations, see Edward Homze, *Arming the Luftwaffe*, (Lincoln, Neb.: University of Nebraska Press, 1976), pp. 205-8.
10. William Green, *Warplanes of the Third Reich*, (New York: Galahad Books, 1970), p. 271.
11. *Ibid.*, p. 314.
12. Mark Axworthy, "On Three Fronts: Rumania's Aircraft Industry During World War II," *Air Enthusiast*, Issue 56 (Winter 1994) 15.
13. Walter Ansel, *Hitler and the Middle Sea*, (Durham, NC: Duke University Press, 1972), p. 14.
14. A good overview of the command arrangements in the Mediterranean is found in Gen. Hellmuth Felmy, *Die Deutsche Luftwaffe auf dem Mittelmeer-Kriegsschauplatz*, in US Air Force Historical Research Agency Doc. K 113.106-161 (1956).
15. See Malcolm Muggeridge, ed., "Conversation with Foreign Minister Ribbentrop, 2 June 1941" in *Ciano's Diplomatic Papers*, (London: Odhams Press, 1948), pp. 441-42.
16. Maj. Gen Burkhardt Mueller-Hillebrand, *Germany and Her Allies in World War II*, part I, p. 114.
17. For a good overview of the state of the Italian armed forces in 1939-1940, see MacGregor Knox, "The Italian Armed Forces, 1940-3," in *Military Effectiveness*, vol. 3, eds. Allan Millet and Williamson Murray, (Boston, Mass.: Unwin-Hyman, 1988), pp. 136-79.
18. Schreiber, p. 83.
19. Jonathan Thompson, *Italian Civil and Military Aircraft 1930-1945*, (Los Angeles, Calif.: Aero Publishers, 1963), p. 150.
20. *Ibid.*, p. 149.
21. *Ibid.*, pp. 167-69, 183-84.
22. *Ibid.*, p. 271.
23. The Italians sent 80 BR 20 bombers to Belgium in 1940 to take part in the Battle of Britain. In fewer than 300 hours of combat missions, the Italian air corps lost more than 20 BR 20s. Its slow speed and poor armament made it very easy prey for defending British fighters and flak. See Enzi Angelica and Paolo Matricardi, *Combat Aircraft of World War II 1938-1939*, (New York: Orion Books, 1987) p. 38.
24. *Ibid.*, pp. 265-69.
25. C.G. Grey and Leonard Bridgman, eds. *Jane's All the World's Aircraft 1940*, (London: Low Marston and Co., 1941).
26. Philip Jarrett, ed., *Aircraft of the Second World War: The Development of the Warplane 1939-1945*, (London: Putnam Aeronautical Books, 1997) pp. 19-20.
27. *Ibid.*, p. 19.
28. Thompson, p. 38.
29. Peter Smith, *Into the Assault*, (Seattle, Wash.: University of Washington Press, 1985) p. 65.
30. Schreiber, p. 82.
31. Chef des Generalstab der *Luftwaffe*, *Gedanken zur Luftlage in Europe* (early 1939), in US Air Force Historical Research Agency K113.3111, vol. II, p. 34.
32. *Ibid.*
33. Bernd Stegemann, "The Italian-German Conduct of the War in the Mediterranean and North Africa," in *Germany and the Second World War*, vol. II, ed. Militärgeschichtliches Forschungsamt, (Oxford: Clarendon Press, 1995) p. 646.
34. Stegemann, p. 688.

35. *Ibid.*, p. 659.
36. Mueller-Hillebrand, part II, pp. 35-36.
37. The best overview of German and Italian air operations in the Mediterranean is Karl Gundelach, *Die deutsche Luftwaffe im Mittelmeer 1940-1945*, Vols. 1 and 2, (Frankfurt a.M.: Peter Lang, 1981).
38. Peter Smith, *The Stuka at War*, (New York: Arco Publishing, 1971), pp. 80-82.
39. Mueller-Hillebrand, pp. 68-69.
40. The Macchi MC 202 had a top speed of 372 mph. and was highly maneuverable. See Enzo Angelucci and Paolo Matricardi, *Combat Aircraft of World War II 1940-1941*, vol. IV, (New York: Orion Books, 1988), p. 56.
41. General Paul Deichmann, ed. *Die deutsche Luftwaffe in Italien*, Monograph, April 1956. U.S. Air Force Historical Research Agency Doc. K113.310-8 1943-1945 Kapitel 1, 25.
42. *Ibid.*, part II, p. 7.
43. Thompson, p. 299.
44. Mueller-Hillebrand, part II, p. 35.
45. *Ibid.*, pp. 35-36
46. Lucio Ceva and Andrea Curami, "Luftstreitkräfte und Luftfahrtindustrie in Italien, 1936-1943," in *Luftkriegführung im Zweiten Weltkrieg*, ed. Horst Boog, (Herford: E.S. Mittler, 1993), pp. 113-36.
47. Philip Jarrett, ed., *Aircraft of the Second World War: The Development of the Warplane 1939-45*, (London: Putnam Aeronautical Books, 1997), p. 21.
48. William Green, *Famous Fighters of the Second World War*, vol. II, (Garden City, NJ: Doubleday, 1962), p. 54.
49. *Ibid.*, p. 57.
50. *Ibid.*
51. Enzo Angelucci and Paolo Matricardi, *Combat Aircraft of World War II 1940-1941*, vol. IV, p. 56.
52. William Green, *Famous Fighters of the Second World War*, vol. II, p. 59.
53. *Ibid.*, p. 58.
54. *Ibid.*
55. *Ibid.*, p. 59.
56. Generalluftzeugmeister, *Amtscheftsbesprechung* (13 April 1943), in US Air Force Historical Research Agency K 113.82, vol. III, 4. On the Caproni Ca 310 see also David Donald, ed., *The Complete Encyclopedia of World Aircraft*, (New York: Barnes and Noble, 1997), pp. 231-32.
57. Donald, 231-232.
58. GL, *Amtsbesprechung* (18 January 1944), in US Air Force Historical Research Agency K113.82, vol. III, 3.
59. *Ibid.*
60. Alfred Price, *The Luftwaffe Data Book*, (London: Greenhill Books, 1997), pp. 127-28.
61. For the best overview of the Rumanian aircraft industry, see Mark Axworthy, "On Three Fronts," pp. 8, 9.
62. *Ibid.*, pp. 10-11, 21-22.
63. *Ibid.*, pp. 114-20.
64. Martin Thomas, "To Arm an Ally: French Arms Sales to Rumania, 1926-1940," *Journal of Strategic Studies* (June 1996) p. 252.
65. General der Flieger a.d. Hellmuth Felmy, *Die Deutsche Luftwaffe auf dem Mittelmeer-Kriegsschauplatz* (1956), in US Air Force Historical Research Agency K 113.106-161, 36.
66. *Ibid.*
67. Mueller-Hillebrand, part II, p. 169.
68. *Ibid.*, p. 164.
69. Joel Hayward: *Stopped at Stalingrad: The Luftwaffe and Hitler's Defeat in the East, 1942-1943*, (Lawrence, Kans.:University Press of Kansas, 1998), p. 248.
70. See Bezv. Kuban, *Erfolge der Luftwaffengruppe Kaukasus* (25 November 1942 to 6 February 1943), in BA/MA RL 8/59.
71. For a history of this subject see J.L. Roba and C. Craciunoiu, *Seaplanes Over the Black Sea: German-Romanian Operations 1941-1944*, (Bucharest: Editura Modelism, 1995).
72. *Ibid.*, pp. 9,20.
73. *Ibid.*, p. 14.
74. *Ibid.*, p. 12.
75. *Ibid.*, p. 15.
76. William Green, *Warplanes of the Third Reich*, p. 432.
77. Lt. Gen. Speidel, *Letter to General Luftzeugmeister* (5 July 1941), in NARA T 405, Reel 49.
78. Reichsmarschal Goering, *Letter to Lt. Gen. Speidel* (13 May 1942), in NARA T 405, Reel 55.
79. Green, *Warplanes of the Third Reich*, pp. 548 and 565.
80. Mark Axworthy, "On Three Fronts," p. 14.
81. Green, pp. 439, 565.
82. Richard Watt, *The Kings Depart*, (New York: Simon and Schuster, 1968), p. 381.
83. Christopher Shores, *The Finnish Air Force 1918-1968*, (New York: Arco Press, 1969), pp. 5-6.
84. *Ibid.*, p. 7.
85. *Ibid.*, p. 2.
86. Kalevi Keskinen, Kari Stenman et al., *Suomen Ilmavoimien Lentokoneet 1939-72*, (Helsinki: Tietoteos, 1975), pp. 117-19.
87. Shores, pp. 11-14.
88. Ing. E. Wegelius, "Entwicklung von Schichtholz-Luftschrauben in Finnland," in *Deutsche Luftwacht; Luftwesen*, Band 10 (October 1943) pp. 273-79.
89. *Ibid.*, p. 9.
90. Kalevi Keskinen, et al, p. 199.
91. *Ibid.*, 117.
92. Shores, p. 8.
93. Kalevi Keskinen, et al., p. 118.
94. Shores, 8.
95. Mueller-Hillebrand, part II, pp. 113-14.
96. *Ibid.*, p. 114.
97. *Ibid.*, pp. 114-15.
98. The Germans sold the Finns 700 Bofors 37mm anti-aircraft guns that they had captured from the Poles in the 1939 campaign. See Mueller-Hillebrand, part II, p. 110.
99. Waldemar Erfurt, *Der Finnische Krieg 1941-1944*, (Wiesbaden: Limes Verlag, 1950), p. 104-105.
100. *Ibid.*, p. 134.
101. *Ibid.*, p. 147.
102. Kalevi Keskinen, et al., p. 117.
103. *Ibid.*, p. 118.
104. Kari Stenman, "Finland's Front Line," in *Air Enthusiast*, Issue 50 (1993), p. 59.
105. Kari Stenman, "The Short Saga of Battle Unit Kuhlmei," *Air Enthusiast*, Issue 37 (1987), pp. 1-6.
106. *Ibid.*, pp. 5-6.
107. George Punka, *Hungarian Air Force*, (Carrolton, Texas: Squadron/Signal Publications, 1994), pp. 20, 35.
108. *Ibid.*, pp. 44 and 48-49.
109. *Ibid.*, pp. 20-21.
110. William Green and Gordon Swanborough, "RE 2000: The State of the Art Reggiane," in *Air Enthusiast*, Issue 41 (1989), pp. 54-69. See also Chris Szabo, "Hungary's Hawk: The Story of the Heja Fighter," *Air Enthusiast*, Issue 71 (Sept./Oct. 1997), pp. 36-41.
111. Green and Swanborough, pp. 55-66.
112. Punka, p. 54.
113. *Ibid.*, pp. 48-49.
114. *Ibid.*, pp. 21-22.
115. *Ibid.*, p. 41.
116. *Ibid.*, p. 61.
117. Figures from George Punka, *Hungarian Air Force*.
118. *Ibid.*, pp. 67-68
119. Chris Szabo, "Hungary's Hawk," p. 41.
120. Punka, p.15.
121. Schreiber, p. 82.
122. *Ibid.* See also R. J. Overy, *The Air War 1939-1945*, (Chelsea, MI: Scarborough House, 1980), pp. 40-42.
123. Figures drawn from K.M. Molson and H.A. Taylor, *Canadian Aircraft Since 1909*, (London: Putnam, 1982).



Before the D-Day Dawn: Reassessing the Troop Carriers at Normandy



Daniel L. Haulman

(Overleaf) 53d Troop Carrier Wing-Troop Carrier Airborne Maneuver, December 1943. (All photos courtesy of the author.)

820 C-47 TROOP CARRIER AIRPLANES DROPPED MORE THAN 13,000 U.S. PARATROOPS OF THE 82D AND 101ST AIRBORNE DIVISIONS

The first invaders of Normandy, on June 6, 1944, did not arrive by sea during the day but by air at night. Part of Operation Neptune, the channel-crossing phase of the larger Operation Overlord, some 820 C-47 troop carrier airplanes dropped more than 13,000 U.S. paratroops of the 82d and 101st Airborne Divisions on the Cotentin Peninsula. Their mission was to strike the German Utah beach defenses from the rear, block enemy counterattacks on the beachhead, take key communication centers, and seize bridges and causeways over rivers and marshes. Approximately 100 additional C-47s dropped gliders laden with more troops and equipment before the first amphibious forces landed.¹

How well did the pre-dawn troop carriers do? The common impression is that they did very poorly.² The troops seemed to have been scattered all over the peninsula. In this paper, I want to explore that impression and raise some other questions. Why were the troops so separated from each other? Just how scattered were the drops after all? Were there other reasons the airborne divisions took so long to assemble? In short, has history been fair to the troop carrier pilots?

There were eight primary reasons the airborne troops were scattered. First of all, the paratroopers and some of the gliders dropped at night. There were no night vision goggles in 1944. Darkness obscured the visibility of key landmarks. However skilled the pilots and navigators, they could not manufacture the light needed to see what they were looking for. They had to depend on what little moonlight was available and a few lights set up on the ground by pathfinders. Besides that, they had only the light from enemy anti-aircraft artillery fire and from the crashes of their burning comrades. Some of the pilots mistook flooded fields on the Cotentin peninsula as the English Channel and dropped their troops too early. Others waited too long and dropped their paratroopers into the English Channel because they could not see they had re-crossed the coast.³

Secondly, there were unexpected clouds. As most of the troop carrier airplanes crossed the coast of France, they entered a thick cloudbank. To avoid colliding in the haze, the pilots instinctively spread out the tight nine-plane V formations into which they had been packed, the ones on the left going farther left and the ones on the right going

Pathfinder equipment, Troop Carrier-Airborne Maneuver, December 1943.



THE PARATROOPERS AND SOME OF THE GLIDERS DROPPED AT NIGHT ... THERE WERE UNEXPECTED CLOUDS

Dr. Daniel L. Haulman is a historian at the Air Force Historical Research Agency, at Maxwell AFB, Alabama, where he has worked since 1982. He earned his Ph.D. in history from Auburn University in 1983 after earning previous degrees from the University of Southwestern Louisiana and the University of New Orleans. In the course of his degree work, he taught high school history for five years. Since 1982, Dr. Haulman has taught several history courses as an adjunct professor at Huntingdon College, Auburn University in Montgomery, and Faulkner University. He is the author of two books, four Air Force pamphlets, and ten published historical articles and has presented papers at twelve historical conferences.



THERE WAS HEAVY FLAK ... THE DISPERSAL WAS [CAUSED BY] THE LACK OF NAVIGATION EQUIPMENT

farther right. Some of the airplanes climbed and others descended. By the time the airplanes emerged from the clouds, some seven minutes later, they were too far apart to see each other in the darkness. They could no longer use each other to determine where and when to drop.⁴

Thirdly, there was heavy flak, especially for later formations. The Germans threw up tremendous amounts of antiaircraft fire when they heard the hundreds of aircraft flying just a few hundred feet overhead. Searchlights and tracers illuminated the sky, further blinding the pilots and illuminating airplanes no longer obscured by clouds. Three quarters of the troop carrier pilots had never been under fire before. Many instinctively changed course, going to the right or left, climbing or descending. Some C-47 pilots, to avoid being hit, increased speed more than 50 knots over the 100 knots prescribed for the drops.⁵ Despite these maneuvers, many C-47s fell to flak, although not as many as British Air Marshal Sir Trafford Leigh-Mallory had predicted.⁶ Of the troop carrier airplanes that were shot down before dawn on D-Day, the great majority unloaded their paratroopers before crashing.⁷ Their pilots were determined to keep their planes level as long as possible. 450 of the troop carrier planes returned with damage, and 41 failed to return.⁸

A fourth reason for the dispersal was the lack of navigation equipment aboard most of the airplanes. Only the lead airplanes of each formation or serial carried a navigator or the navigation equipment needed to find the drop and glider landing zones. Only two of every five troop carrier airplanes in Operation NEPTUNE carried navigators. Planners did not want to overload the Eureka-Rebecca systems that depended on bea-

cons set up by the pathfinders on the ground, so they limited their use. Only a small minority of the airplanes had special navigation equipment such as GEE, which relied for guidance on radio beams transmitted from ground stations.⁹ The great majority of the troop carrier pilots depended on seeing neighboring airplanes, but those airplanes, despite their zebra stripes, were no longer visible because darkness, clouds, blinding air defenses, and the breakup of the formations. Left without their visual guides, most of the pilots dropped by estimating how far they had gone in a given time since crossing the French coast.¹⁰ It is no wonder that they were often wrong. A few airplanes that had sped up because of flak found themselves over the English Channel on the other side of the peninsula when their heavily laden troops dropped.¹¹

Fifthly, many pilots expected to see lighted tees on the ground that the pathfinders were supposed to have set up. Many of the tees did not appear because enemy troops were nearby. Illuminating the tees would have given away the pathfinder positions and alerted the Germans as to where the drop zones were. To avoid ambushes, some of the pathfinders did not illuminate their tees.¹²

The fact that many of the pathfinders themselves had landed in the wrong place was a sixth reason for the scattered drops. Although they were the most experienced of the paratroops, the combination of darkness, clouds, and flak had also put them off course. Even if the troop carriers that followed the pathfinders had flown precisely, they might have dropped in error because the pathfinders on whom they guided were in error in many cases. Only 38 of the 120 pathfinders landed directly on their targets, and they had less than an

MANY PILOTS EXPECTED TO SEE LIGHTED TEES ON THE GROUND ... THE PATHFINDERS THEMSELVES HAD LANDED IN THE WRONG PLACE

Paratroops board a 53d Troop Carrier Wing C-47 during practice maneuvers in late 1943.



ORDERS COMMANDING RADIO SILENCE FURNISHED A SEVENTH REASON FOR THE SCATTERED DROPS

hour to reach the proper zones to mark before the arrival of the bulk of the troop carriers.¹³ "The blind could not lead the blind."

Orders commanding radio silence furnished a seventh reason for the scattered drops. To preserve the element of surprise, pilots were ordered to stay off the radio. If the troop carrier pilots had been able to communicate with each other, they might have been able to reestablish their formations or at least let each other know when they were dropping so that they could drop together.¹⁴

An eighth reason the paratroop drops were so scattered was the wind. Part of the same front that delayed the D-Day operation brought with it high

wind from the northwest. This wind, often more than 20 knots, pushed the C-47s faster than they were supposed to go and sometimes diverted them from the prescribed route. Pilots moving faster than they intended because of the wind sometimes dropped their paratroopers beyond the intended drop zones if they were dropping a set number of minutes after crossing the coast. The same wind would later affect the paratroopers themselves.¹⁵

Paratroopers who took very long to assemble naturally blamed the troop carriers for scattering them badly. Of course, the more separated the paratroops were on landing, the longer it took them to gather into effective fighting units. By

Paratroops on June 5, 1944.



THE D-DAY OPERATION BROUGHT WITH IT HIGH WIND

Paratroop practice for D-Day, March, 1944.



