

SUMMER 2023 - Volume 70, Number 2
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Journal of the Air Force Historical Foundation



Upcoming Events Not to be missed

June 1, 2023

2023 Doolittle Award Ceremony and Annual Awards Banquet

1000-1130 Membership Meeting, Army Navy Club Arlington

1500-1600 Doolittle Ceremony, Air Force Memorial

1700 Awards Banquet, Spaatz Award, Army Navy Club Arlington

July 19, 2023

7:00 PM

WAR STORIES

Col. Fred Watkins, F-105 Vietnam

Sept 11-13, 2023

AFA Air, Space, and Cyber Conference (AFHF Booth)

Gaylord National Resort & Convention Center in National Harbor, Md.

Conference provides first-class professional military development,
facilitates sharing of emerging requirements and technologies,
and helps fuel connections that advance the cause of air and space power.

Sept 15-19, 2023

Air Force Historical Foundation Fall Symposium, Literary Awards and Museums Conference.

The theme for the Conference is “The U.S. exit from Vietnam—1973”

Hyatt Denver Tech Center, and Wings Over the Rockies Centennial Annex

The Foundation is seeking combined academic/museum panels that cover topics related to USAF airpower and space history, its applications and implications from the late 1950s through 1973. Presentations related to museum collections addressing the Vietnam War are highly encouraged, but other topics will be considered by the Program Committee in certain circumstances. If you are interested please submit (by the July 1, 2023 deadline) your application. Please include your name, affiliated institution, and full panel proposal, including panel members, title, and 300-word abstract. For complete submission details, contact: xd@afhistory.org

“Pass it on Membership Campaign” — We are making a concerted effort to grow our membership and need your help. For every \$100 we receive from a donor like you, you become eligible to give a free one-year membership (\$50 value) to a person you choose. So give \$100 or more today by mailing in your donation to: Air Force Historical Foundation, P.O. Box 405, Mechanicsville, MD 20659 or give on line at www.afhistory/support/donate/, and our staff will reach out to you with the details so you can pass on a membership today!

Journal of the Air Force Historical Foundation

SUMMER 2023 - Volume 70, Number 2
WWW.AFHISTORY.ORG

know the past
.....*Shape the Future*

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FRONT COVER: A2C William Puthoff of the 354th TFS cleans the canopy of his F-105D, 62-4262, prior to a combat mission in October 1966. The aircraft, Cheeta 02, was hit by 85mm AAA and lost on October 24, 1967 while on a combat mission against Kep Airfield. The pilot, Capt Martin Scott, managed to reach the Gulf of Tonkin, where he ejected and was rescued by a Navy helicopter in good shape. (USAF, via Theo van Geffen)

REAR COVER: *Fini Flight* by Michael McGinty. Item number 2013.036 in the USAF Art Collection. See the rest of the story on page 5 of this issue.



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Leadership's Message

“Special Edition”

Dear Readers,

What you hold in your hands is the first printed edition of the Journal of the Air Force Historical Foundation. This “Special Edition” establishes the model for the Foundation’s journal cycle from here on out. Each year, only the Summer Edition will be printed. It will be an expanded edition and will focus on the Foundation’s theme for the year. This edition will be mailed to all AFHF members and will be distributed at AFHF events throughout the rest of the year. ENJOY!

We hope that you attended the inaugural “WAR STORIES” event that took place on March 16. Our host, Matt Jolley, led a vibrant discussion with leading USAF Vietnam ace, Chuck DeBellevue during the one-hour session. Highlights included Col. DeBellevue’s emphasis on the importance of selfless teamwork and the critical contribution made by those in support roles during operations.

The AFHF’s efforts to increase the material available to researchers has grown exponentially. Our “Research” web page offers Air and Space History book lists that are easily accessed at this link: <https://www.afhistory.org/research/book-lists/>

Included are contributions by AFHF authors, USAF Academy Department of History authors, a link to The Harmon Lectures in Military History, and a link to the Air University Library Archives where AFHF now has its own research file. More research links are in the works. If you are an AFHF member and your published books are not yet included, send us a book cover thumbnail and any link that applies to your work. This is not an Amazon page, it is an effort to disseminate information to our membership and interested researchers regarding the written contributions to USAF Air and Space History created throughout the years.

Perhaps the Foundation’s most ambitious project for the year is the rebirth of the AFHF Symposium. From September 15-19, this year’s event will include a unique blend of Air and Space Museum presentations, AFHF Vietnam Veteran panel presentations, academic lectures, and the culminating AFHF Awards event that will be held at the Wings Over the Rockies Exploration of Flight Hangar at the Centennial Airport in Denver. All symposium participants, community supporters, and AFHF membership will rally at the Blue Sky Gallery to enjoy a heavy hors d’oeuvres meal, aerial demonstrations, the presentation of the AFHF Book and Article Prizes for 2023 and will culminate with the presentation of the Maj Gen I. B. Holley Award, recognizing an individual who has made sustained, significant contributions to the documentation of USAF Air and Space History during a lifetime of service. This year’s recipient is Col. Phil Meilinger, USAF (Ret.), PhD. We invite all of you to attend this seminal event. Registration will be available soon on the AFHF website.

If you are an AFHF member and Vietnam veteran and would like to participate on a discussion panel during the Fall Symposium, contact our staff at xd@afhistory.org by 1 July.

Gen. James “Mike” Holmes
Foundation Chairman

Jonna Doolittle Hoppes
Foundation President

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Back Cover Story

The painting depicts Hess' repatriation flight since returning from captivity. He was retired long before this flight.



Colonel Jay Hess was shot down over North Vietnam on August 24, 1967. He spent 2,029 days, which is more than 5 years in various prison camps in North Vietnam, including the notorious Hanoi Hilton. At right, his daughter welcomes him back home. In March of 2010, our Executive Director was fortunate to witness Col. Hess return to the skies for his "Fini Flight" at Randolph AFB, in San Antonio, Texas. The 560th Flying Training Squadron allowed Col. Hess the opportunity to take off and land...the right way, complete with champagne! This jubilant portrait is currently on display in the Pentagon on the 5th floor, E-Ring, corridors 9-10. (USAF Art program 2013.036 by Michael McGinty. Their permission has been granted.)



Guidelines for Contributors—We seek quality articles—based on sound scholarship, perceptive analysis, and/or firsthand experience—which are well-written and attractively illustrated. If a manuscript is under consideration by another publication, the author should clearly indicate this at the time of submission. Manuscripts should be prepared according to the Chicago Manual of Style (University of Chicago Press). Use civilian dates (month, day, year) and either footnotes or endnotes may be used. 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. Notes should be numbered consecutively through the article with a raised numeral corresponding to the list of notes placed at the end. Submissions may be submitted either by mail or via email. Email is generally the norm. While Microsoft Word is the most common, any word processor may be used. Do not "Track Changes." Photographic illustrations are greatly appreciated. There is no restriction on the file format 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 Richard Wolf, Editor, c/o Air Power History, 70 Shannon Way, Upton, MA 01568, e-mail: airpowerhistory@yahoo.com.

From the Editor

With this issue, we break new ground in the collection, construction and dissemination of our historical information. The theme of this issue is *The End of the War in Vietnam*, as we reach the half-century mark since the Nixon Administration negotiated a “peaceful” end to the conflict. This large, 160-page issue will be the only printed issue for 2023, and contains the usual magazine articles and extended book reviews, as well as articles from the past which reinforces our theme. We hope you enjoy the various subjects and interesting illustrations. With the large number of reprint articles in this issue, we will only preview here the new scholarship presented.

We start with an article by return contributor Theo van Geffen, as he continues to explore the aircraft used in the first Gulf War, and how those systems found their way to Southwest Asia.

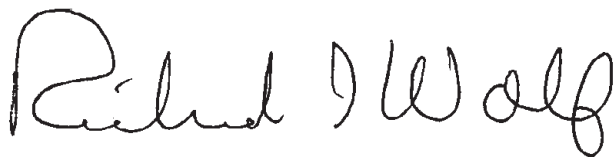
Our second article is also by a returning contributor, as John A. Schell revisits the SA-2 and the U-2, the shootdown of Francis Gary Powers, in the light of new information (or maybe more complete information. This is a follow-on to his earlier article from the Summer 2021 *Air Power History* issue.

Our third article is by repeat contributor Frank A. Blazich, Jr., who writes about the Civil Air Patrol and its response to the civil rights movement and the integration of the Air Force.

Our fourth article is by one of our previous authors, Kathy Wilson, who writes about the brief time when the Army Air Corps carried the U.S. mail.

Our final current article began its existence as a student paper by Sean Geither at the U.S. Air Force Academy. It was submitted for, and won, our Foundation’s award for 2022 for the best student paper at the USAFA. As a reward, so to speak, we publish it here. The author has received his commission in the USAF since then, and is on active duty.

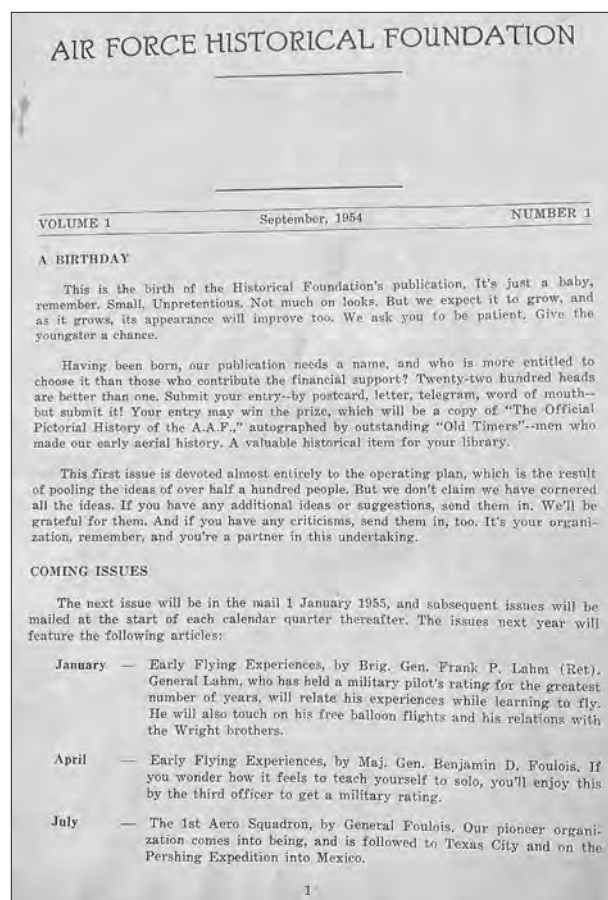
The Leadership’s Message can be found on page 3. It’s worth the read to keep you abreast of our changes. Our publication plans have evolved to try and keep our publication relevant and attract new members. As mentioned, only this issue will be printing in hard-copy this year, but as you can see, it is more than twice the size of the normal issue, and is centered around the Foundation’s theme for the year. This year’s theme is the fifty-year anniversary of the end of the war in Vietnam. So we have our regularly scheduled content and a collection of scholarship on the theme of the year. Don’t miss Upcoming Events on page 158. And the issue closes with the Mystery. Enjoy!



“Pass it on Membership Campaign” — We are making a concerted effort to grow our membership and need your help. For every \$100 we receive from a donor like you, you become eligible to give a free one-year membership (\$50 value) to a person you choose. So give \$100 or more today by mailing in your donation to: Air Force Historical Foundation, P.O. Box 405, Mechanicsville, MD 20659 or give on line at www.afhistory/support/donate/, and our staff will reach out to you with the details so you can pass on a membership today!

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Where it All Began: Our First Issue



Air Force Historical Foundation Vol. I, No. 1

In September 1954, the first AFHF Journal was published. By modern standards it was not much of a journal. It was seven pages long. But in those pages, reprinted here, were the core ideas that have driven the Foundation's activities for nearly 70 years.

This past year, the Foundation has executed Project PHOENIX, a direct effort to revive our commitment and programming to the original core principles that you see in these pages. We have revived relations with Air University Library, the National Museum of the USAF, the USAF Academy, the Air and Space Foundation, and Air University Press. We have rejuvenated the Board of Directors and continue to restructure the committees that organize and direct our programming.

These seven pages created the Air Force Historical Foundation and still define us even as we have evolved over the years.

THE AIR FORCE HISTORICAL FOUNDATION**PLAN OF OPERATIONS****1. OBJECTIVE:**

To preserve and perpetuate the annals of American air power, especially the annals of the United States Air Force and its predecessor organizations and of the individuals composing those organizations; to disseminate to the men and women of the air force, to the public, and to posterity accurate and complete historical information on air subjects; and to preserve in suitable repositories significant materials depicting the history, culture, and traditions of the United States Air Force.

2. METHOD OF OPERATING:

A satisfactory dissemination of Air Force history can be accomplished only by presenting it in the proper places. To keep all significant historical material in a single repository, or to have all historical activity located in a single Air Force agency, would expose relatively few to the impact of history. By integrating the program into the Air Force in action, contact would be made with a much larger percentage of Air Force personnel and of the public. The activities of the Foundation will complement and assist official and other unofficial Air Force historical and related agencies, and will be as follows:

a. Centralized activities of the national headquarters, and

b. Decentralized activities, grouped into projects, directly supervised by volunteer project chairmen, operating under a general directive from national headquarters.

3. INITIATION OF ACTIVITIES:

Premature initiation of activities and over-expansion must be avoided if a steady, stable growth is to be attained. Activities will be undertaken only as adequate means become available.

4. CENTRALIZED MEANS TO ACCOMPLISH:

a. Liaison with the Historical Division and the Technical Museum. Liaison to be extended as soon as possible to other historical organizations.

b. Publications: Initially, a quarterly eight-page leaflet, to be expanded as rapidly as finances permit into a substantial journal. This field to be given high priority since it is a "must," if membership interest is to be maintained.

c. Public Relations: In addition to the normal contacts with the press, service publications, and closely affiliated publications (such as the "Air Force Times" and "Air Force"), contact to be made with historical organizations in localities removed from Air Force contacts with a view to supplying information, exhibits, motion picture films, and speakers. Press releases might well include illustrated material in "mat" form as used in syndicated releases.

d. Collection of historical materials for central files and for distribution to projects. These to be obtained by soliciting individuals and through general requests in publications. The national headquarters will keep a central file of materials preserved by the various projects and also one of items available on loan for displays.

e. Dissemination of historical information at meetings of important public groups, to include civic clubs, historical organizations, and schools, and at periodic meetings, at central locations, of members of the Foundation, to which interested civilians of the community would be invited.

f. A series of traveling exhibits to supplement local exhibits of the various projects, these exhibits to cover matters of general interest, such as:

- (1) Strategy Exhibits: Illustrations and models showing the development of our concepts of strategic and tactical air warfare.
- (2) Tactics Exhibits: Illustrations and models showing the development of various kinds of air tactics, as for example, the development of fighter tactics from the dog fights of World War I to the teamwork technique of World War II and the Korean War; from the rough-and-ready stage of tactical support in World War I to the highly complex, radio directed form in World War II and Korea.
- (3) Air Education Exhibit: Using photographs, charts, and caption texts to trace the development of air education from its primitive beginnings to the present educational systems.
- (4) Corporate Exhibits: Exhibits prepared by various corporations showing their contributions in the development of aircraft, engines, armament, photographic equipment, and electronic equipment.
- (5) Combat Garb Exhibit: Articles of clothing and personal equipment showing the changes from the coveralls and crash helmets of the early days to the G-suits of the modern era.
- (6) Anniversary Exhibits: Such exhibits offer infinite possibilities. As an example, the coming 20th anniversary of the first flight of the XB-17 offers an opportunity to trace the history of that work horse of bombardment.

g. A series of tape recordings of informal round-table discussions of various topics. A few examples are:

- (1) A discussion of our early struggles to learn to fly, by General Foulois, General Lahm, and General Milling. (Completed 29 June 1954).
- (2) A similar discussion of the struggle for recognition of air power, to include the battleship bombing off the Virginia Capes, by personnel occupying key staff positions at that time.
- (3) A discussion of our air operations in World War I by leading participants in those operations.
- (4) A discussion of Korean fighter tactics and personal combat experiences by several leading jet aces.

h. "Great Men of Military Aviation," a biographical program, subjects to be selected by a special board.

i. A program of historical writings on the history of aviation, stimulated by awards of medals and cash prizes. Such a program, conducted through local historical societies with awards on a nation-wide basis, could develop widespread interest.

j. Radio and television programs, possibly in cooperation with the aircraft industry. Programs to mark a particular anniversary or other event, or a series of programs developing a central theme of general interest.

k. The encouragement of outstanding members and former members of the Air Force to write their memoirs and to prepare first-hand accounts of the significant events in which they participated.

5. DECENTRALIZED MEANS TO ACCOMPLISH:

a. Projects in order of priority:

- (1) The Air University
- (2) Air Force R. O. T. C.
- (3) Permanent Bases
- (4) Air National Guard
- (5) Civil Air Patrol
- (6) Smithsonian Institute
- (7) Public Institutions
- (8) The Air Force Academy (A priority project as soon as construction permits).

b. Project Chairmen: Each project is a major work of long range proportions and will be supervised by a volunteer project chairman. To insure maximum support of the project, the Foundation will solicit the services of the senior responsible authority, where practicable, as follows:

- (1) Air University, The Commander, Air University Command.
- (2) Air Force ROTC, The Commander, Air Force ROTC.
- (3) Air National Guard, Chief, Air Force Division, National Guard Bureau.
- (4) Civil Air Patrol, Commander, C.A.P.
- (5) Air Force Academy, The Superintendent, Air Force Academy, when established.

If desired by a project chairman, the Foundation will nominate to him members of the Foundation to serve as an advisory committee on his project.

THE AIR UNIVERSITY PROJECT

Project Chairman: The Commander, Air University Command.

1. OBJECTIVE:

To perpetuate the contributions of the Air University and its predecessors, especially the Air Corps Tactical School, to the development of air power; to develop student interest in the accomplishments of the Air Force, and to build tradition; to bring the history of the Air Force to the attention of visitors, both military and civilian; to disseminate historical information on military aviation to the military and the public.

2. SUGGESTED MEANS TO ACCOMPLISH:

a. A display -- subsequently located in the proposed A. U. Library building -- of documents, manuals, monographs, photographs, etc., which record the story of the Air Corps Tactical School, AAFSAT, AAFTAC, the AAF School, and the Air University, the emphasis being on the development of doctrine and the men who contributed the most to that development.

b. A display of documents, photographs, and other items which tell the story of Maxwell Air Force Base and record relationship with the city of Montgomery.

c. Portraits of Air Force leaders.

d. Display of models, photos, and paintings of aircraft from 1909 to the present to show the development of military aviation.

e. Photographs and paintings of the Air Force in action.

f. War relics.

g. A writing program which will include the preparation of articles on air power, biographies of leading airmen, and articles on aviation history.

THE AIR FORCE R. O. T. C. PROJECT

Project Chairman: The Commander, Air Force R. O. T. C.

1. OBJECTIVE:

To generate and develop the student's interest in air power in general and an Air Force career in particular; to inspire a pride in his organization; to perpetuate past accomplishments and customs as a basis for traditions; and to provide a means for dissemination of accurate historical information on air subjects to the student body, faculty, and general public.

2. SUGGESTED MEANS FOR ACCOMPLISHMENT:

a. Display, pictorial and written, giving the complete story of the Air Force R. O. T. C. graduate in training in his specialty, (pilot, observer, engineer).

- b. Display of photographs of graduating classes and Air Force R. O. T. C. activities, particularly those of the summer camp.
- c. Display of photographs of outstanding graduates accompanied by brief accounts of unusual student activities, military careers, and outstanding accomplishments.
- d. Display of heraldic devices of institutions in the Air Force R. O. T. C. program.
- e. Display of models, and photographs, showing airplane development in the Air Force, beginning with the first military airplane.
- f. Showing of unclassified moving picture films as part of rainy-day schedules, and before appropriate civic groups.
- g. Serve as "collection points" for requests for historical information which will be supplied by the Foundation and the Historical Division; conversely, to serve as outlets for historical information for publication in student publications and local papers.
- h. Historical exhibitions, material on hand to be supplemented by material on loan from other projects, private collectors, and Technical Museum.

PERMANENT BASE PROJECT

Project Chairman:

1. OBJECTIVE:

To preserve the history of the many contributions the base has made to the overall development of the Air Force; to bring to the attention of both military personnel and civilians the many successes, in battles around the world, of organizations organized and trained at the base; and to promote a reciprocal feeling of partnership, pride, and loyalty in the base personnel and the people of the community in which the base is located.

2. SUGGESTED MEANS TO ACCOMPLISH:

- a. A suitable centrally located building, or at least a large room, is a basic requirement.
- b. Pictorial display showing progressive development of the base including photos (or paintings) of Commanders.
- c. Similar display covering development of adjacent community with photos of civic leaders; also a scrapbook of military community relationships.
- d. Display of insignia, photos, paintings, and historical sketches depicting the history, training, battle successes, and other outstanding accomplishments of organizations organized and trained at the base.

e. Displays of materiel pertinent to the above mentioned organizations. (Example: Langley Field could use old bomb sights used in the ship bombing, early '20's, off the Virginia Capes.)

f. When pertinent, historical markers to perpetuate military and civilian items of historical significance.

g. Exhibitions: Augmented by material on loan, to bring the community in closer contact with the base, and to expose both the civilians and the younger generation of the Air Force to history.

h. Establish a speakers bureau.

i. Collect historical material for the Foundation's other activities.

3. ADDITIONAL ACTIVITIES:

Many air bases no longer in existence had a significant influence on Air Force history. When possible, existing bases should incorporate into their programs historical data and material of nearby "ghost bases."

THE AIR NATIONAL GUARD PROJECT

Project Chairman: Chief, Air Force Division, National Guard Bureau

1. OBJECTIVE:

To bring communities in vicinity of wing and subordinate headquarters into closer contact with the Air National Guard and the Air Force; to develop and foster a community and state pride in the past accomplishments of the Air National Guard and the vital part it plays in our national defense; to stimulate interest in air power and the Air Force in the younger generation.

2. SUGGESTED MEANS TO ACCOMPLISH:

a. Pictorial and materiel displays of the development of the National Guard and of the community designed to show the general relationship of the two.

b. Display of organization insignia with historical and battle records.

c. Open house programs to develop interest and bring the public in contact with National Guard personnel and the historical displays.

d. Similar open house programs aimed at the youth organizations.

e. Talks before business groups, clubs, etc. to disseminate information, emphasizing how lessons of the past have been applied to future plans.

f. Establish a speakers bureau.

g. Collection of historical material for other activities of the Foundation.

THE AIR FORCE ACADEMY PROJECT

Project Chairman: The Superintendent, Air Force Academy

1. OBJECTIVE:

To furnish inspiration for the cadet body; to build esprit de corps; to form the basis for great traditions.

2. MEANS TO ACCOMPLISH:

a. Commemorative Center:

- (1) An Air Force "Hall of Fame." Portraits and brief biographies of great figures in our military aviation. Selection to be an annual event by an appointed high level board.
- (2) Portraits of Air Force leaders and heroes.
- (3) Organization insignia with caption texts and battle records.
- (4) Displays of aircraft depicting development from the first military airplane -- models, photos, paintings.
- (5) War relics (such as the torn flag from Clark Field, P. I., etc.)
- (6) Captured materiel.
- (7) Commemorative Tablets and Memorial Windows.

b. Historical exhibitions in Commemorative Center.

c. Historical lectures.

Joint Task Force Proven Force and the Gulf War (Part 4)



North American Aviation's proposal 'F-100F Ferret Fighter Bomber' became USAF's first dedicated Wild Weasel aircraft. Seven F-100Fs were modified to the Wild Weasel I configuration. 58-1227 was one of the four WW Is, which deployed to Korat RTAFB on November 21, 1965 in accordance with Strike OPOD 190-65 'Wild Weasel I'. (Bob Krone)

Theo van Geffen

In August 1990, U.S. and allied forces arrived in numbers in the Gulf region to persuade Iraq to give up Kuwait, which was occupied on August 2. In mid-January 1991, a second front was opened from Incirlik (Turkey). USAF deployed many different aircraft types. In this part we look at the development of Wild Weasel aircraft, focusing on the F-4G Advanced Wild Weasel and its peacetime operations.

As a result of the first loss of a U.S. aircraft (Leopard 02, F-4C 37599 of the 47th TFS) by a North Vietnamese SA-2 Surface-to-Air Missile (SAM) on July 24, 1965, Chief of Staff of the Air Force (CSAF), Gen John McConnell, on August 13 established the 'Air Staff Task Force on Surface to Air Missiles in SEA' to study the serious threat posed by SAMs and to recommend means to cope with them. It was popularly known as the Dempster Task Force (TF), named after its chairman, Brig Gen Kenneth Dempster. The TF published its report on September 23. A score of solutions were identified. One of the proposals was the 'Hunter-Killer', which envisioned conversion of the rear cockpit of a two-place TAC fighter into an ELINT/ECM operators position and equipping the aircraft with an S, C and X-band omni-directional Radar Homing and Warning (RHAW) device. The aircraft could be loaded with standard ordnance. As it seemed to have considerable merit, the Task Force recommended immediate exploitation of the concept.

Wild Weasel I, IA, II and III

The most promising early capabilities appeared to be North American Aviation's (NAA) proposal to modify two F-100F Super Sabre aircraft with a RHAW device for test (called by NAA 'F-100F Ferret Fighter Bomber') and a Republic Aviation Corporation (RAC) proposal for a follow-on aircraft, the F-105F Thunderchief (called 'F-105F ECM Fighter Bomber'). Task Force recommendations with regard to the F-100F were to flight test the prototype, evaluate employment tactics, and deploy the modified F-100F to SEA. With regard to the F-105, to obtain funding, authorize the EF-105F prototype development, to flight test it, evaluate employment tactics and deploy the EF-105F to SEA. It is interesting to note the difference in F-100F and F-105F designations used by the Task Force. Seven F-100Fs were modified to the WILD WEASEL (WW) I configuration. Through Class V Modification 1778, F-105Fs were upgraded to the WW III configuration. Flight testing (TAC Test 65-85B) took place in the February 5-June 10, 1966 period with 276 sorties flown. Eighty-six F-105Fs were modified. Later on, 61 F-105Fs were upgraded to the F-105G configuration.

To determine the capabilities of an F-105D employing RHAW similar to that employed in the WW I F-100F, F-105D WILD WEASEL I ALPHA was flight tested, involving two F-105Ds, one configured with the AN/DPN-61 Maxson receiver

and one with the APR-25V (Mod 4A) capability. Yet another WW project at that time was WILD WEASEL II, the evaluation of an F-105F configured with the AN/APS-107 (XA-1) system.

Wild Weasel IVC

Although USAF, on February 20, 1966, had already authorized to establish Project Wild Weasel IV, tasking TAC to conduct a Quick Look test on four F-4C RHAW-configured aircraft (TAC Test 65-85C), it took until November 1967 the F-4C program for 36 1778-modified WW IVC aircraft was released and placed on procurement in December. This became feasible after the decision to convert the aircraft to an internal configured WW IVC with the equipment located in the left forward AIM-7 well, rather than in an external pod. By tri-command agreement 15 each aircraft were allocated to PACAF and USAFE and six to TAC for training.

Wild Weasel IVD

As early as February 26, 1965, the F-4D was suggested for the WW role, when TAWC (Tactical Air Warfare Center, Eglin) in a message to TAC urged it to be used rather than the F-4C. To no avail. However, when the existence of SA-2s and other threat radars in SEA generated a requirement for additional WW aircraft, USAF on August 11, 1966 directed TAC to conduct an IOT&E on two 1778-modified F-4D RHAW-configured WW aircraft (50657 and 50660), TAC Test 66-57 'Wild Weasel IVD'. A Modification Requirement (MR) released in late 1967 called for the modification to WW IVD configuration of 58 F-4Ds. However, due to continuing problems with the APS-107 RHAW system, TAC on May 30, 1968 cancelled the original TAC Test 66-57. Both F-4Ds were de-modified.