**GENERAL
MAXWELL
TAYLOR ...
REMARKED,
"NEVER
WERE SO
FEW LED BY
SO MANY"**

dawn of June 6, only about one-sixth of the 101st Airborne Division had assembled.¹⁶ General Maxwell Taylor, 101st Division commander, was able to gather only his staff and a few lower-ranking soldiers at first. He remarked, "Never were so few led by so many."¹⁷ Both the 82d and 101st Airborne Divisions took about three days to fully unite. By midnight of D-day, only some 4,500 of the 13,000 airborne troops had concentrated.¹⁸

How much were the troops really scattered? According to official records in a study by Dr. John Warren, 35 to 40 percent of the paratroops landed within a mile of their intended drop zones. More than half the paratroopers landed within two

miles of their zones, and eighty percent within five miles. If the paratroopers had been able to travel even one mile per hour toward their objectives, eighty percent of them would have reached those objectives in the six hours they had between the drops and H-Hour at 0630.¹⁹

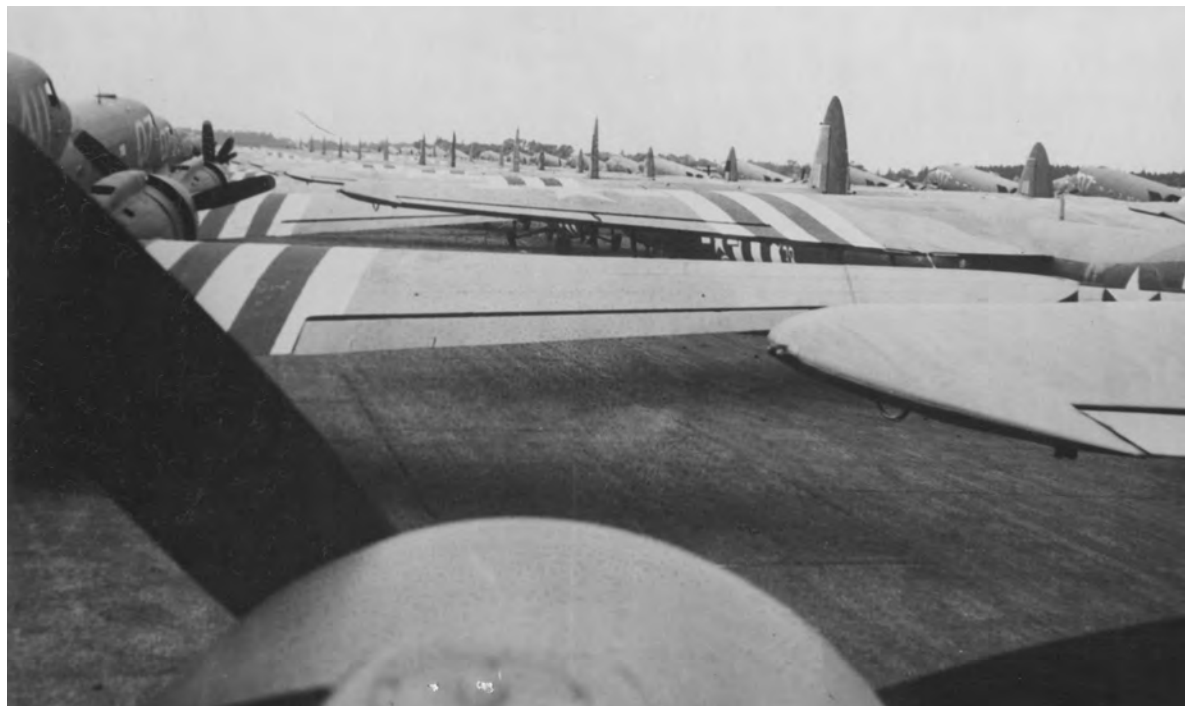
Intelligence officers calculated that 74 percent of the 216 airplanes in the first D-Day mission dropped accurately.²⁰ The 435th Troop Carrier Group dispatched 45 C-47s for the paratroop drops. Intelligence officers later estimated that at least 37 of the airplanes dropped within two miles of the drop zone and 25 transports dropped within one mile. The 435th lost only three transports on

Maneuvers of combined British and American airborne forces, March, 1944.



**35 TO 40
PERCENT OF
THE
PARATROOPS
LANDED
WITHIN A
MILE OF
THEIR
INTENDED
DROP ZONES**

Scores of C-47s and gliders, loaded with airborne infantrymen, are shown marshaled on a Ninth Troop Carrier Command field shortly before takeoff to Normandy.



A GREAT DEAL OF THE TERRITORY WAS FLOODED

the mission.²¹ Of the 2d battalion of the 505th Parachute Infantry Regiment, 27 of 36 sticks either hit their designated drop zone or landed within a mile of it.²² Both the division commanders, General Matthew Ridgway and General Taylor, landed so close to the places where they were to set up their headquarters that they were well in place by dawn.²³ Brig. Gen. James M. Gavin, commanding a regiment of the 82d Airborne Division, remarked in a June 9 letter of thanks to the 50th Troop Carrier Wing commander: “every effort was made for an exact and precise delivery as planned. In most cases this was successful.”²⁴ Brig. Gen. Paul L. Williams, com-

mander of the IX Troop Carrier Command, commended his three wing commanders for “the very high degree of efficiency exhibited in this operation.”²⁵

In the face of all this evidence, how do we account for the impression that the troop carriers did a poor job?²⁶ If the drops were more accurate than many veterans remembered, why did the paratroopers take so long to assemble? Were there any other reasons besides the scattered drops that contributed to the failure of the troops to unite quickly? I want to suggest eight other reasons.

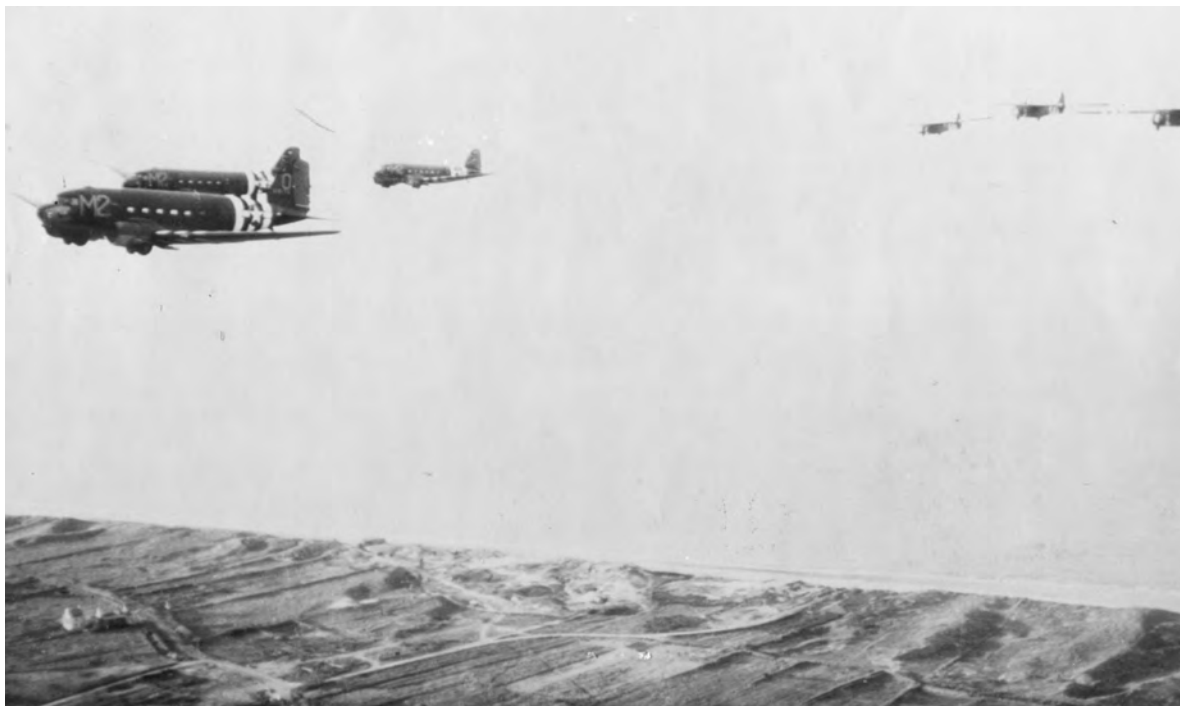
First there was the terrible terrain. A great deal of the territory was flooded. The dry land was com-

Gliders of the Ninth Troop Carrier Command speckle the Normandy landscape on D-Day. Many have landed, with more coasting toward the ground.



OPEN GROUND WAS OFTEN STUDDED WITH ENEMY OBSTACLES

Gliders, packed with American infantry troops, and towed by C-47s of the Ninth Troop Carrier command have reached French soil where earlier in the day American paratroops had landed.



A SECOND REASON THE PARATROOPERS DID NOT ASSEMBLE RAPIDLY AFTER LANDING WAS ENEMY FIRE

partmentalized by hedgerows with imbedded trees. Open ground was often studded with enemy obstacles to discourage glider landings. Even if the troop carriers had dropped precisely, the paratroops and glider troops would have had difficulty assembling rapidly because of the need to cross hedgerows, swamps, and obstacles.²⁷ Even for the minority of paratroops who landed where they were supposed to, gathering into effective fighting units was a challenge. What they found on the ground was not always what they expected to find. The location of landmarks did not always match the maps. Troops were often confused because so many of the hedgerows, fields, and swamps looked alike. In the largely flat country, they had difficulty telling one from another.

DARKNESS WAS A ... MAJOR FACTOR

A second reason the paratroopers did not assemble rapidly after landing was enemy fire. No less than three German divisions occupied the Cotentin peninsula, outnumbering the airborne troops by at least three to one in the predawn hours of D-day.²⁸ The Germans had heavy artillery and tanks not immediately available to the paratroopers. One of the divisions lay in the immediate vicinity of the drops, and individual paratroopers often landed among enemy troops. Even if the paratroopers had known exactly where to go to assemble, obstacles much more dangerous than hedgerows and swamps lay in their paths.

A SHORTAGE OF RADIOS FOR COMMUNICATION ... DELAYED TROOP ASSEMBLY

Darkness was a third major factor delaying troop assembly on the ground. Members of the 82d and 101st Airborne Divisions used a variety of sound and light devices and passwords to identify each other because they could not easily see each other in the night.²⁹ The same darkness that contributed to the inability of troop carrier pilots to see their proper drop zones also prevented paratroops from seeing each other. Daylight would have accelerated assembly considerably. Not only

could the troops not see each other very well, they could also not see landmarks very well.

A fourth factor was drowsiness. The paratroops were tired. They had been waiting for the operation to launch for some time in England before General Dwight D. Eisenhower had given the word to go. They began taking off around midnight, and dropped after a dark, droning flight across the English Channel. Even if they had been rested before the flight, they would have had trouble staying awake, especially if they had taken pills given to them to fight airsickness on the flight. Many had taken the medication, and found themselves extremely sleepy when they dropped.³⁰ Their drowsiness slowed down their assembly.

A shortage of radios for communication was a fifth factor that delayed troop assembly. Most paratroops did not carry radios. Those who did often lost them on the way to the ground, or the radio was damaged on impact. An estimated sixty percent of the radios dropped with the paratroopers were lost. Gliders that were supposed to deliver larger radios for communication beyond the local area often crash-landed, resulting in malfunctioning equipment and the inability of officers to communicate with other units.³¹

A sixth reason the paratroopers had difficulty assembling on the ground was the heavy loads they carried. Many soldiers dropped with more than 100 pounds of equipment.³² Lugging such equipment across the ground slowed movement because vehicles did not arrive until the first glider landings around 0400.³³ Many of the vehicles on the gliders did not land without damage, and were not available for use in any case.

Wind was a seventh factor that affected the air-drops. Although the paratroopers generally exited the airplanes from an altitude of only about 600 feet, they drifted slowly to the earth on a huge



THE FIRST MEN TO JUMP WALKED IN THE DIRECTION OF THE AIRPLANE

U.S. AIRBORNE OPERATIONS SUBSTANTIALLY SPEEDED THE ALLIES' TAKING OF INITIAL OBJECTIVES AND SIGNIFICANTLY REDUCED THE U.S. CASUALTY COST

wind catcher. Unlike parachutes today that allow the trooper to guide his descent, the paratroopers of 1944 landed wherever gravity and wind took them. Many of the troops intending to land on drop zones outside of the French town of Ste. Maire Eglise, for example, were blown directly into the center of town where they were easy prey for the German defending garrison. Wind blew one of the parachutists into the church steeple. Even if an airplane dropped troops exactly over an intended zone, strong winds could blow the parachutes considerably off course on the way down.³⁴

An eighth reason for the delay in paratroop assembly was the very nature of a World War II paratroop drop. Even if all had gone ideally, and the troop carrier airplanes had dropped exactly when and where they were supposed to, the paratroops would have been scattered.³⁵ As each paratrooper jumped, he knew he would not land with the man who just jumped or the man who would jump next. For a time he would be on his own. He would be even farther from the men who jumped a few ahead of him or a few behind him. The paratroops dropped from each plane in a line called a "stick." By "rolling up the stick," they attempted to assemble. The first men to jump walked in the direction of the airplane, the last men walked in the opposite direction, while the men in the middle stayed put. Some of the men did not even know exactly what the course of the airplane was, because they could not see it as its noise faded away.

The scattering of the paratroops in the predawn hours of D-Day was worse than planned but better than many of the paratroopers themselves imagined. Even given the scattered drops and the slow assembly, the paratroops were able to accomplish most of their objectives. The 82d Airborne Division captured the town of Ste. Maire Eglise by the early

morning of D-Day.³⁶ General Kurt Student, the foremost German authority on airborne operations in World War II, acknowledged that the U.S. airborne operations substantially speeded the Allies' taking of initial objectives and significantly reduced the U.S. casualty cost of the Utah beach landings.³⁷ The airborne operation succeeded, not only because of what the paratroops did on the ground after landing, but also partly because of the drops themselves.

The scattering itself, even if it were not as bad as some imagined, was a sort of blessing in disguise. Faced with American troops descending all around them, the German 91st Division was confused. Paratroops were able to sever enemy communications over a wider area. The Germans overestimated the number of paratroops they were facing. They could not find a center of gravity to counterattack. Some German officers even imagined that the scattered drops were part of a deliberate saturation drop to overwhelm the defenders from above. Scattering the troops surely did not do as much good as harm, but it provided certain benefits.³⁸

In the final analysis, the troop carriers succeeded. They dropped more than 13,000 troops behind enemy lines, more than half of them within two miles of their designated zones, and four out of five of them within five miles.³⁹ Of the 925 troop carrier airplanes launched, only 23 did not return. The invasion of Utah beach succeeded more than that of Omaha partly because of the airborne operation behind Utah.⁴⁰

The airborne invasion was successful not only because of the heroism of the paratroops, but also because of the troop carrier pilots who delivered them. History should remember the troop carriers at least as much for their successes as for their failures. To them, as much as to the ground troops, belongs the glory of victory. ■



NOTES

1. Russell F. Weigley, *Eisenhower's Lieutenants* (Bloomington: Indiana University Press, 1981), p. 75. Maxwell D. Taylor, *Swords and Plowshares* (New York: W. W. Norton, 1972), p. 77. Samuel T. Moore, *Tactical Employment in the U.S. Army of Transport Aircraft and Gliders in World War II* (Air Force Historical Research Agency, call number 546.04), pp. 12, 14. Cornelius Ryan, *The Longest Day: June 6, 1944* (New York: Simon and Schuster, 1959), pp. 130, 135. Charles H. Young, *Into the Valley* (Dallas: Printcomm, 1995), pp. 111, 118. John C. Warren, *Airborne Operations in World War II, European Theater*, USAF Historical Study no. 97 (Maxwell AFB, Ala.: Air University, 1956), p. 64.
2. Martin Wolfe, *Green Light!* (Washington, D.C.: Center for Air Force History, 1993), pp. 114, 120; David McCullough, editor, *The American Heritage Picture History of World War II* (New York: American Heritage Publishing, 1966), p. 483; Gordon A. Harrison, *Cross-Channel Attack* (Washington, D.C.: Office of the Chief of Military History, 1951, republished by the Center for Military History in 1993), pp. 288-89.
3. Moore, p. 13. Warren, p. 65.
4. Stephen E. Ambrose, *D-Day: The Climactic Battle of World War II* (New York: Simon and Schuster, 1994), p. 199. Stephen E. Ambrose, *Band of Brothers* (New York: Simon and Schuster, 1992), pp. 66-67. Young, p. 111. Taylor, p. 77. James M. Gavin, *On to Berlin: Battles of an Airborne Commander, 1943-1946* (New York: Viking Press, 1978), p. 105. Warren, pp. 32, 59. Matthew B. Ridgway, *Soldier: The Memoirs of Matthew B. Ridgway* (New York: Harper and Brothers, 1956), p. 4.
5. Ambrose, *Brothers*, p. 67. Ambrose, *D-Day*, p. 198. Gavin, p. 102. Warren, p. 59.
6. Air Chief Marshal Sir Trafford Leigh-Mallory, Eisenhower's tactical air chief, predicted at least 50% losses for the airborne forces. Gavin, pp. 92-94. Weigley, p. 75. Bill Newton Dunn, *Big Wing: The Biography of Air Chief Marshal Sir Trafford Leigh-Mallory* (Shrewsbury, England: Airlife, 1992), pp. 120-21.
7. Mark Bando, *101st Airborne: The Screaming Eagles at Normandy* (Osceola, Wisc.: MBI Publishing, 2001), p. 61.
8. IX Troop Carrier Command Statistical Control Office Consolidated Tactical Operational Summary, Operations Neptune, Dragoon, Market (Air Force Historical Research Agency, call no. 546.308B). Moore, p. 16.
9. Ambrose, *Brothers*, pp. 66-67. IX Tactical Air Command Operational Research Section Report no. 47, 25 Jun 1944 (Air Force Historical Research Agency) pp. 1-2. Warren, p. 60.
10. Ryan, p. 136.
11. *Ibid.*, Gavin, p. 104.
12. Weigley, p. 76. Warren, p. 60. Moore, p. 13.
13. Ryan, pp. 105-106. Weigley, p. 76.
14. Ambrose, *D-Day*, p. 198. Warren, p. 59.
15. IX TAC Report no. 47.
16. Ryan, p. 181. Ridgway, pp. 11, 13. Warren, p. 58.
17. Taylor, p. 80.
18. Warren, p. 58.
19. *Ibid.*
20. "Percentage of Accuracy in Neptune Serials," IX Troop Carrier Command, contained in history of the 50th Troop Carrier Wing (WG-50-HI) for May-Jun 1944.
21. 435th Troop Carrier Group history, June 1944 (Air Force Historical Research Agency, call no. GP-435-HI June 1944).
22. Ambrose, *D-Day*, p. 206.
23. Weigley, p. 76. Taylor, p. 80. Ridgway, p. 8.
24. Ltr, Brig. Gen. James M. Gavin to Brig. Gen. Harold L. Clark, June 9, 1944, found in the history of the 50th Troop Carrier Wing, May-June 1944.
25. Message, Brig. Gen. Paul L. Williams, IX TCC, to commanders of 50, 52, 53 Troop Carrier Wings and commanding officer of Pathfinder School, June 6, 1944.
26. Wolfe, pp. 114, 120; McCullough, p. 483; Harrison, pp. 288-89.
27. Ryan, p.133. Gavin, p. 106. Taylor, p. 79. Warren, p. 58. Ridgway, p. 6.
28. Ryan, p. 134.
29. Weigley, p. 76. Warren, p. 58. Taylor, p. 79. Gavin, p.106.
30. Ambrose, *D-Day*, 199. Dr. Daniel Mortensen of the Center for Aerospace Doctrine, Research, and Education at Air University, Maxwell Air Force Base, Alabama, also mentioned this to the author after his conversations with D-Day veterans.
31. Ryan, p. 135. Ridgway, p. 9. Warren, p. 63. Gavin, p. 102.
32. Ryan, p. 105.
33. *Ibid.*, p. 135. Moore, p. 14.
34. Ryan, 130. Young, pp. 110-11. Gavin, p. 103.
35. Ambrose, *D-Day*, p. 205. Ridgway, p. 7.
36. Ryan, p. 181. Ridgway, pp. 8, 10. Weigley, p. 93.
37. Moore, pp. 20-21.
38. Weigley, pp. 76, 93. Ambrose, *Brothers*, p. 75. Ridgway, p. 8. Warren, p. 59.
39. Warren, p. 58.
40. Wolfe, pp. 97, 111.



RICHARD K. SMITH AN APPRECIATION



R. Cargill Hall with David Alan Rosenberg

(Overleaf) Richard K. Smith, in his *World at Sea*, c. 1952. (All photos courtesy of Cargill Hall.)