Advanced Wild Weasel, F-4D

With advanced technology in mind, USAF, in February 1968, directed AFSC (Air Force Systems Command) to conduct a cost and feasibility study of a new WW system. Its requirement was stated in paragraph II of TAC ROC (Required Operational Capability) 35-68 'Wild Weasel' of July 1, 1968. This was followed in November by a Required Action Directive. RAD's second of two Phases was to produce an advanced capability to meet Tri-Command's requirement for WW capability in 25 percent of all tactical strike aircraft. To meet '35-68', ASD (Aeronautical Systems Division) asked a number of vendors to submit preliminary technical proposals to the prime and integrating contractor, McAir (although McDonnell and Douglas merged in April



The F-4D Advanced Wild Weasel program encompassed the modification of 116 F-4Ds. As USAF decided to use F-4Es, the F-4D/APR-38 combination did not reach the full-scale development phase. One of the two F-4Ds that were modified to the F-4D AWW configuration was 66-7635. Along with 66-7647, '635' was subsequently de-modified and brought back to a standard D. (McAir)

1967 to McDonnell-Douglas and the latter with Boeing in August 1967, we use 'McAir' throughout the article). This ultimately resulted in selection of four major sub-contractors, who, with McAir, formed an industrial team to implement the F-4D/APR-38 Advanced Wild Weasel (AWW) system.

After a risk reduction study, accomplished by ASD and McAir in September 1969-June 1970, concluded an engineering development program could proceed, DoD, in August published performance, schedule, and cost threshold for an F-4D/APR-38 prototype effort and released funds for its DT&E (Development Test & Evaluation). Effective November 20, McAir was awarded a contract. The plan was to configure 116 F-4Ds through Class V Mod 2740 'F-4D/APR-38 Wild Weasel' to F-4D AWW. Selection would be from approximately 200 F-4Ds in Block 30 and above that could physically accept '2740'.

Two F-4Ds, 67635 and 67647, were modified as prototype AWW F-4Ds, the work of the industrial team being the base to design, fabricate and test eight preproduction models of the APR-38. A DT&E flight test program was performed by the AFFTC (Air Force Flight Test Center) at Edwards April 1973-early 1974 with 79 sorties flown. IOT&E with one F-4D was accomplished by the TFWC (Tactical Fighter Weapons Center) at Nellis in January-April, 1974.

However, on October 26, 1973 AFSC had informed CSAF the APR-38 would not pass full qualification testing for at least 18 months. With this, along with the relative scarcity and age of F-4Ds, CSAF, Gen George Brown, sent a message on November 12 to AFSC et al. AFSC, for instance, was requested to examine the feasibility of installing the APR-38 into the F-4E. Broad guidelines were to be followed with examples being, (1) installation of the APR-38 LRUs (Line Replacement Unit) in the gun/ammo bay areas; (2) installation of presently used APR-38 chin radome assembly on the F-4E radome; and (3) which F-

Theo van Geffen has been an aviation journalist and historian since 1977. He is from Utrecht, The Netherlands. His focus is the history of the F-105 Thunderchief and the units it flew with, and of the Air War in Southeast Asia.

4E Block number(s) would be recommended? AFSC was also requested to address the issues at a Joint Operation Technical Review (JOTR) in late November and to present that detailed follow-on data as soon as possible, but not later than January 1, 1974.

The JOTR was held on November 30 and examples of issues addressed by the commanders of AFLC (Air Force Logistics Command), AFSC and TAC were, (1) added capabilities and (2) F-4E versus F-4D. As to (2) it was found the F-4E airframe was preferred. The trio recommended to provide program direction in early January 1974 to, among others, (1) designate the F-4E for the AWW mission; (2) initiate modification planning for 116 F-4Es; and (3) authorize the highest priority for the program.

With the decision to use F-4Es, the F-4D/APR-38 combination did not reach the full-scale development phase. The two F-4Ds were subsequently de-modified and brought back to standard Ds.

Advanced Wild Weasel, F-4E/G 1974

As requested in CSAF's November 12, 1973 message, work was initiated to complete projection of cost, production and deployment schedules, and the first MPA (Modification Proposal and Analysis). With ASD's concurrence, engineers at OOAMA (Ogden Air Materiel Area) at Hill and McAir began preparing a work statement in January 1974 for installation of the APR-38 in the F-4E. Also, a cockpit configuration review was held in St. Louis with ASD, OOAMA and TAC representatives.

In anticipation of a PMD (Program Management Directive), OOAMA informed TAC in a February 12 message 'Identification of Two F-4E Aircraft by Tail Number for Mod 2740', a Certification Requirements Plan was being prepared to procure installation of APR-38 systems in two

F-4Es, i.e., Trial Installation (TI) and Kit Proof (KP). To facilitate its completion, TAC was requested to identify, not later than February 15, their serial numbers and location. Also, if Leading Edge Slats (LES) were required on these aircraft (all F-4Gs were LES-modified). AFLC had earlier directed OOAMA to use non-TISEO (Target Identification Set, Electro-Optical)-configured F-4Es in Blocks 40-45.

FY74-75 procurement and production planning was discussed at a February 26-27 meeting at OOAMA by F-4E AWW program officers from AFLC, ASD, and Warner Robins (WRAMA) and San Antonio (SAAMA) AMAs (on April 1, 1974, all AMAs were re-designated ALCs, Air Logistics Centers). The program was given the nickname PACER GROUND.

Pursuant to a March 5 Air Force Council meeting, USAF decided to install the AN/APR-38 in the newer and more maneuverable F-4E and to incorporate additional system capability. As a result, Hq USAF PMD 'Advanced Wild Weasel' was published on April 3, tasking AFLC to prepare an MPA, MPS (Modification Planning Supplement), and APP (Advanced Procurement Plan) for Class V modification of F-4Es with the AN/APR-38 AWW system. All had to be submitted by May 15. Examples of guidance items were, (1) program to be accomplished and funded as a Class V modification with June 1974 being considered as program approval; (2) the AN/APR-38 had to be interfaced with the Navy's High-speed Anti-Radiation Missile (HARM); (3) retrofit kits, except two systems for TI and KP, would not be given final go-ahead and contractor release until completion of F-4E IOT&E; (4) planned output of the first operational F-4E AWW should be FY4/77, building to a rate of 15 per quarter, with completion of four 24 UE operational squadrons by FY4/79; and (5) installation would be accomplished by OO-ALC. USAF validated the F-4E AWW as the TAF's (Tactical Air Forces included PACAF,

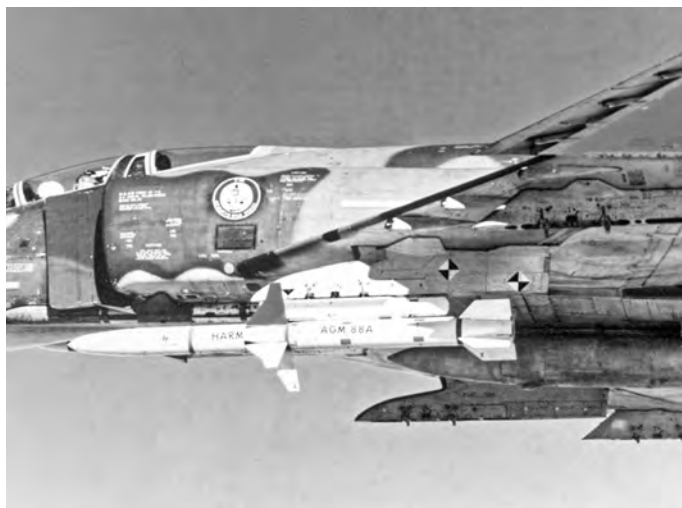


Block 43 F-4E 97254 of the 414th Fighter Weapons Squadron (Nellis) was selected as prototype for the R&D phase of the F-4E AWW program. Earlier it had served as kit-proof F-4E for the Leading Edge Slats modification. It is seen here at McAir in St. Louis in December 1975, prior to departing for Edwards for phase II of the DT&E. (McAir)

TAC and USAFE) number one priority program for FY74 Class V modification.

As a result of the PMD tasking, AFLC sent an April 18 letter to OO-ALC, requesting the Depot to prepare the MPA to include an APP and MPS. As required, WR-ALC and SA-ALC would support their Hill colleagues. Ogden's Director of Materiel Management forwarded the initial MPA to AFLC on May 14. As amended, it was sent to USAF three days later.

On June 28, Hq USAF published PMD 'Advanced Wild Weasel' for Class V modification of the F-4E. Its specific purpose was to implement Mod 2740 and provide the F-4E aircraft with the AN/APR-38 AWW system. The modification was planned for the 116 F-4E (including trial installation/kit proof) lowest time Block 40-45 non-PAVE SPIKE, non-RIVET BAT-equipped aircraft. All 1F-4E TCTOs (Time Compliance Technical Order) not yet complied with on the selected F-4Es would be accomplished during the modification process. Final program production release was withheld until successful completion of F-4E/APR-38 flight and qualification testing. McAir in St. Louis would accomplish trial installation. OO-ALC was responsible for modification, using both PDM (Programmed Depot Maintenance) and speed-line facilities. As to command responsibilities, AFLC would, for instance, initiate a request for re-designation for a new MDS (Mission Design Series), procure Group A kits, issue a TCTO, remove all Group B portions of Mod 2777 RIVET BAT. AFSC was to procure the Group B for the TI and KP aircraft with modification kits being the present baseline AN/APR-38 tested in the F-4D AWW. TAC was to select the 116 aircraft by tail number, to provide, upon AFLC request, the aircraft for TI and KP testing, and to develop aircrew training requirements. The schedule showed for instance (1) FY4/76 for trial installation completion and modification acceptance flight tests; (2) not later than FY4/77, start of aircraft modification; and (3) modification completion in FY4/79. FY76 funds would not be released until qualification test-



'254' was also used in the program to interface the Navy's AGM-88A HARM, High-speed Anti-Radiation Missile (HARM), with the AN/APR-38. As such, USAF, on April 3, 1974, published Program Management Directive, 'Advanced Wild Weasel'. The decal says 'F-4E Advanced Wild Weasel'. (McAir)

ing was completed and a decision made on total system configuration. It was specifically stated the PMD did not constitute funding authority.

The F-4E/APR-38 program was initiated on August 1 by awarding McAir the 'Update R&D and Pilot Production' contract. The basic development and pilot production contracts included the F-4E Research & Development (R&D) effort (engineering and modification of one prototype F-4E for system flight test and TAC IOT&E), the APR-38 added capabilities, design and testing of the Operational Flight Program (OFP), and Pilot Production (PP) of four APR-38 systems. Most of the Group B equipment involved refurbished assets from the AWW F-4D R&D program, while new Group B equipment was built to support F-4E trial installation and kit proofing. Group A kits were started upon completion of R&D definition. New production units would include the added APR-38 capabilities. Total system would be subject to final qualification testing. Any change, resulting from system flight or qualification tests would be retrofitted into the TI and KP F-4Es. Examples of major (structural) modifications to make the F-4E suitable included (1) removal of the M61A1 gun system and conversion of the gun bay into a supportive electronics compartment, and installation and critical alignment of the chin pod on the forward fuselage and modified radome; (2) the vertical fin to accept the new fin pod; (3) the cockpits to accommodate the Control Indicator Set (similar to the F-4D AWW arrangement); (4) doubling the memory size and reduction of the memory cycle; and (5) addition of new wire bundles in the radome, nose, cockpits, vertical fin, and forward, center and aft fuselages.

In an August 24 letter, OO-ALC informed AFLC a study had been completed of F-4Es, ranking them by serial number in order of fatigue damage. One hundred and sixteen aircraft made the list with two spares. Three aircraft, the prototype, TI and KP F-4Es should be designated from this group. For scheduling and planning purposes, certification of the dedication of 116 aircraft was required no later than October 1. The list showed the F-4E with the least fatigue damage (.00005) was USAFE's Block 43 69-7212 with 763 flying hours. The opposite was USAFE's Block 42 90248 with .081 and 1,217 respectively.

On November 1, McAir also received a contract 'Class V Mod 2740, F-4E Wild Weasel Group A Provisions'. It involved the engineering, design, and development of Group A provisions for retrofit installation of the AN/APR-38 AWW, including AGM-45 Advanced Shrike and AGM-78 Standard ARM capabilities, into the F-4E.

After the planned completion of system qualification slipped from January to July 1976, TAC's commander, Gen Robert Dixon, asked for a JOTR to investigate ways to maintain the initial production schedule or upgrade the capabilities of the F-105G and F-4C WW force. To help maintain the production schedule after pilot production, the Air Staff and TAC requested DoD to approve contracting for initial long lead time items prior to the Defense Systems Acquisition Review Council III, i.e., the full production decision point, initially set for April 1976, but postponed until July. The JOTR was held on November 4. Considered was



A second F-4E was modified in St. Louis in the AWW program, Block 44 F-4E 97263, which was reassigned from the 334th TFS at Seymour Johnson. It served as the dedicated Trial Installation (TI) aircraft. '263' is shown at McAir with a 13-man group of OO-ALC personnel before being flown to Hill. (McAir)

the long lead release option, along with the idea of installing Group A provisions prior to arrival of Group B components. The combination of early funding and phased installation would result in a January 1976-August 1977 schedule, with trial installation in January-May 1976 and first aircraft delivery in August 1977.

1975

Advanced Soviet technology, as revealed in the October 1973 Yom Kippur conflict through substantial Israeli losses by Egyptian SAMs, had accentuated the gap between U.S. defense suppression and enemy SAMs. As available WW forces in FY75 had limited capability against newer radar threats, the F-4E advanced WW was expected to correct the situation and therefore remained a top priority for the TAF.

Although a phased installation was recommended in the November 1974 JOTR and favored by TAC, it was opposed after all by AFLC's commander. In a February 10 message 'Production Schedule' to AFLC, TAC again urged phased installation to the maximum practical extent, willing to accept risks to improve the schedule. However, as OO-ALC's individual aircraft approach to install Group A and B items seemed to reduce risk (AFLC April 9 message), TAC accepted the Depot's position (TAC April 24 message). Later on, AFLC's position softened, when it agreed to pursue phased installation if Group B items were available at the start of production.

1976

Due to the high man-hours and extremely complicated nature of TCTOs 1F-4E-600/601, Col Dudley Foster, OO-ALC's Director of Materiel Management's Aircraft Systems Management Division, advised on February 26 to hold periodic coordination meetings for involved Hill personnel to keep abreast of program developments and solution of

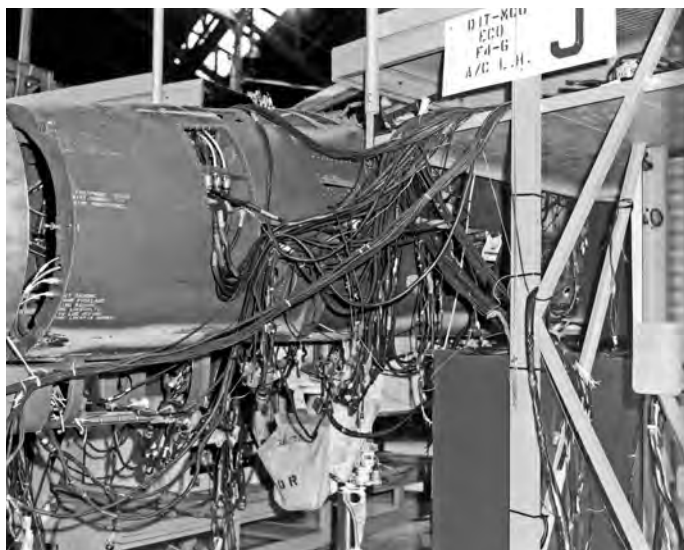
problems through action items. The first such meeting was called for March 11.

To develop an ICA (Independent Cost Analysis) as requested by USAF, a 13-man ASD team in April utilized the following buy schedule: FY75, four; FY76, 21; FY77, 60; and FY78, 29 for a total of 114 aircraft (117 kits to be produced, including three pilot production kits). It was anticipated PDM and A/B kits installation could be combined for some 78 F-4Es. The ten-year O&S estimate was based on 96 operational (one wing with four 24 UE aircraft) and 18 training F-4Gs, including spares. The number of flying hours would be 336/UE/year.

Air Force Regulation (AFR) 82-1 'Military Aircraft, Rockets and Guided Missiles', indicated a series mission symbol was appropriate when 'a major modification...resulted in a significant difference...affecting related system components or resulted in significant changes to the logistic support'. USAF had indicated in its June 28 PMD the aircraft 'may receive a new MDS' and the F-4 SM (System Manager) had planned for a re-designated aircraft in his first MPA to improve logistical support for the many components not common in other F-4s. In this case, there was sample evidence a series symbol change was justified. A F-4E/APR-38 Re-designation TF wrote the formal justification and request, which reviewed the aircraft's new capability and unique structural, cockpit, and logistic support features. Proposed was 'G', which also referred to the F-105G's precedent and the fact the F-4s sold to Germany for training purposes at George were designated F-4Fs. However, it was not the first F-4 with a G MDS, as the Navy had earlier re-designated 12 F-4Bs temporarily as F-4Gs, which had AN/ASW-21 data link equipment to make hands-off carrier landings. On July 9, USAF requested ASD initiate required actions to re-designate the F-4E AWW to F-4G. On August 7, ASD informed OO-ALC the Air Staff had approved the F-4G designation. (After receipt at OO-ALC of conflicting messages from AFLC and USAF about when an F-4E would become an F-4G, Neslin Bangerter of OO-ALC's Technical Services Branch advised in the January 1977 coordination meeting the aircraft would become an F-4G on completion of the final flight test.)

1977

In a January 12 letter, TAC's commander, Gen Robert Dixon, informed PACAF's commander, Gen Louis Wilson, that in preparing the 1978 Presidential budget submission, DoD had deferred the FY78 modification funds for the F-4G to FY79. According to Dixon, the reprogramming made it necessary to stretch the delivery schedule to prevent a break in the projected schedule (from five to three per month [precluding the need for speed-line], with the final ones in FY81). This would result in (1) a slippage of the first F-4G squadron's IOC (Initial Operational Capability) with three months; (2) a required revision of the F-4G Force Program projections; and (3) a slippage of the phase out of the F-105G/F-4C WW force. Predicted on a satisfactory cleanup of the program's major deficiencies, Dixon



The OO-ALC at Hill was responsible to modify an F-4E to serve as the dedicated Kit Proof (KP) aircraft, Block 44 F-4E 69-7290. The photo demonstrates the myriad of cables OO-ALC personnel had to deal with. (OO-ALC)

stated a JOTR, to determine if the F-4G system was ready for full production, could be scheduled for February.

By February, a DoD review was contemplated for the second week in March, following a JOTR and Air Staff review. The JOTR with Gen William Evans (AFSC/CC), Lt Gen George Rhodes (AFLC/VC), and Gen Dixon was held on February 23. Positions/recommendations included, (1) the earliest introduction of all F-4G WW assets into the operational force was a top priority, with #3 priority for TAF and #18 USAF-wide; (2) successful completion of the F-4G R&D program would result in a capability, satisfying basic operational requirements; and (3) full-scale production should be initiated immediately, providing ASD would pursue fixes for the deficiencies reported. The March Air Staff review showed substantially similar positions and recommendations were subsequently made to DoD. On the 11th, DoD announced the full-scale production decision, releasing funds four days later for the production of 60 additional kits (85 total, plus an FY79 option for the final 29 kits).

As recommended by February 1977 AFTEC (Air Force Test and Evaluation Center, Kirtland), TAC, AFSC and AFLC messages to USAF, the follow-on level of effort R&D task was being initiated for system growth and enhancement, essential to provide a WW capability that would remain effective against an ever increasing threat.

On May 6, USAF directed AFLC to prepare a third MPA to update the previous submission, using revised guidance. The second MPA of May 5, 1976, updating the initial MPA, which was based on a full production schedule, included, for instance, trial install and kit proof Group A and B kits, and to validate and verify TCTOs. The MPA was completed on September 19, dealing with the basic modification of 116 F-4Es. Also, for example, the weapons delivery system was to be improved by the employment of the AGM-45-9/10 Shrike, AGM-78C/D Standard Anti-Radiation Missile (ARM), and AGM-65D Maverick and improve overall effectiveness and safety by adding a role

change relay and second fuel quantity indicator gauge. Modification now had to be accomplished in conjunction with the selected F-4E's PDM cycle at a rate of three inputs versus five per month, in line with higher headquarters direction to defer funding for the last 29 kits. Estimated average installation man-hours were revised to 5,024 per aircraft, down from 6,093 of the second MPA. Program changes resulted in a revised (fourth) December 14 MPA, mainly due to adding a fourth simulator and additional support equipment.

After DoD had directed USAF in December 1976 via Program Budget Decisions to establish an F-4G enhancement program, USAF, on June 7, published the 'F-4G Development (Basic and Enhancements)' PMD. It provided direction to (1) complete basic F-4G R&D efforts; (2) correct APR-38 system deficiencies identified by the IOT&E; (3) conduct a FOT&E (Follow-on Operational Test and Evaluation); and (4) initiate a level of effort F-4G enhancement program. AFLC became the implementing command and was tasked with overall responsibility, except FOT&E management. Two of its responsibilities were, (1) to work closely with TAC, Air Training Command, AFLC, AFTEC, NASC (Naval Air Systems Command) and the NWC (Naval Weapons Center) to coordinate AGM-88/F-4G integration and testing as soon as possible to verify compatibility between the APR-38 and HARM; and (2) to start de-modification of the one remaining F-4D AWW testbed aircraft as soon as possible. TAC was to provide USAF with a revised ROC, which would address the desired enhancements as soon as practical, but not later than December 1, and to prepare the IOT&E test plan. With regard to program management guidance, AFSC should anticipate receiving direction by separate PMD to integrate an improved INS (Inertial Navigation System) so that it could be installed during the first scheduled F-4G PDM cycle.

The production prototype F-4G, Block 42 F-4E 90239, was input at Ogden on September 8, even though kit-proofing was not complete and despite the risks known to be involved due to non-availability of complete, update Group A kits. However, those risks were outweighed by the need to provide TAC with F-4Gs to meet its training schedule. '239' was #1 in the production sequence and received kit serial number four. It was delivered to TAC on April 24, 1978. Had KP's completion taken 373 calendar days, 239's took 228 days, although the retrofit production flow time was well over the 140-day target. It required time to establish the most expedient routine, the actual receipt of the new aircraft provisions and classified APR-38 components, along with their transport/routing to the appropriate storage/work stations and subsequent integration for installation.

In October McAir received a contract 'Production Group A Kits', valued \$19.7M. The period of performance was to June 1981.

1978

On January 12, the F-4G Ad Hoc Steering Committee met at Nellis to discuss several related topics, one of which was flight testing production aircraft. It was agreed that

the first ten F-4Gs, starting with 90239, were required to fly instrumented EW range sorties, with the first five to each fly the routine Functional Check Flight (FCF) and two range sorties ('239' required three range sorties). The next five, the FCF and just one range sortie. It would then be decided, based on system performance up to that time, whether additional range sorties were necessary. Although OO-ALC's Flight Test Branch had F-4E pilots assigned to fly F-4G FCFs and range sorties, it lacked a necessary qualified EWO. As TAC's priority was training operational F-4G aircrews, a solution had to be found to flight test the first production F-4Gs.

Capt T. Bear Larson arrived at George in January 1978 and was assigned to the 39th TFTS after six years flying F-4C/WW aircraft at Zweibrücken and Spangdahlem, Germany. He flew some F-4C and E sorties to maintain C model currency and gain F-4E model experience. His first F-4G sortie was flown at Nellis on February 28 during AFTEC's FOT&E. Training was based on the Integrated Test Bench, I-Bench, used by maintenance to wring out the 'black' boxes end to end, but giving all of the displays and BIT (Built-in-Test) tests, and processing some signals with a squirt box. He then became Chief of the F-4G Ready Team. Capt Larson,

The modification to F-4G configuration involved putting a digital system into the old trusty analog F-4E. Due to the nature of the APR-38 ranging system and its interfaces with the INS and other avionics on the platform, the mod could not be fully checked out on the ground. This drove TAC to request that at least the first ten aircraft that went through mod line be accepted with a test experienced F-4G EWO in the back seat, and fly it across an EW test range. That's when Capt Dennis Haney and I stepped in. This provided significant scheduling challenges. For instance, there were the standard depot slips in delivery time, as well as the relative inflexibility of the test range schedule.

For instance, T. Bear flew three sorties in 97566, the second production F-4G, before it was delivered on June 6 and also three in 90206 (#6) in June before delivery on the 21st. As he continued,

We worked around as many of these as we could, but Denny and I accepted them. The first couple were a little rough as we were breaking in the folks at Hill (both the existing aircrew and some of the depot folks as well). We would try to explain the system on the I-Bench to a Hill back seater. We would then get these first operational jets to George, where initially the first ones were used as hands-on aircraft to train maintenance personnel with the red lined tech data, so they were in high demand. But all was worth the effort: the jets started to come out standardized and there were qualified guys at Hill that could accept the aircraft.

That back seater was Capt John Andrews (388th TFW, Hill). After going through APR-38 school he took over acceptance testing and also coordinated range dates and times.



'290' freshly painted, on a wet Hill tarmac after its PDM and modification, seemingly ready for its transfer to Nellis. (OO-ALC)

By January 31, eight F-4Es had been input for PDM and modification. An earlier directed study of F-4G production flow time, based on incremental parts shipments, indicated that extraordinary effort was required to meet the FY78 output of 18 aircraft. To deliver them on time, Brig Gen Kenneth Milam, AFLC/DCM, on January 28 approved OO-ALC's overtime request of 51,000 man-hours. In addition, work was based on McAir's complete delivery dates and accomplished in three shifts. FY78 output was even 19 F-4Gs.

To evaluate corrections made by AFSC of the remaining deficiencies, a FOT&E and TD&E (Tactics Development and Evaluation) was conducted by AFTEC and TAC at Nellis with TAWC's two 'CB'-coded F-4Gs. It was initiated on February 6 and completed on July 29. A total of 223 hours were flown in 149 sorties with 121 being successful. TD&E began in June and approximately 40 of the 149 sorties were used to satisfy its objectives. While operational effectiveness proved to be satisfactory, deficiencies had to be corrected. For instance, the APR-38 MTBF (Mean Time Between Failure) was only 2.2 flying hours. Gen Bryce Poe, AFLC/CC, expressed his concern about this low MTBF and its performance to his TAC and AFSC colleagues. It also regarded the high cost to improve the APR-38 reliability, both in the short and long terms and indicated they would bear directly on the decision to purchase additional F-4Gs. Although aware of the commitment to the need for F-4Gs in USAFE, AFLC now considered the possibility of terminating the planned deliveries. ASD then began work on APR-38 reliability with better quality control, longer MTBFs for LRUs and improved fabrication methods. With other changes made, AFTEC gave the F-4G a satisfactory rating.

In September, USAF tasked AFTEC to prepare and schedule briefings for DoD, the Air Staff, the Air Force Council et al regarding the release of FY79 funds for conversion of the last 29 F-4Es and continued program support. A series of briefings were given by AFTEC, ASD, and AFLC at TAC, AFSC and to the Air Force Council. ASD

presented several ECPs (Engineering Change Proposals) to improve system reliability and Built-In-Test performance. In all, over 100 ECPs applied to the APR-38. According to ASD, the improved APR-38 MTBF would be 9.2 versus FOT&E's 2.2. AFTEC's commander, Maj Gen Howard Leaf, considered the ECPs adequate to justify continuance of the program.

During an October 16 General Officer Review, AFLC showed the program to be too expensive to pursue more F-4Gs and recommended careful consideration of overseas deliveries. To prove their fixes, ASD briefed the program, showing six aircraft with normal LRUs and six with improved LRUs flying at George and Nellis. With Gen Leaf's support, AFLC agreed to support the acquisition of 29 more F-4Gs, providing ASD would improve the APR-38 and its support equipment and AFLC would receive more money for, among others, spares. Based on continuing improvements and pursuant to DoD and Air Staff reviews, FY79 funds were released in November for the 29 F-4Gs. With a three per month production rate, all would be modified by May 1981. TAC believed the F-4G AWW had a good capability for defense suppression, but yet it was looking at an enhancement program to make it effective against increasing and changing threat environments.

Air Force Magazine reported in October that President Carter, after 'intense debate within the Administration' had denied Iran's request for the procurement of 31 F-4Gs. DoD had urged the sale, while the State Department was against it. Apparently, the aircraft's advanced EW equipment was thought to be too 'sensitive' to be given to another country. As an alternative, the U.S. offered an equal number of F-4Es and 1,000 AGM-45 Shrikes.

1979

On February 13, 30 of the first 34 TAC F-4Gs had been delivered. Three aircraft were in flight testing and one was about to enter it. Depot flow time was decreased to an average of 160 days with more than 5,000 maintenance man-



F-4E Block 42 69-0239 was the production prototype, reassigned from the 347th TFW at Moody and input at OO-ALC on September 8, 1977. '239' was delivered to TAC on April 24, 1978 and flown to George four days later by Col Dudley Foster, 35th TFW/CC, and Capt Denny Haney, EWO with the 39th TFTS. The May 1980 photo shows 239 while on a X-country in the colors of the 563rd TFS (red). (Jim Rotramel)

hours required to accomplish the two TCTOs. The initially proposed flow time of 140 days had not taken into account the extremely crowded condition resulting from the new wire bundles in the cockpit. A review indicated cockpit area work required some 600 hours and 14 days more per aircraft than negotiated with the F-4 SM. Not included either were time consuming requirements for overseas deliveries: at least two days to assure navigation and air refueling systems were ready and another day for a complete compass swing.