SMITH BECAME FASCINATED WITH AERONAUTICS AND ITS HISTORY

IN 1949 HE ABRUPTLY LEFT UNIVERSITY AND ... ENLISTED IN THE UNITED STATES MERCHANT MARINE

SMITH POSSESSED THE REMARKABLE FACULTY OF NEAR-TOTAL, ENCYCLOPEDIAIC RECALL

Born on November 2, 1929 in Joliet, Illinois, four days after the “Black Tuesday” stock market crash precipitated a collapse of economies around the world, Richard Kenneth Smith grew up a true child of the “Great Depression.” The first of two children born to Raymond K. and Loretta Cunningham Smith (a sister, Barbara, followed in 1931), he spent his first years in Joliet while his father, a mechanical engineer and “steam locomotive man par excellence,” traveled widely finding temporary employment with firms that sold equipment to major railroads. In 1937, Raymond rented the home in Joliet and moved the family to Mexico, where he had obtained work with the Mexican state railway system. The family returned briefly to Joliet in 1938, then back to Mexico and its railroads for another year in 1939-1940. The family lived mostly in Mexico City, but eventually moved “up country” to the railroad town of Aguascalientes. While in Mexico, Dick Smith attended local public schools, where he became fluent in Spanish.

December 7, 1941, marked America’s entry into World War II and found the Smith family living in Los Angeles, California, where it remained for the duration of the war. Located in the heart of America’s burgeoning airplane industry, with all of the nation’s military and civil airplanes swarming noisily through the sky overhead, Smith became fascinated with aeronautics and its history. Already a voracious reader and inveterate moviegoer at age twelve, he would eventually turn his fascination with aeronautics into a vocation. His father, a veteran chief engineer in the merchant marine during and after World War I, enlisted in the United States Navy in 1943 and served as a reserve officer in the Pacific for the next two years. Ray returned to Seattle, Washington, in early 1945 where his ship was to be refitted for Operation Olympic (the invasion of Japan). Needless to say, the family moved to Seattle and, at age sixteen, Dick Smith found a job at the Boeing Airplane Company riveting on inboard wing sections of B-29 bombers at 85 cents an hour.

When, in the face of atomic attack, Japan surrendered in September 1945, the family returned to Joliet, Illinois. Dick Smith returned to high school full time, and graduated in the spring of 1947. That fall he entered the University of Illinois at Champagne-Urbana, where he matriculated for two years. Uncertain about an academic major or a career, in 1949 he abruptly left university and, emulating his father a generation before, enlisted in the United States Merchant Marine. Smith spent the next six years on board various American merchant ships hauling all manner of goods from port to port around the world. As a mariner, he chose engineering. It meant shifts worked far below decks, in engine rooms where temperatures rarely dipped below 100 degrees Fahrenheit. Engineers in the 1950s, he recalled, worked in a hive of pipes and valves, “in a noisy asbestos world,” and he loved it. Smith took and passed maritime exams that advanced him to Engineer Second Class, which at that time commanded a salary of \$10,000-\$12,000 a year—a princely sum. His travels at sea took him to numerous ports of call including Yokohama, Singapore, Colombo, Bombay, Alexandria, Cadiz, Lisbon, Brest, Rotterdam, Bremerhaven, New York, New Orleans, and San Francisco.¹

All the while, in his many off-duty hours at sea, Smith read books and journals. He learned German, consumed the “great books” in literature and history, fell in love with the works of Rudyard Kipling, and maintained and kept annotated calendars that allowed setting himself easily in time and place many years afterward. But with or without records, Dick Smith possessed the remarkable faculty of near-total, encyclopedic recall. I don’t know whether he developed that ability at sea or, as I suspect, had it all along. Friends and professional acquaintances could question him about an obscure movie, an airplane, or aeronautical event and he would have an answer and an explanation of its importance or unimportance in history, most often citing a source where you could look up the details. In my own experience, I have known only

R. Cargill Hall is Emeritus Chief Historian of the National Reconnaissance Office (NRO), an intelligence arm of the Department of Defense. He previously held a variety of posts in the U.S. Air Force History Program including, among other assignments, tours as Contract Histories Manager at the Air Force History Support Office (1989-1998) and as Chief of the Research Division and (concurrently) Deputy Director of the USAF Historical Research Agency (1981-1989). Earlier, Hall served as a NASA historian at Caltech’s Jet Propulsion Laboratory. Hall is the author of Lunar Impact: A History of Project Ranger (now online at <http://history.nasa.gov/SP-4210/pages/Cover.htm>), and is the editor of Case Studies in Strategic Bombardment; The U. S. Air Force in Space; Early Cold War Overflights, 1950-1956, and Lightning Over Bougainville: The Yamamoto Mission Reconsidered.

Dr. David A. Rosenberg is a Senior Strategic Research Professor at the Naval War College. He directed Task Force History collecting Navy historical documentation for the Global War on Terror and Operation Iraqi Freedom for the Vice Chief of Naval Operations in 2003-2004. Rosenberg held the Navy civilian chair of maritime strategy at the National War College from 1996 to 2003. In 1990-2000, he helped found the Center for the Study of Force and Diplomacy while a tenured professor of history at Temple University, where he remains a Professorial Lecturer. He has served as chair of the Secretary of the Navy’s Advisory Subcommittee since 1995. He received a B.A. in history from American University, an MA and Ph.D in history (1983) from the University of Chicago, and has taught at the University of Wisconsin-Milwaukee and the University of Houston.



Lt. JG Smith, 1955.

one other historian who shared this remarkable ability. No antiquarian, however, Smith could marshal, distill, and synthesize vast amounts of data, and fashion it into compelling generalizations supported with insightful illustrations. Employing an engineer's rigor, he introduced into aeronautical history the mathematics of an airplane's weight and all-important weight-ratios and structural loading that compass a vehicle's performance, and

which defied rebuttal. Best known in this regard, perhaps, is his seminal article on the intercontinental airliner that appeared in *Technology and Culture* in 1983. It summarily overturned the cherished historical interpretation of a "DC Revolution" in American aeronautics.²

In 1955, at the age of 26, Smith left the Merchant Marine and, based on his engineering credentials, joined the United States Navy as a

**SMITH LEFT
THE NAVY
INTENT ON
EARNING A
COLLEGE
DEGREE**

lieutenant, junior grade. He thought at first to go “regular” and make of it a career, but soon changed his mind. As he reflected, “the rational operations of merchant ships had spoiled me for the Navy and all its stilted hocus-pocus . . .” Moreover, “I was a grubby [below decks] engineer and the Navy was ‘deck officers’ company. For another, I was older than my fellow junior officers and some of them asked me, ‘How did *you* get to be an officer without having a college degree?’ as if I had somehow cheated. My answer was, ‘I brought the Navy six years of steamship experience, sonny; and what did you bring?’ However, this question of theirs nagged at me. It was a reminder that the damned college degree was the great loose end of my life.” After his two year tour was up, Smith left the navy intent on earning a college degree, though he remained in the Naval Reserve. Despite his frustrations with the service’s aristocracy, the United States Navy and its modern history remained a subject of continuing fascination. Smith had first become interested in the subject as a boy, on learning the story of a small table that his father had purchased that contained timbers from the frigate *USS Constitution*.³ In the years that followed, he studied naval history in depth and could expound at length on naval matters with the same compelling narrative and incisive commentary as he could on matters of aviation.

Smith reentered the University of Illinois at Champagne-Urbana in the fall of 1957, and a year later pocketed a Bachelor of Arts degree, and, in 1959, a Master of Arts degree, both in history. At Champagne-Urbana, he studied under the diplomatic historian, Norman Graebner, and the American historian, J. Leonard Bates. He next taught at Illinois for a year as a graduate instructor before entering the University of Chicago in 1961. At Chicago, William H. McNeill, the brilliant historian of global human affairs who would soon win the National Book Award for *The Rise of the West*, became his advisor. McNeill soon came to admire Dick’s intellect, his “active, synthetic mind,” which, he told him in a note, was “the first and most important requirement for the study of history.” When his savings ran short, Smith returned to sea for one year in 1963, then back to the University of Chicago to finish his Ph.D.

Smith chose as his dissertation topic “The Airships *Akron* and *Macon*: Flying Aircraft Carriers of the United States Navy.” The topic allowed him to combine his two historical passions, aviation and naval history. He began researching the story of United States navy dirigibles after becoming frustrated with the lack of details on them in John Toland’s popular 1950s book, *Ships in the Sky*. Navigating what he called “the salty vineyard of ships, aircraft, National Archives, L.C. [Library of Congress] and the Eller Empire [the Navy’s Naval History Division and Operational Archives headed at that time by retired Rear Admiral Ernest M. Eller],” he completed the first draft of his dissertation before he entered the University of Chicago. The United

States Naval Institute Press published it as a book in 1965—one year before the university awarded him his Ph.D. In fact, the University of Chicago History Department’s maroon edition of his dissertation is a rebound copy of the Naval Institute book.⁴ It remains a standard reference on the history of the Navy’s dirigibles.

In 1967, Smith signed on as a curator at the Smithsonian Institution’s National Air and Space Museum, in Washington, D.C., when it still shared a corner of the brick building next door to the “red castle.” He remained with the museum until 1971, when the non-appropriated funds for his position expired. During that time he began work on what he hoped would be a multi-volume history of aviation’s greatest achievement of the 20th century: the North Atlantic Airway. His second book he envisioned as the first volume in that series. Combining his interests in the navy and aviation, it assayed the United States Navy’s NC-4 transatlantic flight of 1919, and won the 1972 history manuscript prize of the American Institute of Aeronautics and Astronautics (AIAA).⁵

Smith next went to work for the Milton S. Eisenhower Library at Johns Hopkins University. Working out of Washington, D.C., with support from Eugene Emme and Walter Bonney at the NASA History Office, he collected, ordered, and catalogued the papers of Hugh L. Dryden.⁶ An eccentric life-long bachelor, he lived in a book-filled basement apartment in a house he had purchased on Capitol Hill. The two upstairs floors he rented to Congressional staffers and government bureaucrats. His lifestyle permitted him to travel extensively in Ireland, England, France, and Germany pursuing research in airline records of transatlantic flight. His bachelor days ultimately ended in 1975, when he married Maria Tursky, a supervisory librarian at the Library of Congress, and the two moved upstairs in the house on E Street.

After his stint at Johns Hopkins, Smith spent two years with a defense contractor. Solicited to write a history of the Cold War Navy, the study was personally commissioned by then Chief of Naval Operations Admiral Elmo R. Zumwalt, Jr. Armed with a security clearance, he was one of the first historians to exploit the collection of official command histories at the United States Navy’s Operational Archives. The resulting 400 page unclassified study (of which less than a dozen copies were printed) covered the navy’s global activities from World War II through the Gulf of Tonkin and provided insight on naval operations still not found in books published since.⁷ Hoping to bring the study up through the 1970s, he found himself stymied by navy reluctance to grant him access to critical files and by the service’s lack of a declassification program that sealed “classified” records even from the 1920s and 1930s. It led him to testify before Congress in the mid 1970s on the need to declassify and open government records twenty-five years old and older.

In the late 1970s and early 1980s Dick Smith taught the history of aeronautics in the engineer-

**SMITH
SIGNED ON
AS A
CURATOR AT
THE
SMITHSONIAN
INSTITUTION’S
NATIONAL
AIR AND
SPACE
MUSEUM**

SMITH
TAUGHT THE
HISTORY OF
AERONAU-
TICS IN THE
ENGINEERING
DEPARTMENT
AT THE
UNIVERSITY
OF
MARYLAND

AERONAUTI-
CAL AND
NAVAL HIS-
TORIANS IN
THIS COUN-
TRY AND
ABROAD
OFTEN
REFERRED
GRADUATE
STUDENTS
OR COL-
LEAGUES TO
SMITH FOR
ADVICE

ing department at the University of Maryland in College Park, before retiring to Wilmington, North Carolina, in 1986. To accompany his course at Maryland, Smith wrote and distributed to his students brief monographs and case studies on various aspects of flight, each one insightful, almost all of them unpublished. (Assembled with his other published articles and ordered chronologically and topically, they would comprise in print a formidable textbook on the history of aeronautics.) In Wilmington during the 1980s, Smith served as the American editor of *Flight International*, maintained an extensive correspondence with aeronautical pioneers he had met and with historians and students who sought his counsel, while continuing to produce aeronautical history of the first order. His articles on transatlantic flight for the *American Aviation Historical Society Journal* remain expository classics that explained how and why American airliners dominated their European counterparts in international traffic from the 1930s until the arrival of the Anglo-French A300B Airbus in 1974—with World War II the catalyst for intercontinental air travel.⁸ Between 1919 and 1939, Smith observed, aircraft, including dirigibles, had flown the North Atlantic but a few dozen times, and in the latter year scheduled commercial airline service had just begun operating two flights a week via the Azores. “When Germany surrendered on 7 May 1945 the Atlantic was literally being criss-crossed by more than a dozen routes, and with more than a dozen organizations—civil and military—operating hundreds of aircraft daily . . .”⁹ The same explosion in international aerial movement occurred in the Pacific Theater of war, with Hawaii serving as the stepping-stone on the way to Australia and Japan.

If World War II catalyzed intercontinental aerial navigation and conclusively demonstrated the might of military air power, what logistical miracle created overnight the airfields that permitted these thousands of new, heavier airplanes to take off, land, and be serviced all around the globe? Smith turned to that question in research at the United States Air Force Historical Research Agency in Montgomery, Alabama, in 1987-1988. He answered it in “Marston Mat: Footprint of Airpower,” which appeared in *Air Force Magazine* in 1989. Bull dozers and novel pierced steel planking had quickly provided runways for American military airplanes everywhere they went: “It was ten feet long, fifteen inches wide, covering 12.5 square feet with a surface resembling Swiss cheese stamped out of steel, and it weighed 66.2 pounds. Locked together, 60,000 of them created a durable all-weather surface 5,000 feet long and 150 feet wide that routinely accepted punishment from airplanes weighing up to 60,000 pounds thumping down at speeds of ninety miles an hour.” He ranked this innovation “as one of the most subtle, versatile, and ultimately devastating ‘secret weapons’ of World War II.” But however vital to the success of wartime air power, Smith observed tartly, a Marston mat “will not be found . . . among

the World War II exhibits of any aviation museum. The reader will find instead “the stuff of ‘aces’ and airplanes and almost no end of sentimental ephemera.” There is not “a word about, much less a sample of, this dramatically simple invention that . . . carried American combat aviation to the ends of the earth.”¹⁰

Smith’s contribution that compassed airplane performance, “The Weight Envelope: An Airplane’s Fourth Dimension . . . Aviation’s Bottom Line,” appeared in *Aerospace Historian* in 1986, and was quickly picked up and reprinted as a feature technical article by the International Society of Allied Weight Engineers in 1987.¹¹ It summed up ideas he had been fashioning since the early 1960s, when United States aeronautical firms controlled the market for subsonic airliners, and the British and French signed a treaty to jointly develop a supersonic Mach 2.2 airliner, eventually known as the Concorde. The Soviet Union responded with its own supersonic transport (SST), the Tupolev Tu-144. The United States briefly joined in “the SST race,” with Boeing winning a design competition for a Mach 3 giant that weighed nearly twice that of its competitors. But the enormous national cost to subsidize its development prompted the United States Congress to decline the honor, and Boeing’s effort ended later in the decade. This followed a national debate in which historians Richard Smith and Ronald Davies at the air and space museum, and Robert Perry at the RAND Corporation, among others who “ran the numbers,” argued at AIAA meetings that a commercial SST could not be built to operate economically, much less recoup its cost of development. In the event, they were absolutely right. When in February 1973 the sleek, pencil-thin delta-winged supersonic Concorde production model became ready for the airlines of the world to exercise their options, none did. Carrying only 125 passengers, each seat per flight cost thousands of dollars; only the British and French national airlines could be dragged into operating these airplanes. Catering to the rich and famous, they would fly on transatlantic routes and charter runs for the next thirty years.¹²

Beside his extensive correspondence, and because of his contributions to the literature, aeronautical and naval historians in this country and abroad often referred graduate students or colleagues to Smith for advice, especially in his retirement at Wilmington. And he always took time to reply, often with multi-page letters that outlined research needed for significant thesis topics, or the best methods to secure an historical publication. In one instance, the person charged with organizing and producing an anniversary history in three years for the International Federation of Automatic Control (IFAC) contacted Smith, described his plans, and asked him whether he could recommend an accomplished graduate student who might manage it for the federation. Smith replied:

I’ve . . . come to the conclusion that you’re not going to find any ONE person to put together a satisfac-

Smith at home in Wilmington, with Boeing XB-47 test pilot Robert M. Robbins (at left) in 1993.



SMITH WAS ALMOST ALWAYS OUTSPOKEN, OFTEN IRASCIBLE, AND WITHOUT FAIL ACERBIC IN HIS COMMENTARIES

HIS INTELLECTUAL MASTERY OF AERONAUTICS MORE THAN COMPENSATED FOR HIS ECCENTRICITIES

tory literary product within the next three years. Least of all capable of producing what you desire is a graduate student of any description. You want a Rolls Royce but the best a grad student might be able to produce is a gold-plated skateboard framed in neon with a lot of rhetorical bells and cheap philosophical whistles.

Along with his single-spaced, seven-page letter, Smith enclosed electrostatic selections from two successful anniversary history volumes, one by the British Institution of Naval Architects and the other by the American Society of Naval Architects and Marine Engineers, and his recommendation that the IFAC could achieve what it wanted in the time available only by inviting and ordering papers in an anthology. His reasoned letter wasn't the answer wanted. After several months passed without the courtesy of a reply, Smith sent along a copy of his response upon which he had penned: "I've not heard a whisper from him. I get weary of these FREELOADERS!"

In person, Dick Smith was almost always outspoken, often irascible, and without fail acerbic in his commentaries. He had zero tolerance for those who, by virtue of their publications, he judged fatuous and feckless members of the academy. His own contributions were of substance, the stuff of classical history via the University of Chicago, leavened with an engineer's careful analysis, devoid of the fads and fancies that beset American history departments later in the twentieth century. In the 1980s a newly minted Ph.D. had published a précis of his dissertation in *Technology and Culture*, which attempted to explain how and why metal had replaced wood in primary aero structures. Asked to comment on the work, Smith, who would briefly cover the subject for the National Air and Space Museum,¹³ replied mordantly: "He had only to build a canoe in his garage to answer that question." But those he judged worthy of praise received it: James Hansen and William Trimble at

Auburn University,¹⁴ Tom Crouch and Von Hardesty at the NASM, and Joe Guilmartin at The Ohio State University, to name a few. For those who knew him and appreciated his work, his intellectual mastery of aeronautics more than compensated for his eccentricities. His periodic evening or weekend phone calls to his "students," often running on for an hour or more, were always an entertaining and sagacious experience.

In the 1990s, under contract to the Air Force History and Museums Program, Smith researched and wrote a history of inflight refueling. A much-condensed version of the manuscript appeared in 1998 on the seventy-fifth anniversary of the first aerial refueling.¹⁵ Based on previous work, he could explain how and why the Europeans, especially the British in the late 1930s, fixed on this technique as the most reasonable way to extend the range of overweight commercial airliners. American aeronautical firms, on the other hand, extended the range of their airliners by reducing tare weight and increasing engine horsepower, among other methods, before World War II intervened. Not until the late 1940s, when leaders of a newly formed United States Air Force contemplated the task of striking the Soviet Union with manned bombers in the event of another war, did this method of range extension come into its own. The development and introduction of inflight refueling of military airplanes, orchestrated by General Curtis E. LeMay, Commander in Chief of the Strategic Air Command, became so successful that it essentially disappeared from view. As Smith phrased it, those who daily flew air force and navy aerial tankers on vital refueling missions in Southeast Asia, and, later in Operation Desert Storm, became "invisible men in invisible airplanes." But, he was quick to add, the United States Air Force's proud claim of "Global Reach, Global Power" rested entirely on invisible inflight refueling.

At the end of the 1980s, after a protracted delay, the Department of State released documents on

his petition, and Dick Smith finished one other manuscript, a biography of Frank G. Tinker, Jr. A 1933 Naval Academy graduate at the depth of the Great Depression, Tinker found himself, among numerous other members of his class, without a commission because the required naval billets were not funded. He subsequently qualified as a naval aviator, was dismissed, and, later in the decade flew for the Republicans during the Spanish Civil War commanding a squadron of Soviet aviators. Tinker died later under mysterious circumstances in Missouri during World War II. The volume, using German and Spanish sources replete with maps, sheds considerable light on the air war in Spain, but at the end of the 1990s it sat on a shelf in Smith's library.¹⁶ During a visit, I inquired of him why he hadn't pursued publication. "By the time I finished it," he replied, "I found that I didn't care for the man." Typical Smith. After some prodding, he released the work and it is now in the hands of Joe Guilmartin, pending publication.

With the turn of the Millennium, Smith's health and eyesight began to deteriorate sharply, and he steeled himself for "the end." His one goal: living to celebrate the centennial of powered flight in December 2003. Over a cup of hot tea he looked up with a wry smile, fixed me with dark eyes, and said, "Each of us unknowingly passes a major milestone in our lives every year. It is the date of

our death." For Dick Smith in Wilmington, North Carolina that date fell on 2 October 2003—four weeks shy of his seventy-fourth birthday and just ten weeks before the centennial he wished to celebrate at Kitty Hawk on the nearby Outer Banks. In Europe, meanwhile, officials of the British and French national airlines announced that the supersonic Concorde, technological marvel and economic white elephant, would be retired from service. The last of them touched down, to be towed away to aeronautical museums, not long after Smith's death. With their passing, an era in aeronautics drew to a close. ■

**The Historiographical Dictum
According to Smith:**

*If you can measure
That of which you speak
And express it in numbers,
You will know something
Of your subject;
But if you cannot measure it,
And cannot express it in numbers,
Your knowledge will always
be unsatisfactory.*

William Thomson, Lord Kelvin of Largs
(1824-1907)

NOTES

1. Smith avoided maritime assignments that would take him to Australia. The Australian longshoremen's union, he said, had exceptionally arcane work rules and would strike without notice if any of them were judged abridged. Merchant vessels could be delayed for days and even weeks, while labor negotiations were conducted, disrupting shipping pickup and delivery schedules so badly that it sometimes caused the loss of planned business.
2. Richard K. Smith, "The Intercontinental Airliner and the Essence of Airplane Performance, 1929-1939," *Technology and Culture*, Vol. 24, No. 3, July 1983.
3. The U.S. Navy had approved the sale of tables and desks containing the timbers in a fundraising campaign to preserve this War of 1812 veteran for posterity.
4. *The Airships Akron & Macon: Aircraft Carriers of the U.S. Navy* (Annapolis: Naval Institute Press, 1965).
5. *First Across! The U.S. Navy's Transatlantic Flight of 1919* (Naval Institute Press, 1973).
6. Dryden served as director of research for the National Advisory Committee for Aeronautics (NACA) 1947-1958 and deputy administrator of the National Aeronautics and Space Administration (NASA) from 1958 until his death in 1965. Johns Hopkins University Press published Smith's finding guide to the Dryden papers in 1973: *The Hugh L. Dryden Papers, 1898-1965*.
7. *Cold War Navy* (Falls Church, Virginia: Lulejian and Associates, Inc., Contract N00014-75-C-1001, March 1976). A copy is available at the Operational archives, Naval Historical Center, in the Washington Navy Yard.
8. "The Superiority of the American Transoceanic Airliner 1932-1939," *American Aviation Historical Society Journal*, Vol. 29, No. 2, summer 1984, and "Fifty Years of Transatlantic Flight," Parts 1 and 2, *AAHS Journal*, Vol. 35, Nos. 2 and 3, summer/fall 1990.

9. "Fifty Years of Transatlantic Flight," Part 1, p. 99.
10. "Marston Mat," *Air Force Magazine*, Vol. 72, No. 4, April 1989, *passim*. The USAF Museum in Dayton, Ohio, it must be said, has since included pierced steel planking in one of its World War II displays.
11. "The Weight Envelope: An Airplane's Fourth Dimension . . . Aviation's Bottom Line," *Aerospace Historian* (now *Air Power History*), Vol. 33, No. 1, Spring 1986; and *Weight Engineering*, Vol. 47, No. 1, Summer 1987.
12. In addition to its passengers and luggage, on each transatlantic flight the Concorde carried 100 tons of fuel, about 80 tons per passenger if the airplane was full, and it frequently was not. Elsewhere, in the absence of any plutocrat customers in the USSR, the unfortunate TU-144 never entered airline service, and, after some limited freight runs between Moscow and Alma Ata, these SSTs were mothballed or consigned to museums at the end of the 1970s.
13. See R. K. Smith, "Better: The Quest for Excellence," in John Greenwood, ed., *Milestones of Aviation; Smithsonian Institution National Air and Space Museum* (N.Y.: Macmillan, 1989), which sketches significant improvements in the airplane, 1908-1989.
14. Auburn University received as a bequest Smith's extensive papers and library collection, which, it is safe to say, will occupy graduate students for several years ordering and cataloguing them.
15. *75 Years of Inflight Refueling: Highlights, 1923-1998* (Washington, D.C., USAF History and Museums Program, U.S. GPO, 1998). Smith's complete inflight refueling history remains to be printed.
16. *Ace of Chaos: Frank G. Tinker and the Air War in Spain*.

Open Skies Policy and the Origin of the U.S. Space Program





Lester F. Rentmeester

(Overleaf) The SR-71 Blackbird, fastest of the airborne reconnaissance platforms.

(Right) George W. Goddard, shown here as a colonel.

IN 1951, ... I LEARNED OF THE HIGH PRIORITY PLACED ON DEFINING SOVIET STRATEGIC CAPABILITIES AND INTENTIONS

EVERY NATION'S SKIES SHOULD BE OPEN FOR INSPECTION OF THEIR MILITARY CAPABILITIES

In a 1946 speech at Fulton, Missouri, Britain's Winston Churchill declared that an "iron curtain" had descended over Europe to separate the East and the West. Indeed, by 1948, the USSR achieved control of Eastern European countries. When the Soviets exploded their own atomic bomb in 1949, it caused many in the U.S. to fear that they might use this weapon to achieve their expansionist ambitions. The period of mutual distrust and antagonism between the two nations could properly be called the forty-five-year Cold War.

Early in this period, President Harry Truman implemented the Truman Doctrine, asserting that Soviet aggression would be stopped at the northern boundaries of Greece and Turkey. My role in implementing this national policy was as an advisor to the Turkish Air Force, in developing their reconnaissance and intelligence capabilities.

In April 1950, President Truman ordered the National Security Council (NSC) to prepare NSC-68, a policy paper authorizing major military force and expending up to 20 percent of our GNP, to meet a Communist threat anywhere in the world. Two months later, North Korean forces invaded South Korea. In his usual firm manner, Truman rallied United Nations forces to defend South Korea.

Upon my assignment to the Air Force headquarters in 1951, with responsibility for development of reconnaissance and intelligence systems, I learned of the high priority placed on defining Soviet strategic capabilities and intentions. That winter, the Air Force had procured the Beacon Hill Study in Project Lincoln at the Massachusetts Institute of Technology. Among the outstanding scientists at that time were James Killian, James Baker, and Richard Leghorn. Issued in June 1952, the Beacon Hill study reported on intelligence future forecasting. In research and development, the Reconnaissance Working Group was established in 1952. Its members worked closely with Beacon Hill. Because of the Air Force's major role in ICBM development and in strategic reconnaissance, the group's report was regarded highly. It stressed the fact that every nation's skies should be open for inspection of their military capabilities; their conclusions were stated in an Open Skies report.

Many other activities were aimed at divining USSR intentions. In 1947, the Air Force had established its Long-Range Detection Program to monitor the Soviet nuclear program. Its air-sampling capability discovered that the USSR had exploded a nuclear bomb in August 1949.

Col. Lester F. Rentmeester, USAF (Ret.) was born in Green Bay, Wisconsin. He attended St. Norbert High School and College, the University of Wisconsin at Madison, the Air Force Institute of Technology, the Army War College, George Washington University, and NOVA University. Colonel Rentmeester earned the B.S., M.B.A., M.P.A., and D.P.A. degrees. During his thirty-one-year military career, which included thirty combat missions as a B-17 pilot over Europe in World War II, he was chiefly involved in research and development of intelligence programs. He initiated the first U.S. satellite program. In retirement, he has taught graduate courses at NOVA University and the Florida Institute of Technology. He has written eight books, including seven in collaboration with his wife, Jeanne. He has also written a dozen articles in various journals, such as American Heritage.



Detection devices of all types were gradually established around the Soviet Union. The National Security Agency was created in 1952, to gather communications intelligence (COMINT). Aircraft equipped with electronic gear gathered intelligence to determine the Soviet Union's air defense radar order of battle. Cameras, with very long focal lengths were installed in high-flying aircraft to photograph deep into the Communist bloc. Maj. Gen. George W. Goddard, the "father of aerial reconnaissance," who had survived five aircraft crashes since his pilot training in World War I, suffered his first injury, a broken leg, when he fell off a huge camera installed in a C-97.

In 1952, the U.S. exploded a hydrogen bomb device; the USSR tested their version the following year. The Air Force's Strategic Air Command (SAC), which had been established in 1946, had to be modernized and expanded. However, the Air Force did not have the resources for this until the Korean War liberated funding.

In response to the USSR atomic bomb, the Air Force needed intercontinental ballistic missiles (ICBMs) to destroy strategic targets. However, U.S. knowledge of the number and location of enemy targets, the input to ICBM guidance systems, and USAF charts were found to be grossly deficient. In March 1954, the Air Force Secretary Harold Talbott directed that the missile program receive all necessary funding. Development of the Atlas

Maj. Gen. Goddard, as a lieutenant, prepares to photograph an eclipse in 1925.



FEAR OF A SURPRISE ATTACK WAS SO GREAT THAT USAF COMMANDERS CONDUCTED RECONNAISSANCE OVERFLIGHTS OF THE USSR'S BORDERS ALMOST CONTINUALLY

and Titan ICBMs, both with a 5,000-mile range, was stressed. The Thor, a 1,500-mile intermediate range ballistic missile (IRBM) was developed and tested rapidly – in less than four years— for use against closer targets. Gen. Curtis E. LeMay, SAC's commander-in-chief, insisted that the Pentagon provide the means to identify and locate the targets necessary to carry out his mission.

Fear of a surprise attack was so great that USAF commanders conducted reconnaissance overflights of the USSR's borders almost continually. When Gen. Nathan Twining was Air Force chief of staff, he claimed that he had forty-seven planes fly over the USSR at one time.¹ However, this type of reconnaissance (even if it was true) would not have provided the necessary intelligence on a possible Soviet missile and bomber in that nation's interior.

Some of our efforts to obtain information on Soviet capabilities and intentions bordered on the desperate. The Air Force took over a Navy research balloon project and attached to it a 1,400-pound camera package, so that it could take aerial photographs, while floating over the Soviet Union. When my boss, Maj. Gen. Donald Yates, was briefed on the project, he said that he thought that we were crazy, but authorized the \$5 million to initiate the project. We soon found that winds at altitudes over 100,000-feet blew from east to west, instead of the westerlies found at lower altitudes. On our first flight to the west from Japan, the automatic timer released the camera package too soon and it fell in downtown Warsaw. However, enough of the 500 balloons used in the project blundered over some Soviet targets to make the project worthwhile. There were many other projects like this, some not as haphazard as the balloon program, as we in research and development tried to satisfy the SAC's need to define the Soviet threat. The two most promising projects for photo-reconnaissance were a very high altitude aircraft and a reconnaissance satellite.

THE TWO MOST PROMISING PROJECTS FOR PHOTO-RECONNAISSANCE WERE A VERY HIGH ALTITUDE AIRCRAFT AND A RECONNAISSANCE SATELLITE

In our efforts to develop long focal-length lenses, we had to create a new production process. Our best optics had been produced at an optical glass works in West Germany, but even they could not provide the huge long-focal length optics that we wanted. This required a continuous flow-casting process involving close temperature control over a long distance. The major U.S. optics producers cooperated with the Air Force and other government agencies to solve the problem. During one step in the project, we borrowed a million dollars worth of platinum, needed for temperature control from the U.S. Treasury and transferred it to the Bureau of Standards for prototype testing.

Col. Joseph J. Pellegrini, who managed the reconnaissance research and development at the Air Research and Development Command (later called Air Force Systems Command), was the key figure in developing new programs. In August 1953, he initiated study contracts with Bell, Martin, Lockheed, and Fairchild for designs of a very high-altitude photo-reconnaissance aircraft. In an effort to keep the other military services from competing with us, he tied up all of the wind tunnel facilities in the United States with contracts to the Air Force. His office pursued an aggressive course with the major aircraft companies to produce designs for aircraft, satellite and component systems, even before we had sufficient funds and authority for hardware development.

It was a heady time for dreaming and scheming of ways to counter the Soviet threat. Col. Richard "Dick" Leghorn, a key figure in the USAF Open Skies group and Dr. Duncan MacDonald, another member, were gathering ideas from members of the scientific community. Those that we considered useful, we turned over to RAND Corporation, a USAF-funded think tank that had been studying the concept of an Experimental World-Circling Spaceship, since 1946. One of our primary concerns during this period was the legal-

The author, in uniform.
(Photo courtesy of the
author.)



**WHEN THE
USSR
ORBITED THE
FIRST
SATELLITE,
NOBODY
WORRIED
ABOUT
SPACE LAW
ANY LONGER**

ity of using the skies over other sovereign nations for our purposes. We asked our think tanks, plus the experts at the Air Command and Staff School and the Air War College to produce studies on space law to justify our position.

As it turned out, when the USSR orbited the first satellite, nobody worried about space law any longer. The Soviets did protest in November 1960, that satellite photographs were illegal, no matter what the altitude from which they were taken. However, they soon developed their own electro-optical system, with real-time imaging capability.²

Colonel Pellegrini's request for proposals (RFP) for a one-man, high-altitude reconnaissance aircraft, which could operate at 70,000-foot altitude, went to four different aircraft manufacturers in August 1953. The competition resulted in the Bell X-16.

Meanwhile, in early 1954, the Air Force accepted the proposal submitted by Kelly Johnson of Lockheed because it would produce an acceptable aircraft in the shortest possible time. The U-2 (U for utility) aircraft was 63-feet long, had a 104-foot wing span, weighed 17,000 pounds, and could cruise at 430 miles-per-hour at an altitude over 70,000 feet for a 4,000-mile range. The photographic package in an interchangeable nose of the airplane was a 36-inch folded-lens camera designed by James Baker. Other interchangeable noses contained receivers of electronic intelligence, signal intelligence, etc. Although the wing-span of the U-2 was similar to the B-17 that I flew over Germany in World War II, its powerful J57 engine, its light weight and its immense wing area were designed to take it to altitudes out of reach of the Soviet surface-to-air missiles.³

This high-altitude proposal was approved by Lt. Gen. Donald Putt, who was in charge of USAF development, Generals LeMay and Twining, and Air Force Assistant Secretary for R&D Trevor

Gardner. When President Eisenhower was briefed in November 1954, he liked the concept but didn't want it to be a military project. Our Air Force briefer, Col. Paul Gremmler, told us that Ike said that he didn't want a blue-suiter (Air Force) pilot flying any missions and asked Allen Dulles, head of the Central Intelligence Agency (CIA) whether his outfit could do the job. That's how CIA got into the project and, incidentally, thwarted Pellegrini's plan to freeze out other agencies by tying up all of the wind tunnels. (Generals Twining and LeMay were so sure that the Air Force would take over the U-2 program that they furnished the \$22 million dollars and 30 Pratt and Whitney J57 engines for the initial 20 aircraft.)⁴

Meanwhile, Col. Victor Genez in Pellegrini's office, worked with us in going to manufacturers to determine how the five subsystems, such as, propulsion, airframe, cameras, etc., could provide us with a workable reconnaissance satellite. Because of the constraints, we selected a television camera that would transmit its signal to three ground stations in the United States. This system led to the first project name, Feedback. Because of the low resolution of the images, the system was later discarded for this program although it was used a decade later in NASA's RANGER program. The Feedback name for the project was changed often: SENTRY, SAMOS, and PIED PIPER; KEY-HOLE was the name for various photographic systems, KH-1, KH-2, etc.

We used the RAND people to collect the ideas from people concerned with the project. In October 1954, they briefed my boss, Maj. Gen. James McCormack, and others in the Pentagon. With General McCormack's approval, I wrote a formal directive for the program, as Weapon System 117L, Advanced Reconnaissance System, requesting \$12 million immediately and designating October 1956 as target date for the launch of the first United States satellite.

**THE AIR
FORCE
ACCEPTED
THE PRO-
POSAL ... OF
LOCKHEED
BECAUSE IT
WOULD PRO-
DUCE AN
ACCEPTABLE
AIRCRAFT IN
THE
SHORTEST
POSSIBLE
TIME**

The U-2, among the earliest strategic reconnaissance platforms.



BRIEFINGS ON THE RECONNAISSANCE SATELLITE, U-2 AND A VARIETY OF OTHER COLLECTION PROGRAMS WERE PRESENTED

Today, school children know about spacecraft; their operation had to be explained to the five major generals, heads of directorates, whose approval was needed for the project because hundreds of millions of dollars would be needed in future years. One asked me what held the satellite up without wings. My answer used the example of the moon as a satellite of the Earth and planet Earth as a satellite of the sun. When I was explaining to another about Keplerian motion and decaying orbits, he said, "Do you mean to stand there and tell me that thing will come back to Earth and probably hit me in the back of the head when I'm not looking?"

At last the project was off and running. Lockheed had the most responsibility for the reconnaissance package and later replaced the TV camera with high resolution optics in a system with high-pointing accuracy. In March 1955, Col. Gremmler wrote a General Operational Requirement that further refined the system requirements in my WS-117L directive.

Briefings on the reconnaissance satellite, U-2 and a variety of other collection programs were presented to escalating levels of the Department of Defense and the CIA during the latter part of 1954. The CIA program director, who later was responsible for the Bay of Pigs operation, worked in coordination with the Air Force and Lockheed, resulting in the first U-2 flight in August 1955.⁵ Colonel Pelligrini briefed the Joint Chiefs of Staff in December 1954, and the National Security Council received approval of the Open Skies Policy from Eisenhower in early 1955, following the Killian Committee's report in February. A few months later, at a superpower conference in Geneva in July 1955, Eisenhower proposed, as a step to prevent nuclear war, that nations give each other the right to use their airspace in an Open Skies Policy to prevent surprises. Nikita

Khrushchev was cool to his proposal.

At that time I was stationed in Germany, flying some of the special reconnaissance aircraft. Two aircraft from my unit were shot down over the USSR in 1958, a C-118 and a communications-intelligence C-130.⁶

Colleagues from the Pentagon, bent on such tasks as briefing Chancellor Konrad Adenauer and the King of Norway, would keep me informed. The Eisenhower administration viewed the Vanguard as a "stalking horse for the classified military reconnaissance satellites that were to follow. In July 1956, the first operational U-2 landed at my air base; friends accompanying the aircraft said that they were assigned to the 1st Weather Reconnaissance Squadron, a statement accompanied with a grin. My squadron flew support missions for them to bases like Adana in Turkey, Peshawar in Pakistan and Bodo in Norway.⁷

My wife, Jeanne, and I were on vacation in Valencia, Spain, on October 5, 1957, when we came down to breakfast in our hotel to find the headlines proclaim the orbiting of a Soviet satellite, a technological first. We could feel the dramatic change of attitude of Europeans toward Americans. The superman American who had contributed so much to World War II, who had furnished a generous Marshall Plan to resuscitate impoverished nations, who had produced hydrogen bombs, and other technological triumphs, was now inferior to the Soviets in the minds of many people. This mood was reflected in a chagrined America. Eisenhower signed a National Defense Education Act, authorizing huge sums of money to correct educational deficiencies. This act bolstered math, science, and foreign language training at all levels. Many people thought that Sputnik was evidence that the Russians had a superior school system which caused school children to stretch their intellectual capacities to the utmost.

IN JULY 1956, THE FIRST OPERATIONAL U-2 LANDED AT MY AIR BASE

An artist's rendering of a Global Positioning System satellite.