As with other F-4 types, F-4G engines left a trail of smoke which degraded its chances of tactical surprise. This prompted TAC in May to submit a SON (Statement of Need) for low smoke engines. It was expected to be reviewed in 1980. As AFLC had seventeen new production, low smoke engines left over from another program, they were delivered to George in December for installation. Starting with the 1982 PDM, smokeless engines were installed in F-4Gs.

The first F-4G to return to Hill for PDM, was 69-7263, which was fielded as the first 'real' F-4G in September 1977 and therefore returned early. It was input on July 18 and returned to George on October 17. Kit-proof F-4G 69-7290 was returned for PDM in April 1981. It was overhauled and returned in October. Like '263', it had test instrumentation and other features not found on production F-4Gs and also helped OO-ALC to establish a routine PDM production flow, which started in earnest in October 1981. Through December, six F-4Gs were input. During FY82 and 83, 36 F-4Gs were returned after PDM completion. Initially, flow time averaged 130 days, but by the summer of 1983, it had been reduced to under 110 days.

To manage the F-4G program with its numerous sub-programs and tests designed to increase its capabilities, USAF, on August 24, directed AFLC to take the lead with support from AFSC. AFLC then took steps to tie together all F-4G-related PDMs and to delineate responsibilities of concerned commands. Examples of present and future sub-programs were the AN/APR-38 OFP engineering evaluation (ASD), AN/APR-38 FOT&E and TD&E (TFWC), AGM-88 HARM (ADTC and AFTEC), and F-4G update tests (AFSC). Within TAC, the TFWC was directed to work its management of tactics development with TAWC's Det 5 at George. As AFTEC recognized the need for TAC to be the test schedule coordinator of the limited test assets (two F-4Gs), it promised to work with the TAC test force, even as AFTEC maintained the independence of its testing. By the end of 1979, AFLC's draft PMD for F-4G integration and management was being coordinated.

In 1979, the Air Staff started to delete WW aircraft as nuclear weapons carriers, meaning the F-4G was not to be certified for nuclear weapons. This caused TAC to seek information, leading to a TAF position on the matter. TAC did not have plans to use the F-4G as such. PACAF felt that a nuclear capability should be studied to increase the options available in future contingencies. USAFE stated the F-4G was not committed to a nuclear strike role, but was counted as nuclear capable for multilateral balanced force reductions. The eventual TAF position was that the

aircraft should be certified for carriage and employment of nuclear weapons.

1981

In response to AFLC’s message of February 27 ‘F-4G Force Structure’, OO-ALC responded on March 31, providing the information as requested in USAF’s February 25 message to AFLC. Additional F-4E candidates for conversion to F-4G configuration, plus compatible with existing Group A modification kit design, could be provided from Blocks 41-45. Aircraft from Blocks 40 and below would require redesign of the Group A kit. Available were 29 Block 41 and 19 Block 42-45 F-4Es. As all were PAVE SPIKE-modified, they had to be de-modified. Based on the initial 22 aircraft, the estimated cost would be \$51.7M, assuming modification was accomplished concurrent with PDM. Group A lead time was estimated to be 22 months with deliveries at the rate of five per month. Group B lead time, based on the longest item, was estimated to be 35 months with deliveries at the rate of three per month.

Although work on the Weapon System Training Sets began in earnest in 1978 as funds became available, the first of four F-4G trainers was not formally accepted at George until February 1981, with a second one following in June. Two months later, Clark received its trainer, with Spangdahlem following in November 1983. Due to the limited threat environment available for actual aircraft training, the F-4G simulator was far superior to the aircraft for WW combat training, as it had an almost unlimited threat environment capability. The trainers, consisting of six computers, simulating the particular inflight combat and simulating the F-4G systems, were more complex than the actual aircraft. Adding to the complexity of the trainers was the yearly F-4G OFP software update.

In June, OO-ALC’s Directorate of Maintenance completed its most significant single accomplishment, the complex multimillion dollar costing conversion of F-4Es to F-4Gs. The final F-4G of the original 116, 97268, departed Hill for George on July 1, 1981. In the foreword in a monograph about the F-4G, OO-ALC Commander, Maj Gen Marc Reynolds, stated that ‘the developers had a difficult time integrating the system and developing the support equipment and technical data necessary to maintain the aircraft’. The modification was the largest single production modification ever performed on a fighter aircraft. Modifications of this magnitude were previously performed by a contractor. In addition to TCTO 1F-4E-600, a standardized F-4G configuration baseline of 119 TCTOs was established. This work was accomplished concurrent with the modification. During the course of the modification, virtually every system in the aircraft was affected. After the M61A1 gun and ammunition rack were removed, the forward fuselage was rebuilt. Initially, this required over 1,000 line items. Installation of the skin required 1,175 fasteners. The Lead Computing Optical Sight System (LCOSS) was removed, 121 wire bundles were added with over 4,000 wiring terminations made. Some of the connector plugs had over 100 pins to lock in



The 39th TFTS received the first 12 F-4Gs out of production, including 69-7206, photographed on October 13, 1978. It still lacks its white fin cap and TAC emblem on the tail. It is configured with an AGM-65 Maverick under the left wing. (Theo van Geffen)

place. In addition, the new APR-38 system added 52 new antennas and 27 LRUs to the aircraft. Other existing equipment and black boxes had to be relocated to provide the space required to facilitate APR-38 system installation. The rear cockpit and instrument panel were completely redesigned. The final step in the total production process, testing the new aircraft, was accomplished by the Flight Test Branch. In all, it took some 600,000 depot maintenance man-hours to complete the 116 aircraft. Deliveries were as follows:

Command/Base	Number	Remarks
TAC/George	34*	Apr 78-Feb 79
USAFE/Spangdahlem	12	Mar-Jul 79
PACAF/Clark	12	Jul-Nov 79
USAFE/Spangdahlem	12	Nov 79-May 80
TAC/George	46**	Mar 80-Jul 81
* ten for the 39th Tactical Flying Training Squadron (TFTS, training) and 24 for the 563rd TFS.		
** 24 for the 561st TFS and 22 as backup.		

F-4Es to be modified to F-4Gs came from one USAFE and five CONUS bases. F-4E 90241, input for F-4G modification on October 19, 1979, was utilized as kit proof aircraft for the Airborne Video Tape Recorder, a Class V modification.

USAF PMD ‘Class V Modification, F-4G Wild Weasel’ of July 27 amended the one of March 20, 1978, addressing only the financial data provided and raising the funding limit. The change formalized direction/funding actions authorized by previous Air Staff direction. The amendment represented a cost increase of \$40.8M to \$366M, including the increase of \$5.4M for the over 100 approved and funded Group B ECPs under Mod 2740 that stemmed from deficiencies during APR-38 qualification tests.

1983

On May 18, USAF published PMD ‘Class V modification to F-4E for conversion to AN/APR-38 Performance



The next 24 F-4Gs were assigned to the operational 563rd TFS, although 69-0304 was later reassigned from the 39th TFS. Its crew chief makes the final checks prior to a sortie from Nellis during a 1987 Red Flag exercise. '304' is configured with an AGM-45 under the left wing. Note that by this time all F-4Gs were painted in 'European' camouflage. (USAF, TSgt B. Simons)

Update Program and AN/ARN-101 Configuration'. It directed the preparation of a Class V MPA and Acquisition Plan to modify another 18 F-4Es to the G configuration to include the AN/ARN-101 Digital Avionics System and AN/APR-38 Performance Update Program (PUP) modifications as described in TAC SON 315-80, 'Wild Weasel', November 14, 1980. With the additional 18 aircraft, the PAA (Primary Authorized Aircraft) was rebuilt to 84. TAC was to identify the 18 F-4Es. Re-designation to F-4G would follow after installation of the APR-38 PUP. For planning purposes modification would begin in FY4/87. The aircraft were upgraded and delivered in 1987/88. Included were PAVE SPIKE de-modification and Phase I of the PUP. In contrast to the 5,200 man-hour original conversion, the additional aircraft required some 8,100 depot production man-hours.

On September 1, the F-4G inventory numbered 105. Sixty-five were assigned to the 37th TFW (George), 25 to the 52nd TFW (Spangdahlem), 13 to the 3rd TFW (Clark), and two to Det 5, TAWC (George).

AN/APR-38 PUP

On May 23, 1979, USAF published a PMD for AN/APR-38 Performance Updates, providing direction for the follow-on engineering development of performance updates and technology improvements to the AN/APR-38 receiver system and integration of these into the F-4G weapons system. They would make the F-4G an effective lethal defense weapons system for the mid-1980s, enabling it to accommodate the constantly expanding hostile air defense system network, including expanded Pulse Recurrence Frequency (PRF) agile emitter systems. In addition, AFTEC's FOT&E had indicated its reliability and maintainability were less than desired and needed improvement.

The PMD stated that funding constraints, impacting both DT&E and procurement, did not allow simultaneous development of all desired capabilities. Therefore, a priority schedule was established. AFLC and AFSC, for instance,

were to prepare a coordinated Class V Modification Program Management Plan and Program Budget. All efforts had to be timed so as to facilitate initiation of engineering development as soon as FY81 funds were available. Two sets of AN/APR-38 Pilot Production LRUs, including the LCOSS, were authorized for the follow-on development program. Upon approval of full-scale development, authority to Class II modify one of the CB-coded F-4Gs at George would be granted.

As the operational scenario was not up to date, TAC was directed to conduct an operational requirements study to address the capabilities required of WW avionics, as applied to the F-4G or other appropriate airframes, for use in the late 1980s. Subjects to be considered included enemy employment doctrine, quantification of the number of aircraft and training devices. Results were to be used to formulate a SON, to reach USAF not later than September 1, 1979.

The scheduled projections, based on the known funding profile, indicated PUP production decision could not be made until FY86 or 87.

According to the FY83 history of AFSC's Air Force Acquisition Logistics Division, enhancing the F-4G weapon system was a primary goal set for the Full Scale Engineering Development (FSED) phase of the APR-38 PUP. Top operational priorities in this phase included, for example, computer memory and receiver set capability improvements to the overall APR-38 system. Additional factors were reliability, maintainability and survivability. May 1987 was set for the production contract award, 1988 for IOC and 1990 for program completion.

In October 1982, McAir was awarded the FSED contract. As prime integrating contractor, it became responsible for design, development and testing of the hard- and software to meet APR-38 PUP requirements. The overall T&E objective was to assure the development of a cost effective, supportable APR-38 PUP system with the capability to counter, suppress and destroy electromagnetic emitters through the 1990s.

McAir announced on October 2, 1986 USAF had awarded the company a \$55M contract to start production of an updated version of the AN/APR-38 as part of the F-4G PUP (TCTO 1F-4G-529). Involved was production of the CP-1674/APR-47 WASP (Weasel Attack Signal Processor), a major component of the AN/APR-47 radar receiving set. The AN/APR-47 gave the aircraft the capability to detect, classify, and localize enemy air defense radars. It was the only radar receiver then available to automatically provide HARM with bearing, ranging and enemy system information, significantly increasing its effectiveness. WASP was not only the first EW MIL-STD-1750A computer in production, but also the fastest one, able to perform more than one million instructions per second. To satisfy TAF's most critical operational priority, a two-phased approach was used with Phase I being WASP and Phase II involving extension of the frequency range of the Directional Receiver Group.

The Air Force Operational Test and Evaluation Center (AFTEC was re-designated AFOTEC on April 4, 1984) pub-



The 561st TFS was the second operational F-4G squadron at George, receiving its first aircraft on March 18, 1980 while converting from the F-105G. The photo shows 69-7561 with an AGM-78 and -45 under the left wing, forming a hunter-killer team with AGM-45 configured F-4E 66-0303. Both are equipped with AN/ALQ-119 ECM pods. (USAF, SMSgt D. Sutherland)

lished its IOT&E Plan in May 1985 and its final report (on Phase I) in December 1986. However, due to FY91 budget constraints, CSAF Gen Larry Welch announced on January 30, 1990 the early retirement of the F-4G and termination of follow-on WW development, including APR-38 PUP's Phase II.

AN/ARN-101

Installation of LSI's (Lear Siegler Inc.) modular digital AN/ARN-101 (V) INAS (Inertial Navigation Attack System) was a Class V modification of initially 60 RF-4Cs and 167 F-4Es and initiated in October 1978.

In their March 11, 1977 Memorandum 'F-4G Wild Weasel Program', DoD had not only approved F-4G full-scale production, but also expressed concern over the low reliability of its navigation/attack system with a resulting impact on the availability of operational aircraft. USAF was therefore directed to initiate a program to update the F-4G with a more reliable and maintainable system not later than the first F-4G PDM cycle, July-September 1982.

Early in 1979, TAC had strongly endorsed replacement of the F-4G's low-reliability LN-12 INS with the ARN-101 system. Both F-4G and F-4 fleet INS replacement issues were studied. Replacement of the WW item was seen as necessary because of the AN/APR-38's dependence on the INS: the F-4G's APR-38 memorized where a signal was if the emitter stopped radiating and continued to display its position based on this information. Not only was the need held to be mission essential, there was also a TAF consensus on the urgency of the situation. As a result, the Air Staff promised to find a source for modification funds in FY81 and arrangements were made whereby the work would be done during September 1982-June 1984.

The Class IV modification to improve the F-4G weapons system through the addition of the AN/ARN-101 INAS and interfacing all major avionics systems, was very complex. The 2,500 man-hour task was to be accomplished during PDM or by contractor field teams. With OO-ALC as

the procuring agent, LSI was awarded a contract 'F-4G/ARN-101 Integration'.

After LSI successfully integrated and installed the AN/ARN-101 in the trial F-4G, 97206, at George in December 1982, flight testing was initiated with the goal to have a production release available for the fleet by October 1983. Since arriving at George in July 1982, an LSI team had modified aircraft equipment, strung wires and cables, installed AN/ARN-101 boxes, updated the drawing package and finally tested the completed installation on the ground prior to the FCF. Flight testing was to continue through May 1983, with a follow-on test of USAF-requested operational software changes to extend into the fourth quarter. The AN/ARN-101 continued to be updated through OFPs.

The Test Aircraft

F-4E 69-7254, Advanced Wild Weasel (AWW) R&D Prototype

The purpose of the F-4E/APR-38 R&D effort was design, development, fabrication, installation, test, validation, verification and documentation required to integrate the AN/APR-38 into F-4Es. A prototype would be used by ASD to develop the Group A kit and to fly the DT&E and IOT&E.

Block 43 F-4E 97254 of the 414th Fighter Weapons Squadron (Nellis) was selected for that purpose.

'254' was delivered to McAir in St. Louis in February 1975 for preliminary measurements. After accomplishing DT&E's Phase I (instrument calibration and stores separation) at AFFTC in March-April 1975, the aircraft returned to St. Louis for layup to receive the initial Group A provisions and APR-38 LRUs updated from the F-4D AWW prototypes. For instance, the M61A1 gun system was removed to provide space for a new forward fuselage chin pod, installation of avionics shelves in the nose and of a new AI radome. Also, the vertical fin was modified to accept the new fin pod. To assure flight stability for selected test missions, ballast sets were necessary as weight replacement for various subsystems.

This was followed on September 15 by a six-week Group B integration period to prepare 254 for Phase II in December. It was formally initiated on the 6th with an APR-38 installation verification sortie at McAir. Four days later, USAF pilots flew the aircraft to Edwards. Full-scale structural, environmental, and avionics testing was conducted at China Lake's NWC and Nellis ranges by a Joint USAF-Contractor test team. In the first week, four sorties were flown to obtain data to verify the hardware baseline and a data base on the new 64K computer and software program. While on a December 19 high altitude high-G vibration test flight over the Edwards range, the crew heard a loud and sharp crack and RTB-ed. After expending close to 400 man-hours, it was determined the sound was caused by a crack in the canopy rail, supposedly a common F-4 maintenance problem. Repair by McAir personnel took some three days.

A problem encountered with 254 was that with the added weight of the chin pod and equipment to the



In December 1986, TAWC, Tactical Air Warfare Center, had one of its Det 5's F-4Gs at George painted in 'Hill Project' camouflage. It was a gray-on-gray pattern, used on F-16s to evaluate the effectiveness on WW missions. It must have been effective, as all F-4Gs were similarly camouflaged. '277' was one of (initially) two CB-coded F-4Gs. (USAF, TSgt Rob Marshall)

radome, it proved to be difficult to close and align it during normal maintenance. This prompted McAir to design a radome cam lock device that lifted the radome and aligned the pins during the closing procedure. The device would be installed on the Trial Installation aircraft and added to sub-kit #1 or #2.

Three days after DT&E was suspended on May 25, IOT&E was initiated at Nellis by AFTEC. All of the update goals from the F-4D/APR-38 program were demonstrated. After IOT&E completion in early July, 254 was returned to Edwards to receive a digital scan converter and AGM-65 Maverick Class V mods by an OO-ALC field team. APR-38 DT&E was to be continued in late July/early August, while IIR Maverick DT&E was being conducted. The reason to continue DT&E after IOT&E completion and even after the full production decision in March 1977, was to provide McAir a modified aircraft to refine software and to address specific hardware difficulties not previously resolved. As to the latter, IOT&E follow-up sorties were conducted in late 1976 by ASD and AFFTC at Edwards, which received mixed reviews. Although some system improvements were noted, many other problems, primarily with software debugging and interface with other F-4E subsystems cast doubt upon timely completion of the IOT&E follow-up by AFTEC crews. After ASD, in early January 1977, had successfully incorporated and flight tested several software changes to correct deficiencies, AFTEC conducted the final Group B (APR-38, which was to be installed upon completion of 1F-4E-600) IOT&E. Nine sorties were flown with the final one on February 4. AFTEC's conclusion was the system met the minimum level of acceptability for TAC, but needed improvement and further testing. The aircraft was then returned to McAir.

254 was flown to Hill on May 15, 1978 and as production sequence #24 it became a 'real' F-4G through kit serial

#27. It was delivered to George on January 7, 1979, where it served with the 35th and 37th (T)FW until retired to AMARC (Aerospace Maintenance and Regeneration Center) on June 5, 1992. It departed for MFSI at Mojave (CA) on June 17, 1999 for QF-4G conversion. While with the 82nd ATRS (Aerial Targets Squadron) at Tyndall, it was expended on June 4, 2002.

F-4E 69-7263, Trial Installation

McAir's trial installation was the development of the F-4E Group A design (Pilot Production, PP, hardware). Necessary ECPs, originated from the DT&E, were prepared, submitted and incorporated into the contract in a timely manner, allowing delivery of PP hardware on schedule. Trial installation also helped to define and deliver the production configuration to include data, kit material and tooling and installation support required for Ogden to perform the modification.

As prototype F-4E 97254 differed from the desired production configuration specified by flight test discrepancy reports and changed in Group B design, a different aircraft was necessary for trial installation. Block 44 F-4E 97263 was selected as the dedicated TI aircraft. It came from the 334th TFS (Seymour Johnson) arriving at Hill on November 10, 1975. As a first step, 263 was input for PDM where the baseline configuration was verified, i.e., accomplishment of prerequisite TCTOs.

After arriving at McAir, it was laid up in February-September 1976 for installation of Group A, which initially contained 13 sub-kits, and unqualified Group B APR-38 components. Unqualified, as the first qualified Group B would not be available until the kit-proofing process. Work on eight sub-kits started on February 9. Although the scheduled completion date for all was April 9, the eighth, sub-kit #9 'Cockpits', was not completed until September

16. That date also meant completion of Group A and Group B APR-38 equipment installation. In the process, OO-ALC maintenance personnel and observers began to perform and write TCTOs 1F-4E-600, installing Group A sub-kits, and 1F-4G-501, installing Group B. Uniform retrofit control drawings, parts lists, wiring diagrams, and detailed work statements developed as this and the third F-4E accepted the new components.

In the meantime, an OO-ALC team had visited St. Louis May 2-7, 1976 to observe the trial installation of Mod 2740. One of the team's conclusions was that overall progress was good, considering the problems encountered on sub-kit #2, the structural modification of the forward fuselage. It was about four weeks behind as it proved 263 had suffered battle damage by a .50 caliber hit in the ammo bay area, requiring field repair of bulkheads and panels. The resulting structural repair required funding, which was slow in coming about. Also, the initial structural repair by McAir was not compatible with the TCTO-kitted parts and consequently had to be removed, re-engineered and re-installed.

Another OO-ALC team visited St. Louis September 15-17. Examples of subjects covered were, (1) the 'tie down' phase was 99 percent complete; (2) incoming defects, immediate/urgent action TCTOs and calendar/time change requirements were being worked; (3) verification of the APR-38 system components on the 'hot mockup' at the McAir St. Charles facility was completed on September 9 with system/operational checkout on the aircraft rescheduled to the 29th; and (4) flight test was rescheduled from September 3 to October 1.

263 arrived at Hill on October 19, 1976 without black boxes for a two-week period for first article acceptance testing of the new automatic circuit analyzer, support of the APR-38 theory/organizational maintenance training and flight crew training. The aircraft would then depart for and be possessed by George AFB.

However, it was decided to keep 263 at Hill so that a number of kits could be installed before flight testing. Estimated flow time for this modification kit package was around 90 days. Although some kits were not yet available, work should begin on some of the more complex modifications, e.g., TCTO 1F-4E-1071 'Modify Fuel Cell Cavities'. The need to start work was accentuated by the fact FOT&E instrumentation was required (also for KP F-4E 97290). McAir would provide drawings by January 1977. Every effort had to be made to be sure that as much work as possible would be completed on 263, as instrumentation alone would take 1-2 months to install. On November 24, Maj Gen Edmund Rafalko, OO-ALC's commander, gave approval to start work on the aircraft.

McAir's inability to rectify the deficiencies identified by AFTEC's final IOT&E, resulted in Gen Rafalko to request a 60-day extension of kit proof completion in the TI aircraft. Two examples of deficiencies were the addition of an angle of attack and fuel gauge in the rear cockpit, as well as installation of an audio control for the AGM-45/78 missile tones in the rear cockpit. Both changes were contracted for on March 15. To proof the changes, McAir re-

quired a three-week re-access to the aircraft. Its personnel arrived for that purpose on March 8. Yet, officially, the completion date for 263 remained April 30, 1977.

The FOT&E instrumentation package contained, for example, video cameras and recorders, and a digital display. A meeting was held at McAir on January 18, 1977 to determine the precise equipment. In May, McAir was awarded a contract for both packages. Personnel began kit installation on July 26 with completion August 9. They returned on September 19 and installed the package on '290', September 20-30. Although package installation was completed, it still had to be signed off. The video and range time interface needed to be checked out after installation of sub-kits #16-18, followed by re-installing the APR-38. By November 29, McAir had successfully accomplished checkout of 290's package. They returned December 13 to certify its instrumentation package before the aircraft left for flight tests over the range. FOT&E would be conducted after kit proofing was completed and both aircraft were being flight tested.

In late August, one complete APR-38 set became available at Hill for 263. It was installed in early September. The aircraft, configured with some of the Group A kit-proof changes, test flight instrumentation, and complete APR-38 Group B, was flown on September 20, 22, and 26 over the Caliente Range (NV). Flight tests not only revealed the aircraft proved acceptable overall, but also showed weapons release system malfunctions.

Because of continuing delivery problems by McAir, it had been decided by mid-July 1977 to waive TOs 1F-4-1087 and -1090 for both TI and KP F-4Es if it would become a factor to delay the aircraft. As 263 could not be delayed any longer, it was decided in late August to waive both TOs. The result was that when 263 departed for Nellis on September 28, 1977, it still required portions of TCTO 1F-4E-600 in order to become a 'true' F-4G (according to the 1977 TAC Chronology, it was the first G to be assigned to the 35th TFW on that date). Some items were updates to match kit proof configuration and some baseline TCTOs. A Depot field team was sent to Nellis on January 14, 1978, to install both TOs, repair strip lights and to install the still missing sub-kits #16-18. On February 10, 263 returned to



The 563rd TFS participated with F-4Gs in Exercise Team Spirit 85 in South Korea. The March 1, 1985 photo shows three of their Gs with their accompanying KC-135As prior to takeoff. (USAF, MSgt Mike Dial)

the custody of the 57th FWW with the CB code and on July 27, it joined the 35th TFW CB-coded as well.

97263 was spared the fate to become an QF-4G and joined the National Museum of the United States Air Force in September 1996.

F-4E 69-7290, Kit-Proof

The purpose of kit-proofing was to verify the form, fit, and function of the changes made. It was accomplished by OO-ALC and initially scheduled for November 1976-April 1977. Block 44 F-4E 69-7290 was the dedicated KP aircraft.

It was input for PDM on July 15, 1976 and accomplishment of prerequisite TCTOs and those to be performed concurrently with the basic conversion. Output was due October 28. As to the 1F-4E TCTOs, (1) 47 prerequisite TCTOs were earlier accomplished; (2) 11 were during PDM; (3) 19 were accomplished between PDM completion and start of kit proofing; (4) 18 TCTOs to be accomplished between December 1 and April 20, 1977; while (5) 1F-4G-501 was to be accomplished between April 20 and May 3. Some of the TCTOs in (3) and (4) also had to be complied with on the TI aircraft. Layup at Hill was then planned through April 1977, followed by transfer to Nellis for FOT&E.

Delivery by trucks from St. Louis of the kit-proof A kit to Hill began on October 20, 1976. It included the draft TCTOs, a set of ballast, two sets of installation tools, and a spare set of Group A parts. Eventually, an entire Group A kit consisted of seven crates, weighing a ton with a shipping cube of 168.5 feet. On December 21, Maintenance formally transferred 290 from PDM status to Mod 2740. A Project Directive was published on November 16 to begin installation of TCTO 1F-4E-600. Work on TCTO 1F-4G-501 was deferred until IOT&E was successfully completed. In October, program managers at Hill considered to further delay kit-proofing 3-4 months. They did so due to ongoing system qualification and changes. However, due to the program's high priority and the risk of undermining requests for additional long-lead time item funds, Gens Dixon and Rhodes agreed it should begin on schedule, although it was realized there were risks associated with verification of parts that were subject to change.

As new TCTOs were identified, it was ensured McAir would include each one as a requirement for -600. When the basic TCTO was published in January 1978, it listed over 100 pre-requisite and concurrent TCTOs.

Initially, the KP F-4E was scheduled to receive the same 13 Group A sub-kits as the TI F-4E. Installation of the first sub-kit, 'Aft Fuselage/Fin Pod' was begun on December 21, 1976. The final two, 'Cockpits' and 'Equipment' were completed on October 7, 1977. However, as kit-proofing progressed, Maintenance personnel found a number of Group A structural provisions did not fit properly. Examples were (1) the radome did not fit its fixture, which was used to locate the position of the new chin pod; (2) the chin pod doors and fairing were mismatched; (3) the antenna pod for the vertical fin did not fit; and (4) the fin doors were not similar on the TI and KP F-4Es. The problems were



When the 39th TFTS was re-designated TFS on October 9, 1980 to become an operational F-4 squadron with 26 PAVE SPIKE-configured Es within the 35th TFW, its resources were absorbed by the 562nd TFTS, which had sent off its final two F-105Gs the previous day. The aircraft on the May 9, 1988 photo, 69-0292, is configured with two each AGM-65 Mavericks and AGM-88 HARMs. (USAF, Ken Hackman)

solved by McAir. Also, changes based on AFTEC's IOT&E deficiency report added significantly to the time required for kit-proofing. Examples included the central location of the calibration tapes near the HAWC for faster tracks, rerouting cables to the Aircraft Commander's Plan Position Indicator and replacement of electrical connectors to enhance safety. These and other changes affected all of the 13 original sub-kits and prompted the addition of five more sub-kits in May 1977, one of which was #18, 'IIR Maverick AGM-65D'. Any additional kits also applied to 263. During 1976-77, the Group A work statement changed ten times through negotiations with McAir. These changes and qualification of depot support equipment extended kit-proofing through 1977.

With regard to sub-kits #16-18, McAir was requested in early August 1977 to expedite delivery. They were authorized to use TI 263 at Hill for mockup. Personnel arrived on September 13 and mockup was completed eight days later. Structural installation on 290 by McAir began on October 17. An electrical team arrived the next day to install wire bundles, connectors, etc. Installation was completed on October 27. All parts for KP's APR-38 were received by October 18 and Group B was installed the following month.

In the meantime, the scheduled November 12-December 8 radar and flight tests had slipped to November 25. Two of the three reasons were, (1) fuel quantity problems; and (2) seals dried out because of length of time the aircraft was out of service. Hence the question, if it would be able to meet the December 9 range date. Range time was planned in the December 9-29 period, with December 14-16 for the Nellis range and December 19-20 for the Tonopah range. TAC wanted to fly the KP aircraft with the TI F-4E on range at the same time. By doing so, expenses could be cut. Checkout of 290's weapons release system was completed on December 5. It revealed that 263's earlier malfunctions were not associated with the modification design, but rather was peculiar to that aircraft. After the kit-proofing process was formally completed on December 13,



The 52nd TFW at Spangdalem was the second wing to receive F-4Gs, with the first two, 69-0273 and 69-7293 being delivered on March 16, 1979. The official arrival ceremony was held on March 28. The flight to Germany was led by Lt Col 'Duke' Green, the commander of the 81st TFS, on the photo second from right, with EWO Capt Mike Freeman in the back seat. (OO-ALC)

the aircraft departed for Nellis on the 29th, where it was used with 263 by AFTEC and TAC for the FOT&E, initiated in February 1978. It had proven that kit-proofing had taken twice as long as expected with over 11,000 man-hours to complete. On the other side, it allowed 1F-4E-600 to remain un-amended.

After serving with the 35th/37th (T)FW, 290 joined the 190th (T)FS of the Idaho ANG. It was flown to AMARC on January 4, 1996, departing on December 2, 1997 for QF-4G modification. It was expended on January 31, 2002 while serving with the 82nd ATRS.

The Units

35th/37th TFW, George AFB, CA

One of two important continuing programs in CY80 which impacted heavily on the TAC force structure, was the consolidation of training programs. A plan to consolidate training bed-down was approved by CSAF. He also authorized implementation actions. One of the four objectives was to reduce F-4 training locations from four to one by April 1983. At George, the 35th TFW had six fighter squadrons with F-4E/Fs and F-4Gs.

The first step in this process was the re-designation, effective October 9, 1980, of the 21st and 39th TFTS to TFS, and of the 562nd TFS to TFTS. The second step followed with the activation of the 37th TFW on March 30, 1981. It was formed by dividing the assets of the 35th, which retained the 20th TFTS (training of German Air Force aircrews in the F-4F), and the combat-ready operational 21st and 39th TFS with F-4Es. The combat-ready operational 561st and 563rd TFS, the 562nd TFTS (aircrew training) and F-4Gs were reassigned to the 37th TFW. The 35th had lost four F-4Gs before transferring the fleet to the 37th.

TAC F-4Gs not only participated in exercises in CONUS, like RED FLAG, but also deployed to South Korea

and Germany. As to the former, eight Gs deployed to Kunshan under CORONET SPRAY to participate in exercise TEAM SPIRIT 81, March 8-12 and a similar number (563rd TFS) deployed on March 5, 1983 to Suwon under CORONET SQUIRE for TEAM SPIRIT 83. As to the latter, 13 F-4Gs deployed on September 4, 1981 to RAF Wildenrath under CORONET FLEET as part of CRESTED CAP 81-III, a dual basing rotation from CONUS to Germany.

With regard to George the 1988 Base Realignment and Closure Commission (BRAC) had recommended to relocate the F-4E/Gs to Mountain Home to be consolidated with that base's EF-111As and close George. To accommodate the move, part of the 366th TFW (its F-111s) was to be realigned to Cannon.

With the pending closure of George in mind, USAF decided to reverse the 1981 actions. When on October 5, 1989 the 37th TFW PCS-ed WOPE (Without Personnel and Equipment) to Tonopah Test Range to replace the F-117A equipped 4450th Tactical Group, the then 35th Tactical Training Wing was re-designated TFW. Obtained were the 561st TFS and 562nd TFTS, while the 563rd TFS was inactivated.

However, as a result from analysis of the changing world order, other base closures, the threat and force structure plan, and the budgetary reality, USAF on April 12, 1991, announced changes to BRAC 1988. The composite wing concept was USAF's hot new item on the agenda with the first one to be established at Mountain Home. F-4G Phantom-related recommended changes included (1) realignment of 18 F-4Gs from George to Boise, ID and 18 to Reno, NV; (2) to inactivate the 35th TFW; (3) close George in December 1992; and (4) to retire Spangdahlem's and Clark's F-4Gs to AMARC by January 1, 1993. The 35th was inactivated on December 15, 1992 and George closed.

39th TFTS

The 39th Tactical Electronic Warfare Training Squadron was re-designated TFTS on June 1, 1977, activated on July 1, and assigned to the 35th TFW. Primary mission was training of F-105G and F-4C/G WW aircrews (accepting mission and resources from the 563rd TFTS), and secondary mission, to provide aircrews to support F-4G qualification tests at Nellis. After TAC's, 35th TFW's and 39th TFTS's first F-4G, 90239, was delivered at Hill on April 24, 1978, it was flown to George four days later by Col Dudley Foster, 35th TFW/CC, and Capt Denny Haney, EWO with the 39th. They were welcomed with a fly-by of three generations Wild Weasel aircraft, WW III F-105G, WW IVC F-4C, and AWW F-4G. On June 30, the 39th had six F-4Cs, six F-4Es and seven F-4Gs, of which two remained at Nellis with its Det 1 to complete FOT&E. On July 24, it initiated the first F-4G training course (F4G00WW) with two classes, 78AJG and 78ALG. The latter, with eight students, was designed to qualify F-105G aircrew members in the F-4G. On August 9, the Squadron began the final F-4C/WW course with four pilots and three EWOs, graduating on September 20. Det 1 flew the first flight test sortie of the AGM-88 IOT&E on November 16, 1979. Flight tests were flown from George and Naval Air



Who is not strong must be smart. This Belgian groundcrew is re-installing the drag chute of F-4G 69-7236 of the 480th TFS off the roof of his tractor after the Phantom arrived at Bierset on September 17, 1985 for a joint exercise. '236' still serves the 52nd, guarding the gate at Spang. (USAF, SSgt Fernando Serna)

Station China Lake (CA). IOT&E was completed on September 23, 1980.

As the 39th TFTS would remain in the 35th TFW to be re-equipped with 26 PAVE SPIKE-configured F-4Es, it was re-designated TFS on October 9, 1980 with mission and assets transferred to the 562nd TFTS.

561st TFS

The Squadron received its first F-4G on March 18, 1980, giving up its F-105Gs. In the final quarter of 1982, it became a combined F-4E/F-4G unit when it gained the E version of the Phantom.

Assignment of F-4Gs to the Air National Guard (ANG) resulted in the subsequent retirement of the F-4G from USAF's inventory. As a consequence, both the 561st and 562nd FS (re-designated from TFS and TFTS respectively on November 1, 1991) were inactivated on June 30, 1992. The 35th TFW sent the first of its 24 F-4Gs to AMARC on January 21, 1992.

562nd TFTS

The 562nd TFS at George was the last active USAF F-105G Thunderchief unit and its final two aircraft were flown to the 128th TFS (Georgia ANG) on October 8, 1980. The next day, the Squadron was re-designated TFTS, picking up the mission, resources, aircraft and related equipment of the 39th TFTS. The 562nd was authorized six F-4Es and 16 F-4Gs. The Squadron provided IPs and qualified aircrews for TAC, PACAF and USAFE F-4G squadrons.

563rd TFS

After the 563rd TFS was re-designated TFTS on July 15, 1975, it was activated at George on July 31st and assigned to the 35th TFW. Its primary mission was to train operational F-105G aircrews for the 561st and 562nd TFS and F-4C/WW aircrews for PACAF (Kadena) and USAFE (Spangdahlem) units. A secondary mission was to support the Wing in testing tactical warfare weapons and tactics. On December 31, 11 TF-coded F-105Gs and eight F-4C/WWs were assigned.

In the second quarter of 1976, the Squadron was tasked to design an additional, fourth, course to encompass the future transition to the F-4G, F4000WG. To meet TAC training requirements, the 563rd was designated an RTU (Replacement Training Unit) for two years, FY79-81. This would assure sufficient training assets to convert F-105G and F-4C/WW units to the F-4G.

In 1976, the 563rd TFS represented the 35th TFW in the AFTEC's IOT&E of prototype F-4E AWW, 97254. On July 1, 1977, it was re-designated TFS, transferring its resources and mission to the 39th TFTS and becoming non-operational. In the Wing history of July-September 1978, its Deputy Commander wrote in his quarterly report the 563rd was 'activated on August 12 and transitioning to the F-4G'. The first two Gs were received in August, with five following in September. On October 1, Lt Col Lucky Ekman assumed command versus Lt Col James Martin. IOC was reached on April 1, 1979. By then, TAC had 34 F-4Gs. The Squadron received its first ARN-101-modified F-4G in the final quarter of 1985. On October 5, 1989, the 563rd was inactivated.

Det 5, TAWC

Mission of Det 5 included F-4G Tactics Development and Evaluation, passing new systems through DT&E and integration, such as the AGM-88 HARM, AN/APR-47 and the AN/ARN-101. A 'special' relationship existed with the NWS at China Lake for HARM work/test shots in particular. Also, new software OFPs, which were developed as part of the continuing effort to improve F-4G capabilities and response to new threats, were test flown for validation.

The early problem with testing the F-4G/APR-38 involved the myriad of projects that needed use of CB-coded, instrumented aircraft. Early on there were two, while six primary hardware/software test configurations were being tested by four different test agencies. Also, the Navy supported the AGM-88 HARM, the prime contractors for each of the projects and 35th TFW personnel. As T. Bear stated,



A three-ship, consisting of two F-4Gs and one F-16C, photographed over the German coast on May 27, 1988. As part of Creek Hunter, the 52nd TFW received its first F-16C Fighting Falcons on April 23, 1987, losing its F-4Es in the process. The aircraft were assigned to the 81st TFS. (USAF, SSgt David Nolan)

At first it was a challenge to generate and schedule the required sorties, track software and hardware configurations, and garner appropriate instrumented test ranges to match the test issues. It took an inordinate amount of time to code, load, fly and analyze each change to each of the hardware and software programs as well as maintaining configuration control of the test aircraft for each of the test entities. The testing would slip due to configuration incompatibilities, coding delays, and the length of the analysis chain for determining if a change to the code had worked. We would fly a mission in the morning, debrief, review the cockpit videos, wrap up the recorder tapes and hand carry them down the hill to Ontario airport where the package was given to the crew flying the next flight to the contractor. We would alert them, and they would meet the aircraft, pick up the package and begin analyzing the results—which usually took several days. In the meantime, we continued flying test sorties not knowing if that software and/or hardware configuration was functioning properly. Something needed to be done to close this gap. We needed to consolidate the multiple teams into one structure, put someone in charge and get everyone operating from one set of rules and one schedule. We also needed to get the operational Weasel wing out of the testing business and turn the flight operation over to one of the professional test organizations. After considerable negotiations and funding discussions, we agreed about the makeup of the team, whom it would report to and who would be in charge.

The result was the activation at George on April 1, 1980 of Detachment 5, TAWC. Aircrews and maintenance personnel were hand-picked from the 35th TFW to support the (initial) two CB-coded F-4Gs. An onsite engineering team was put together from the participating USAF engineering groups. They also hosted representatives from the TFWC, AFTEC/AFOTEC and the acquisition and support centers of AFSC and AFLC, either in a TDY or PCS status. It was one of the first truly integrated product teams. On July 1, Det 5 assumed full control of their two F-4Gs (97206 and 97235), although the 39th TFTS (and later the 562nd TFTS) continued to support Det 5's flying activities with the aircraft being scheduled through Squadron Ops ('assigned' to TAWC, but 'possessed' by the 39th). On August 1, 1988, Det 5 was reassigned from TAWC to the 4443rd Test Group. On December 15, 1991, the 4443rd was consolidated with the newly activated 79th TEG. Capt Larson continued,

After weeks of difficult conditions and long hours we finally were up and running with an on-site data reduction facility and an integrated team for testing software, hardware and developing tactics for these new systems. We went from weeks to identify software changes to days. Instead of waiting up to a week to see if a change worked, we could turn it around in a couple of days. As a result, we successfully completed and checked out the first operational software load.

In 1985-88, Jim 'Uke' Uken was also a Det 5 EWO, pinning on Major in early 1986. He flew F-4s for 19+ and F-

4Gs for fifteen years, except for a 10-month assignment to the Air Command and Staff College. Maj Uken,

The Det's F-4Gs were specially instrumented to include pencil cameras for both cockpits, back seat hoods at times, and a Conrac Airborne Digital Recorder as a backup to instrumentation pods. It was essentially a recording device you 'plugged' into the nose door that used to house the Vulcan 6 barrel Gatling gun. It recorded every detail of what the F-4G RHAW gear saw, what you were looking at, etc. The beauty was, it 'captured' everything and I mean everything. Even what you personally interested (and what you were not interested in) at the time. After landing we extracted the Conrac and handed it to intel who had a couple playback consoles that looked just like the F-4G rear seat RHAW gear. In the Gulf War, this was to the point that Riyadh and other Wings in theater were calling us on classified phones asking for the 'real ELINT picture'. We also had ACMI (Air Combat Maneuvering Instrumentation) tie-ins and instrumentation pods that were tied to satellite link for real-time position measured in nanoseconds.

Uke was in the last F-4E class to graduate from the 414th Fighter Weapons Squadron before becoming known as the F-4 Division. The selection was a very competitive process with two classes a year. Jim's class started with fourteen students, but only nine graduated. Being senior, he became the Chief, F-4G TD&E in Det 5. With Capt Scotty Andersen, they had a 'license to steal' on tactics development. As he explained,

Let's just say we came up with some pretty amazing sxxx that higher ups were reluctant 'to buy the boat on'. At least a two-beer discussion. I'll give you one teaser, 'diddling' bore-sight constants to improve APR-47 blind bombing CEP mission to mission or even on the same mission. We used to go to Superior Valley with 24 BDU-33s on three MERs and two TERs. Obviously we were able to do a lot of 'in-flight'



Clark was the third USAF base to receive the F-4G, with the first two delivered on July 31, 1979. The 90th TFS of the 3rd TFW at Clark had the honor to form hunter-killer teams with F-4Es. Such a team, consisting of G 69-0283 and E 71-1088, is taking off from Clark on January 1, 1981. Eleven days later, the Squadron suffered its only F-4G loss, when '283' crashed just after takeoff from Clark. (USAF, TSgt G. Holland)



The October 18, 1984 photo shows a 90th TFS hunter-killer team while being refueled with the F-4G flying below the F-4E. Both are configured with AN/ALQ-119 ECM pods. (USAF, TSgt David Craft)

analysis / corrections and refine our processes, but probably beyond the scope of a line crew.

The ARN-101 configuration required testing the old LN-12 and the ARN-101 configurations of both the PUP (APR-47) and APR-38 software configurations, while the system introduced both navigation and computer systems to the field over a period of three years. This drove flying a larger number of sorties in two of the four configurations above, resulting in the addition of a third CB-coded ARN-101 F-4G to Det's 5 test team, 97206.

All three aircraft were reassigned on June 29, 1992, with 90277 and 97235 going to Gowen Field. F-4G 97206 was flown to Nellis to serve as a maintenance trainer until flown by a Marine Corps CH-53D to one of the Nellis ranges as a target. Det's 5 mission and functions were transferred to Nellis.

McAIR

The F-4G was an analogue aircraft that was being updated with digital equipment. These were the early days of digital equipment and putting it on an analogue aircraft certainly generated plenty of issues. As T. Bear Larson remembered,

Early on McAir had provided an onsite lead APR-38 / F-4G engineer. They had found over the years this would alleviate the identification of issues within the system and isolate the issue to which system (the aircraft or subsystem, or the item under test) was the problem and whether it was a hardware or a software issue! Soon we found ourselves leaning heavily on him (Bernie Conway) for all our programs. Due to teething issues with new programs, Bernie couldn't do it all, so we started a policy to ensure there was an onsite engineer for each unique test sortie for each specific system under test. This ensured each unique hardware and software items under test were represented at the mission setup, planning, briefing, debriefing and initial data reduction. Cumbersome at first, it ended up being very synergistic and enabled everyone in the new systems to better understand

the Wild Weasel mission and the stated and unstated requirements. Soon each of the programs would rotate their engineers in and out of the test site so they would all gain this insight. They contributed greatly to the mission, and soon were adding features to the software and suggestions for hardware that would improve either crew interface or combat capabilities.

Capt Larson concluded by stating,

The F-4G success was largely contributed to the can-do attitude of the Weasel community. A story that had started with the fielding of the first F-100F Wild Weasel aircraft.

AFOTEC had a Detachment co-located with Det 5, being responsible for FOT&E of updates.

TAWC, Eglin

The Tactical Air Warfare Center at Eglin was responsible for test planning and analysis for system upgrades, primarily software updates, and operational and/or tactics tests.

After Maj Victor Ballanco completed his assignment as an F-4G pilot at Spangdahlem in October 1984 (480th TFS), he was assigned as a staff officer to TAWC/EWEG, the F-4G Program Office. His job, working with TAWC's Det 5, the engineers and analysts, included developing the test plan, overseeing flight testing, analysis of test results and writing up of test reports. In this respect quite a few TDYs were made to George.

The way to develop a test plan was to take an existing test plan and modify it for the test objectives to be completed. Initial coordination was with the Det 5 project test officer to ensure test objectives properly met the intentions of the upgrades in question. This turned the test plan into a rough draft that was then evaluated by a TAWC analyst to ensure meeting the proper testing methodology and intent. After approval, Det 5 crews flew the missions and provided their initial observations. Next, the recorded test data were analyzed to determine trends and problem areas. In event of the latter, they were discussed with the engineers who developed solutions when possible. If needed, tests were repeated until the key tests passed. At conclusion, the test report was written, showing test objectives were met. Maj Ballanco,

Coordinating the test report through the TAWC staff was twice as hard as coordinating the test plan. At each staff level, people questioned test data and conclusions. In effect, they wanted to ensure that each 'i' was dotted and 't' was crossed. I learned this is where the assigned analyst's attention to detail really helped.

Victor's first project was the integration of the ARN-101 DMAS (Digital Modular Avionic System) into the F-4G. He already flew with the ARN-101 in the F-4E and understood how it worked and what it could do. The system had to be integrated with the WW avionics, which at that time was the APR-38 HAWC. When it was replaced in

Phase I of the PUP by a new computer, the WASP, both systems had to be integrated. TAWC ARN-101 testing not only provided its fielding decision, it also established a baseline for AFOTEC testing with the newly developed WASP. After WASP was fielded a few years later, F-4G's avionics designation was changed from APR-38 to APR-47.

While conducting the ARN-101 tests, preparations were made to integrate the AGM-88 HARM, with AFOTEC being responsible for testing. As Victor stated,

As one of TAWC's operational liaisons to its test program, I also worked on the HARM from an operational employment perspective, which involved working with the Navy and Det 5 on the missile's employment. One of the projects I was responsible for was the computer-simulated analysis of early HARM employment in a real-world scenario. The findings from this study contributed to the initial HARM targeting concepts that ultimately turned into the employment tactics we used.

For the employment analysis, a company in San Diego was contracted to develop a simulation with a radar threat laydown that the HARM was employed against. The launch aircraft location could be varied and the target priorities and rates of fire adjusted. The initial results were not very good. But by refining the tactics, it was possible to develop some sample tactics that could then be used during flight testing. According to Maj Ballanco, "Much of it was common sense, but it was common sense backed up with simulation results that showed its viability."

Victor's office also began running the HARM Six Degree of Freedom (6DOF) model that analyzed a HARM fly-out in very minute detail. Although he did not do any 6DOF simulations, he was privy to the results that were then compared to the actual HARM flight test results. Himself being a fighter pilot, this was some very advanced information that later served him well. Before HARM's FOT&E, Victor Ballanco left TAWC in October 1986 for a tour as ALO (Air Liaison Officer) in Korea, but returned to flying the F-4G one year later.

81st TFS, Spangdahlem

USAFE's dedicated WW squadron, the 81st TFS, received F-4Gs as replacement for its F-4Cs. CORONET EAST 55 was initiated on March 16, 1979 with the delivery of F-4Gs 90273 and 97293 under control of the 2nd Aircraft Delivery Group (ADG). The last F-4G of the initial group of 12 was delivered on July 6. The first aircraft of the next batch of 12 F-4Gs was delivered on November 14 with the last one on March 11, 1980. Conversion was completed on July 26. The Wing then had two squadrons with ARN-101-equipped F-4Es (23rd and 480th TFS) and the 81st. On March 13, 1980, the Squadron lost its and USAF's first F-4G, when 69-7213 crashed into Mount Moncayo, 36 miles west of Zaragoza AB, Spain, while in a holding pattern over the Bardenas Reales Weapons Range. Its replacement was delivered on May 15.

On June 16, 1983, the Wing reorganized into a 'Rainbow Coalition' defense suppression wing as each of its



As was the case with the F-105G Wild Weasel, the F-4G also joined the Air National Guard, the then 124th TRG at Gowen Field, Idaho. Their first two aircraft arrived on June 20, 1991. The photo shows 69-0249 on June 5, 1995 departing London IAP (Ontario) after participating in an air show. (Norm Taylor)

three fighter squadrons included a mixture of 16 F-4Es and eight F-4Gs, paired into hunter-killer teams, capable of locating and destroying hostile guidance radars and surface-to-air missiles launched by other means in any weather. The process was completed on November 28. To train F-4E and F-4G lead crews into the other aircraft type, resulting in experienced crews to be qualified immediately in both types, WTDs (Weapon Training Deployments) were made to Zaragoza in late November-mid-December. To perform mini-RTU training for former lead F-4E aircrews, the 52nd TFW set up a detachment at George with its own F-4Gs. In mid-January to late February 1984, three two-week training sessions were accomplished, basically following an abbreviated Wild Weasel 'C' instruction course.

On February 10, SACEUR (Supreme Allied Commander, Europe) deleted all of the Wing's non-defense suppression attack tasking with release from its nuclear alert commitment. In an effort to align its F-4G, EF-111A and EC-130H EW assets, USAFE activated the 65th Air Division at Sembach on May 31, 1985. The next day, the Wing was reassigned from 17th Air Force. CREEK HUNTER was announced by 17AF on November 22, 1985. It encompassed USAF's intention to replace Spang's F-4Es with Block 30 F-16C/Ds and increase the number of F-4Gs. Phase I included the assignment of 13 additional F-4Gs with the final ones arriving from George on September 26, 1986. In Phase II, the Wing received its first Fighting Falcons on April 23, 1987. The aircraft could be equipped with the AGM-45 and AGM-88. The 480th TFS had the honor of becoming USAF's first F-16C/F-4G integrated unit. With regard to the latter, TAWC, in June 1987, had published its final report on TD&E of F-4G/F-16C mixed force employment. The final six F-4Es departed Spangdahlem for George on December 8, completing the conversion.

After DoD notified the F-4G was to be withdrawn from active units, USAF announced three actions on April 12, 1991 with regard to Spangdahlem: (1) 18 F-4Gs to retire in late 1991; (2) the remaining 18 to follow in early 1993; and (3) at that time, the Wing would replace the F-4Gs with



F-4G 69-7297 of the 124th FG in the Idaho sky. The unit's F-4Gs were later adorned with the Whiskey Whiskey tail code. (via ANG Bureau)

an additional 18 F-16C/Ds and 24 A/OA-10As. According to USAF, most F-4Gs could be retired due to the declining Soviet threat. The first F-4G (69-0270) departed for Davis-Monthan on June 3, 1991. With the start of FY92 on October 1, 1991, the Wing's overall PAA was decreased from 72 to 60. This resulted in two fighter squadrons with 18 F-16C/Ds (23rd and 480th) each and one with 24 F-4Gs (81st). On March 26, 1992, the 81st FS received the USAFE Commander in Chief's Trophy as its outstanding fighter squadron for 1991. USAF formally announced on December 29 that Spang's remaining F-4Gs would transfer to Nellis by April 1994, marking the reversal of previous plans to retire the F-4G altogether due to budget constraints.

The 81st began its conversion from F-4Gs to F-16C/Ds when the first Fighting Falcons were received from MacDill on February 18, 1993. At that time, the unit still had F-4G resources in Turkey and Saudi Arabia. Another round of force structure and realignment actions, announced by DoD on July 1, showed a decrease in the number of F-16C/Ds at Spang with 18 by November, the inactivation of the 81st FS, and the return of the remaining F-4Gs to CONUS in January 1994 with most going to the 561st FS at Nellis. A Phantom-Pharewell ceremony was hosted on January 14-15, 1994 by the 81st FS, marking the departure of its, and USAFE's, final F-4Gs. The last four aircraft departed for Nellis on February 18, officially signaling the end of 27+ years of Phantom ops at Spangdahlem.

90th TFS, Clark

Like TAC and USAFE, PACAF was also programmed to receive F-4Gs, through USAF PD (Programming Document) 80-3 of May 23, 1978. It scheduled the conversion of the 90th TFS (3rd TFW, Clark AB, PI) to a 24 UE F-4E/F-4G composite squadron, consisting of 12 each F-4E and F-4G aircraft to provide an expanded theater defense suppression capability. In a July 7, 1978 letter, USAF provided PACAF with the delivery schedule: three in June, two in July, three in August, three in September and one in October 1979. Eighteen F-4G aircrews would be trained in two Classes (79 CJG with six and CKG with 12 aircrews) by the 35th TFW, April 9-September 17, 1979. The

objective was to provide the initial six F-4G aircrews from in-place (Kadena) F-4C WW assets. Upon receipt of the PAD (Program Action Directive), the Wing established an F-4G Project Office. After receipt of a F-4E Weapon System Trainer, it was modified to F-4G configuration. With the arrival of the F-4G, the Wing's primary mission changed from air-to-air superiority to air-to-surface (its other fighter squadron was the 3rd TFS). IOC was scheduled for the first quarter of FY80. Designated F-4E aircrews in the 90th began defense suppression training, including AGM-65 Maverick and PAVE SPIKE, in sufficient time to meet the desired IOC date. On January 13, 1979 13AF announced that F-4Gs would replace a like number of F-4Es in the 90th TFS. To accommodate the transfer to Elmendorf, PACAF published PAD 78-2 'Commando Anvil' on September 15, 1978.

On July 30, 1979, CORONET WEST 60 was initiated, the delivery of the first two F-4Gs, 90279 and 90275, to PACAF under control of the 2nd ADG. Hill delivered the last two of 12 F-4Gs on November 8. On January 12, 1981, the 90th TFS suffered its only F-4G loss, when 69-0283 crashed just after takeoff from Clark.

On December 19, 1990, the 90th TFS sent its first two of six F-4Gs to AMARC. The others were redistributed among CONUS-based units. On May 29, 1991, the unit was PCS-ed WOPE to Elmendorf and assigned to the 21st TFW. Five days before the first, low-level, eruption of Mount Pinatubo, the final of Clark's Phantoms departed at 0800L, June 4, 1991.

190th TFS, Gowen Field

As in the case of the F-105G, the F-4G was also assigned to the ANG. On April 15, 1991, it was announced the 124th Tactical Reconnaissance Group (TRG, Idaho ANG) at Boise's Gowen Field and the 152nd TRG (Nevada ANG) at Reno's Cannon Field would convert from RF-4Cs to F-4Gs. The 152nd, however, assumed the RF-4C RTU mission from the 124th. The 124th TRG was to decrease its PAA from 12 to six RF-4Cs in the first quarter of FY93 and to zero in the third quarter. In the meantime, the unit would convert to initially 18, but as of the third quarter FY92 to 24 PAA F-4Gs. The Group's flying units were the 190th TRS and the 189th Fighter Flight, FF (RTU). Its first two F-4Gs arrived on June 20, 1991, including 97551, which is still on display at Gowen Field. On October 1, the Group was re-designated Fighter Group and the 190th, Fighter Squadron.

On April 9, 1992, the Squadron commander received approval from the Organizational History Branch (Air Force Historical Research Agency, Maxwell) for the new 190th TFS organizational emblem. On June 30, the 124th FG had a PAA of 18 F-4Gs; the 189th six TF-coded F-4Gs in addition to 12 RF-4Cs, which flew the last sortie on March 31, 1993. This situation was programmed to change in FY94, when the 190th would lose and the 189th would gain six F-4Gs. In December 1993, an AFOUA (Air Force Outstanding Unit Award) was presented to the 124th by SECAF Sheila Widnall for the March 21-October 1, 1993 period.