THE U-2 AIRCRAFT FLEW TWENTY-SEVEN SUCCESSFUL MISSIONS FROM 1956 UNTIL ONE WAS SHOT DOWN ON MAY 1, 1960

A congressional committee, chaired by Senator Lyndon Johnson, worked with the President to expedite numerous programs, all in the name of national defense. In fact, the Soviets helped the United States program by flaunting their technological superiority. A cartoon in their *Krokodil* magazine showed golf-addict Eisenhower addressing his golf ball on a tee with, "Now go into orbit!" It was true that the first U.S. satellite, Explorer I, launched on January 31, 1958, was golf ball size compared to the Sputnik II, which carried a live dog. Explorer I found the Van Allen radiation belt, which caused great concern at first, until its properties were found to be less harmful than at first thought.

The U-2 aircraft flew twenty-seven successful missions from 1956 until one was shot down on May 1, 1960, disrupting a Khrushchev-Eisenhower conference. The resulting U-2 photographs soon showed no massive USSR buildup in their ICBM and bomber programs. In an attempt to quell interservice rivalry, development of the reconnaissance satellite was transferred for awhile to a research group, the Advanced Research Projects Agency (ARPA) in the Department of Defense. Subsequently, a reconnaissance satellite was launched in 1959, and the program began in earnest at the end of 1960.

Subsequently control of the reconnaissance satellite was transferred to the National Reconnaissance Office (NRO). The two major reasons why the photo reconnaissance satellite development was delayed for four years were: first, the success of the U-2 aircraft in locating and identifying targets for the Strategic Air Command, and second, the difficulty in selecting a booster to put the first U.S. satellite in orbit. The Army's Jupiter C, with strap-on rockets, won over the Navy Vanguard and the Air Force Atlas. The "missile

gap" that President Kennedy bewailed in his 1960 campaign proved to not be as much of a threat as the intelligence community had concluded.

However, identifying Soviet ICBM sites was the first part of the problem. It was still necessary to provide navigational information to our ICBMs, which would guide them with sufficient accuracy to destroy a "hardened" target.

The most needed information was the location of the targets in relation to the ICBM launch point. An ICBM travels a parabolic arc, from launch site to target. Since the North American continent was tied to Europe with a single SHORAN measurement, a World Geodetic System was required, locating three axes points on a mathematical model for the Earth.

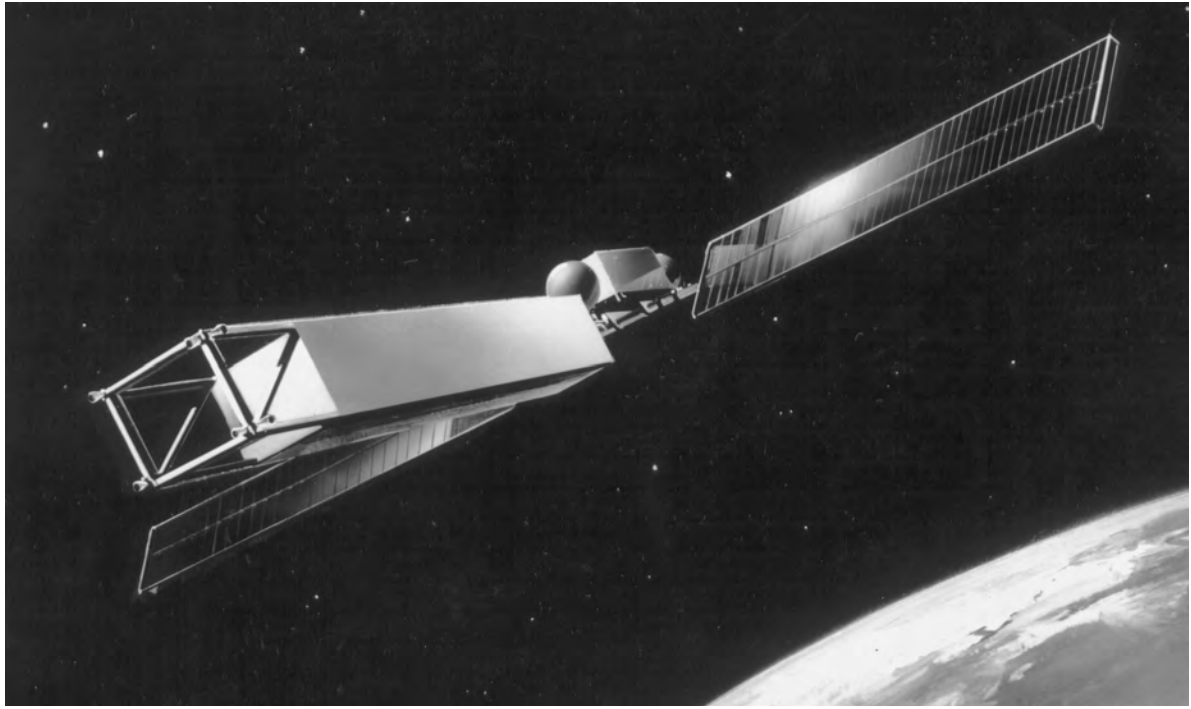
The second item needed was a mapping satellite, with special mapping cameras and photogram metric lenses for the required accuracy measurements.

Third, our ICBM's required precision-pointing accuracy and knowledge of gravity anomalies in the Earth's crust that could pull the ICBM off its preplanned course. A collection program was initiated to collect these data.

President Johnson had followed this program closely ever since he chaired the Senate committee that was concerned with satellites. In a March 1967 speech at Nashville, he proudly reported on the success of the reconnaissance satellite. He said that the \$35-40 billion dollars that the U.S. had spent on the program had resulted in information worth ten times as much. A couple of months later, as a representative of the Defense Intelligence Agency, I gave a speech on a related subject to the American Association of Geographers at Toronto, Canada. The main theme of the speech was that it was now possible to collect many types of geographic information and store it in a universal cartographic data base in

A RECONNAISSANCE SATELLITE WAS LAUNCHED IN 1959, AND THE PROGRAM BEGAN IN EARNEST AT THE END OF 1960

An artist's rendering of a MILSTAR satellite.



**TODAY,
SATELLITE
INTELLI-
GENCE
COLLECTION
IS AN
ACCEPTED
PROCEDURE,
ACKNOWLED-
GED BY
WORLD
LEADERS**

such a way to easily provide such products as inventories of worldwide food crops, measurement of flood areas, and plant disease detection and control. A Canadian magazine asked permission to print the article. That the Soviets had a keen interest in the subject was evident a couple of years later when a CIA colleague asked me to evaluate an article that they had purchased from a Soviet source for \$10,000. It was a copy of my 1967 Toronto speech, which was printed in the magazine!

Today, satellite intelligence collection is an accepted procedure, acknowledged by world leaders. Imaging techniques produce photographs capable of identifying small objects on the Earth's surface, define heat sources with infrared lenses, find metal with magnetic detectors, use radar to spot movements, and monitor maritime activity. Communications, including electronic emissions, are routinely intercepted and analyzed. An example of the improvement in performance of reconnaissance satellites is the comparison between the objectives stated in the 1954 development directive for a resolution of 50-foot objects by the television system from a 300-mile high orbit, to the current Keyhole cameras that can detect objects as small as six inches from a 150-mile high orbit.

Succeeding presidents cited the Open Skies Policy as an integral part of this nation's agenda;

the most recent was by President George H. W. Bush during Desert Storm. It is now an agreed upon requirement for nations living together in peace through major arms agreements, such as the Conventional Forces in Europe Treaty, Strategic Arms Reduction Treaty, Intermediate- and Shorter-Range Nuclear Forces Treaty, Threshold Test Ban Treaty, Peaceful Nuclear Explosion Treaty, three chemical weapons agreements, and the Open Skies Treaty.

In March 1992, twenty-six nations signed the Open Skies Treaty, which commits member nations in North America and Eurasia to open their airspace, on a reciprocal basis, to permit the overflight of their territory by unarmed observation aircraft. This is a breakthrough made possible because of the capabilities of both American and Russia satellites. The constellations of military satellites, now orbiting Earth, have a capability for photo reconnaissance, radar reconnaissance, signal intelligence, missile warning, military navigation and military communications. The orbiting reconnaissance platforms deter aggression by making it virtually impossible to hide military threats. The Open Skies policy can provide a model and a stepping stone during the formation of a new policy to help define the role that the U.S. will play internationally. ■

NOTES

1. Michael Beschloss, *Mayday*, New York: Harper and Row, 1986, p. 78.
2. *Prologue*: Quarterly of the National Archives and Records Administration, Summer 1996, Vol. 28, No. 2.
3. Two books describing the aircraft development and capabilities are *Skunk Works* by Ben R. Rich and Leo Janos, New York: Little Brown & Co., 1994, and *Operation Overflight* by Francis Gary Powers, New York: Holt Rinehart & Wilson, 1970.
4. Michael Beschloss, op.cit., p.85.
5. Ben R. Rich, op.cit. Rich stated "to put an airplane in the sky in 8 months was a tremendous achievement." p. 132.
6. See Michael Beschloss, *Mayday*, op. cit.
7. Ben R. Rich, op .cit. p. 132.

Milestones of the First Century of Flight. By F. Clifton Berry, Jr. Charlottesville, Virginia: Howell Press, Inc., 2002. Maps. Photographs. Bibliography. Index. Pp. 214. \$35.00 ISBN: 1-57427-076-1

Mr. Berry has been involved with aviation since he participated in the 1948-49 Berlin Airlift. Since then he has been an active pilot with land and seaplane ratings and is also a master parachutist. He has written hundreds of articles for magazines and is the author or co-author of eight books on international aerospace subjects.

In honor of the first 100 years of flight, the Aerospace Industries Association of America decided to convene a panel of aerospace experts with the mission to select the 100 most important and influential events in the aviation and space fields. Berry was selected to be one of the members of this panel. The book is divided into nine chapters with the first chapter covering the years between 1903 and 1919, and the remaining chapters covering each decade thereafter. The author not only describes the milestone itself but also speaks to the men and women who made the event possible. *Milestones* is richly illustrated with over 200 black-and-white and color photographs which aid greatly in the understanding of the text for the general reader. The author allows approximately two pages per milestone including both text and photographs. This is not a scholarly text in the sense that Berry treats each milestone as an isolated event and does not try to explain how one event led to or influenced another selected event in the book. However, at the beginning of each chapter, he does explain (to a degree) how the selected events of that chapter influenced the growth of aviation or space development.

Events that the panel chose as milestones included Glenn Curtiss winning the Scientific American Trophy in 1908, and the creation of the first scheduled airline in 1914. In the 1920s, in-flight refueling became a reality, and Goddard launched his first rocket. The 1930s saw the development of radar and radio beacons to define airways. Swept-back wings, gas turbine engines, and supersonic flight were developed in the 1940s; while the 1950s saw America's first ICBM (Atlas) and the launching of the first U.S. satellite (Explorer) in 1958. The 1960s brought the Harrier V/STOL aircraft, Apollo 11, and jumbo jets. The 1970s followed with the F-14 Tomcat and the Apollo-Soyuz Test Project. In the 1980s, the Space Shuttle was developed, and the Voyager circled the world non-stop without refueling. Lastly, the 1990s witnessed the launching of the Hubble Space Telescope and creation of the Global Positioning System.

Milestones of the First Century of Flight is the history of planes and rockets "in a nutshell." This book, being easy to read and con-

taining beautiful photographs, would make a nice gift for any aerospace buff.

William A. Nardo, NASM Docent



Turning the Vertical Flank: Air power as a Maneuver Force in the Theater Campaign. By Lt. Col. Robert P. Givens, USAF. Maxwell AFB, Ala.: Air University Press, 2002. Maps. Notes. Bibliography. Index. Pp. xi, 85. Paperback. ISBN: 1-58566-108-2

In this monograph, Lt. Col. Givens argues effectively that air power can be used as a maneuver force in a theater campaign. Some airmen might suggest he is merely stating the obvious. There appears to be the assumption among airmen that air power's effectiveness as a maneuver force is so well established that it deserves little doctrinal attention. After all, it is plain to see that aircraft can maneuver better than surface forces. However, the concept of maneuver warfare examined in this paper is a far more complex concept than simple movement. In modern doctrine, maneuver is more a noun than a verb. Air Force doctrine and future vision papers pay the least attention among the services to articulating a future role in the Joint Vision concept of dominant maneuver—a central feature of proposed Army, Navy, and Marine approaches to future war. Givens seeks to establish the relevance of air power to these ascendant concepts of maneuver warfare. The task is important because the main effort of operational combat in future wars may be largely based upon such concepts.

To succeed, Givens must do far more than prove the obvious conclusion that aircraft can maneuver through the air to establish a position of advantage against enemy forces. He must also avoid making extravagant claims that exceed the demonstrated capability of air power throughout history. He succeeds by defining maneuver in practical terms. The paper begins by establishing the characteristics of a maneuver force through historical examples that should meet with the approval of any ground commander. The phalanxes of ancient Greece serve to illustrate that a maneuver force comes in direct contact with the enemy formation and shocks it. The ancient Roman army shows that a maneuver force exerts a zone of influence morally and physically, affecting any enemy force within its range of operations. The neoclassical armies of eighteenth century Europe are used to show that a maneuver force compels or denies battle through superior mobility. The examples of Napoleon's campaigns demonstrate how a maneuver force gains and exploits a position of advantage of the enemy. Finally, he uses Gettysburg to demonstrate the integration of all four aspects in a campaign.

Givens succeeds admirably in defining boundaries and key features for the elusive concept of maneuver through these examples. The resulting definition of maneuver warfare does not set up a strawman argument tailor-made for historical examples of air power. On the contrary, inclusion of the requirements that a maneuver force must be able to compel battle, establish a zone of influence, and shock the enemy forces makes proving his thesis far more difficult. It also makes his work far more effective at silencing recent air power critics. The assertion that air power lacks shock, compellence, and influence capabilities lies at the heart of the argument that air power is only a form of precision fire, and not a maneuver force. The author's choice of ancient and pre-modern historical examples also lends credibility to maneuver as a fundamental principle of the operational art of war, rather than as a temporary benefit of technological advantage.

The attention to effective definition of maneuver warfare results in a coherent, well organized argument of the thesis that air power is an operational maneuver force. The case studies used to illustrate the maneuver characteristics of air power include the 1973 Arab-Israeli war, the 1972 Easter Offensive in Vietnam, and air war during the Normandy invasion. Again, Givens has chosen his examples wisely. The selected case studies showcase air power in a variety of climatic conditions at various stages of technological development. He elected, consciously, to exclude Desert Storm because of continuing controversy about whether the war was an aberration, with exceptional conditions particularly suited to supporting Air Force claims about the effectiveness of air power. In each case, Givens effectively presents air power's demonstration of positional advantage, shock, compellence of battle, and zone of influence. His arguments go beyond a machine-like application of these principles to his air power examples. He treats the four traits as aspects of an integrated whole. For example, he shows how the lethality of the Israeli Air Force limited maneuver options outside of their SAM umbrellas for Egyptian and Syrian ground commanders in the 1973 war. He then shows how the IAF doggedly fought to establish air superiority over the Arab integrated air defense networks to create a "vertical flank" position of advantage. Finally, he explains how the IAF exploited this hard-won position of advantage to compel battle, leading to shock and disruption the enemy attack by both independent action of air power and combined actions of Israeli air and ground forces. The examinations of the Easter offensive and Normandy receive similar effective treatment. Documentation is excellent throughout the work, with appropriate and extensive use of secondary, primary, and some statistical resources to back up every detail offered.

Turning the Vertical Flank ultimately succeeds because Givens does not bite off

more than he can chew. The author repeatedly emphasizes that his goal is to demonstrate that air power should be considered as a maneuver force on a co-equal basis with surface forces. He asserts that air power's superior mobility can help it compel battle with the enemy better than ground forces, but he concedes that ground forces ultimately deny battle through halting defense better than the transitory effects generated by air attack. In each case study he points out that air power has been used to engage surface maneuver elements independently of surface forces. However, he also provides even more examples showing the effectiveness of air power as a maneuver element in a combined arms team. He illustrates the effectiveness of air power as a maneuver force in campaigns that vary by time, technology, and condition. He doesn't suggest that air power is the panacea for all operational maneuver problems.

Only in one detectable instance does the author overreach himself. The argument that strategic attack of supply and logistics targets in North Vietnam and interdiction operations against the Ho Chi Minh Trail represented "extending a zone of influence" over NVA forces attacking South Vietnam during the 1972 Easter offensive is not convincing. This line of reasoning should have ended with the much more coherent argument Givens makes that interdiction attacks closer to the NVA maneuver elements immobilized them for subsequent air and ground counter-attack. Overall, howev-

er, his effort carefully establishes air power's place in maneuver warfare doctrine, effectively explaining the need for Joint Force commanders to establish a "vertical flank" in battle that can team with surface power to create a paralyzing dilemma for enemy defense.

Air power history enthusiasts looking for extensive treatment of strategy and political context, logistics and technology discussion, or narratives presenting the human drama of air combat will be disappointed. Givens' writing is tightly centered on proving his thesis through historical examples of operational level air campaigns. However, many readers not interested in the doctrinaire nature of the paper will nonetheless appreciate the author's brief and articulate synopsis of the air operations in each campaign presented. Maps for each campaign are indispensable. Those provided are busy and complicated, but this is largely inescapable due to the massive scope and complexity of the air campaigns described. Considering the small size of the book, the bibliography is quite extensive and provides an excellent jumping off point for those wishing to study the intriguing air campaigns discussed in greater detail.

Maj Martin L. Rothrock, USAF—Student, U.S. Marine Corps Command and Staff College, Quantico, Va.



Early Cold War Overflights 1950-1956: Symposium Proceedings Vol. I & II. By R. Cargill Hall and Clayton D. Laurie, Eds. Chantilly Va., National Reconnaissance Office, 2003. Photographs. Maps. Illustrations. Notes. Selected Readings. Vol. I., Pp. 654; Vol. II., Pp. 371 ISBN 0-9724322-0-5 (Available for purchase from U.S. Government Printing Office, Washington D.C. or National Technical Information Service (NTIS), Springfield Va.)

These two thick volumes are essential to anyone writing about or studying the Cold War, military reconnaissance, aviation history, and the history and contributions of the USAF, U.S. Navy, and Royal Air Force. They are an immensely detailed, revealing, and authoritative accounting of the Anglo-American aerial effort to gather information about the Cold War Soviet Union and its military and technological resources and capabilities. Each chapter contains largely first-person accounts by aircrews and technicians involved in specific individual flights or larger projects. They are very readable and informative and, at times, chilling or even humorous. Most read like a good novel you don't want to end.

This work is really just the beginning of the story, as there is much more to be told and known. But this is a solid step in accurately telling a necessarily secretive and unknown history of British and American overflights (not peripheral reconnaissance flights) of "denied areas" (the Soviet Union,

THE BATTLE OF BRITAIN

Air Defence of Great Britain, Vol. II

T C G James

Edited and with an Introduction by Sebastian Cox, *Head of the Air Historical Branch of the Ministry of Defence*

Foreword by Air Chief Marshal Sir Peter Squire

'there can be nothing but praise for such a majestic, seminal history as this one.' *Air Pictorial*

This volume offers the reader access to the RAF's detailed contemporary day-by-day account of the Battle.

456 pages illus 2000

0 7146 5123 0 cloth \$62.50/£45.00 0 7146 8149 0 paper \$26.50/£18.50

Royal Air Force Official Histories

COURAGE AND AIR WARFARE

The Allied Aircrew Experience in the Second World War

Mark K Wells, *Deputy Head of the United States Airforce Academy's Department of History*

Winner-Society for Military History Distinguished Book of the Year 1997

'Courage and Air Warfare is well written and well researched. It is relevant especially to those who would aspire to the command of flying units. Give it a very high place on your reading list.'