The force structure, realignment actions announced by USAF on August 11, 1995 also regarded the Idaho ANG. As a result of USAF's decision to retire the F-4Gs, the 124th FG was to convert in early 1996 from 24 F-4Gs to 15 A/OA-10As. Also, a squadron was to be activated with four C-130Es. A further re-designation took place on October 1, when the 124th FG became the 124th FW.

It looks like that through August 1995, F-4Gs of the 124th flew without a tail code and that the first Phantoms with the Whiskey Whiskey tail code showed up in September. This did not last long though, as F-4G operations were ended on April 18, 1996 with the final four aircraft departing for AMARC two days later, making a last low-level pass over Gowen Field. All but one of the 29 F-4Gs that arrived at AMARC showed the WW tail code. Concurrently, a farewell celebration, which included social events and a golf tournament, was concluded. The 189th graduated 125 F-4G students. After arrival at AMARC, most, if not all, F-4Gs were flown to Mojave Airport for conversion to QF-4G full-scale aerial targets.

Det 6, 79th TEG, Nellis

Although the 35th FW at George had retired all its F-4Gs by June 30, 1992, F-4Gs were still active at Spangdahlem and joining the Idaho ANG. In fact, due to continuing operations from Turkey and Saudi Arabia, USAF decided to keep F-4Gs longer at Spangdahlem, through 1993, while there were (classified) plans to activate a new operational F-4G squadron within ACC. This meant a continuing need for CB-coded F-4Gs. As Gowen Field was the only CONUS location with F-4G facilities, it was decided to reassign two of Det 5's F-4Gs (90277 and 97235) to the 124th FG. As '235' was at Hill for PDM, it joined '277' in November 1992. This was scheduled to be temporarily with activation of the new F-4G squadron in mind. When Det 5's mission and functions were transferred to Nellis, they were absorbed by Det 6, 79th TEG, which was activated on September 30, 1992. Aircrews PCS-ed to Nellis and TDY-ed to Boise to fly their aircraft.

In the meantime, a site survey was being conducted at Nellis. An environmental impact assessment plan was completed by ACC on November 5, 1992. One month later, on December 4, the Air Staff approved the program change request.

422nd TES

One of the results of the December 4 approval was the inactivation of Det 6, 79th TEG on February 1, 1993 and the subsequent absorption of its resources by the 422nd Test and Evaluation Squadron (TES), which was assigned to the 57th Test Group. Its primary mission is OT&E of fighter aircraft, like the A-7D, F-111 in the past, and presently F-15E, F-22A and F-35A aircraft. In 1985, the F-4E was retired from the Squadron. However, on February 1, 1993, the Phantom returned to its line-up, when CB-coded F-4Gs 90277 and 97235 were reassigned from Gowen Field. The 422nd had two F-4G crews assigned with one pilot attached. The two aircraft were assigned to the 422nd, but maintained, 'possessed', by the 561st FS.



When it became obvious operations from Saudi Arabia and Turkey were to continue, USAF decided to keep F-4Gs longer at Spang and to activate a Fighter Squadron within ACC. After having been inactivated on June 30, 1992, it was reactivated at Nellis on February 1, 1993. The photo shows the tails of seven F-4G tails on the Nellis flight line. (Guy Aceto)

Like all other aircraft within the 57th FW, the two F-4Gs were adorned with the Whiskey Alpha tail code. Both aircraft were flown to AMARC on November 30, 1995.

561st FS

When the 561st was inactivated at George on June 30, 1992, its planned reactivation at Nellis, called PACER SWAP, was classified, although not a well-kept secret. A handful of F-4G pilots and EWOs, including Lt Cols Dan Constantini, the future Squadron commander, and Jan-Marc 'Juice' Jouas, received orders to relocate to Nellis as the Squadron's future initial cadre. As Juice stated,

When we arrived at Nellis, we were assigned to the 57th Operations Group (OG). Shop was set up and the task was initiated to stand up the Squadron, obtain personnel, receive aircraft, and to find and set up ops and maintenance buildings. As landing currency for experienced pilots was 45 days and F-4Gs were assigned to Gowen Field only, we would go to Idaho every 4-6 weeks to fly. Aircrews traveled to Boise via commercial airline, fly once or twice, enough to maintain currency, and then return to Vegas. I don't recall any problems with the Boise Guard regarding our flying. A few of their pilots and EWOs had been at George or Spang and were well known to us. We went to Boise about 3-4 times before we had our own F-4Gs at Nellis.

In the meantime, SATAF (Site Activation Task Force) surveys were being conducted. They revealed a bed-down with many problems. For instance, in operations, concerns centered around adequate aircrew flight training for SWA tasks and equipment. Also, training and maintenance experience levels lacked (which did so well into 1993), while spares and support equipment were a problem. These problems were exacerbated by an extended delay in declassifying the force structure change.

On January 22, 1993, the first F-4G, 90248, arrived at Nellis from Spangdahlem. Most Squadron F-4Gs arrived from the 52nd FW at Spangdahlem with the final ones in January 1994.



A Marine Corps CH-53D was needed to transport F-4G 69-7206 from Nellis to one of its target ranges. Will it have survived? (Guy Aceto)

The second result of the December 4 Air Staff approval of the program change request was the activation of the 561st FS on February 1, 1993 and its assignment to the 57th Operations Group (OG) with an initial PAA of 18 aircraft. Col Jouas became the acting Ops Officer until the arrival of Col Uken from Spangdahlem. USAF announced on May 27 that the 561st was to receive an additional ten F-4Gs in late 1993 with a gain of 508 full-time and ten civilian manpower authorizations. By the end of FY93, 42 F-4Gs were assigned to the 561st and 190th FS. By that time, the former had obtained IOC.

However, on February 28, 1994, USAF stated the May 27, 1993 announcement was amended to read the unit was to receive six (versus ten) additional F-4Gs, giving it a total of 24 aircraft by mid-1994. In a June 30 News Release USAF announced another round of force structure changes. As to Nellis four actions were announced, one of which resulted from USAF's decision to retire the F-4G: the inactivation of the 561st FS and, beginning in late 1995, the retirement of its F-4Gs. PAA on September 30 was 26, with TAI (Total Active Inventory) being 31. Jim Uken,

Knowing we had a bunch of deployments coming up this was the reason we had a 1.5 crew to jet ratio, the ability to plug and play CC to BAI as needed and the largest fighter squadron in the USAF with approximately 500 maintenance and another 100 ops personnel, and about 80 aircrew counting attached. The reason, early on, we went to six flights as opposed to the USAF standard of four.

On February 10, 1995, Jim Uken assumed command of the 561st. PAA on September 30 was 37, while TAI was 40. Led by Jim in the rear seat, with Lt Col Mark Bruggemeyer piloting 97295, the final eight F-4Gs were retired to AMARC on March 25, 1996. '295' was the last operational F-4G to land. As far as could be determined, 28

Squadron F-4Gs were flown to AMARC. The 561st FS was, once more, inactivated, on October 1. ■

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F-4 Phantom Aircraft and Ogden Air Logistics Center, Thirty Years of Pride and Progress

USAF News Release, October 10, 1995

December 19, 1997 Dave Sipe e-mail to the Weasel Net



'Death row' at Tyndall AFB. Twelve F-4s awaiting their ultimate destination of being downed by an air-to-air missile of visiting fighters during a WSEP, Weapons System Evaluation Program, conducted by the 53rd Weapons Evaluation Group. The F-4s are assigned to the 82nd Aerial Targets Squadron, 'Team Target'. The 'damned' aircraft consist of ten F-4Es and two F-4Gs: 69-7209 and -233. The former was lost February 1, 2006, the latter one week later. (Theo van Geffen)

THE SA-2 AND U-2: THE REST OF THE STORY



John A. Schell

SA-2 and U-2. (*mil.ru*)
(All illustrations courtesy of the author.)

In August 1953, the USSR publicly claimed that it had achieved thermonuclear weapon capability. This heightened the need for overflight of the Soviet Union to collect reliable intelligence on nuclear weapons development and deployment. In early 1954, U.S. President Dwight Eisenhower by Executive Order created a sensitive intelligence program (SENSINT) with security compartments to collect, consolidate, and protect high altitude military airborne overflight information.¹ Only he and a handful of advisors knew the total scope of the program, and he retained final approval for the missions. Airplanes such as RF-86F, RF-100, RB-45, RB-47, and RB-57 equipped with high altitude cameras and signal receivers were used. The secret missions provided intelligence on nuclear weapons development, nuclear capable long-range bombers, submarine launched, and land based intercontinental ballistic missiles. SENSINT reduced the uncertainty of war through advanced warning, and it provided the President with diplomatic options.

The U-2

It soon became apparent that military airplanes could not fly high enough to evade improved Soviet interceptors. In late 1954, President Eisenhower initiated the development of a high-flying airplane, the U-2, to be operated by the CIA. He believed that CIA overflight would be less confrontational than that from military airplanes. The CIA constructed a cover story. NACA, a forerunner of NASA, was conducting upper atmosphere weather research using the U-2. Pilots were selected by the CIA and given false credentials as Air Force Weather Service civilians. Capt Francis Gary Powers had an ID which read: Air Weather Service GS-12, Francis G. Palmer. Pilot training was conducted by Strategic Air Command (SAC) at Groom Lake (aka Area 51). Maintenance was performed by vendors under subcontract to the CIA.

Author's Note: The May 1st, 1960, shootdown of Gary Powers in a U-2C over the Soviet Union is an important milestone in Cold War history. Incomplete and often misleading public information masks the reality of "the U-2 incident" to this day. The Soviet Army classified and placed shootdown records in Ministry of Defense (MOD) archives. "The U-2 and SA-2: Secrets Revealed",² summarized how Powers was shot down and what information was hidden from public view. This paper, "The SA-2 and U-2: The Rest of the Story", fills in the missing information. It details the actions taken by four SA-2 batteries against what they all believed was the U-2. And it describes the preemptive attempts by air interceptors to first bring down the U-2. The timeline of events and summary offers new insights as to how the shootdown occurred and why it was truly an air battle in the skies over Sverdlovsk.



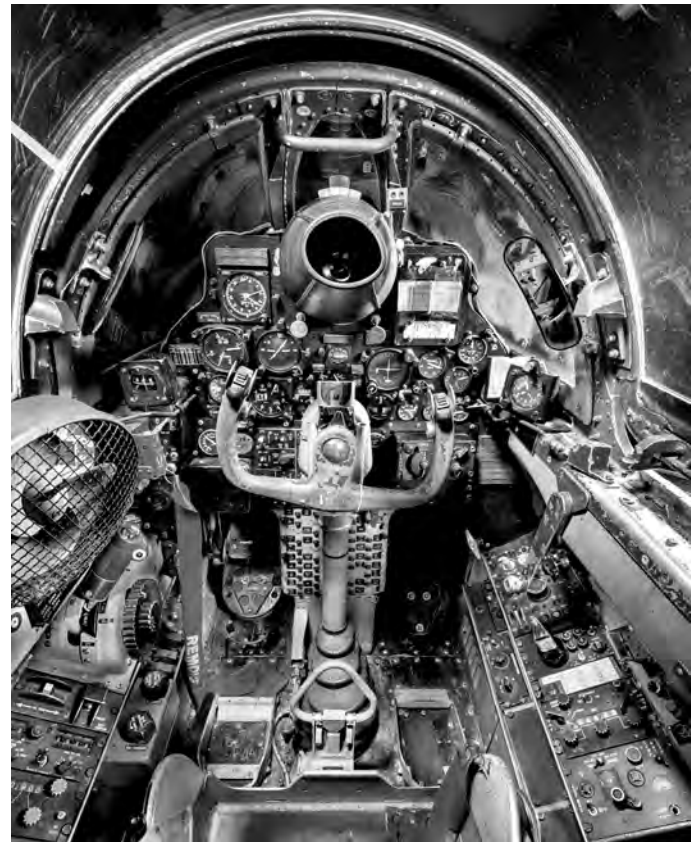
A U-2 with NACA markings. (NASA, Public Domain.)

The CIA imposed extreme secrecy on all aspects of the Program, including creating a new classification category and compartment for it. President Eisenhower approved all U-2 overflight collections in advance. Collection requirements were determined at CIA HQ. Processing, interpretation, and analysis were also performed in Washington, D.C. U-2 missions were flown from forward detachments (Dets). The first USSR overflights in 1956 were flown from Det A at Wiesbaden AB, West Germany. Det A was later moved to Giebelstadt AB, West Germany. A few overflights into Siberia were flown from Det C in Alaska and Japan. Overflights into southern USSR were from Det B at Incirlik AB, Turkey.

Operation Grand Slam was the twenty fourth overflight and assigned to Gary Powers flying a U-2C. The U-2C had an improved engine, the J75-P-13, which allowed it to climb to 75,000 ft altitude and cruise at 70,000 ft at 410kts airspeed.³ It was equipped with additional mid-wing pods which provided extra fuel for the long flight. It carried a panoramic film camera that could image from horizon to horizon using seven “stop and shoot” positions. At 70,000 ft, the camera spatial resolution was 2.5 ft looking down at nadir. At 25 nmi range, in a side-looking oblique mode, the spatial resolution was 5 ft. The camera carried sufficient film for 5-8 hours of continuous collection and was turned on/off over planned collection targets.

Onboard receivers made continuous recordings of ground radar signals. Other receivers made recordings of voice communications and low frequency radars. The U-2C had no surface to air missile warning or missile guid-

John Schell graduated with a BSEE and MSEE in April 1970 from Penn State University and a reserve commission in the USAF. He initially worked as a radar research engineer at the Air Force Avionics Lab, at WPAFB, Oh. Assigned to the SR-71/U-2 Project Office in 1976, he led the development of ASARS-1 and ASARS-2 imaging radar prototypes for the SR-71 and U-2R. He briefly served as the Chief Avionics Engineer for the SR-71 and U-2. Continuing his career with industry, John provided support to multiple intelligence, surveillance, and reconnaissance developments, and was on the original team for the RQ-4 Global Hawk. After retirement in 2016, he volunteers at the National Museum USAF where he is a docent. John is a Cold War historian who has authored multiple papers and presentations on the U-2 and SR-71.



A U-2 cockpit. (National Air and Space Museum, Eric Long.)

ance radar jamming. The cockpit had a drift sight used by the pilot to observe the terrain below to align the camera. The sight could be inverted upward to perform celestial navigation fix points both day and night.

The Soviet Air Defense Forces, PVO

Air defense of the Soviet Union was the responsibility of the PVO Strany, known as “the Troops of the Air Defense.” Their principal role was to shoot down SAC bombers inside Soviet air space. Their secondary role was to shoot down U.S. reconnaissance overflights.⁴ PVO forces included early warning radars, air interceptors and anti-aircraft missiles. In 1960 the PVO CINC was Marshal Sergey S. Biryuzov, who was equivalent in rank to the Commanders of the Soviet Army, Air Force, and Navy. Biryuzov’s deputy for air interceptors was Gen Yevgeny Y. Savitsky. His deputy for anti-aircraft missiles was Col Gen Pavel N. Kuleshov.

The SA-2

The SA-2 Guideline (S-75 Desna) missile system was widely deployed by 1960. It provided anti-aircraft missile defense of major cities, military sites, and manufacturing sites.

Early warning radars first detected incoming aircraft several hundred nmi away. Early warning alerted both air interceptor forces and anti-aircraft missile forces. Anti-aircraft missile forces included District HQ, Brigade HQ, and SA-2 Battalions. An SA-2 Battalion included an acqui-



Marshal Sergey S. Biryuzov, Commander in Chief of Soviet Air Defense. (*mil.ru*)

tion radar with IFF, a tracking/missile guidance radar, six missile erector/launchers, and multiple command vans.

Upon alert from early warning radars, aircraft were detected and tracked by the P-12 Yenisei (NATO, Spoon Rest) acquisition radars out to a range of about 200km. Its antenna constantly rotated 360 degrees. The circular search was sent to displays in the command vans. Spoon Rest had a co-located identification friend or foe (IFF) interrogator and a target speed indicator. Lack of a proper IFF response, revealed the incoming aircraft was a target. Spoon Rest radars were located at the Brigade and Battalion levels. The displays in the command vans provided situation awareness of the route and progress of the approaching target(s). Using the Spoon Rest display, an op-



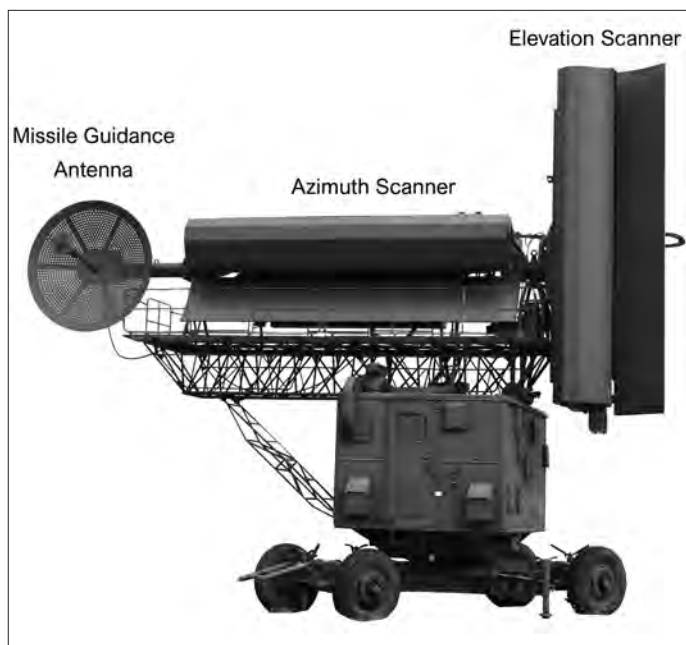
P-12, Spoon Rest acquisition radar. (*Wikimedia Commons.*)

erator manually plotted the targets' approach onto a large glass tablet called the DVO tablet in one-minute intervals. The entire approach toward the battalion was viewed by command staff. It was later copied onto tracing paper laid over the tablet. The radar tracings provided a permanent record of the target's route.

Cued by Spoon Rest, the RSN-75 (NATO, Fan Song) radar pointed to the target in bearing and elevation to detect the target and begin target tracking. Only the SA-2 Battalions had the Fan Song. It could detect a U-2 at 100 km range. Fan Songs' two large scanners continuously swept a small sector in elevation and bearing (azimuth). After detection, it tracked the incoming target in range, elevation and bearing. Tracking could be operator controlled or automatic. When the target came to within 34 km⁵ range, its computer sent an audible alert that the target was entering the "kill zone" where an SA-2 missile launch would be effective.



Remoted radar display and DVO Tablet in Command Vans. (*Russian MOD Archives.*)



The RSN-75 Fan Song radar. (SIMQ Public Forum.)

In 1960, the Soviets had never fired an SA-2 missile at a real target. There were no written operating procedures. It was widely believed a missile would be effective only if the target were approaching. Missile launch was by verbal order of the battalion commander to the firing officer. Up to three missiles were rocket launched, six seconds apart. After the solid state first stage fell off, the liquid fuel second stage with warhead was tracked and guided to the target by Fan Song. Each missile emitted a beacon signal allowing it to be separately tracked. The warhead was armed when the missile approached to within 300 m of the target. When it was 60-120m away, a proximity fuse detonated the warhead. If it never came to within proximity, the warhead self-detonated a minute after launch. And if the missile were never guided, it also would self-detonate a minute after launch. Just before detonating, the missile

pointed upward. Fragments from its 130kg warhead were directed forward in a 20 degree cone, to increase damage and the likelihood of shooting down the target.⁶

The SA-2 Guideline surface to air missile system posed a real threat to the U-2. Most analysts felt that it was only a matter of time until an overflight would be shot down. President Eisenhower was extremely concerned about Soviet capability for early detection. If they could detect and establish track early in overflight, the likelihood of a shootdown was increased.

The PVO Was Warned and Eisenhower Was Not

Early in the overflight on April 9, 1960, PVO early warning radars detected an incoming U-2 and alerted SA-2 Brigades immediately. The U-2 had launched from Pakistan and was crossing into southern USSR over Turkestan. It flew over Saryshagan where it obtained the first pictures of two new Soviet radars, the HEN HOUSE, and the HEN ROOST. Then it imaged the Semipalatinsk nuclear test site, imaged a new ICBM launch pad and road at Tyuratam, and exited into Iran.⁷

The U-2 flew over the USSR for more than six hours, and not a single SA-2 was fired. In his memoirs, Khrushchev said, "Our anti-aircraft (SA-2) batteries were caught napping."⁸ He ordered an investigation. The investigation uncovered serious PVO shortcomings in training and in command and control. Khrushchev was indignant. Reality had undercut his numerous proclamations on the high degree of Soviet combat readiness. Many generals and other officers were penalized. Positive action was also taken. The PVO HQ staff began to chart anticipated routes of future U-2 flights.⁹ Tension was now increased in anticipation of the next overflight.

CIA analysis of the ELINT recordings from April 9, revealed that the U-2 had indeed been detected well before it entered the Soviet Union. This was the first time that early detection in southern USSR had been confirmed. It should have been a warning that future overflights from



SA-2 Guideline missile, second stage. (Wikimedia Commons.)



Grand Slam Route (From C. Gibson, R. Hopkins, *Spyflights and Overflights*, Crecy Publishing with Permission.)

the south now had a higher chance of being shot down. Yet the CIA did not tell Eisenhower about the early detection, nor did they recommend cessation of overflight. Planning for the previously approved next mission began with no further discussion. It was named “Operation Grand Slam” with Francis Gary Powers as pilot and was flown on May 1, 1960.

Operation Grand Slam

The route from Peshawar Pakistan to Bodo Norway was 3300 nmi. Planned for a maximum time of over 9 hours, Grand Slam was the first cross country overflight. At 410 kts cruise airspeed, the groundspeed would be 400 kts plus or minus, depending on winds aloft.

Targets were the ICBM test range at Tyuratam, the plutonium enrichment facility at Mayak, suspected ICBM factories near Sverdlovsk and Kirov, ICBM operational site at Plesetsk, and submarines at Murmansk. As in the past, CIA planners avoided routing the U-2 over known SAM sites.¹⁰

Early warning radars detected the U-2 as it entered Afghanistan inbound for the Soviet Union. All Soviet commercial and general aviation in the area was immediately grounded. A worried Minister of Defense Malinovsky repeatedly called Marshal Biryuzov for status as the U-2 continued northward. Before he left for the May Day (Workers Solidarity) Parade, Khrushchev also called Biryuzov. “It’s a scandal, Khrushchev berated him, — the country gave all the necessary resources to the Troops of the Air Defense, yet you can’t destroy a subsonic plane!”¹¹

As the U-2 approaches Chelyabinsk, the autopilot malfunctions. While this is normally a cause to abort, Powers chooses to continue. He is more than 1,300 nmi inside the USSR with clear weather ahead. From this point on, he uses ADF reception from commercial radio stations for general location as he makes visual updates and records manual course corrections.

The U-2 Approaches Khyshytym

Proceeding northward to image the Mayak facility, the U-2 passes over three SA-2 sites. It flies almost directly over the 2nd Bttn, 37th Brigade SA-2 site at Syrgaydy. The

site is unmanned with the crews away for training. The U-2 images Mayak and then passes by the 4th Bttn at Khyshytym. Its radar transmitter malfunctions, preventing a launch. It then passes by the 1st Bttn at Kasli with crews also gone for training.¹²

Earlier, two Su-9 prototypes went aloft under direct order from Gen Y. Y. Savitsky (aka The Dragon), commander of all PVO air interceptor forces. His order — “find and ram the U-2”. This was a suicide mission because both Su-9’s lacked armament. Savitsky sent them up early wanting his interceptor forces to get credit for the shoot-down. Competition between the PVO air interceptor and anti-aircraft missile forces hindered much needed communication and coordination that day.

The Su-9s were directed by ground-air radar vectoring, but the operators were unfamiliar with the Su-9 flight envelope. As a result, the Su-9s never made visual contact of the U-2. Flying in afterburner to achieve 70,000 ft altitude, the lead Su-9 runs low on fuel and lands on an unpaved airfield at Troitsk. Capt Mentuykov, piloting the second Su-9, has more fuel left. He is ordered out of afterburner to return to Koltsovo airfield. As he descends, Mentuykov passes about 6 km below the U-2 but does not see it. Per Soviet practice, only the lead Su-9 had IFF enabled. Thus, Mentuykov and the U-2 show as closely spaced targets to SA-2 Spoon Rest acquisition. After passing below the U-2, Mentuykov is ordered to fly to the east, increasing the separation as Powers continues to fly his U-2 northward. He has unknowingly safely flown through three SA-2 sites and avoided two Su-9s. He now makes a slight right turn onto a short leg toward the city of Sverdlovsk.¹³

The U-2 Flies Between the 5th and 6th Battalions

The U-2 enters the SA-2 kill zones of the 5th and 6th Battalions, 37th Brigade flying a short leg about midway between the two. The 6th has a Fan Song transmitter failure, making it inoperable while technicians drive about 20 mi to get a replacement magnetron.

Lt Col I. I. Novikov watching in the command van of the 5th is confused. The target coordinates received from 37th Brigade HQ at Kyshtym do not match those from his Spoon Rest. (Note: they were sent by HF radio relay which introduces a small time delay, resulting in the coordinate discrepancy) And Novikov’s IFF detects two targets. Which is the U-2, and which is the Soviet airplane? HQ orders him to fire, but Novikov delays as he tries to resolve the coordinate discrepancy and the target ambiguity. The Su-9 is ordered to fly even further to the east, to increase its separation. HQ now orders, “fire at the target coming directly toward you.”¹⁴

As Novikov struggles, Koltsovo airfield launches two MiG-19s to replace the two Su-9s. The MiGs have guns. Unaware that the U-2 is being tracked just to the south, they sweep to the north and then head west searching for the U-2. The U-2 continues to fly northward past the 5th Battalion. Powers begins a planned 90-degree left turn onto his next leg toward Kirov. The new leg will take him past the southwestern edge of Sverdlovsk.¹⁵

As the U-2 turns, Novikov resolves the issues and commands "fire two rockets!" But there is another delay. His launch officer has left the launch switch in the "test" position. About a minute elapses until he discovers the mistake and moves the switch to "operate." The first missile fires at 0846. The second missile fails to launch. (The missile maintenance crew had clogged the pyro cartridges with lubricant.¹⁶) There was no time to launch another missile. In the U-2, Gary Powers has no indication a missile is heading toward him as he completes the turn. Warhead arming is ordered by Novikov and a few seconds later, at about 0847, the warhead detonates as the U-2 is about to leave the kill zone. 5th Bttn radar operators see a loss of track in all three-axis. And outside observers see a white cloud form in the distance against a clear blue sky.¹⁷

After Detonation

Powers feels a dull thump from behind, the plane jerks forward, and he sees a huge orange glow. He is knocked back in his seat and then checks the cockpit indicators. Readings are normal and the engine is still functioning. The right wing drops, and he levels the wings. The nose then goes down as in a descent. But he has no pitch control and nose keep going down. Either the control rods are damaged, or the tail is gone. A violent movement flings him all over the cockpit. The plane flips onto its back with its nose up. He is now spinning upside down in a falling U-2.¹⁸

A technical analysis of the blast, spin, and fall was conducted.¹⁹

The warhead detonated at about the five o'clock position, below and behind the U-2. The blast force pushed on the rear fuselage, starting a clockwise turn. The blast immediately tore off the right rear stabilizer and weakened the connection of the fuselage tail section. That is why Powers had no pitch control. Warhead fragments damaged the right wing immediately causing a roll to the right. The fragments also tore open the right wing pod. Ignition of fuel in the wing and pod caused the intense orange glow reported by Powers. The damaged right wing lowers, increasing a clockwise turn. With a loss of airspeed, the U-2 nosed downward into a stall and subsequent oscillations. Violent secondary stalls resulted in an unrecoverable clockwise inverted spin. Powers, who did not have his seat belt or shoulder harness tightened, was flung far forward in the cockpit.

Powers knew he was falling rapidly in an inverted spin. Soviets on the ground were able to track the direction of the falling U-2. At the 5th Battalion, radar operators report "seeing the target depart to the NE" after warhead detonation.²⁰

Falling Toward The 2nd Battalion

The falling U-2 with Powers inside spins into the kill zone of the 2nd SA-2 Battalion, 57th Brigade. Maj Mikhail Voronov is the commander. He launches a single missile toward the U-2. Almost immediately thereafter he sees what looks like radar chaff on the command cabin radar display. A few minutes later, he went outside the cabin and

saw falling debris and a pilot descending in a parachute. In his official report Maj Voronov was unable to assess if or how his missile had detonated.²¹

What happened to Voronov's missile? Analysis²² estimates the U-2 had fallen to about 45,000 ft when Voronov's missile was launched. About four seconds later, the weakened right wing broke away from the fuselage. The released metal debris would be significant with thousands of small radar scatterers, just like radar chaff. On his radar, Voronov was seeing the debris. More importantly, the debris prevented the Fan Song radar from continuing to track the U-2 and prevented missile guidance. Therefore, Voronov's missile flew in the direction launched without guidance and self-detonated after about a minute. The detonation at a low elevation might have gone unseen by Voronov.

So, Maj Voronov's report appears accurate. He launched one missile, saw what looked like radar chaff, and could not determine the result. The missile would have flown past the falling U-2 which tore off the right wing and then the left wing. Powers is estimated to have pushed himself out about 27 sec after Voronov's missile was launched. He then spent several minutes parachuting to ground.

What Did The 1st Battalion Shoot At?

Further to the north, the 1st SA-2 Battalion, 57th Brigade at Monetny believes it has the U-2 approaching from the east along the southern edge of its kill zone at a low altitude. Commander Maj Nikolai Sheludko is watching an unidentified airplane on his radar approaching at 9km altitude. Unknown to him, it is the Su-9 returning to land at Koltsovo. Sheludko and his HQ have not received reports from the 5th and 2nd Battalions which had fired just minutes earlier. After conferring with HQ, he is directed to fire at what they both think is the U-2 at a low altitude. Sheludko orders launch of three missiles at 0855.

As Mentuyukov lowers his Su-9 to land, radar tracking and missile guidance is lost. The missiles continue a straight path and self-detonate above and behind him. Mentuyukov lands safely at Koltsovo. The detonations were not seen from nearby Sverdlovsk because of the low elevation.

They Shoot Down Their Own MiG!

The two MiG-19s launched to search in the wrong direction 40 minutes earlier are now getting low on fuel and are heading back to Koltsovo. The 4th Battalion, 57th Brigade at Reshety commanded by Maj Shugayev, detects two airplanes one followed by another with no IFF response. (In the hurry to launch, the lead MiG did not reset his transponder code from April to May.²³)

Shugayev is doubtful. Why two targets? And at a low altitude? He calls staff headquarters. Air Defense Commander General F. K. Solodovnikov answers and snaps "None of our planes are in the air."²⁴ HQ has received the shoot-down report from Lt Col Novikov, but disregards it



1st Lt Sergei Safronov (*Unknown Author, Wikipedia.*)

because the target was departing. Thus, Solodovnikov thinks the U-2 is still airborne, 35 minutes after it was shot down! He gives Shugayev permission to fire.

Capt Ayvazyan in the lead MiG dives to make a long low approach back to Koltsovo just as three missiles are launched at 0922. One missile comes within proximity of his wingman and is armed. The warhead detonates forcing the plane to fall from a clear blue sky. Its pilot, 1st Lt Sergei Safronov, ejects. The MiG falls along the edge of a small town, Degtyarsk, where a Workers Unity Day Parade is underway. Parade onlookers see the plane fall and they rush out to find a dead pilot nearby in a parachute.

The Aftermath

Sitting in his Moscow headquarters, PVO Marshal Biryuzov with Generals Savitsky and Kuleshov at his side, is eagerly trying to gather the latest reports so that he can personally relay success to Premier Khrushchev at the Moscow Parade. But the information coming back from Sverdlovsk is disjoint and confusing. So, he concocts a story. This is what happened, Biryuzov began — “The intruder only brushed the edge of the missile range. We expected that and sent a Su-9 to intercept it. No, better—a pair of Su-9s. There were two planes available. They had already reached the target when it entered missile range. At the extreme limit. It was decided to launch. The interceptors



Gary Powers on trial. (*ITAR-TASS.*)

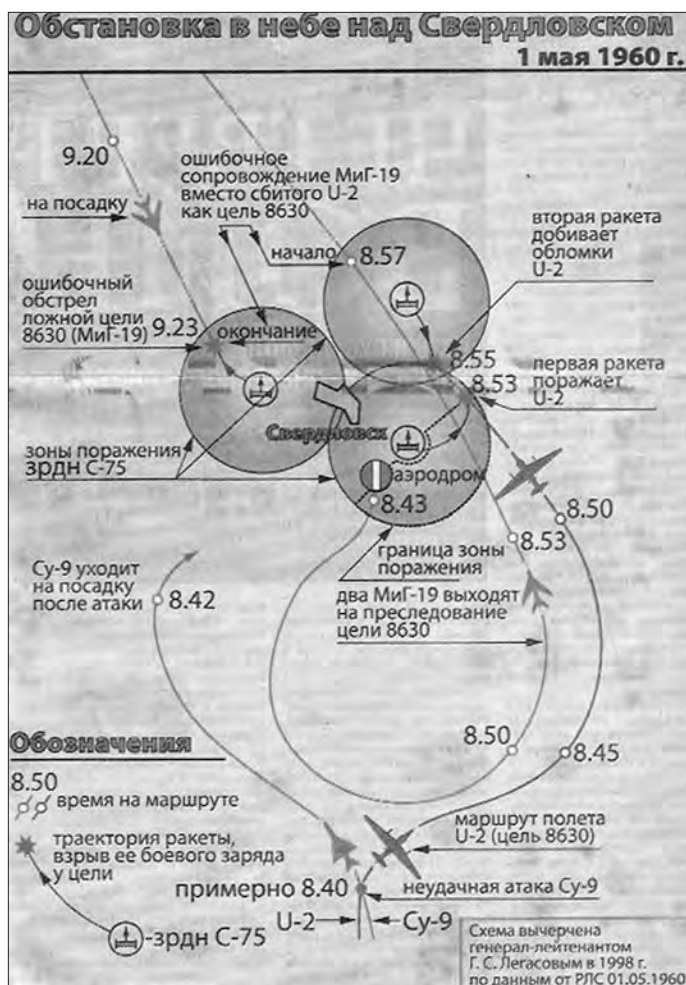
were ordered to leave the firing area, but one pilot only shouted in reply: ‘I am attacking.’ Two missiles were launched, as called for. The planes were so close together that they could not be distinguished from the ground. The radar images merged. One missile therefore hit the spy plane, while the other went after our plane.”²⁵ While far from the truth, the story reflects the fog of war combined with the PVO’s determination to impress Khrushchev that it did not fail this time.

An investigation was begun. Before the investigation started, the Soviet press announced that a foreign spy plane had been shot down near Sverdlovsk by Air Defence units led by Maj Voronov in the 2nd Battalion and Capt Sheludko in the 1st Battalion.

Soviet TV interviews followed. Voronov, Sheludko, and members of the 57th Brigade received many awards. PVO Marshal Biryuzov was later promoted to Chief of General Staff. Gary Powers was sent to trial, imprisoned, and later traded for Soviet spy, Col Rudolph Abel. Lt Safronov was posthumously awarded the Order of the Red Banner.

After a four day investigation, during which all participants were sternly warned “never discuss this with anyone,” the PVO filed a summary report. All records were gathered, classified, and sent to the Ministry of Defense (MOD) archives, away from public scrutiny. Many participants knew the report was false and they talked among themselves.²⁶

Col (Ret) Boris Samoilov had the records declassified in 2004. After seven years of research, he published new findings in 2012 in Russian “to set the record straight”. Most of the English speaking world are unaware of the Russian publications. Over the years, the PVO story and the initial news announcements have morphed into simply that the U-2 was shot down by a missile fired by Maj Mikhail Voronov of the 2nd Battalion, 57th Brigade. “The Rest of the Story” draws on Samoilov and other eyewitness accounts to build a complete picture and provide context for both interceptor and anti-aircraft missile activities during Grand Slam.



Summary

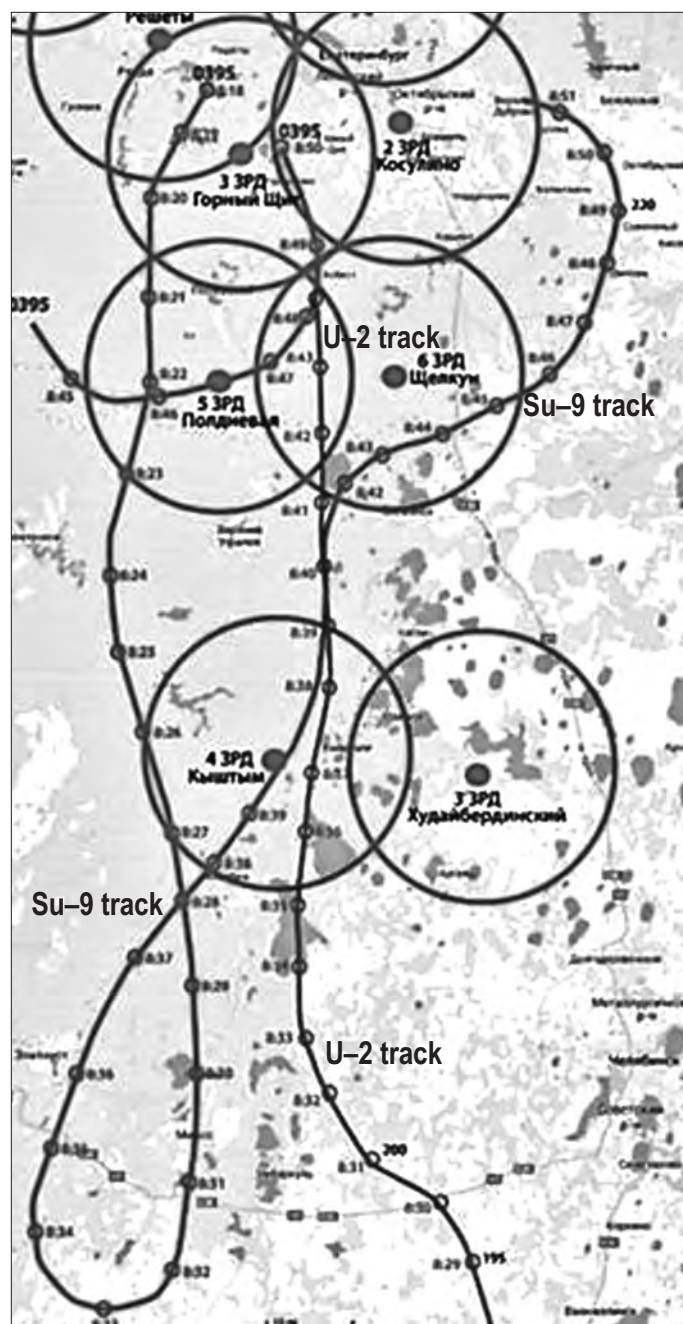
Eight missiles from four SA-2 battalions had been fired in less than one hour. One U-2 and one MiG-19 had been destroyed.

The investigation report states missile launch by the 2nd Battalion was at 0852 as the U-2 approached from the east after making a wide right turn. This is a hand drawing of the U-2 approach made by Lt-Gen Legasov (**above**), Co-chairman of the Investigation. He shows the U-2 on a long wide right turn into the 2nd Battalion from the east with detonation at 0853. The Su-9 is shown flying to the west.

The U-2 would have to burn extra fuel for such a wide turn – extra fuel that it did not have. Plus, the CIA would not have routed the U-2 over 2nd Bttn. because it was a known SA-2 site. In 1959, a CIA agent had taken an out the window photograph of the 2nd under final construction while landing with Vice President Nixon at Koltsovo airport.

To the right is a copy of the declassified radar trace retrieved from the Russian MOD Archives.

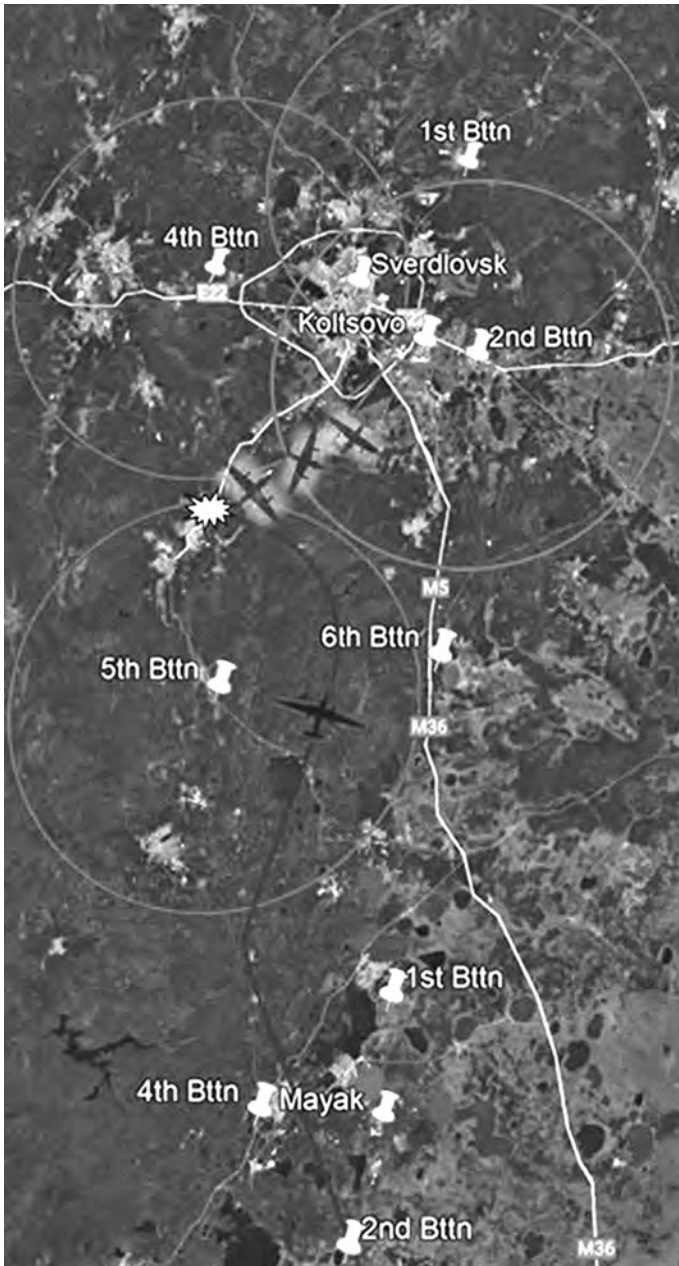
It shows the U-2 flying a straight leg between the 5th and 6th Bttn. It is consistent with publications written by Col (Ret) Samoilov and Col (Ret) Starun who had observed the overflight on their DVO tablets at the 5th Bttn and



37th Brigade HQ. It shows that the U-2 flew about midway between the 5th and 6th Battalions. And it traces the U-2 up to the point of its left turn at 0844.

The investigation report stated that the U-2 was struck from behind, but “the target was beyond the kill zone for the 5th Bttn”. That is because the Soviets erroneously plotted the zones as a 28 km ground radius. Their new missile, the Desna 13D, was used that day. It had an increased kill zone of 32 km ground radius. And the war-head detonated near the edge just as Powers and the U-2 were about to depart northwest toward Kirov.

Col (Ret) Mikhail Khodarenok, a Soviet engineer who held several anti-aircraft PVO assignments, recently stated “most likely, (of all missiles fired) only the missile of the 5th anti-aircraft missile division of the 37th anti-air-



U-2 Final Legs and Detonation. (J. Schell.)

craft brigade could so “softly” hit the target from behind from below.”²⁷

The Su-9 breaks to the right, consistent with both Selin and Samoilov’s report that the Soviets had ordered it to the right to separate it from the U-2. The turn and approach to Koltsovo airfield from the east is consistent Mentuykov’s report of his Su-9 landing.

The Archives contained another radar trace showing the exact opposite. The U-2 flies wide to the right and the Su-9 flies straight ahead. I have concluded that other trace was an alteration that was made during the investigation to support the story that the 2nd Battalion shot down the U-2. Soviet engineering analysis in Moscow of the remains stated the U-2 appeared to have been hit from behind. Yet, the investigation team in its report never satisfactorily explained how that could occur if the U-2 had approached

0740 - First Su-9 departs Koltsovo
 0810 - Second Su-9 departs Koltsovo
 0836 - U-2 images Mayak facility
 0837 - U-2 passes Kyshtym
 0839 - Su-9 passes below U-2
 0841 - U-2 enters kill zone of 5th Bttn
 0843 - Two MiGs depart Koltsovo
 0844 - U-2 begins turn toward Kirov
 0846 - One missile launched by 5th Bttn
 0847 - Warhead detonates behind U-2
 0848:20* - One missile launched by 2nd Bttn
 0848:47* - Powers pushes out
 0849:18* - Fuselage hits ground
 0849:20* - Warhead self-detonates
 0855 - Three missiles launched by 1st Bttn
 0856 - Warheads self-detonate
 0911:24* - Powers lands by parachute
 0922 - 4th Bttn launches three missiles
 0923 - Warhead detonates near MiG-19

* Calculated

Grand Slam Timeline. (J. Schell.)

the 2nd Bttn head on. One line in the official report stated “the U-2 made a 180 degree turn” just before it was hit! (Not possible in the U-2)

Based on the recent Russian papers, Gary Powers recollections in his book and his CIA debriefing, these are my estimates of the final flight legs from Kyshtym thru the left turn toward Kirov. Detonation of the 5th Bttn warhead occurred about 22.6 nmi south-southwest of Sverdlovsk at 56°31’43.62”N, 60°17’02.48”E. It detonated as the U-2 was about to depart the kill zone of the 5th Bttn. Shown also are the kill zones for the four SA-2 battalions that engaged what they believed was the U-2. The times below are from investigation records rounded to the nearest minute. If the 5th Bttn warhead detonation occurred at 0847, then the 2nd Bttn launch would have to occur earlier than 0852 reported by the investigation. As part of the analysis, we have calculated about when it should have occurred. 2nd Bttn launched its missile at approximately 0848:20, after the U-2 had fallen to 45,000ft. Subsequently, three additional debris clouds should have formed. One after each wing separated from the fuselage and one after the 2nd Bttn warhead self-detonated. We estimate the wing separations and second detonation occurred 80 - 140 seconds after the initial detonation at the 5th. A cloud should form after each. Samoilov reported that outside eyewitnesses saw additional clouds form low on the horizon two or three minutes after the first detonation.²⁸ The eyewitness times of additional clouds are congruent with our estimates of the break-up of the U-2.

Conclusions

A milestone in the Cold War, the shootdown was much more than an engagement of one SA-2 missile against the U-2. It is better described as an air war in the skies over

Sverdlovsk. It was fought with poor PVO coordination between air interceptor and anti-aircraft missile forces. Lack of timely coordination resulted in loss of the MiG-19 and Lt Safronov. The war was fought with a lack of proper operating procedures, well trained personnel, and good maintenance. Although the 5th Battalion was fully trained, its delays in launch almost let the U-2 escape. Taken in whole, there was good reason for the PVO to classify and hide the results in the Archives, masking reality from both Khrushchev and the public. To this day, the Russian military schools have never used the shootdown as a case study.

Of the eight SA-2 Guideline missiles launched that day:

The warhead detonation of the first missile launched sent the U-2 into an inverted unrecoverable spin to earth. It was fired by the 5th Battalion, 37th Brigade, commanded by LtCol I.I. Novikov.

The warhead of the second missile launched self-detonated after flying above the falling U-2. A few seconds after launch, Gary Powers safely pushed out of the U-2 and parachuted to earth. It was fired by the 2nd Battalion, 57th Brigade, commanded by Maj Mikhail Voronov.

Warheads of all the three missiles fired by Maj Nikolai Sheludko of the 1st Battalion, 57th Brigade against what he thought was the U-2 all self-detonated. The actual target, Mentyukov's Su-9, landed safely.

One of three missiles fired by Maj Shugayev the 4th Battalion, 57th Brigade at what he thought was the U-2, brought down a MiG-19, killing its pilot 1st Lt Safronov.

Going Forward

The Paris Peace Talks that began a few weeks later ended abruptly. President Eisenhower admitted to the U-2 overflight, but refused to apologize to Premier Khrushchev. The Soviet delegation then walked out, putting a renewed chill into the Cold War.

SA-2 rules of engagement and operating procedures were subsequently changed. In Oct 1962, a USAF U-2 was shot down as it departed Cuba during the Cuban Missile Crisis. Operations and maintenance vastly improved in the next few years, and the SA-2 became a formidable weapon system in the Vietnam war.

The U-2 went on to have many defensive system improvements including radar warning and jamming for surface to air missiles. Sensor and communication upgrades gave it superior worldwide collection and dissemination capability. The U-2 is still in USAF operation today.

Acknowledgements

I gratefully appreciate the help of the world's foremost U-2 historian, Chris Pocock. Chris provided initial source material and has kindly reviewed and critiqued my research. I thank Cold War historian, Lin Xu for the Legasov map. I also thank fellow National Museum USAF volunteers Joseph Matis and Pranay Bhardwaj for their analyses of warhead detonation, the fall, and break-up of the U-2. Their contribution provided the final missing pieces to the Rest of the Story. ■

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Civil Air Patrol and Civil Rights, 1941-1965



Cadets of the newly established National Capital Wing meet Air Force Chief of Staff Gen Carl A. Spaatz at the Pentagon, circa March-April 1948. Note the lack of black cadets. Source: Colonel Louisa S. Morse Center for Civil Air Patrol History (hereafter "Morse Center").

Frank A. Blazich, Jr.

On January 28, 1942, the Office of Civilian Defense (OCD) issued a press release on the eligibility for licensed female pilots to join the new Civil Air Patrol (CAP). The release emphasized a policy statement by CAP's National Commander, Maj Gen John F. Curry, who proclaimed, "There will be absolutely no discrimination as to race, creed, color or sex" and "each member is to be accepted and assigned to duties strictly upon the basis of his or her experience and record of performance."¹ This inclusive membership statement for CAP largely governed the composition of the all-volunteer civilian organization while under federal jurisdiction throughout World War II.

Postwar, however, CAP's incorporation in 1946 produced a noted shift in the racial composition of various units across the nation. Regulations and policies governing membership did not explicitly speak of race, creed, color, or sex, resulting in confusion and misunderstanding about policy concerning discrimination. Whereas the United States Air Force (USAF) began to desegregate itself beginning in 1949 and continuing into the early 1950s, several CAP units instead opted to segregate and counter the personnel actions of the USAF and Department of Defense. While the Air Force lacked legal influence or control over CAP's policies, its financial and material support to the civilian organization provided a means to direct soft influence on CAP's racial composition. CAP membership inclusivity and integration in the 1950s and into the early 1960s thereafter vary by wing and region due to three overarching factors: organizational culture, state or local laws or ordinances, and individual unit leadership.

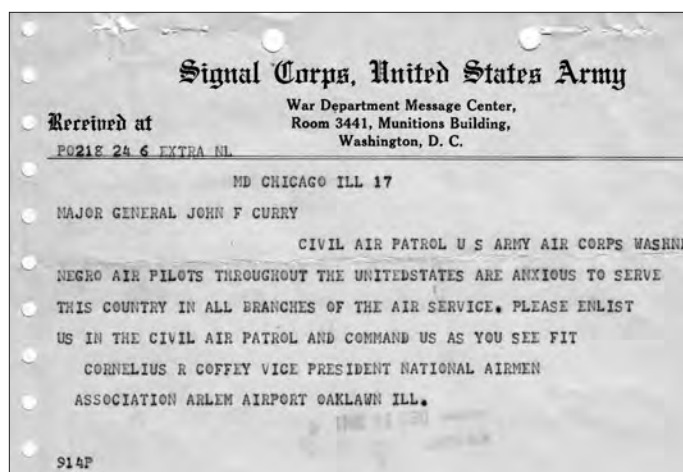
Founding and Federalized Control

The initial policies governing CAP's membership policies are rooted in OCD itself. On May 20, 1941, President Franklin D. Roosevelt issued Executive Order (EO) 8757, establishing the OCD under the directorship of New York City Mayor Fiorello LaGuardia. This order gave LaGuardia responsibility to study and plan measures for civilian defense programs which included civilian auxiliaries.² Weeks later on June 25, Roosevelt issued EO 8802 banning discrimination in the employment of workers in defense industries or government on the grounds of race, creed, color, or national origin.³ The order resulted primarily from a threat by A. Philip Randolph and other black leaders to organize a march on Washington to protest for fair opportunities for work and desegregation of the military. Roosevelt met with Randolph on June 18, and with LaGuardia present, Randolph requested either an executive order to prohibit discrimination in defense plants or else his march would take place on July 1. With neither side giving an inch, LaGuardia called for a solution and Randolph received his executive order.⁴

With the inclusion of “or government” in the executive order, the OCD, under LaGuardia instituted a non-discrimination membership policy for civilian defense volunteers.⁵ As planning for CAP unfolded in fall 1941 within OCD, membership would align with the parent organization. On December 3, two days after LaGuardia used the authority of EO 8757 to approve creation of a CAP division within OCD, Maj Reed Landis, LaGuardia’s aviation aide, removed a question about race from CAP’s enlistment form just prior to its publication and national distribution.⁶ Following the attack on American forces in Hawaii, LaGuardia initialed OCD Administrative Order No. 9 on December 8, formally establishing CAP. He announced the new organization that same evening in a national radio broadcast. An OCD press release thereafter defined CAP as “an organization of the civilian aviation resources of the nation for national defense service,” but neither the radio address nor press release provided specific mention about who was eligible to join.⁷

Clarification about CAP’s membership policy arrived ten days later via telegram. On December 17, Cornelius R. Coffey, vice president and founder of the National Airmen’s Association of America, wired Curry stating “Negro air pilots throughout the United States are anxious to serve this country in all branches of the air service. Please enlist us in the Civil Air Patrol and command us as you see fit.”⁸ In his reply to Coffey the next day, Curry noted no restrictions on CAP membership as to race, creed, color, or sex. In his words, “only the ability to do [the] job [is the] only consideration beyond patriotism.”⁹ Curry’s comments thereafter would be echoed in the OCD press release of January 28, 1942.

The outcome of Coffey’s telegram exchange with Curry resulted in a lesser-known civil rights milestone. On March 7, 1942, the *Chicago Defender* headlined an article with “Civil Air Patrol Does the ‘Impossible’ in Illinois” while discussing the establishment of the 111th Flight Squadron of



Telegram from Cornelius R. Coffey to Maj Gen John F. Curry, December 17, 1941. Source: Morse Center.

“the Illinois Wing.”¹⁰ Weeks later on March 20, Jack Vilas, commander of the Illinois Wing, swore in Coffey as the commander of the 111th Flight Squadron of the Illinois Wing. The squadron consisted of 25 black and white flyers, male and female; it is the first racial and gender integrated, uniformed operational flying unit in American history.¹¹

The integrated squadron proved a success. Re-designated as Squadron 613-6 in mid-1942, the unit had well over 100 members. In September 1942, several aviators flew a 2,000 mile, six-state cross country flight to gain experience for active-duty missions. Other members of this squadron would go on to participate in the CAP courier service during World War II. In October 1942, Squadron 613-6 launched a cadet program through which countless young African American men and women in the Illinois Wing gained their first experience with aviation. The legacy borne from those first cadets in 1942 and 1943 lives on today with the Cornelius R. Coffey Composite Squadron in Chicago.¹²

On April 29, 1943, President Roosevelt issued EO 9339, transferring CAP from OCD to the War Department.¹³ Days later, a War Department memorandum charged Gen Henry H. “Hap” Arnold, Commander, Army Air Forces (AAF), with supervising and directing the operations of CAP on behalf of the Secretary of War.¹⁴ AAF Regulation 20-18 published on May 25 established CAP as an exempted activity under the supervision of the Commanding General of the AAF, who would in turn delegate these responsibilities to Lt Col Earle L. Johnson as CAP’s national commander.¹⁵

Johnson, having led CAP since April 1, 1942, made no changes to the membership policies governing CAP in his new AAF capacity.¹⁶ The CAP cadet program, which began in October 1942 via a memorandum issued by Johnson, received official AAF recognition on May 23, 1944.¹⁷ This recognition allowed 9,000 male cadets between the ages of 15-17 years, selected on a merit basis, to attend a ten-day summer camps at AAF installations nationwide from mid-July through mid-September. Each group of 25 cadets experienced the same military living as AAF airmen. CAP

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A student of the Coffey School of Aeronautics hand starting a Piper J-3 Cub while an instructor looks on at Harlem Airport, Oak Lawn, Illinois. The aircraft was also used by the 111th Flight Squadron, later Squadron 613-6. Source: National Air and Space Museum, Smithsonian Institution.