Dr David Mets, Maxwell AFB, Alabama, Airpower Journal

256 pages illus 1995 repr. 1997, 2000

0 7146 4618 0 cloth \$59.50/£42.50 0 7146 4148 0 paper \$24.50/£17.50

Frank Cass Publishers

North American Orders: ISBS, 5824 NE Hassalo Street, Portland, OR 97213 3644, USA Tel: 800 944 6190 Fax: 503 280 8832

UK/RoW Orders: Crown House, 47 Chase Side, Southgate, London N14 5BP Tel +44 (0)20 8920 2100 Fax: +44 (0)20 8447 8548

Website: www.frankcass.com

AIR POWER HISTORY

Turning Points from Kitty Hawk to Kosovo

Peter Gray, *Director of Defence Studies for the Royal Air Force* and Sebastian Cox, *Head of the Air Historical Branch of the Ministry of Defence* (Eds)

Contributors from academia and the services examine the theory and practice of air power from its earliest inception.

288 pages 2002

0 7146 5291 1 cloth \$64.50/£45.00 0 7146 8257 8 paper \$26.50/£18.50

STRATEGIC AIR POWER AND THE GULF WAR

John Andreas Olsen, *Royal Norwegian Air Force Academy*

Olsen provides a comprehensive examination of the origins, evolution and implementation of 'Operation Desert Storm' using official military and political documentation, interviews with US Air Force officers and Iraqis with experience of the inner workings of the Iraqi regime.

256 pages 2003

0 7146 5193 1 cloth \$62.50/£45.00 0 7146 8195 4 paper \$26.50/£18.50

North Korea, Eastern Europe and the People's Republic of China) from 1950 through 1956. The volumes reveal, clarify, and document an incredible amount of material including some previously appearing in various books and magazine and newspaper articles only as tantalizing footnotes or unsubstantiated reports. These include the RF-100A "Slick Chick" activities in Europe and the RF-86A "Ashtray" flights made from Okinawa and Korea during and after the Korean War. Also documented are the better known RB-45C flights made by Royal Air Force "Special Duty Flights" crews in American aircraft wearing RAF roundels and refueled by KB-29s.

If a reader wonders about the scope of these efforts, the list of aircraft types involved is just one clue: RB-45B/C, RB-47B/E/H, RAF Canberra, RB-57A/D, RF-86A/F, and RF-100A missions are highlighted. But the author also mentions flights of RF-80A, RF-84F, P2V-3W, RB-29, RB-50E, RB-17, A-26, RC-97, RC-118, RC-121, and RC-130 aircraft as well. Unfortunately, little is included about RB-36 activities. And the study's scope means that the work of RB-66, photo-recon F9F, FH, and PB4Y aircraft is not included. The work of RAF photo-recon Spitfires is just mentioned as is some material on mainland China overflights by Republic of China U-2, RB-57, and RF-84 aircraft. Another aspect of these overflights still remaining largely untold and under recognized is the critical role of the USAF KB-29, KB-50, and KC-97 tankers in the success of these missions. There seems to be so much history and so little time to document it.

While the skills, courage, resourcefulness, and professionalism of flight crews and support staffs are finally publicly recognized, the reputations of several important national figures are also appropriately enhanced:

This work dispels the image of President Eisenhower as a genial, somnambulant golf-playing president. The strategic and organizational vision and skills that made D-Day possible were applied to the problem of determining Soviet capabilities and intents in some of the earliest and most frigid days of the Cold War. "Ike" transformed national security for the Space Age. Among his significant decisions were authorization of U-2 development, approval of specific overflights, and funding of reconnaissance-satellite development. He also established a highly compartmentalized program regarding overflights and the processing, interpretation, and dissemination of the gathered information. Vol. II presents (intelligently and, thankfully, chronologically) a range of official documents related to overflights and the security arrangements surrounding their planning and conduct and use of the gathered information.

Some historians, authors, journalists and at least one movie producer have delighted in Strangelovean depictions of Gen. Curtis LeMay as a "loose cannon" wag-

ing his own "war" against the Russians. Material presented here dispels that mythical image. LeMay's adherence to the chain of command, both military and civilian, is documented as well as his defined role in these flights. His deep concern for the safety and welfare of his crews and his better known insistence on exceptionally high and strict standards of military behavior and technical aeronautical competence are also detailed. President Truman's role in authorizing the earliest overflights is also documented, a little recognized act of foresight and courage taken by an under-estimated and appreciated leader.

Also included are dozens of wonderful and insightful anecdotes and flying stories as well as several mind-teasing revelations. An example is in Lt. Col. Arthur Andraitis' article about overflight imagery interpretation in the 1950s. He was with the 497th Reconnaissance Technical Squadron in West Germany and compared human intelligence reports with satellite imagery to verify an agent's accuracy. A member of his crew couldn't identify the type of helicopter in U.S. Army markings appearing in a photo taken along the Rhine River in West Germany when most of the photos they studied were of Eastern Europe or the Soviet Union. Andraitis looked at the photo and realized that he was seeing a Russian Mil Mi-1 light utility helicopter in American markings being flown up and down the Rhine around American military installations!

The editors have also included an excellent appendix of suggested readings from a vast range of sources. As a very minor aside, it is unfortunate that Lt. Col. John Farquhar's research on overflights and other reconnaissance missions is neither included nor generally available. The deputy head of military history at the Air Force Academy, Farquhar was among a distinguished group of authoritative experts who assisted in organizing and chairing the symposium's panels.

These two volumes are a significant addition to the body of knowledge not only about political, military, and aviation history and the technology of aerial reconnaissance, but also the larger paradigm of the still-to-be written history of the latter half of the 20th Century.

Thomas Wm. McGarry, Aviation News Service, Lake Oswego OR



Airwar: Theory and Practice. By Philip S. Meilinger. London and Portland Ore.: Frank Cass Publishers, 2003. Tables. Diagrams. Illustrations. Notes. Index. Pp. x, 234. \$27.50 Paperback. ISBN: 0-7146-8266-7

The U.S. Air Force has several categories of icons: Billy Mitchell, Hap Arnold, and Alex de Seversky are high on the list of prophets of independence and victory through air power.

Kenney, Spaatz, Eaker, Stratemeyer, Momyer, and Horner are prominent among practitioners. George, Hansell, Kuter, Walker, Boyd, and Warden warrant inclusion with the theorists and planners. Phillip Meilinger has a niche of his own having served as the Dean of the School of Advanced Air power Studies as well as authoring four books and about 40 articles on that subject.

This work is intended to tell the story of air power evolution. It is patched together from a variety of Meilinger's books, articles, and lectures. All of the various chapters are well prepared, interesting, and generally worth reading. They were not, however, designed to be connected whole and, therefore, don't add up to a cohesive entity. Even though all are written by the same author, the book then suffers the usual limitations of any collection of essays. A few are of limited value to a general reader—even an informed one.

The first chapter is about Douhet, who, with Clausewitz, Jomini, and Sun Tzu, is more often quoted and misquoted than actually read. Another chapter covers Lord Trenchard who is rightly considered the Father of the Royal Air Force. RAF doctrine expanded and codified his beliefs, but those theories were unsuited for World War II. Jack Slessor is also covered and was one of Britain's most brilliant thinkers and more prescient about the role of air power in future war.

The chapter on the Fleet Air Arm brings to mind our own "Revolt of the Admirals." The Geneva Disarmament Conference of 1932-34 included an attempt to abolish aerial bombing and, perhaps, all military aircraft. Luckily or not, this was as successful as the ban on unrestricted submarine warfare.

"Air power and Joint Operations during WWII" does a good job in 20 pages of covering the evolution of multi-service doctrine. Armies and navies have had to fight together for centuries and had achieved a certain *modus vivendi* (or *combatare*). Now there was a new partner—and not one willing to accept a junior share.

The chapter on the B-29 concentrates on several significant matters such as why Arnold took command of the Twentieth Air Force; how Wolfe, Hansell, and LeMay fit into the hierarchy; and the roles played by Nimitz, Hoover, and Harmon. The reason for the change of tactics for the Superfortress is well explained.

Targeting for effect brings us to John Boyd's "OODA Loop," which seems so simple that there must be more to it (the colonel did have a lengthier presentation he insisted on giving). Basically, it means getting inside the enemy's decision cycle—though a recent pundit describes it as "Observe, Overreact, Destroy, Apologize."

The final chapters get into the future of aerospace power, but inserted here are six pages on "The Versailles Treaty and Iraq: On the Road to Munich." This by itself is worth the price of the book.

The only picture provided is of the author. Some might prefer to see what Douhet, Trenchard, or some of the other key players looked like. Also, a map would help clarify B-29 operations. But these aside, the wide range of subjects and their scholarly analyses deserve the attention of any reader interested in air power.

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



Arabs at War. By Kenneth M. Pollack. Lincoln: University of Nebraska Press, 2002. Maps. Notes. Index. Bibliography. Pp. 698. ISBN: 0-8032-3733-2

This book examines why Arab militaries consistently performed poorly and provides an assessment of their strengths and weaknesses—an increasingly important assessment as the U.S. increases its presence in the Middle East. Cannibalized from Pollack's 1996 MIT dissertation, it is surprising a major press did not gobble up his book sooner. It analyzes the traditional explanations for Arab weaknesses—unit cohesion, generalship, tactical leadership,

information management, technical skills and weapons handling, logistics, morale, training and cowardice—for Egypt, Iraq, Jordan, Libya, and Syria. What he finds is surprising and informative.

Regardless of country or political system, the militaries all shared similar traits. Contrary to conventional wisdom, Arab armies were cohesive (at least at the company and battalion level) and their soldiers brave. Arab units often fought to the death and disintegrated only when ordered to retreat under aggressive enemy pursuit. While morale varied by army and war, soldiers' resolve tended to stiffen when defending their soil, as with Iraq during its war with Iran. Further, with the exception of Syria, all nations had outstanding logistics support. Egypt and Libya, for example, fought expeditionary wars in Yemen and Chad respectively and never wanted for supplies.

Generalship received a barely passing grade. Senior staffs usually developed good plans, as in Jordan's 1967 West Bank defense; and, as long as the battles went according to plan, armies performed well. But as von Moltke observed, "No plan survives contact with the enemy." Senior field commanders proved unable to adapt their plans to

fluid situations. Incredibly, when the gods of war turned against the Arabs, these commanders often fled the battlefield!

While general staffs received mixed ratings, tactical leadership failed. Small unit leaders proved incapable of leading troops and reacting to unpredictable situations. Outflanked and surrounded Arab units simply could not reorient to meet new threats. Moreover, Arabs often declined or rejected appeals from beleaguered neighboring units. Instead, they stayed in their defensive positions and waited for the enemy to roll up their flank.

Arab armies also suffered from information management deficiencies ranging from feeble signals protection to poor reconnaissance and intelligence gathering to false or exaggerated reporting. Among the most egregious examples is Egypt's claims to have destroyed the Israeli Air Force on the first day of the Six-Day War when the reverse was true. Egypt's lies caused Syria and Jordan to change their war plans and launch different or accelerated offensives or—if Jordan had known the truth—would not have attacked Israel at all! False reporting permeated the Arab military structure. Minor advances became enemy routs. Stalemates became victories. Friendly defeats

Celebrating 50 Years of Air and Space Power Publishing

Currently seeking manuscripts on Aerospace Doctrine,
Strategy, History, and Biographies
of Pioneer Airmen

AIR UNIVERSITY PRESS
131 West Shumacher Avenue
Maxwell AFB AL 36112-6615

For catalog or information, call
334-953-2773/6136 DSN 493-2773/6136
Fax 334-953-6862 Fax DSN 493-6862

<http://aupress.maxwell.af.mil>



became enemy setbacks. By the time the truth filtered to the decision-makers it was too late to stop disaster.

Finally, education, training, and equipment maintenance were abysmal. Concerned more with political advancement than military efficiency, officers rarely insisted on realistic troop training; most was highly scripted and rarely deviated from the syllabus. This lackadaisical attitude spilled over into other areas such as weapons maintenance where, for example, Saudi Arabia replaced equipment every six months.

Arab air forces performed worse than their armies. Training was so poor and weapons so complicated that Arab nations found it difficult to maintain enough pilots to fly all the modern aircraft. Some Arab nations resorted to hiring foreigners to operate their aircraft. Pollack underscores that although Israeli air power actually destroyed relatively few tanks, the effect paralyzed or routed enemy forces. He validates the statement of another desert fighter who lamented about Allied air superiority in World War II, "Anyone who has to fight, even with the most modern weapons, against an enemy in complete command of the air, fights like a savage against modern . . . troops, under the same handicaps and with the same chances of success."

Pollack has written a truly interesting study that goes beyond why Arab militaries have failed to gain victories. *Arabs at War* validates the principles of combined arms operations and joint and combined operations. The keys to successful military effectiveness include well-educated and free soldiers who support their government coupled with realistic training stressing initiative and ingenuity with accurate and timely reporting. Technologically superb weapons are worthless unless maintained and operated by highly trained, motivated soldiers. Finally, nations should guard against the military becoming the purview of a single political philosophy. When that happens, officers worry more about gaining the next position and accumulating more power and less about fighting war. Anyone interested in what impairs or enhances military effectiveness should read this book.

Maj. Jim Gates, USAF, Air Staff, Pentagon



Like Sex with Gods: An Unorthodox History of Flying. By Bayla Singer. College Station: Texas A&M University Press, 2003. Number 3, Centennial of Flight Series. Illus-

trations. Photographs. Glossary. Timeline. Notes. Bibliography. Index. Pp. x, 219. \$29.95. ISBN: 1-58544-256-9.

The casual reader of aviation history is in for an unusual journey. Bayla Singer, historian of technology and culture, has charted an unorthodox approach to the subject by looking at the diverse cultural threads that compelled some societies to take to the skies and others to remain grounded. The reader can tell that Singer is a lecturer and professor by the tone of her book. It is not unusual for her to ask the reader, "What do you think?" and to challenge her audience to think outside the box. The author's discussion of the sexuality of flight, encompassed in the term "cockpit," for example, is provocative. And I was absorbed by her tale of the way in which you can make an Easter egg float in the air. I suspect that less adventurous readers, however, may wonder at times how the disparate ideas relate to the attainment of manned flight.

The narrative is divided into two parts. The first examines the cultural "dreams and mythology" that led to flight while part two looks at the "theory and practice" behind the development of balloons, dirigibles, and heavier-than-air craft. Some of the legends

Lancaster Index to Defence & International Security Literature

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

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

Military Policy Research Ltd.

Smithsonian Institution Press Ad-- Full Page

Draw from last issue, Page 53

Bleed to edge of paper

and myths found in the first section stray pretty far afield from the standard treatment, but that's the way in which Singer differentiates her study. The second portion of the narrative is an abbreviated version of the evolution of the hardware of flight with which most readers will be familiar. The glossary alerts us to the fact that the whole vocabulary of aviation had to be negotiated once humankind took to the skies, and the Timeline helps pull together the threads of Singer's thesis. One of the many delights to be found in this book is the rich illustrations, many of which I had not seen before.

While fascinated with the disparate myths and stories strung together, there were several aspects of the book I found lacking. Like many lecturers, Singer hits the high points but glosses over details. She pays due homage to George Cayley, but mentions John Stringfellow and William Samuel Henson without describing their work with steam-powered aircraft. She also has an extensive passage about the Brazilian Alberto Santos-Dumont without mentioning that it was he who performed the first flight of a manned, controlled, heavier-than-aircraft before an official sanctioning body. One

association I would have expected in this examination of the significance of words, thoughts, and belief systems to the evolution of flight was the development of the Ezekiel Airship in Texas, a contraption that most likely flew more than a year before the Wrights became airborne at Kitty Hawk. Finally, looking to find the works behind specific passages in this book, I became frustrated at times with the sparse footnoting. Singer's celebration of the many streams of culture that led to manned flight is noteworthy, and while *Like Sex with Gods* may be an unorthodox history of flying, it is an important contribution to the literature of aviation.

Bruce Ashcroft, HQ Air Education and Training Command History Office




Forgotten Fields of America, Volume III: World War II Bases and Training, Then and Now. By Lou Thole. Missoula Mont: Pictorial History Publishing Co., 2003. Photographs. Appendix. Pp. x, 178. \$17.95 ISBN: 1-575510-102-5

In this well-researched third volume about America's old World War II airfields, author Lou Thole again provides a nostalgic yet fact-filled tour of these once mighty bases. With the sole exception of the still very vital Columbus AFB in Ohio, all of the fields in this book are no longer active military installations.

As the author illustrates, both in his text and through excellent then-and-now photographs, some of the old bases have become municipal airports; industrial parks; or, perhaps most hauntingly, nothing but ruins that can only echo the feverish activity of six decades ago. As he did so effectively in his first two volumes, the author weaves into his chapters the personal recollections of some of the veterans who served on the fields during the war. It is through their words that today's reader is able, at least in part, to experience those exciting days of yesteryear, filled as they were with thrilling adventure, hardship, sheer boredom and, all too often, tragedy.

Included in this volume are the stories of the dedicated black pilots who struggled against all odds, both civil and military, at Tuskegee Field, Alabama, as well as the adventures of those who endured the harsh



AIR POWER

New books from Texas A&M

100 YEARS OF AIR POWER AND AVIATION

ROBIN HIGHAM
Higham presents a critical history of British, American, Soviet, German, Italian, French, Japanese, and Israeli air power and aviation. In the process, he uncovers the social, economic, and political components; the lessons learned during wartime; the composition of air forces; and the creation of aviation industries. "Students of all levels—begin or continue your exploration here."—Stephen L. McFarland. 8 1/2x11. 480 pp. 398 b&w photos. \$50.00

THE BIRD IS ON THE WING

Aerodynamics and the Progress of the American Airplane
JAMES R. HANSEN
Hansen presents an easily understandable overview of the research and design processes that gave rise to historic American aircraft such as the DC-3, X-1, and 747. 54 b&w photos. 240 pp. \$50.00 cloth; \$24.95 paper

TEXAS A&M UNIVERSITY PRESS

College Station, Texas
Orders: 800-826-8911
Fax: 888-617-2421
www.tamu.edu/upress

Illustration courtesy NASA

climates at Kingman and Williams in Arizona, and at Tonopah, Nevada. Also colorfully described are the fields at Dyersburg, Tennessee; Venice and Page in Florida; Laurinburg-Maxton in South Carolina; and Lubbock Army Airfield (later Reese AFB) on the High Plains of Texas. The final chapter provides a fascinating in depth look at Wendover Field, Utah, which the late Bob Hope once dubbed "Leftover Field."

Of all the chapters, the Wendover story probably provides the most evocative memory of the World War II experience. Home to the famed 509th Composite Group, commanded by Col. Paul Tibbetts, the field played a crucial role in the preparation for the fateful bomb runs over Hiroshima and Nagasaki. Now, where the legendary Enola Gay was once hangared, only desolation dwells. Yet, according to the author, the geographic isolation of the old field has provided it with a degree of protection that makes it perhaps the best preserved of all the World War II bases. It is somehow ironic to consider that Wendover Field, the stateside home of the bomb group that launched the age of nuclear weaponry in order to bring the terrible war to a close, now sits more or less intact in the bleak desert of western Utah.

Every chapter in this book contains far more than just a nostalgic look back in time. Readers can learn much about the Army Air Forces and its training regimen as well as gain insight into the civilians who were the hosts—willingly or otherwise—to the men who, for a brief but exciting time, came their way to learn the skills of war.

There are a few geographical glitches that spring up here and there in the book, such as placing the Admiral Nimitz Museum in Virginia rather than in Texas and a duplication in the otherwise excellent Appendix that sites Sherman Field, Texas, one mile northeast of Fort Leavenworth, Kansas.

These are only minor distractions, however, and in all other respects, *Forgotten Fields, Vol. III*, is every bit as informative as were its two predecessors. Hopefully, a fourth volume is nearly ready to take wing.

Tom Alexander, *President, The Alexander Company, Fredericksburg, Texas*



They Marched into Sunlight: War and Peace, Vietnam and America October 1967. By David Maraniss. New York: Simon & Schuster, 2003. Maps. Photographs. Notes. Bibliography. Index. Pp. xvii, 572. \$29.95 ISBN: 0-7432-1780-2

Maraniss examines the closely contested and monitored clashes on three fronts during the fall of 1967: that of the soldier in Vietnam, the University of Wisconsin students, and the Washington political scene. At this time, the many issues that sparked student protests and demonstrations were melded into a single cause under the banner

of the Vietnam War. Most arguments against the war became linked by the single unifying tenet among the young men on campus: fear of being drafted, wounded or killed in the continuing war. Maraniss' depiction of the third front, the Washington political scene, is not new. The tribulations and angst of President Lyndon B. Johnson and his Secretary of Defense Robert S. McNamara and others have been recorded elsewhere. The book's uniqueness is the meshing of these three areas of conflict.