National Headquarters reported the encampments came together without incident.¹⁸

In Illinois, a total of 400 cadets were slated to attend a ten-day encampment at Chanute Field from August 20-30. The encampment, however, initially excluded cadets from 1st Lt Coffey's Squadron 613-6, the only squadron not represented at the encampment. In an article in the *Chicago Daily Tribune*, the squadron adjutant 2nd Lt Willa B. Brown, stated Coffey received oral instructions from CAP National Headquarters "that no provisions were available for Negro cadets and therefore they were not invited to the camp."¹⁹ Brown's press statement apparently worked, as 17 members of Squadron 613-6 did attend the encampment and trained alongside white cadets. Cadet MSgt Wardeen Mason received recognition as one of the nine outstanding cadets at the encampment, receiving an AAF identification bracelet.²⁰

For wartime CAP, African American participation remained limited and segregated. Cadet programs offered the greatest mechanism for involvement. In the Michigan Wing, 1st Lt Earsling Taylor and 2nd Lt Neal V. Loving co-founded the all-black Squadron 639-5 in Detroit in the summer of 1942. As CAP's only all-black glider squadron, the unit grew to include a cadet program and even parachutists who participated with white CAP parachutists in the wing's Group 639.²¹ In the Ohio Wing, Cleveland Squadron 3 launched a third, all-black male cadet detachment on April 15, 1945 under the command of 2nd Lt Paul C. Smith. Capt George Bennies, commanding the Cleveland Group, considered the policy of segregation ideal and the first two detachments of the squadron consisted of only white male cadets.²² In the Kansas Wing, Kansas City-based Squadron 751-9, commanded by 1st Lt Harry B. Thornton, featured over 25 male and female students-turned-cadets at the segregated Sumner High School.²³

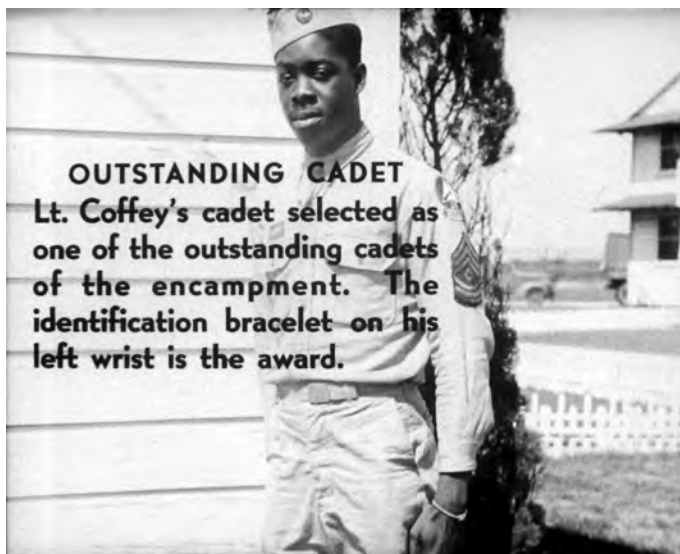
CAP in World War II had a diversity in race and gender. Nonetheless, social mores and laws governed the composition of wings and squadrons. Technically no policy

existed for segregation, although the racism prevalent in American civil society resulted in a wartime CAP with self-segregated units. CAP's active-duty operations which directly aided the war effort, notably its coastal patrol antisubmarine operation, remained white-only with blacks kept on the ground in positions of maintenance, cooking, or janitorial work.²⁴ Racial equality remained a future endeavor.

Postwar Incorporation

By January 1946, CAP's days were numbered. From January 10-11, Generals Arnold and Carl A. Spaatz informed CAP leadership of the forthcoming termination of the present national emergency and with it the legal authority for the financial support and continuation of CAP (slated to cease on March 31). The generals pledged, however, to assist the volunteer organization to obtain a federal charter. Following a flurry of meetings between wing commanders, members of Congress, and military leadership, on July 1, President Harry S. Truman signed Public Law (PL) 79-476, incorporating CAP.²⁵ The legislation authorized the incorporators – essentially all the wing commanders – to complete the organization of CAP by drafting and adopting a constitution and bylaws as well as regulations and policies, with eligibility for membership in the corporation as "determined according to the constitution and bylaws of the corporation."²⁶ As an independent corporation, CAP's existing wartime policies and procedures would in essence have to be reestablished or at the least, reevaluated.

The actual process to draft a constitution and bylaws would unfold slowly over the course of the next two years. Two CAP majors and Philadelphia attorneys, George Witney and Wallace D. Newcomb, were tasked to complete the draft constitution and bylaws by April 1948 for distribution to the wing commanders. As the two attorneys explained to the CAP Board, the proposed constitution and bylaws "will carry on the organization as it now exists and that



Cadet MSgt Wardeen Mason, Squadron 613-6, seen in a slide show of the 1944 Illinois Wing Encampment. Source: Morse Center.

will further include every element and every community in the country.”²⁷ That month, the House Committee on Armed Services held hearings on HR 5298 to establish CAP as a civilian auxiliary of the USAF.²⁸ On May 7, not long after the legislative action was introduced, Gen Hoyt S. Vandenberg, Air Force Chief of Staff, advised Maj Gen Lucas V. Beau, CAP National Commander, that it would be highly desirable if CAP completed its corporate organization in accordance with PL 79-476 to clarify its legal status with the Air Force.²⁹ Weeks later on May 26, President Truman signed PL 80-557 into law, establishing CAP as a volunteer civilian auxiliary of the USAF.³⁰ Only two days after this action, CAP formally adopted a constitution and bylaws.

The 1948 CAP Constitution and Bylaws offered little concrete information concerning membership. In Article 7 of the Constitution, the document stated that all those persons who were members of CAP as of July 1, 1946 would automatically become members of the newly incorporated Civil Air Patrol, and all those persons who joined between July 1, 1946 and May 28, 1948 would also become members of the Civil Air Patrol under the new constitution and bylaws. Regarding whom could become a member, within the Section 2 of the Bylaws notes that “Any United States citizen interested in promoting the objects and purposes of the Civil Air Patrol shall be eligible for membership in the Civil Air Patrol upon compliance with the requirements for membership.”³¹ The documents list nothing akin to an anti-discrimination policy, and those African American members presently in the corporation remained members, able to serve in their communities.

Air Force Integration, CAP Regression

Approximately two months after CAP unveiled its new constitution and bylaws, President Truman issued EO 9981, desegregating the Armed Forces of the United States.

The order declared the policy of the President to be that “there shall be equality of treatment and opportunity for all persons in the armed services without regard to race, color, religion, or national origin.” The policy “shall be put into effect as rapidly as possible,” albeit with “due regard to the time required to effectuate any necessary changes without impairing efficiency or morale.”³² The order represented a recommendation articulated in the 1947 report of the President’s Committee on Civil Rights to be enacted by Congress, but Truman’s 1948 political campaign and pressure to secure the black vote pushed the executive order through.³³

Prior to issuance of EO 9981, the USAF was not the most progressive of the services in integrating its personnel. As noted by historian Alan L. Gropman, in 1941 the AAF leaders “were racist or bigoted and the institution they led was more than segregated, it was devoid of blacks.” By 1951, however, the USAF found itself the first service to truly integrate.³⁴ In May 1949, desegregation came to the USAF “largely because of military pragmatism,” argues Gropman.³⁵ As observed by Lt Gen Idwal H. Edwards, Air Force Deputy Chief of Staff for Personnel, segregation adversely impacted Air Force effectiveness, limiting the movement of personnel while undermining operational readiness at added expense for maintaining segregated units and facilities. In April 1948, Spaatz, now Air Force Chief of Staff, agreed. In a letter to Lemuel E. Graves of the *Pittsburgh Courier*, Spaatz concluded how “the ultimate Air Force objective must be to eliminate segregation among its personnel by the unrestricted use of Negro personnel in free competition for any duty within the Air Force for which they may qualify.”³⁶

With the release of EO 9981, the USAF acted immediately. The service secretary, W. Stuart Symington, expected his generals to either support integration or resign. Edwards briefed the flag officers on the executive order, and noted how the order had created the Committee on Equality of Treatment and Opportunity in the Armed Services to monitor the progress of integration in the armed forces.³⁷ The USAF shared with the committee its proposal for integration which began on May 11, 1949. Within six months, 1,301 units had integrated; by June 1952, the last all-black USAF units disappeared.³⁸

Although bearing the added title of “United States Air Force Auxiliary,” CAP itself did not pursue a policy of integration. Mere months after the USAF began desegregating, CAP National Headquarters published *Civil Air Patrol Manual, Volume 1, Book 1* on August 1, 1949. It did not include any mention of EO 9981, mainly because the books were already at the printers when the executive order was published. The manual does, however, mention a slight variation on the membership requirements. It said eligibility was “open to citizens of the United States and its Territories, both men and women, who apply through local units,” although approval by the unit commander was required for membership.³⁹ The issue of commander approval would prove problematic, particularly for those black Americans desiring to join a local CAP unit where the concept of integration proved unwelcome.



Maj Gen Lucas V. Beau, CAP National Commander, 1947-1955. *Source: Morse Center.*

Later that month, Fabius Russell, a two-year member of the Ohio Wing, wrote to President Truman. A member of the Youngstown Squadron, Russell had attended encampment at Lockbourne Army Airfield the previous year with other Ohio Wing members without incident. The base, coincidentally, was home to the all-black 477th Composite Group (later 332d Fighter Wing) commanded by Col Benjamin O. Davis, Jr.⁴⁰ When Russell attempted to attend the 1948 encampment at Selfridge Air Base in Michigan, he was denied participation on grounds of his race and told he could not even visit the base on visitors' day. As he noted to President Truman, Russell wrote "I feel that this is more of an injustice than the segregation that I run into daily. I want to continue to prepare myself as a member of CAP and well as near as possible, but I do believe that I should be permitted to participate in all of the activities that aid this preparation."⁴¹ The White House responded to Russell's letter on September 14, stating "the president has a deep personal interest in seeing to it that persons like yourself are not denied an opportunity to join in activities that are shared by other citizens."⁴²

Russell left Civil Air Patrol. He would serve honorably in the USAF during the Korean War and then go on to earn his Doctor of Osteopathic Medicine, the nation's first recorded African American osteopathic radiologist.⁴³ Although EO 9981 moved the USAF to desegregation, its civilian auxiliary remained an organization of civilian volunteers, subject to the values and cultural norms of the communities where squadrons formed and met. Moving into the 1950s, CAP and the USAF would increasingly confront the nation's civil rights struggles, with the former's auxiliary status influencing the latter's attention to membership policies.

Denial of Volunteer Service

The vague nature and localized approval regarding CAP membership came to the attention of the CAP National Executive Board in March 1951. This body advised the national commander on policies affecting CAP and consisted of eight members with an elected chairman representing the 52 wings and eight regions (a subordinate body referred to as the National Board). During the meeting of the National Executive Board from March 28-30, 1951, which was chaired by Spaatz, assembly members laid down the first real CAP policy regarding the eligibility of African Americans to join the organization. During this meeting, Beau, CAP's national commander noted "an increasing number of letters are coming in from colored individuals requesting membership in the CAP," while acknowledging neither the National Executive Board nor the National Board had established a policy in writing. Beau recommended issuance of a policy statement about the membership eligibility of African Americans wanting to join CAP. His recommendation, however, recognized the fact that the two boards set the policies "for more than one Wing, whereas the individual Wing Commanders may set the policy within their Wings as long as they are in conformity with the general policies as promulgated by the boards." Without further explanation in the minutes of the National Executive Board, the senior leadership unanimously decided to not amend the constitution or bylaws but defer the issue of African American membership eligibility to the individual wing commanders – all white men.⁴⁴

The National Executive Board chose not to establish a policy concerning the membership eligibility of African Americans as they believed the issue—or political sensitivity—did not warrant a specific policy. Multiple CAP wings, from their inception in late 1941 had embraced and propagated diversity within their ranks. Although written records are often lacking, photographs of white and black CAP members serving together exist, notably of cadet members in the Illinois, National Capital, and New York Wings. Photographs of Illinois Wing cadets at encampments in the late 1940s are remarkable considering the racial climate in the nation, with male cadets of both ethnicities seen eating, training, and serving together. In Washington, DC, the National Capital Wing had an integrated cadet program from its inception in March 1943, when the future wing existed as only an oversized squadron.⁴⁵ By the 1950s, the wing's integrated cadet drill team proved extremely competitive at the Middle East Region competition and frequently represented the region at the National Drill Competition. In the New York Wing, those units in and around New York City featured African American, Puerto Rican, and immigrant children from across the world finding a home in CAP. While it is impossible to claim perfect racial harmony among the wing personnel, race did not prove to be the limiting factor for those who wished to volunteer and serve.

Since the National Executive Board left the issue of African American membership in the hands of wing com-



Illinois Wing cadets sharing a meal together at summer encampment, ca. 1948-1950. Source: Morse Center.

manders, a few wings decided to use the opportunity to deny black CAP membership. The issue of discrimination made no appearance in official CAP records throughout the majority of the 1950s, but the issue came to the front in April 1957. That month, reporters from the *Baltimore Afro-American* newspaper began investigating matters regarding segregation in the Maryland Wing. When CAP National Headquarters learned of the news investigation, they reached out to the then-Maryland Wing commander, Col A. Paul Fonda, who admitted on the record that the wing did not have any black members. But Fonda also stated that “we are making a study of establishment for an all-colored squadron. We do not plan to integrate into white groups.” Fonda further mentioned that he had surveyed Maryland Wing personnel. Cadets had no objection whatsoever to integration, but most of the senior members in the wing were opposed to it. As for the issue of integration, he admitted anticipating trouble on this score for many months and “we’ll have to find a way to deal with it.”⁴⁶

Frank Burnham, a public affairs officer at CAP National Headquarters, was interviewed by reporters from the *Baltimore Afro-American*. Burnham explained that, “as far as the Air Force is concerned, there is no segregation [in CAP]. But you know the situation as well as I do, particularly down South,” and added that CAP found it advantageous to have segregated units in the South. He further stated that racial discrimination in CAP is “against national policy and CAP is too important a program to become involved with the problems of segregation. Thus, there is a policy of non-discrimination for Civil Air Patrol.” The truth of the matter is there was no such policy. In Washington, Burnham pointed to the National Capitol Wing as having an integrated drill team and two “colored” squadrons, with the Syphax Squadron, commanded by Maj Charles E. Wren, being the largest overall squadron in the wing. Wren himself denied segregation in the wing but admitted there were “white” and “colored” squadrons, with integration purely voluntary and as a result of the geographic location of those units within the district.⁴⁷

Even before the *Baltimore Afro-American* published any of its findings, Donald J. Strait, Air Force Deputy Assistant Secretary for Reserve and ROTC Affairs, issued a memorandum of record on April 23 to explain the relationship between CAP and the USAF. Strait emphasized the USAF had no authority to exercise control or establish any policy over CAP, particularly regarding membership. The USAF acknowledged publicly that the CAP National Board “does not have a policy of discrimination so far as membership is concerned. However, local CAP commanders are permitted the latitude of determining who will be accepted as a member of CAP. In certain states where segregation is still an unsolved problem” – southern states or those states with Jim Crow laws – that “distinction in membership is possibly practiced.”⁴⁸ This was a diplomatic way to admit there was discrimination and segregation happening in CAP.

The May 4, 1957 issue of the *Baltimore Afro-American* had not one but two stories about how African Americans in Maryland had attempted to join the Civil Air Patrol but were denied membership. The first detailed how three high school freshmen attending Charles Hamilton Houston Junior High School 181, James A. Watson, Van C. Webb, and Victor Cole, had attempted to join the Maryland Wing at the Friendship International Airport but were told by CAP personnel that “we don’t accept colored cadets.”⁴⁹ Lt Col Albert W. Ward, Maryland Wing vice commander, and secretary of the Maryland State Tax Commission, denied having knowledge of the students applying.⁵⁰ Notably, Fonda previously told Capt H. Ross Miller, Deputy Chief of Information Services at CAP National Headquarters, that Ward had “fairly strong anti-negro feeling[s].”⁵¹

The second story detailed the denial of a transfer of a CAP member from the Alabama Wing to the Maryland Wing. From June to December 1956, Reverend Julius Carroll, an associate pastor of the Sharp Street Methodist Church in Baltimore, and a licensed pilot and aircraft owner with over 1,500 flight hours, had attempted to transfer into the Maryland Wing after serving in the Tuskegee Squadron of the Alabama Wing. The Maryland Wing, however, refused to transfer and process the reverend’s personnel file and they continued to give him a bureaucratic runaround. Carroll further reached out to the USAF liaison officer assigned to Maryland Wing and even had the Airplane Owners and Pilots Association ask for official attention in the matter. Perhaps because of the inquiries by the *Baltimore Afro-American* reporters, CAP National Headquarters said they would personally address the matter with Fonda and advise him to take “favorable action” on the request for membership.⁵² Herein too, Fonda had acknowledged in his telephone conversation with Miller on April 9 that he had heard from Carroll “relative to admission of colored personnel to Maryland CAP units.”⁵³

An editorial in the same issue of the *Baltimore Afro-American* titled “But we’re interested” referenced the three young men denied CAP membership. The editorialist observed that CAP received annual appropriations of federal tax dollars, “extracted from the pockets of all Americans,



National Capital Wing drill team at the 1956 National Drill Competition, Amarillo Air Force Base, Texas. Source: Morse Center

without regard to race or color,” and noted how the CAP cadet manual made no mention of race. As membership then listed only young men and women from the ages of 14 to 17, “it remained for Maryland to insert the qualification that all recruits must be white,” in “bitter defiance of not only the Air Force’s rules, but of national policy.” The CAP program, in the eyes of the editorial author, “is being deliberately sabotaged” in Maryland by prejudiced officials, and they called upon Secretary of Defense Charles Wilson and his USAF subordinates to act.⁵⁴

The articles about the Maryland Wing’s discriminatory membership practices reached the highest levels of the Air Force. Air Force Chief of Staff Gen Nathan Twining’s Air Staff swiftly prepared a position paper regarding the Air Force support of CAP, which was now starting to come into question because of its segregation practices. By this time, the USAF had been integrated for a decade. Within the findings of Air Staff’s paper of May 7, the authors noted “It is obvious that in some states the membership of CAP would be adversely affected if the Civil Air Patrol were forced into an integration policy. It is evident that members of the white race would abstain from joining colored units.” The paper’s authors also recognized that Civil Air Patrol was dependent on the USAF for logistical and financial support. If this support was removed over the issue of segregation, they believed CAP would potentially collapse as a result.

Several Air Staff recommendations observed that the USAF was not in favor of segregation, but it was not going to necessarily withdraw support for CAP. Although the USAF could not dictate policy, the Air Staff recommended that “CAP should be encouraged to initiate a program within each state that will tend to influence public opinion favoring integration of membership and CAP units.” As an auxiliary of the USAF, negative publicity from CAP’s racial discrimination invariably rubbed off on that of the uniformed service. Mentorship and an indirect, soft policy hand regarding integration offered the USAF a means to begin a shift to Department of Defense policy.⁵⁵

Within days after completion of the Air Staff’s position

paper, two more media accounts brought attention to the CAP segregation issue. On May 11, the *Baltimore Afro-American* published the story of how another potential adult senior member and licensed pilot, Howard Whims, was denied admission into the Maryland Wing and instead sought assistance from the National Capital Wing to establish a squadron in Adamstown, Maryland.⁵⁶ Four days later on May 15, Louis Lautier of the National Negro Press Association publicly asked President Dwight D. Eisenhower during his news conference at the White House the following question: “Would you comment on the extent to which the Civil Air Patrol program is open to all the people without discrimination and, as an auxiliary of the Air Force, do you think it should seek recruits from all segments of the population?”⁵⁷

President Eisenhower, previously reticent on civil rights matters, offered a fascinating reply. He reminisced that his first contact with CAP went back to its beginnings when he was an operations officer at the War Department. The president spoke well of CAP, and deemed it a “splendid organization.” But going deeper into the matter at hand, Eisenhower told Lautier “I believe that we hurt ourselves when, in military organizations, we try to discriminate among Americans in recruiting them. I believe that just as a matter of efficiency is it better to use those that are capable of doing things strictly on merit and without such things as you were talking about,” in this case, discrimination.⁵⁸ The president’s comments appeared lightly in the news media, summarizing that he did not approve of segregation in CAP. The media coverage did not produce any immediate shift in CAP’s lack of anti-discrimination policies.⁵⁹

The next few weeks proved quiet regarding media coverage of reported CAP discrimination. On June 5, Brig Gen Cecil Combs, Deputy Director, Personnel Procurement and Training, wrote to Maj Gen Walter Agee, CAP’s national commander, to share the Air Staff report of May 7. Combs commented that those Air Force personnel who participated as region or wing liaison officers must comply with



New York Wing Cadets at a recruiting display in Manhattan, ca. 1959. Source: Morse Center.

the Air Force's policy that there will be "no discrimination based on race, color, religion, or national origin," and he also mentioned that "if their [liaison officer] advice or consideration is requested in connection with CAP policies, the traditional Air Force policy in this respect should be clearly stated and every influence should be exerted to see to it that these principles are followed within units of the Civil Air Patrol."⁶⁰ Subsequently, Col James W. Brown, Jr. at CAP National Headquarters, distributed the Air Staff paper to all region and wing liaison officers with orders to effect compliance of the Air Force position "to the extent possible" within their respective area of responsibility.⁶¹

Prior to Combs' letter, reporter Ethel L. Payne of the *Chicago Defender* reached out to CAP National Headquarters as a follow-up to the Lautier-Eisenhower exchange. After receiving additional details from Miller and Lt Col Joseph H. Griffith, Jr., CAP's national executive officer, about CAP in general, Payne conducted a follow-up inquiry concerning the corporation's stated policy on membership, about the reported incidents in Baltimore, and the number of African Americans in CAP. Although no answer could be provided, Miller shared the names of Cadets Charles M. Banks of Lima, Ohio and Robert M. Bradshaw of New Rochelle, New York who had both risen above peers nationwide to participate in the International Air Cadet Exchange (IACE) in Great Britain. Miller further shared contact information for the two African American squadron commanders in the National Capital Wing, Majors William H. Rhodes and Wren.⁶² Payne's questions did not result in any notable article about CAP's segregation matters but rather only an unattributed small article noting Banks and Bradshaw's participation in IACE.⁶³

After a brief lull in coverage, perhaps due to the Little Rock Crisis, the issue of discrimination reemerged in August 1958 when the *Baltimore Afro-American* published an article about how an annual ball for foreign cadets of IACE staged by CAP at Bolling Air Force Base (AFB) sent invitations to only white girls while snubbing African American female cadets.⁶⁴ The *Cleveland Call and Post* reported an investigation would be launched into the matter, but no further stories addressed the subject.⁶⁵ Instead, another CAP race-related story hit newsstands beginning in October and November 1958. Readers learned about Cadet James E. Spruill of West Philadelphia who had joined the Franklin Institute Air Squadron of the Pennsylvania Wing, becoming the first completely blind cadet in Civil Air Patrol history. Spruill had become interested in aviation after reading Arthur C. Clarke's 1957 book, *Going into Space*, albeit in braille. CAP National Headquarters had all of Spruill's CAP manuals and materials translated into braille, and his fellow squadron mates even conducted close-order drill with Spruill, having developed a method to steer himself along. Spruill partook in an orientation flight and was able to handle the aircraft with relative ease and maintain and sense level flight. His story would be featured in *Jet* magazine, the *CAP Times*, as well as other national publications. When Pennsylvania Governor George M. Leader learned about Spruill's story, he penned the cadet a personal letter congratulating him on



Maj Gen Walter R. Agee, CAP National Commander, 1956-1959. Source: Morse Center.

joining CAP and wishing him well in his future endeavors.⁶⁶

Spruill's uplifting story aside, CAP membership policies did not change in the 1950s for the inclusion of African Americans. Squadrons and several wings remained segregated, while the nation's racial tensions reflected themselves in CAP. The USAF, hamstrung by the legal relationship between itself and CAP, could do little more than encourage its liaison officers to influence the policies of the civilian volunteers as opportunities allowed.

Changes in the 1960s

Newly elected President John F. Kennedy, in contrast to his predecessor's passive approach to civil rights, took greater action to support the cause of African American equality. On March 6, 1961, Kennedy issued EO 10925 which forbid the armed forces from encouraging segregation or any forms of discrimination. The order further prohibited organizations that practiced discrimination based on race, creed, color, or national origin from using military facilities. Lt Gen William H. Blanchard, Air Force Inspector General, subsequently declared that based upon the executive order, USAF facilities would not be made available to segregated organizations.⁶⁷

Two days after publication of EO 10925, Lt Col Shirley R. King, commander of the National Capital Wing's Potomac Group, wrote to Lt Col John T. Martin in the Office of the Assistant Secretary of Defense for Manpower. King's letter brought up a civil rights issue regarding the upcoming mid-April CAP Middle East Region conference, which



Cadet James E. Spruill with fellow members of the Franklin Institute Air Squadron, Pennsylvania Wing, ca. October 1958. *Source: Morse Center.*

was slated to be held in Columbia, South Carolina. King shared a letter from Col John R. Taylor, South Carolina Wing commander to the National Capitol Wing commander, Col F. Joseph Donohue asking for assistance “in a matter which possibly might require some diplomatic handling.” Acknowledging how South Carolina remained segregated, Taylor explained the hotel for the conference venue would not allow black CAP conference attendees to stay there, nor serve them in the public dining rooms. Taylor asked that should black members of National Capital Wing choose to attend the conference that either Donohue or another officer “would advise them of the necessity of separate hotel accommodations.”⁷⁶⁸

King further explained to Martin the gravity of the matter. Recognizing CAP as an incorporated organization by Congress with a USAF general officer as national commander and a recipient of taxpayer dollars, “we feel that it is wrong and certainly bad publicity to condone segregation.” “We have felt for a long time that these meetings could be held on an Air Force Base or in some part of the region that does not have to be subjected to these unpleasant practices,” continued King. Adding further insult to injury, King wrote that the Potomac Group had selected Cadet Bruce T. Stewart to attend the conference but that now he “cannot be sent to the Conference due to his *race* as the cadet would have to stay with a cadet from the South Carolina Wing and there are no Negro cadets in the South Carolina Wing.” Speaking as a CAP officer, King concluded to Martin that “As a leader of the group I feel that it is important for me to attend this Conference but I cannot do so and keep my respect and dignity.”⁷⁶⁹

Within a day, Martin forwarded King’s correspondence to Frank D. Reeves, Special Assistant to the President. Martin agreed with King that holding the conference on a military installation, perhaps Fort Jackson, would allow black CAP cadets to participate in all activities without fear of embarrassment.⁷⁰ Reeves prepared a memorandum for the President which included King’s correspondence. The CAP situation mirrored another recent event where the Civil War Centennial Commission planned to meet in Charleston, South Carolina on April 11-12. As black attendees would be discriminated against, Kennedy wrote to the commission chairman, Maj Gen Ulysses S. Grant III, that discrimination on grounds of color or race is contrary to public policy for agencies and officers of U.S. Government-sponsored meetings.⁷¹ In Reeves’s opinion, the same action would be preferable. He included a draft memorandum to the Secretary of Defense expressing this position and asking for officials with the Department of the Air Force and CAP to take action to ensure the conference arrangements “meet this standard set forth by our Constitution and by our national conscience.”⁷²

The White House via Col Godfrey T. McHugh, Kennedy’s military aide, routed the message to Col Robert N. Ginsburgh, Assistant Executive to Air Force Chief of Staff, requesting to know what actual authority the USAF had over CAP and could be done to avoid holding meetings in controversial cities.⁷³ Two days later, McHugh reached out to Maj Gen Robert E.L. Eaton, Assistant Chief of Staff for Reserve Forces, and alerted him that a memorandum was being prepared “to slap the Air Force in the face’ for letting this happen.”⁷⁴ On March 26, CAP National Commander Brig Gen Stephen D. McElroy, became informed of the situation and received word that the Air Force Chief of Staff Gen Thomas D. White had requested a memorandum on Civil Air Patrol – Air Force relationships on March 24, as well as CAP’s policy on segregation within a day. Eaton acknowledged to McElroy that he was sure White “wants to keep CAP from being the pawn to try and solve this issue” of integration.⁷⁵

In conversations over the ensuing two days, McElroy and the Air Force worked out a potential solution. McElroy emphasized in his telephone conversations with the Air Staff how CAP “cannot in any way be segregated and Civil Air Patrol is not segregated,” but that “no one must have the opportunity to use Civil Air Patrol as an argument to settle integration or segregation.”⁷⁶ A memorandum from McHugh, however, arrived at the desk of Lt Col M.R. Walsh, Office of the Assistant Chief of Staff for Reserve Forces, stating the White House wanted the Air Force to take action about “getting away from this controversial situation.”⁷⁷

On March 28, Eaton sent White the requested memorandum. The document explained the conference situation, the USAF – CAP relationship on legal and financial grounds, and the 1957 Air Force policy position regarding CAP and segregation. Eaton found that the Secretary of the Air Force did have the legal authority to host the conference at nearby Shaw AFB where all black CAP conference attendees could be quartered on base. He added that the base commander was fully authorized and even re-



Letter from Lt Col M.R. Walsh to Brig Gen Stephen D. McElroy, April 12, 1961. Source: Morse Center.

quested by the Secretary to provide maximum accommodations and facility support to the Middle East Region conference while convened on his base.⁷⁸

Additional factors, however, muddled the use of Shaw AFB as a conference destination. The buildings to be used consisted of 1942-vintage communal open bays, deemed inadequate to house VIPs or conference meetings.⁷⁹ General of the Army Omar Bradley would be the keynote speaker at the conference and neither the USAF nor CAP wished to embarrass him. As Eaton understood the situation, the fact remained that the USAF furnished the federally chartered CAP taxpayer money, and while the uniformed service could not control CAP policy, they could work to keep the Air Force auxiliary out of the nation's newspapers.⁸⁰

The following day, South Carolina Wing commander Taylor turned down the offer to host the conference. He explained to Col David S. Harter, CAP National Executive Committee representative from the Middle East Region, that while the distance from Columbia was not vast, the wing had invited 40 to 50 very important persons, and in Taylor's words, these were "mostly politicians and if word got out that it was moved for this reason, they would not come...." Taylor thought best to cancel the conference. McElroy, in conversation with Harter, recommended the conference be postponed rather than canceled.⁸¹ Later that afternoon, Taylor, Harter, and Middle East Region commander Col Stanhope Lineberry concurred to postpone the conference.⁸² Ultimately, the 1961 conference was can-

celled. Ironically, the following year the Middle East Region Conference convened in Baltimore, a city with considerable racial problems not to mention its segregated all-white wing.⁸³

Approximately two weeks later, Walsh sent a candid letter to McElroy. Referencing President Kennedy's position on segregation within government agencies and firms with federal contracts, Walsh acknowledged new inquiries into CAP. On the issue of segregation, Walsh wrote

I was most forcibly informed by some people in quite high positions that if CAP wants to continue to receive support from the Air Force as it does now, the CAP leaders had better do some thorough soul searching and align their sights with the Air Force concerning segregation. The thinking is that it will be contrary to the President's policy for [the] Air Force to continue supporting CAP if that organization now is and continues to be segregated.