Maraniss's protest scenes take place on the University of Wisconsin Madison campus, on October 17 and 18, 1967. Dow Chemical, manufacturer of napalm for the military, arrives to recruit prospective applicants. The students blame Dow and its product for killing innocent civilians in Vietnam. On October 17, an ambush and a massacre northwest of Saigon became known as the battle of Ong Thanh. There, Alpha and Delta companies of the "Black Lions" Battalion, 2/28 Infantry Regiment, First Infantry Division, fought the Viet Cong's First Regiment and a large contingent of North Vietnamese Regulars.

The student issues at the time were so diverse that it proved difficult to find a common ground. However, the war in Vietnam consolidated these issues into a single cause on which protesters focused. For example, the feminist movement obtained equal status such mundane concerns as re-inflating basketballs in March, to permit students to use indoor facilities in lieu of relinquishing them to the baseball team, whose "field of dreams" remained frozen under layers of melting snow. A focal point was required and the war in Vietnam became the linchpin.

In the students' drive for a common cause are found some essential elements of democracy. Throughout the caucusing efforts, certain students rose to leadership positions; some followed, while others left in disgust or lost interest. Still others pursued practical endeavors, such as, studying, writing term papers, and taking part time jobs to retain their student status that warranted their draft deferment. But for thousands of other young Americans of lesser means, there was no choice — nothing but the reality of dead bodies on the battlefields of Vietnam.

An example of devotion to the cause on the campus was Richard B. Cheney, a two-time "flunky" from Yale, who returned to his home state to attend the University of Wyoming on a six-year program. In 1967, he was a second year graduate student at Wisconsin working on a Ph.D. in political science. Cheney was married and a parent, who had reached the magic draft exempt age of twenty-six that year. Thus, he was free to pursue his life's goals, while younger men squirmed with their fears of combat and death. Timing is everything.

The book's two main settings — the college campus and the battlefield — aptly

exhibit the nature of two classes in the United States: those with connections and the means to avoid service by attending college, and those who did not and were gobbled up in the war machine. By contrasting the backgrounds of the participants on campus and in combat, the author emphasizes the privileges and handicaps of the "class system" in the U.S. and the resulting consequences.

It was a tightrope on which the students of the mid-1960s walked. Getting into school and staying there was wrought with angst. Failing grades surely meant a government sponsored one-year trip to the jungles and nightmare of Southeast Asia. College acceptance and passing grades meant draft exemption and deferment. Maraniss's portrayal of the apprehensions of draft age men on campus and the realities and horrors of the war rings true. With the news media's realistic assessment of the war in articles, stirring photographs and television, draft-eligible students witnessed the war daily. They did not want to die in a war of attrition that was being sold by political and military leaders.

Reading Maraniss's battle accounts raises sympathy for the young soldiers who endured the gore and atrocities of war in a "no-win" situation. With death all around, and the battlefields strewn blood and body parts, it is not surprising that many returning veterans suffered from physical and psychological wounds. This book makes a strong case for the government's obligation to provide everything possible for the veterans.

The author points out that the military leadership made serious miscalculations before the October battle ensued. Both the young soldiers and Lt. Clark A. Welch, who commanded Delta Company, were apprehensive before the battle. They wanted B-52 strikes and artillery barrages to hit known enemy positions prior to leaving their night defensive lines. Maraniss's description of the chaos and carnage that followed the Red Lions' advance into the Secret Zone compares to the battle portrayal in *We Were Soldiers Once and Young*. The fears, cries of anguish and pain, the smell of death and sheer exhaustion of battle upon one's nerves and mind are descriptively awesome, torturous, and terrible.

The author attempts to link the ambush of soldiers in Vietnam by the Viet Cong and North Vietnamese regulars with the surprise attack by the police against the students at the University of Wisconsin. But getting caught up in a student protest or demonstration that occasionally featured tear gas and police wielding batons hardly compares to terrors of the battlefield. Moreover, innocent bystanders who happened to catch a blow at a demonstration cannot compare to the draftee's encounters with death and butchery in war.

Maraniss admits to an obsession with the connections. He was himself a freshman

at the University of Wisconsin in the fall of 1967, and witnessed the confrontation on campus. In 1970, he drew a low lottery number and was deemed 4F, following a physical examination that diagnosed his asthmatic condition. Perhaps another medical office, another draft board, and an undetected ailment in another part of the country might have declared him draft eligible.

Much like the Gulf of Tonkin Incident, of August 1964, gave impetus for the buildup of U.S. forces in Vietnam, the battle of Ong Thanh and the rising tide of student protests during the fall of 1967 provided the catalyst for the disenchantment with the war. These flames of dissent would be fanned to disaster levels in three months by the 1968 "Tet Offensive."

During the protest years of the late 1960s and early 1970s many returning veterans were not welcomed home with appreciation for their service. Instead, many were spat upon and met with derisive remarks, such as, "baby killers" and "warmongers." This cold reception by an ungrateful nation cut deeply into the heart and the mind of the veteran who had seen his buddies suffer and die in sacrificing all for their country. There were long-term negative affects for the veteran, but none for the protestors except for the guilt of having other Americans die in their place or perpetually wondering [perhaps the author as well] if they had served could they have survived the horrors of war and continued to live sanely.

This is brilliantly written and spellbinding book that answers many questions in an inspiring epilogue. A reader is in search of an account of the most pressing issue of the second half of the 1960s and the early 1970s in the United States of America, will not find a more comprehensive or better source with which to begin. The Vietnam War divided this nation like no other issue since the Civil War. *They Marched into Sunlight* superbly illuminates that period.

Dr. George M. Watson, Jr., Chevy Chase, Maryland, and author of *Voices from the Rear: Vietnam 1969-1970*.



Women Who Fly. By Lynn M. Homan and Thomas Reilly. Illustrated by Rosalie M. Shepherd. Gretna, La.: Pelican Publishing Co., 2004. [Juvenile Nonfiction, ages 8-12] Pp. 103. \$14.95 ISBN: 1-58980-160-1

In 1911, women achieved something—that something was flight. The book, *Women Who Fly*, by Lynn M. Homan and Thomas Reilly, tells of those achievements. I enjoyed reading this book because I found it very entertaining and interesting.

Woman Who Fly tells about Harriet Quimby who was the first woman to get her pilot's license. It describes how in 1921 Bessie Coleman became the first African

American female to get a pilot's license. The book also focuses on Amelia Earhart, who in 1932 became the first woman to fly solo across the Atlantic Ocean. Unfortunately, she and her co-pilot, Fred Noonan, disappeared while trying to fly around the world. There are many theories about what happened to them. You must read the book to find out what happened.

The book concludes by discussing women in the space program. This includes Jerrie Cobb, an astronaut who did not make it to space, but spent years flying medicine and supplies to poor areas in Central and South America. She was nominated for the Nobel Peace Prize in 1980. While Jerrie Cobb did not make it to space, Sally Ride did. She was the first American woman to fly in space, but not the first woman. Valentina Tereshkova, a Russian woman, flew in space in 1963.

Although the book focuses on successes, it also describes certain failures. This includes STS-51L and STS-107, otherwise known as the *Challenger* and *Columbia*. Sadly, these two space shuttle missions ended in disaster when the shuttles exploded.

I think this book would be interesting to people that enjoy history, women's accomplishments, flight and space exploration. It talks about both the past and the present. I liked this book and recommend it to other elementary and middle school aged kids.

Jordan S. Goldberg, age eight, Clarksville, Maryland



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

This is one of the most delightful books I have read in some time. Actually, it's not so much a book as a monograph. Dr. Young has, from his excellent vantage point at the Flight Test Center, set down not only the story of America's tenuous beginnings in jet aviation but also how the country gained at least temporary preeminence in the field.

He begins his story where any history of jet aviation must begin: the work of Whittle in Great Britain and von Ohain in Germany. While the efforts of these two men have been covered in great depth in many books, Young in only six pages does a masterful job of getting to the heart of early jet development and then leading directly into "Hap" Arnold's visit to the UK in 1941. The general was stunned at the advanced level of British development. The author then presents the story of why America ended up in another "not invented here" situation and the work undertaken by Arnold, Larry Bell, General Electric, and others to catch up.

GE rolled its "Type I-A Supercharger" (a security cover) into the test cell only five and a half months after getting the job to develop the first U.S. jet engine. To say there were major problems would be an understatement, but the company persisted. Meanwhile, Bell was equally hard at work coming up with an airframe (the XP-59A) to be powered by two of the new engines. All of the crated aircraft and engine parts arrived at a little-known Army training base in California known then as Muroc in September 1942. By October, the complete system had undergone taxi tests and was ready for its historic first flight on 2 October. America entered the Jet Age that day.

Young then relates the history of the flight test program of this inauspicious weapon system. The appendix contains the flight test reports from the first five flights. The piece of information I found most interesting—having given many hundreds of tours at NASM where I've noted the German Jumo 004 engine's maximum 10 hours of operation until first teardown—is that our engines lasted three hours before removal for inspection and repair! We did better later. By late 1944, the improved I-16 was going 10 hours, just like the Germans! As almost everyone realizes, the P-59 Airacomet was not going to be an operational weapon system. It was a testbed; it got the US started in jet aviation. Young gives a short history of the development of Lockheed's beautiful XP-80 with its J33 engine before finishing with what I believe is the volume's best feature—lessons learned from the P-59 program and America's late start and, most important, the transformation that took place in R&D within the U.S. Government as a result. Again Arnold is a prominent character along with Theodore von Karman, General Bill Craigie, and others.

The dozens of photos and diagrams only add to the excellence of the text. For something so short, this is a superb read and will enlighten anyone interested in the birth of the Jet Age.

Col. Scott A. Willey, USAF (Ret), Docent and Volunteer, NASM's Udvar-Hazy and Garber Facilities



The Day We Bombed Switzerland: Flying with the US Eighth Force in World War II. By Jackson Granholm. Shrewsbury, England: Airline Publishing Ltd., 2000. Photographs. Index. Pp. 246. \$16.95. ISBN: 1-84037-371-7

"The day we bombed Switzerland? I thought Switzerland was neutral?" were my wife's first words to me after she read the title. "That's right," I told her. "We bombed it by mistake." Granholm decided to write his book soon after he discovered that the transcript of the court-martial that occurred

after the bombing had been declassified. Not that he really needed a transcript; he was there in person as one of the three defence counsels!

Mr. Granholm has had a career in aerospace, electronic physics, and engineering. He is a contributing editor of *Western Viking*, a Seattle weekly, and editor of *Keystrokes*, a quarterly magazine. He has written over 1,000 magazine and newspaper articles, and his work appears in three anthologies. Twenty of his scripts have been produced as motion pictures.

The first half of the book is a series of stories describing the author's experiences as a B-24 navigator. He joined the Army in 1942 in hopes of becoming a pilot but washed out of flight training. However, his superiors saw potential and suggested he try navigator school. His experiences there range from flying in old and poorly maintained aircraft to a hilarious and amorous "goodbye" which took place in the back seat of a student's car in the training school's parking lot, in full view of the guys in the barracks!

From the States, Granholm was sent to the 458th Bomb Group, U.S. Eighth Air Force stationed at Horsham St. Faith in England. Here the stories become more serious: flights flown by "crazy" pilots who created imaginary malfunctions and headed back to base a half hour into the mission; his early relatively tame flights to French targets which ended quickly with his first mission over Germany; a navigator's job while Bf 109s hurled past the formation with guns blazing; what happened over the target area as *flak* got much too accurate for comfort; seeing his friend's plane being hit and starting its slow death spiral to the ground thousands of feet below; what life was like at Horsham St. Faith; and an unfortunate hunting accident

where a U.S. airman accidentally shot and killed an English civilian and the resulting court-martial.

The last part of the book addresses the bombing of Basel and Zurich in Switzerland and the courtroom drama that followed. The two defendants were Lts. William Sincok and Theodore Balides. Granholm's job for the defense, being a master navigator by that time, was to recreate the exact path the errant bombers took when they bombed Basel and Zurich. Were there extenuating circumstances which would exonerate the pilots from wrongdoing? How did they get separated from the main body of the bomber formation? How bad was the weather? How badly were the Germans jamming the radios and navigation equipment? Was the radar working? To make this situation all the more

interesting, the court-martial was chaired by none other than Col. James Stewart, the famed movie star.

Granholm's book is absorbing and readable. Underneath the detailed descriptions of the actions described, whether in the air or in the courtroom, one can feel the emotion and tension of the people involved. Unlike novels, where the characters are fictitious, these were real events with real people described in amazing detail. It was so absorbing, especially at the end, that I could not put the book down. For World War II buffs, this book is a must read.

Bill Nardo, Docent at NASM's Mall and Udvar-Hazy Facilities



New from

AIR
FORCE
History
and
Museums
PROGRAM

Available at
WWW.GPO.GOV

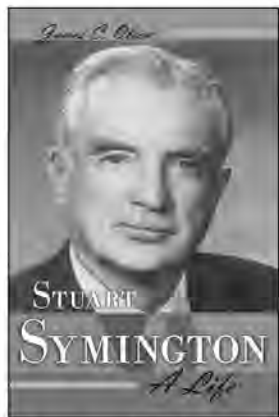


Help from Above

Schlight

Help from Above
Air Force Close Air Support
of the Army
1946-1973

John Schlight



Stuart Symington

A Life

James C. Olson

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

defense. During his tenure as secretary of the air force, he steered that organization through a series of crises, including racial integration, as it developed into an independent entity within the Defense Department. 560 pages, 40 illustrations, \$39.95

"Stuart Symington's story is as fascinating as it is complicated, and James C. Olson tackles the Herculean task of sorting it all out. This well-crafted book provides the first comprehensive portrait of Symington and his multifaceted career. The writing is clear and to the point. The research is impressive. Olson's access to personal papers still in the hands of the family afforded him valuable insights about Symington and his actions. *Stuart Symington: A Life* is a fascinating read."—William E. Foley

www.system.missouri.edu/upress

UNIVERSITY OF MISSOURI PRESS

Phone: 1-800-828-1894

Books Received

Atkinson, Rick, *In the Company of Soldiers: A Chronicle of Combat*. New York: Henry Holt and Co., 2004. Maps. Glossary. Index. Pp. 319. \$25.00. ISBN: 0-8050-7561-5

Burg, David F. and L. Edward Purcell. *Almanac of World War I*. Lexington: The University Press of Kentucky, 1998. Maps. Illustrations. Photographs.. Appendices. Bibliography. Index. Pp. xiv, 320. \$22.00 Paperback ISBN: 0-8131-9087-8

Busby, Michael. *Solving the Airship Mystery*. Gretna, La.: Pelican Publishing Co., 2004. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Bibliography. Index. Pp. 398. \$24.95 ISBN: 1-58980-125-3

Duncan, Stephen M. *A War of a Different Kind: Military Force and America's Search for Homeland Security*. Annapolis, Md.: Naval Institute Press, 2004. Notes. Index. Pp. xx, 366. \$28.95 ISBN: 1-59114-220-2

FAC History Book. [A CD by the Forward Air Controller Association, from Jungle Jim to the Mayaguez Incident, 1961-1975.] \$15.00. ISBN: 0-9703068-1-4 Distribution: citabriair@yahoo.com

Gray, Colin S. *The Sheriff: America's Defense of the New World Order*. Lexington: The University Press of Kentucky, 2004. Notes. Bibliography. Index. Pp. xi, 195. \$29.95 ISBN: 0-8131-2315-2

Haave, Christopher E. and Phil M. Haun, Eds. *A-10s over Kosovo: The Victory of Airpower over a Fielded Army as Told by the Airmen Who Fought in Operation Allied Force*. Maxwell AFB, Ala.: Air University Press, 2003. Maps. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xxxiv, 332. Paperback ISBN: 1-58566-122-8

Hoffmann, Peter. *Stauffenberg: A Family History, 1905-1944*. Montreal: McGill-Queen's University Press, 2003 [2d ed.] Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xix, 424 \$24.95 Paperback ISBN: 0-7735-2595-5

* Homan, Lynn M. and Thomas Reilly. *Women Who Fly*. Gretna, La.: Pelican Publishing, 2004. [juvenile non-fiction] Illustrations. Pp. 103. \$14.95 ISBN: 1-58980-160-1

* Maraniss, David. *They Marched into Sunlight: War and Peace, Vietnam and America, October 1967*. New York: Simon & Schuster, 2003. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography Notes. Index. Pp. xxvii, 572. \$29.95 ISBN: 0-7432-1780-2

Prados, John and Ray W. Stubbe. *Valley of Decision: The Siege of Khe Sanh*. Annapolis, Md.: Naval Institute Press, 2004 [Original Ed, Houghton Mifflin, 1991,] Maps. Illustrations. Photographs. Notes. Glossary. Bibliography Index. Pp. xxi, 551. \$21.95 Paperback ISBN: 1-59114-696-8

Record, Jeffrey. *Dark Victory: America's Second War Against Iraq*. Annapolis, Md.: Naval Institute Press, 2004, Notes. Bibliography Index. Pp. xv, 203. \$24.95 ISBN: 1-59114-711-5

Roach, Kent. *September 11: Consequences for Canada*. Montreal: McGill-Queen's University Press, 2003. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. 272 \$22.95 Paperback ISBN: 0-7735-2585-8

Ryan, Mike. *Baghdad or Bust: The Inside Story of Gulf War 2*. South Yorkshire, UK: Pen & Sword Books, Ltd, 2003. Maps. Photographs. Index. Pp. 220, L 19.95 ISBN: 1-84415-020-8

PROSPECTIVE REVIEWERS

Anyone who believes he or she is qualified to substantively assess one of the new books listed above 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: scottwille@aol.com

* Already under review.

Schlight, John. *Help from Above: Air Force Close Air Support of the Army, 1946-1973*. Washington, D.C.: Air Force History and Museums Program, 2004. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. xv, 455.

Sherwood, John D. *Afterburner: Naval Aviators and the Vietnam War*. New York: New York University Press, 2004. Photographs. Notes. Glossary. Bibliography. Index. Pp. x, 353. \$32.95 ISBN: 0-8147-9842-x

Stueck, William, Ed. *The Korean War in World History*. Lexington: The University Press of Kentucky, 2004. Maps. Notes. Index. Pp. 203. \$35.00 ISBN: 0-8131-2306-2

Tomblin, Barbara Brooks. *G.I. Nightingales: The Army Nurse Corps in World War II*. Lexington: The University Press of Kentucky, 1996. Map. Notes. Bibliography. Index. Pp. viii, 254. \$22.00 Paperback ISBN: 0-8131-9079-7

Trest, Warren. *Missing in Paradise*. [Fiction: A Jake Falcon Mystery] Montgomery, Ala.: Court Street, 2003. \$.00 Paperback ISBN: 1-58838-156-0

Van Creveld, Martin. *Supplying War: Logistics from Wallenstein to Patton*. [Second Edition] New York: Cambridge University Press, 2004. Maps. Notes. Bibliography. Index. Pp. 313. \$70.00 ISBN: 0-521-83744-8

New from

AIR
FORCE
History
and
Museums
PROGRAM

Available
at
WWW.GPO.GOV



History of Rocketry and Astronautics

Donald C. Elder and Christophe Rothmund, Editors



AAS History Series, Volume 23

IAA History Symposia, Volume 15



HISTORY OF ROCKETRY AND ASTRONAUTICS BOOK SERIES

American Astronautical Society History Series

For a complete listing of these excellent volumes on the history of rocketry and astronautics, including brief descriptions of each volume, tables of contents of most of the volumes and ordering information, please visit the following pages in the book sections of our Web Site:

1. http://www.univelt.com/Aasweb.html#AAS_HISTORY_SERIES
2. http://www.univelt.com/Aasweb.html#IAA_PROCEEDINGS_HISTORY_ASTRONAUTICS_SYMPOSIA
3. <http://www.univelt.com/htmlHS/noniaaahs.htm>

If you would like for us to send you more information, then please contact us as follows:

Univelt, Inc., P.O. Box 28130,
San Diego, CA 92198, USA
Tel.: (760) 746-4005; Fax.: (760) 746-3139
E-mail: 76121.1532@compuserve.com

Web Site: <http://www.univelt.com>

Coming Up



Compiled by George Cully

June 3-4

Siena College will host its annual symposium, World War II – A 60-Year Perspective, with presentations featuring the year 1944. Contact:

Dr Karl Barbir
Dept. of History
Siena College
515 Loudon Road
Loudonville, NY 12211-1462
(518) 783-2512 - FAX 518-786-5052
e-mail: barbir@siena.edu

June 3-6

The Historical Society will hold its National Conference in the Spruce Point Inn, near Boothbay Harbor, Maine. The theme of the conference is "Reflections on the Current State of Historical Inquiry." Contact:

2004 Conference
The Historical Society
656 Beacon Street, Mezzanine
Boston MA 02215-2010
e-mail: historic.bu.edu
<http://www.bu.edu/historic>

June 7-10

The American Helicopter Society will host its 60th annual forum and technology display at the Inner Harbor Convention Center in Baltimore, Maryland. Contact:

AHS Int'l – the Vertical Flight Society
217 N. Washington St., Alexandria, VA 22314-2538
(703) 684-6777, Fax 739-9279
e-mail: kim@vtol.org
website: <http://www.vtol.org>

June 15

The **Military Classics Seminar** meets for dinner-discussion at the Ft. Myer, Virginia, Officers' Club. This month's selection is Tami Davis Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas About Strategic Bombing, 1914-1945*, Princeton University Press, 2002. Speaker: Dr. Thomas Julian (Colonel, USAF (Ret.)). Contact:

Dr. Edward Marolda
Naval Historical Center
805 Kidder Breese Street, SE
Washington Navy Yard, D.C. 20374-5060
(202) 433-2331
e-mail: Edward.Marolda@navy.mil

June 21-23

The **Netherlands American Studies Association** will host a conference entitled "The Story of World War II: American Studies" at the Vrije Universiteit in Amsterdam, The Netherlands. Contact:

Dr Diederik Oostdijk
English Department
Vrije Universiteit
DeBoelelaan 1105
NL-1081 HV Amsterdam
The Netherlands
e-mail: dm.oostdijk.let.vu.nl

June 22-27

The **American Society of Aviation Artists** will host its Annual Aviation Art Forum at the Air Force Museum, located adjacent to Wright-Patterson AFB, in Dayton Ohio. Contact:

John Sarsfield, ASAA Vice-President
6541 St. Vrain Road
Longmont CO 80503
(303) 702-0707
e-mail: ASAAcontact@asaa-avart.org
website: <http://www.asaa-avart.org>

June 28-30

The 2004 **IEEE** Conference on the History of Electronics is the fifth in a series of workshops co-sponsored by the IEEE History Committee and the IEEE History Center at Rutgers University. The conference will be held at Bletchley Park, Oxfordshire, England. Contact:

Frederick Nebeker
Senior Research Historian
IEEE History Center
Rutgers University
39 Union Street
New Brunswick, NJ 08901
e-mail: f.nebeker@ieee.org
website:
http://www.ieee.org/organizations/history_center

July 12-13

The **Centre for Metropolitan History** at the Institute of Historical Research will host a conference entitled "Metropolitan Catastrophes: Scenarios, Experiences and Commemorations in the Era of Total War." The Conference will be held at the Institute of Historical Research in London, England. Contact:

Dr Stefan Goebel
Centre for Metropolitan History
Institute of Historical Research
University of London
Senate House
Malet Street
London WC1E 7HU United Kingdom
e-mail: stefan.goebel@sas.ac.uk
website: <http://www.history.ac.uk/cmh/war.html>

July 12-14

The **U.S. Army's Center of Military History** will host the 2004 Biennial Conference of Army Historians in Washington, DC. The theme of the conference is "Military Professionalization: The Quest For Excellence." Contact:

US Army Center of Military History
ATTN: DAMH-FPF (Dr Rush)
103 Third Avenue
Ft. Lesley J. McNair, DC 20319-5058
(202) 685-2727
e-mail: rushrs@hqda.army.mil

July 15-17

To mark the 60th anniversary of the atomic bomb, the **Center for the Study of War and Society** and the University of Tennessee Press will co-host a conference to assess the impact of nuclear weapons development on American society and culture. The conference will be held in Oak Ridge, Tennessee. Contact:

Prof. G. Kurt Piehler, Director
Center for the Study of War and Society
220 Hoskins Library
University of Tennessee
Knoxville, TN 37996-0128
(865) 974-7094
e-mail: gpiehler@utk.edu
website: <http://web.utk.edu/~csws>

July 22-25

The **1st Annual Aircraft Engine Historical Society Convention** will be held at the Fanmarker Hotel in Rantoul, Illinois. Program will include speakers and vintage aircraft engine ground demonstrations. Contact:

AEHS Convention
P. O. Box 278
Brownsboro AL 35741-9998
e-mail: officers@enginehistory.org

August 3-5

The **Association of Unmanned Vehicle Systems Int'l** will host its annual symposium and exhibition at the Anaheim Convention Center in Anaheim, California. Contact:

AUVSI
3401 Columbia Pike
Arlington, VA 22204
(703) 920-2720, Fax x2889
e-mail: info@auvsi.org
website: <http://www.auvsi.org>

August 5-7

The quadrennial joint meeting of the **History of Science Society, the Canadian Society for the History and Philosophy of Science, and The British Society for the History of Science** will be held in Halifax, Nova Scotia. Contact:

History of Science Society Executive Office
P.O. Box 117360
3310 Turlington Hall
University of Florida
Gainesville, FL 32611-7360
(352) 392-1677, Fax x2795
e-mail: info@hssonline.org
website: <http://www.hssonline.org>

August 6-8

The **Western Front Association** will hold its annual national seminar on the SUNY campus in Plattsburgh, New York. Contact:

Len Shurtleff
Western Front Association
(352) 379-3200
e-mail: lshurtleff@aol.com
website: <http://www.wfa-usa.org>

August 17-21

The **International Committee for the History of Technology (ICOHTEC)** will hold its 31st Symposium at Bochum, Germany. This year's theme is "(Re)-Designing Technological Landscapes." Contact:

Barton Hacker
Chairperson, ICOHTEC Program Committee
150 12th Street, N.E.
Washington, DC 20002 USA
e-mail: hackerb@si.edu
website: <http://www.icohtec.org>

August 19-22

The **American Institute of Aeronautics and Astronautics** will host its 5th International Airship Convention and Exhibition in Oxford, England. Contact:

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

August 19-22

The **Mars Society** will hold its annual convention in the Palmer House Hilton in Chicago, Illinois. Contact:

The Mars Society
P. O. Box 273
Indian Hills CO 80454
website: <http://www.MarsSociety.org>

September 9-12

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

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

September 11-15

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

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

September 15-18

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

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

September 24-25

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

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

September 28-30

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

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

October 4-8

The American Institute of Aeronautics and Astronautics will host the 55th Congress of the International Astronautical Federation, the International Academy of Astronautics, and the International Institute of Space Law in Vancouver, British Columbia. Contact:

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

October 8-9

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

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

October 17-20

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

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

October 25-27

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

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

October 26-27

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

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

October 27-30

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

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

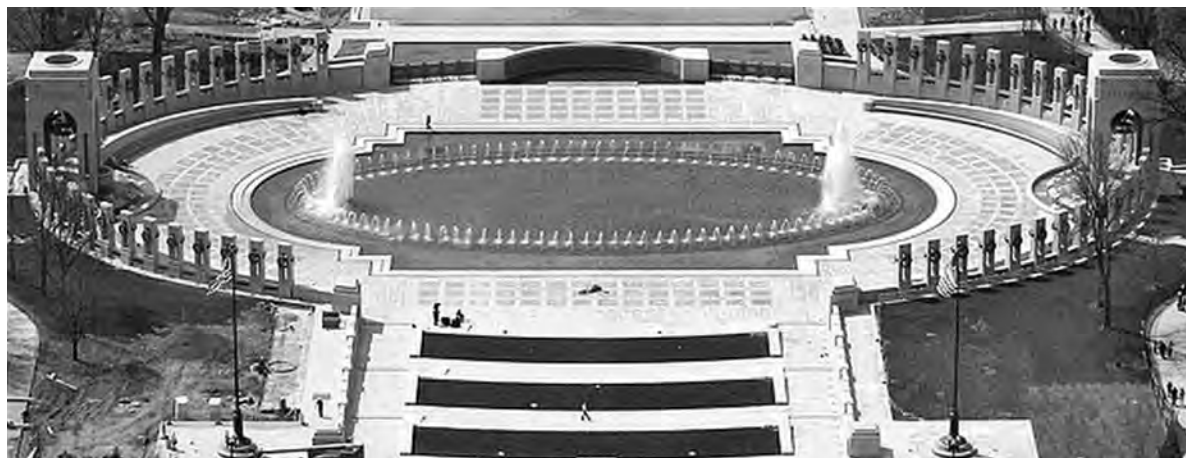
November 16-17

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

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

If you wish to have your event listed, contact:
George W. Cully
230 Sycamore Creek Drive
Spingboro, OH 45066-1342
(513) 748-4737
e-mail: warty@woh.rr.com

**World War II Memorial Opens April 29, 2004
Dedication on May 29, 2004
Honoring the more than 16 million Americans who served,
the over 400,000 who died, and the millions who provided support.**





The readers of *Air Power History* know their airplanes. Once again, readers correctly identified last issue's "What Is It?" flying machine. We received nineteen postcard entries from readers. No one guessed it wrong, but one entrant was disqualified for omitting a telephone number (see "rules" below).

Our Spring 2004 mystery aircraft was Britain's Miles M.27 Master training plane, used during World War II for advanced pilot instruction and as a glider tug. Our follow-up photo, by Robert A. Hadley, shows a Master Mk. III (serial DM112) shooting a landing at the American airfield at Glatton, Connington, Hunts. (Royal Air Force station 130) in England in 1944, with the instructor eyeing his student carefully.

Frequent contributor Earl Lock of Tallmadge, Ohio, pointed out that the ubiquitous Master used various engines. The Mk. I was powered by a Rolls-Royce Kestrel, the Mk. II by an 835-hp. Bristol

Mercury XX, and the Mk. III by a 745-hp. Pratt & Whitney R-1535 Twin Wasp Junior.

The Master Mk. III had a wingspan of 35 ft. 9 in., a gross weight of 5,400 lb., and a maximum speed of 214 m.p.h.

The Master was a familiar sight at Royal Air Force training bases during the war years and immediately after the war.

Eighteen readers in three countries sent postcard entries in *Air Power History's* plane-spotting readers. None was completely wrong, but several were vague as to which version of the Miles trainer was shown.

Our "History Mystery" winner is John Osbourne of Witchford-Ely, Cambridgeshire, England. John will receive an aviation book written by this journal's technical editor.

Thanks to all of our readers who joined in our "name the plane" exercise.

This Issue's Mystery Plane

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

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

2. Correctly name the aircraft shown here. Also include your address and telephone number, including area code. One contestant was disqualified this time around for not providing a phone number. If you have access to e-mail, include your electronic screen name.

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

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



Letters

Reference my article, "Bombers and Boats: SB-17 and SB-29 Combat Operations in Korea," APH, Vol. 51, No. 1, Spring 2004.

The modified bombers performed several classified missions as well. On the moonlit nights of September 22 and 23, 1950, two SB-17s each dropped "oriental" agents by parachute at several sites located on sandbars along the riverbeds amidst the mountains close to the North Korea-China border. The agents, most likely Koreans, were dropped in groups of four from only 500 feet above the

ground and carried radio gear with which they intended to report intelligence data to U.S.-U.N. officials. The SB-17s had been modified for the missions so that the agents could drop from the bomb bays. Unfortunately, the results of the mission are unknown but given the conditions the loss rate was probably high. [Source: General Order No. 287, 21 June 1951 (copy in author's possession), courtesy of Col. Eugene A. Scalise, USAF, (Ret.)

Forrest L. Marion, Staff Historian, Air Force Historical Research Agency

I'm looking at the cover of *Air Power History* magazine dated September

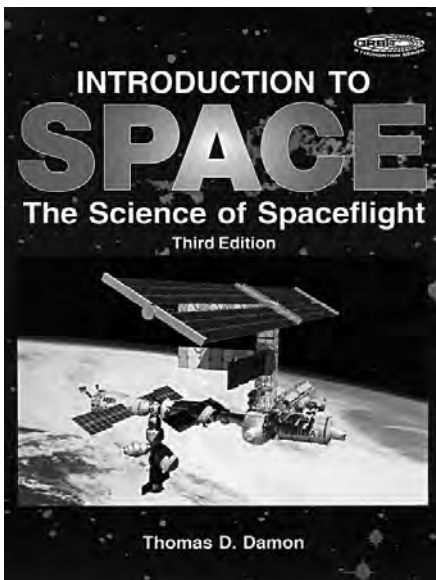
2002, Vol. 49, No.2, it shows Charles Lindbergh standing beside the "Sprit of St. Louis." The lead article, by Raymond H. Fredette is about Lindbergh after he landed in Paris. I seem to recall other articles about Lindbergh in your publication and particularly a critique of a biography of Lindbergh that had been written earlier. My point is that in all of the biographies of Lindbergh, none of them ever mentioned his having a second family in Germany. No one ever knew about this until 2003, when it came to light through the newspapers. Since then, ever so little has been published about this bigamous life. With all this published material by biographers, without their ever mentioning this part of Lindbergh's life, isn't there now a certain amount of "egg on their face" due these biographers? Here is an entire segment of their subject's life that is never accounted for in their works. Or did they know about this portion of Lindbergh's life and chose to leave it out of their work? Do not we interested readers deserve better?

William A. Rooney, Wilmette, Illinois

Editor's reply: *You would have a point if the biographers knew but didn't reveal it. Mr. Fredette, who has researched extensively Lindbergh's papers at Yale, found nothing on this subject. Neither had any other biographer. This is hardly surprising, since Lindbergh donated the papers to Yale. Fredette observes that this "bigamous" affair probably had more to do with Lindbergh's theories on eugenics and superior beings, than it did with infidelity.*

In the Spring 2004 issue of *Air Power History* (Vol. 51, No. 1), the article, "Were There Oil Targets in Japan in 1945?" cites the Target Information Sheet for Akita (Appendix 1). This was omitted from the article and is reproduced here. **(Above right)**

Emanuel Horowitz, Johns Hopkins University, Baltimore, Maryland



INTRODUCTION TO SPACE: The Science of Spaceflight, 3rd Ed.

by **Thomas D. Damon**
3rd. Ed. 2001 326 pp.
Cloth \$57.50
Paper \$49.50

"Tom Damon provides for you, the reader, a lucid understanding of the science and technology of entering space, what we are finding, and some of

our plans for the future. Enjoy it! It's an extraordinary treatment of an exciting subject, an outstanding introduction to mankind's greatest, open-ended adventure"—

Edward G. Gibson, Astronaut, Skylab 4

Krieger Publishing Company

P.O. Box 9542 • Melbourne, FL 32902-9542

Call 800-724-0025

E-mail: info@krieger-publishing.com

Fax: 321-951-3671

NOT TO BE TAKEN
INTO THE AIR ON
COMBAT MISSIONS

TARGET 90.6-1066
OBJECTIVE AREA 50.6 AKITA

TARGET INFORMATION SHEET

TARGET 90.6-1066
NIPPON OIL CO. REFINERY, AKITA
Latitude: 39° 45' N
Longitude: 140° 04' E
Elevation: Approx. 50'

1. LOCATION AND IDENTIFICATION: The target is located immediately north of and along the northern bank of Omono River and on the northwestern outskirts of the port town of Tsuchizaki. It is five miles northwest of the city of Akita and fourteen miles southeast of a peninsula of land jutting out from the west coast of Honshu into the Sea of Japan.

2. PLANT DESCRIPTION: The target area roughly describes a rectangle measuring 2250 ft. northeast to southwest and 2000 ft. northwest to southeast. Facilities for refining are confined to the southern part of the area. Tankage occupies the northern portion of the area. Railroad spur running through southern limits of the compound connects the plant with the mainline Railroad to Aomori. Bunkering facilities are believed to exist.

3. IMPORTANCE: It is one of the most important targets in the Japanese Petroleum Industry. Processes crude oil from the oil fields around Akita, which are the largest natural petroleum producers in Japan proper. The annual crude, capacity was estimated in late 1944 at 1,320,000 bbls. annually, representing 31 per cent of the inner Zone oil refined. Cracking capacity was estimated as lower than that necessary to refine the crude oil available. Capacity has increased in importance since it is not dependent on imported petroleum as are next existing refineries in Japan proper. The plant is believed to have tankage capacity in excess of operating requirements.

TARGET SECTION, A-2
5 September 1945.

TWENTIETH AIR FORCE

[Handwritten Note: Homeland wells produced a total of 1,441,000 bbls., further demonstrating the importance of Akita. Akita produced 61 percent of Japan's total oil output as of 1945.]

Reunions

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

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

The **50th Fighter-Bomber Wing** will hold a reunion June 10-12, 2004, at the Marriott Hotel, Ogden Utah. All members of the 50th FBW, from Clovis through the F-100 era at Hahn AB, Germany. Contact:

Jack Lowrey
(801) 544-0315
e-mail: JumpnJac@aol.com

The **56th Fighter Group** will hold its reunion in Fairfax, Virginia, June 17-19, 2004. Contact:

Ron Brubaker
P.O. Box 57

Red Creek, WV 26289
(304) 866-4415
e-mail: rclif@frontiernet.net

The **303d Bomb Group (Eighth Air Force)** will hold its annual reunion in Savannah, Georgia, August 26-30, 2004. The unit was based in Molesworth, England during World War II, flying B-17s. Contact:

Lt. Col. Eddie Deerfield
352 Landmark Trail
Palm Harbor, FL 34684
e-mail: ED303fsra@aol.com

The **353d Tactical Fighter Squadron** (Myrtle Beach AFB) will meet at on June 18-20, 2004 at the Hyatt Regency Town Lake in Austin, Texas. Contact:

Tim Black
3301 Barker Hollow Pass
Austin, TX 78739
(512) 280-8436
e-mail: tangblack@austin.rr.com

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

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

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

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

Pilot Training Class 54N will hold its reunion in Nashville, Tennessee, September 9-12, 2004. Contact:

Hall McCord
(850) 349-2453
e-mail: hmccord@earthlink.net

or

Dick Seigman
(813) 681-9601
e-mail: pltrng54n@juno.com

Pilot Class 56N All those interested in having a reunion contact:

Jack Fleck
(858) 487-7255
e-mail: jifleck@aol.com

The **C-7A Caribou Association** will hold its reunion in Odessa, Texas, September 30 – October 2, 2004. Contact:

Jim Collier
5607 Jolly Ct.
Fair Oaks, CA 95628
(916) 966-4044
e-mail: jascoll@pacbell.net

or

Bill Avon
(303) 878-7451
e-mail: veteran@tusco.net
www.c-7acaribou.com

The **Eighth Air Force Historical Society** will hold its national reunion,

October 5-10, 2004, in Kansas City, Missouri, Contact:

Donna Lee
Armed Forces Reunions
P.O. Box 11327
Norfolk, VA 23517-0327
(804) 515-8086; FAX (804) 515-8087

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

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

SAC Airborne Command and Control (PACCS) personnel of all ranks will hold a reunion September 22-26, 2004, in Omaha, Nebraska. Contact:

Jack Suggs
855 Crenshaw Loop No.
Keizer, OR 97303
(503) 390-2435
e-mail: jwsuggs@msn.com

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

Guidelines for Contributors

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

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

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

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

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