He recommended that this subject be entered on the agenda for the 1961 CAP National Board meeting at Ellington AFB from May 5-6.⁸⁴ With Walsh present as a representative of Headquarters USAF, McElroy ended his commander's report by reading a letter stating the Air Force's personnel policy of no discrimination based on race, color, religion or national origin. The letter noted the policy "must be strictly enforced in connection with the administration of any military or civilian program of the Air Force" and all Air Force personnel participating in liaison work with CAP were enjoined to comply with the policy and exert the policy on CAP matters.⁸⁵ Nothing more on the matter appears in the minutes of the board meeting.

From September 7-8, 1962, the CAP National Board met in Houston, Texas and engaged in extensive revisions to the Constitution and the Bylaws. Language concerning membership, however, did not change nor did the assem-



President John F. Kennedy visits with a group of Civil Air Patrol cadets in the Rose Garden of the White House, Washington, DC, May 7, 1962. Left to right: President Kennedy, Cadet 1st Lt Sandra K. Christiansen from Utah, unidentified (in back), Cadet James Ronald Aaron from California, Cadet Maj Marilynne Sue Van Velzor from Wyoming, Cadet 1st Lt Cheryle Eguchi from Hawaii, Cadet 2nd Lt Robert P. Alms from Illinois (behind Cadet Eguchi), Cadet Capt Burton C. Andrus III from Montana, and Cadet 1st Lt Thomas E. Bryan from Indiana. Source: John F. Kennedy Presidential Library and Museum.



President Lyndon B. Johnson signing the Civil Rights Act of 1964 in the East Room of the White House, July 2, 1964. Source: Lyndon B. Johnson Presidential Library and Museum.

bled leaders hold any discussion regarding any discrimination policy or segregation.⁸⁶ A week after that board meeting, Col William Patterson, Maryland Wing commander, admitted to reporters from the *Baltimore Afro-American* that the wing remained all white, although he reported working with the Baltimore Board of Education to establish squadrons in the city schools.⁸⁷

Two weeks following the assassination of President Kennedy in Dallas, Texas, the CAP National Executive Board met at Ellington AFB on December 6, 1963. During the conference, the chairman, Col Paul Turner, remarked that people asked him about CAP's policy concerning discrimination and he thought the policy was unchanged from December 1941. To his surprise, he learned CAP had no policy. After a brief discussion, the board unanimously passed a resolution reading:⁸⁸

WHEREAS it has been a standing personnel policy of the Air Force that there will be no discrimination based on race, color, religion or national origin

BE IT REAFFIRMED by the National Executive Committee of Civil Air Patrol that it is the continuing policy of Civil Air Patrol that there will be no discrimination in any activity of Civil Air Patrol based on race, color, religion, or national origin.

Over a decade since the Air Force became integrated and almost 15 years since the passage of EO 9981, CAP finally had a stated policy on discrimination.

Civil Rights Act of 1964

Months later and after considerable political maneuvering, President Lyndon B. Johnson signed the landmark Civil Rights Act of 1964 into law on July 2. The act outlawed discrimination based on race, color, religion, sex, or national origin nationwide, and required equal access to public places and employment. The act enforced desegregation of schools and the right to vote. Although it would not end discrimination nationwide, the law definitively opened the door to further progress on true national equal-

ity. Of considerable importance to the defense establishment and notably CAP, is a section of the act known as Title VI, "Nondiscrimination in Federally Assisted Programs." Section 601 of Title VI reads "no person in the United States shall on the ground of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."⁸⁹ As a current and long-time recipient of federal funding, CAP was accountable under Title VI.

Later in 1964, Johnson approved Department of Defense Directive 5500.11, "Non-Discrimination in Federally Assisted Programs," which would be promulgated throughout the defense establishment. This directive effectuated the provisions of Title VI. Civil Air Patrol is included among the programs listed in Appendix A to which the directive applied.⁹⁰ In mid-1965, both the General Services Administration and the Defense Supply Agency contacted CAP and informed the corporation that since it received federal property from the Defense Department for educational purposes, it must provide assurance that the corporation did and would comply with Title VI of the Civil Rights Act of 1964. On July 15, 1965, Col Turner signed forms stating CAP would comply with Title VI, including that the corporation would promptly take and continue to act to effectuate the agreement and letter of the law.⁹¹

That fall on October 20, CAP National Headquarters issued CAP Regulation 39-1, "Non-Discrimination in Federally Assisted Programs." The regulation implemented and supplemented DOD Directive 5500.11 and thereby placed CAP in compliance with Title VI.⁹² Presently, the CAP constitution of February 20, 2018 as amended, Article 7, governing membership declares:⁹³

Membership in Civil Air Patrol is a privilege and not a right. Qualifications and conditions for membership shall be established in the Bylaws and regulations. Discrimination based on age, disability, or the provisions of Title VI as well as Title VII [which references employment] of the Civil Rights Act of 1964 was and remains prohibited.

Conclusion

By late 1965, almost two decades after becoming a nonprofit corporation and nearly 15 years since the USAF integrated, CAP had an established membership antidiscrimination policy. The impetus for this policy did not come internally from the civilian volunteers, but rather from federal legislative changes with degrees of influence from the USAF. Although the Air Force had no legal influence over CAP's policies, their financial and material resources provided to CAP proved to be catalysts for the auxiliary's policy shift.

As a civilian auxiliary of the USAF, CAP's association and uniformed similarity proved troublesome in the Civil Rights actions of the 1950s and early 1960s. From a position of limited knowledge, members of the public could easily confuse CAP members as the uniformed Air Force. When issues of segregation and discrimination reared their



Maj Shawna R. Kimbrell, 555th Fighter Squadron, first female African American fighter pilot in USAF history and former member of the Parker Composite Squadron, Colorado Wing, CAP. Source: United States Air Force.

head in the media, the USAF suffered undesirable guilt by association. The CAP cadet program and search and rescue operations, however, benefited Air Force efforts and necessitated finding a working solution.

CAP's early solution to the issue of antidiscrimination empowered wing commanders to address African American membership on a case-by-case, community basis. As a civilian volunteer organization, CAP squadrons and wings directly represented local and state society and culture before mimicking the culture of the USAF. For those states where Jim Crow policies dominated racial interactions, CAP organizations toed the line of segregation and/or the "separate but equal" doctrine laid out by the United States Supreme Court during its 1896 landmark decision of *Plessy v. Ferguson*.⁹⁴

When actual change finally came to CAP, the organization had to choose to either accept federal policy or risk losing its taxpayer support. Actual viable integration of African American members in CAP units came through either the continuation of a culture of integrated operations dating back to CAP's origins, or through the actions of young cadets and adult senior members who supported and implemented integration in squadrons and wings – both of which paved the way for the diverse civilian USAF auxiliary of today. ■

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WEATHERING THE STORM: THE ARMY AIR CORPS ANSWERS THE MAIL CALL



Maj. Gen. Benjamin D. Foulois explains air routes covered during Air Corps' operation of air mail in 1934.

Kathy Wilson

There are three dates that I think historians should note as the most significant dates in the development of American air power. The first of those is December 17, 1903, when the Wrights proved flight in heavier-than-air machines was possible. The second is March 19, 1916, when the 1st Aero Squadron took off for Mexico on the first air combat mission in United States history. The third date is February 9, 1934, a day not marked by any flying feat but a three-hour conference I had with the Second Assistant Postmaster General, Harllee Branch, who had been appointed to the job only three weeks before.¹

From a vantage point decades later, Major General Benjamin D. Foulois expressed this sentiment regarding the 78 days the Army Air Corps (AAC) flew the U.S. mail. On February 9, 1934, President Franklin D. Roosevelt canceled the air mail contracts with all commercial airlines because of fraud and collusion between the industry and the Post Office. He further directed the Army Air Corps to take over until the issue could be resolved. Hampered by both internal and external forces, they flew 13,000 hours, 1.5 million miles, successfully completed over 65% of the routes, and delivered more than 700,000 pounds of mail.² Demonized by politicians, the press, and the airline industry, Army Air Corps officers and enlisted men held true to the cause and belief in the mission. Considered a failure by most at the time (and since), the air mail emergency provided the Air Corps a testing ground when none was available otherwise in the Depression-era peacetime. The nascent force gained experience that proved invaluable just a short time later.

The historiography on this subject centers on the operations of delivering the mail and the negative perception of the Army Air Corps' role. It is necessary to add the long-term ramifications of this assignment.³ This paper will examine the obstacles faced by the Air Corps during this 78-day stretch, the immediate effects of the mission, and how the experiences translated into training, action, and policies going into World War II and beyond. Why did the Air Corps take on the mission? Was the number of accidents and deaths disproportionate? Why was the Air Corps vilified for doing its job? How did it overcome the obstacles of weather, logistics, training, and funding? And, most importantly, how did these 78 days help prepare the Air Corps for its greatest challenge – World War II?

In the midst of the Great Depression, Congress passed the McNary-Watres Act in an attempt to save the failing airline industry, which, at the time, carried the U.S. mail. Two provisions of this so-called Air Mail Act are crucial to this discussion. The first changed the way airlines were paid. Instead of being paid a price per pound of mail per mile flown, they would be compensated based on the amount of space available to carry mail. This arrangement not only encouraged the airlines to buy larger planes but also allowed them to receive additional subsidies for buying the newest navigation



Gen. Henry H. "Hap" Arnold, at that time a lieutenant colonel, and commanding officer of March Field, California. He was also Commander of the Western Air Mail Zone.

and communication equipment. The second provision allowed the Postmaster General to effectively choose who would get the coveted routes.⁴

Good and bad came of this approach. The American airline industry was saved and became the envy of the world. However, commercial operators receiving their contracts as a result of the Spoils Conference of May 1930 headed by Postmaster General Walter Folger Brown became dependent on the federal government. Four holding companies received 90% of the air mail subsidies.⁵

When President Roosevelt took office in 1933, he and his administration sought to review and reign in government spending. In doing so, Senator Hugo Black began reviewing ocean mail contracts with the United States Merchant Marines. At the same time, he also heard about the Spoils Conference and the shady air mail contracts. The Black Committee hearings in the fall/winter of 1933-34 resulted in a report alleging fraud and collusion between the Post Office and select airlines. Then in early February, in coordination with the new Postmaster General, FDR canceled all domestic air mail contracts effective at midnight.

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Earlier that day, Major General Benjamin D. Foulois, Chief of the Air Corps, was summoned to the Office of the Second Assistant Postmaster General, Harllee Branch. There, he and Branch discussed several topics related to the air mail and routes. In what Foulois deemed a "casual conversation," he told Branch that the AAC could take over the mail "in about a week or ten days."⁶ Before Foulois could inform his boss and Chief of Staff of the Army, General Douglas MacArthur, President Roosevelt issued Executive Order No. 6591, announcing the Air Corps would begin delivering the mail on February 19th.⁷

So why did the Chief of the Air Corps accept this mission, especially without consulting his boss, and, more importantly, knowing the state of his own branch? Immediately after returning from the meeting, Foulois relayed to then-Major Carl A. Spaatz what he told the President, to which Spaatz replied, "How foolish can you get? We haven't got the adequate equipment."⁸ Maybe Foulois relied on his experience as a Captain in General John J. Pershing's Punitive Expedition in 1916, delivering mail from one point to another.⁹ Two other reasons are more likely. First, Foulois viewed the question as tantamount to an order from the Commander-in-Chief.¹⁰ He could not say no. Years later, General Henry "Hap" Arnold, the Western Zone Commander during the air mail emergency, opined, "I think it is doubtful if any other air leader in his place would have answered differently."¹¹ Second, and equally as plausible and vital, in the peacetime wake of the Great War and the subsequent Great Depression, military aviation suffered. Where U.S. civil aviation led the world, MacArthur estimated U.S. military aviation ranked 17th.¹² The air mail job was an opportunity for the Air Corps to get badly needed funds for equipment and training. The Post Office had \$800,000 that the AAC was desperate to get their hands on for this purpose.¹³

The AAC was woefully ill-equipped to handle their new assignment with the planes, pilot abilities, facilities, and logistics with which they began. First, the number and types of airplanes in inventory were not adequate to do the job. Of the almost 1,500 planes, one-third were training or special purpose, and most of the others were light, maneuverable ones built for combat in good weather, and most had open cockpits.¹⁴ Also, the size of the aircraft would not accommodate the same amount of mail carried by the airlines. Pursuit, observation, and attack planes could only carry an average of 100 to 500 pounds of mail versus the 1,800 – 2,000 pounds regularly carried by the airlines.¹⁵

Not only were the aircraft in the AAC inventory the wrong kind, but they were also not equipped with communication, navigational, or blind flying instruments. What modern equipment the AAC did have was in storage being saved for future airplanes, and the radios had only one-third the range as those used by commercial carriers.¹⁶ As for basic flying and navigational equipment, "only 58% had altimeters of any kind, and only a few of these were sensitive enough to accurately record the distance from the ground. Only 12 had free-air thermometers to warn of approaching ice conditions. None had directional gyro-compasses (standard in civilian air carriers) and no rate of



A pilot is about to embark in a Boeing P-12 pursuit plane from March Field, California.

climb instruments.”¹⁷ As the AAC received equipment, it was hurriedly and often improperly installed, essentially making them useless.¹⁸ Besides, why did military aviators need this equipment? Combat flying was a fair-weather activity, requiring speed and maneuverability. Major Clifford A. Tinker offered this sentiment, “If the weather is bad there is no object in sending an Army plane up...In war we must see our objective. When the Army took over flying the mail there was no time to equip planes with instruments...no time to train men for the work.”¹⁹

In addition to the lack of instruments, only a small number of pilots had any training, let alone a significant amount of night flying experience (when mail is typically carried). Even fewer had instrument flying. Out of the 262 AAC pilots assigned to the mail operation, 140 had less than two years total experience, only 31 had more than 50 hours of night flying, 2 had 50 hours of instrument time, and 214 of the 262 had less than 25 hours of weather or simulated weather time.²⁰ This lack of familiarity was not limited to night and instrument time, but total time as well. Post-World War I demobilization and the Great Depression curtailed funding for equipment and gasoline, affecting air time. At the end of the Great War, AAC budget cuts reduced flying time to 200 hours per year, but the Depression cut it even further – down to just an average of 4 hours per month. At the same time, civilian pilots flew 90 hours per month, and as Major General Norris B. Harbold said, “You don’t stay in shape for that type of flying in that way.”²¹ With no funds for flying, AAC pilots lived a life of relative ease. They generally only worked Monday-Friday, 8:00 am until 3:30 pm with a two-hour lunch, only half days on Wednesdays, and no nights, weekends, or holidays.²² When the air mail emergency hit, officers and enlisted men regularly put in 18-hour workdays.

Pilots and planes were not the only issues. Insufficient facilities and poor logistics hamstrung the AAC. The Pres-



1st. Lt. Arthur Lahman’s engine cut out as he was about to land at Newark, N.J. on April 15, 1934. Lahman was not injured, the O-38B was totaled.

idential decree prevented the Army Air Corps from using airline property because Roosevelt did not want the airlines to profit during the emergency. As such, the AAC had to negotiate with local airports that frequently had sub-par facilities – inadequate hangars, no shops, no tools, and far too few mechanics. Furthermore, no requisition forms or regulations existed to address these issues. In the Eastern Zone, with nowhere else to go, the Section IV Headquarters officers set up in the ladies’ restroom at the Richmond Air Transport Hangar.²³ Captain R.S. Heald told the story of putting in a requisition for an item needed to repair an engine and receiving the reply, “no funds for purchase of this item in this fiscal year, but that it would be taken care of next year.”²⁴ Mechanics had to work outdoors in extremely cold, often sub-zero conditions, exacerbating the problems. Some of the worst late winter weather in U.S. history only added to the human and equipment problems. Commanders regularly cautioned, and even ordered, pilots to fly only when weather conditions were favorable.

Despite these problems, the AAC officers and men stayed true to the mission. Morale remained high, and the airmen were determined to succeed. Major Byron Q. Jones (Eastern Zone Commander) quipped, “We’ll carry the mail, don’t worry about that, unless an elephant drops on us. If it does, we’ll cut it up and ship it as mail.”²⁵ High spirits and sheer willpower, though, could not prevent accidents or deaths. But, were they as alarmingly high as reported, or was it exaggerated for political reasons?

On February 16, three days before the official beginning of the air mail operation, three pilots were killed in two crashes while on training flights. On February 22, another pilot perished, this one carrying mail. All told, six people died in the first week of operation. Four more died on March 9, bringing the total to 10 in just three weeks. As pilots gained experience and better equipment, accidents (and deaths) dropped dramatically. Only two pilots died in the last two months of the operation. During these 78 days, the AAC had 66 accidents, with 12 fatalities.²⁶

Newspapers sympathized with the commercial airlines, whose officers and spokesmen included World War I ace, Eddie Rickenbacker, and famed airman Charles Lind-



Although it was not used regularly, even the Curtiss B-2 Condors were pressed into service.

bergh. On February 23rd, newspapers crucified the Roosevelt Administration, the AAC, and General Foulois, condemning the “air mail murders” and the “needless slaughter of brave airmen.”²⁷ Ironically, on the same day, a United Airlines flight crashed near Salt Lake City, Utah, killing all eight aboard, yet most newspapers ignored this fact.²⁸ A chorus of criticisms erupted. Eddie Rickenbacker referred to the crashes as “legalized murder.”²⁹ Even pioneer Billy Mitchell chimed in, saying, “The Army has lost the art of flying...It can’t fly. If any Army aviator can’t fly a mail route in any sort of weather, what would we do in a war?”³⁰ Speaker of the House, Henry T. Rainey, piled on, saying, “If we are unfortunate enough to be drawn into another war, the Air Corps won’t amount to very much. If it’s not equal to carrying the mails, I would like to know how it would do carrying bombs.”³¹

Air mail stories dominated the papers. They were ruthless and never-ending in their criticism. Major national newspapers ran a story on the air mail operation half of the days in February and March and on the front page 30% of those days.³² Some headlines were as ridiculous as, “Young Army pilot lands with only a pint of gasoline left in his tanks!” and “Inexperienced Army pilot an hour late departing with mail!”³³

Were these attacks justified, or was it bitterness on the part of the airlines and politicians? How did they compare to other periods or the airlines? Let’s begin with a look at the numbers:³⁴

	AAC Deaths	Airline Deaths
1932	50	41
1933	46	31
1934	54*	32
1935	47	43

* 12 of these were during the 78 days the AAC flew the air mail

As you can see from the chart, AAC deaths in 1934 were higher than the year before or after as well as the airlines,



Arnold pushed to counter bad press and garner favorable publicity for the air mail operation, including the use of girls, some in swim suits, and even a dog.

but it’s not as simple as that. They need to be looked at with a few things in mind. Commercial airlines had larger, safer aircraft equipped with the latest technology. They also operated over “fixed routes, established airways dotted with emergency landing fields at frequent intervals, guided by lights and marked airways, and kept informed of weather conditions by radio.”³⁵ Conversely, the Army Air Corps flew with smaller, antiquated planes, almost no communication or navigation instruments, over unfamiliar territory, and with inexperienced pilots. General MacArthur noted that the “payload was so small [at times] it took six planes to carry a shipment of mail it took the airlines one plane [thereby] causing six times the risk.”³⁶ If all historians did was look at the numbers, taking into consideration the other factors previously mentioned, one could argue that the Army Air Corps Mail Operation (AACMO) was not as disastrous as formerly argued. But there was more to the story.

Beyond stepping up to the plate in a time of crisis, the AAC gained valuable experience that prepared them for what lay ahead – World War II. The attention garnered as a result of newspaper articles and headlines, meant to harm the President and his Administration, benefitted the Army Air Corps in the end. The air mail emergency “fo-



The volume of crashes like this meant a further examination of the overall experience.

cused public attention on the inadequacies of...training and equipment [that Foulois blamed on the] lack of Congressional interest and funds.”³⁷

Secretary of War George Dern commissioned the Baker Board to address the air mail operation and overall fitness of the Air Corps. Although the outcome of the report was a foregone conclusion, several recommendations followed, covering organization, equipment, and training. Some were implemented immediately while others took years to fully mature.

First, the Baker Board affirmed the earlier Drum Board’s recommendation to establish the General Headquarters Air Force (GHQ AF), compromising between total control by the Army and complete independence for the air forces. The Air Corps, while still part of the Army, would have its own budget. Functional control would be split between the Chief of the Air Corps (COAC) and the new GHQ AF. Although the COAC retained authority over supply, procurement, and doctrinal development, GHQ AF held responsibility for training and operations. This division of authority allowed for a measure of mobility to be introduced to the air arm, saying that “aircraft have now passed beyond their former position as useful auxiliaries, and must in the future be considered and utilized as an important means of exerting directly the will of the Commander in Chief.”³⁸

Lieutenant General Joseph Smith, a pilot in the Central and Western Zones, said that “this setup was the best thing for the Air Force. It was similar to Pearl Harbor which was a disaster, but in a way we got rid of the ‘battle-ships’ and old things, archaic things, particularly in the military service where they last forever and forever...like a cavalry saber...it’s tough to discard old things, especially airplanes.”³⁹ The public scrutiny and Baker Board highlighted the need for more and better equipment, including new generations of fighters and bombers with closed cockpits, radios, and navigation aids as well as trainers. Key among these were the Link Trainers designed to teach pilots how to fly by instruments in a safe environment. On March 7, 1934, Edwin Link, inventor/creator of the machine, successfully demonstrated its usefulness to Brigadier General Oscar Westover, the man General Foulois had put in charge of the air mail operation. Immediately afterward, the Army ordered ten for delivery in June. “This was the first, and the least, of the beneficial accomplishments of AACMO which would ultimately serve to change the character of the Air Corps.”⁴⁰ Royal Air Force (RAF) Chief of Staff, Air Marshall Robert Leckie, took it one step further, claiming that “the Luftwaffe met its Waterloo on all the training fields of the free world where there was a battery of Link Trainers.”⁴¹

Tying equipment to practicality was Captain Alfred Hegenberger, whose blind instrument landing system was a significant step forward for all-weather flying. This equipment was adopted by and became standard in the Air Corps and civilian airline industry only a few years later. In addition to Link Trainers and the Hegenberger System, the Air Corps realized the necessity for improved and more reliable radio communications. In 1938, under the guid-



Former Secretary of War Newton D. Baker, chair of the “Baker Board.”
(Photo by George Grantham Bain, from the Bain Collection at the Library of Congress.)

ance of the War Department, the Air Corps established the “Army Airways Communication System [consisting of] a network of control towers, navigation beacons, and radio stations at 33 sites [across America] ultimately evolving into the worldwide Air Force Communication Command.”⁴²

The Baker Board also mandated additional instrument, night, and total flying time for all pilots. Instrument time increased from between 5 and 10 hours per year to between 10 and 30; night flying increased from 15-20 hours to 25-42 hours per year; and total flying time increased from less than 100 hours to 300 hours per year.⁴³ “The pre-mail fair-weather pilot commenced to disappear. In his place emerged a new breed of military pilot who was fully competent to operate the most advanced type of aircraft at any time, anywhere, in almost any kind of weather.”⁴⁴

In addition to these immediate and most apparent benefits the Air Corps derived from the air mail emergency operation others took years to surface because they were not patently obvious. Those involved developed leadership qualities that served the U.S. in a more significant way. “The men who had lived the air mail story were the ones who later whipped the Air Corps into shape and led it to victory in World War II.”⁴⁵ Lt. Gen. Smith quipped, “I learned a lot about maintenance and supply and conducting operations at that time...it kept me in good stead when I initiated the Berlin Airlift.”⁴⁶

In the end, the Air Corps took on a mission it was not equipped for – not the people, the training, nor the equipment. Add to that one of the worst winters on record. What they did have were courage and pride. Yes, 12 men lost their lives in 66 accidents, but “the number of accidents was not at all disproportionate for the duty [they] performed.”⁴⁷ Important to consider, however, were the types of aircraft the Air Corps flew versus what the commercial carriers had along with their familiarity with the job. Dur-

ing the early days of the operation, humorist Will Rogers wrote, "I trust an airline, for I know that the pilot has flown that course hundreds of times. Neither could the airline pilot do the Army flier's close formation work."⁴⁸

How do militaries change and adapt in peacetime? In three ways – Experiments, Experience, and/or Education. Despite the accidents, deaths and criticism that followed, the AAC forged ahead. At General Foulois' 85th birthday

celebration, Generals Ira C. Eaker, Carl Spaatz, and Foulois all agreed that "the Army air mail experience, despite its tragedy, was one of the most fortuitous events in the history and development of United States air power [and that] the deficiencies in organization, training, and equipment glaringly revealed by [this operation] were undoubtedly significant, perhaps decisive, in preparing for the world war which was but 7 years away."⁴⁹ ■

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Effect of Jet Engine Development on U.S. Airpower in the Korean War



An F-51 Mustang fighter aircraft releases two external fuel tanks. One is seen nearly vertical behind and below, the second one released has just separated from the aircraft. August 1951. A conflicting caption says that these were napalm bombs being dropped. (USAF via NARA.)

Sean Geither

The advent of the jet engine in the mid-1900s is an event of obvious historical importance, particularly for the air-minded forces of the world engaged in conflict at the time of its adaptation. Such was the case for the United States military, which was engaged in conflict on the Korean peninsula just a few short years after the first successful flight of a jet-powered aircraft. Due to the relative forgotten nature of the Korean War, many of the lessons it affords are not commonly espoused or even communicated. However, its status of hosting the first major air war to feature jet aircraft gives it special importance for the study of allocation of air assets and the associated change in doctrine. The transition from propeller-driven to jet-powered aircraft was not a seamless one. In fact, the early use of jets during the Korean War was met with criticisms, both fair and unfair, as propeller-driven aircraft continued to maintain a foothold for an early portion of the war. Despite these challenges of the new technology, the revolution in propulsion did lead to important changes in doctrine during the conflict and for the future of American airpower. The United States military's transition from propeller-driven to jet-powered aircraft during the Korean War elevated the effectiveness of close air support compared to other airpower missions, diminished the role of light and medium bombers in favor of jet-powered fighter-bomber aircraft, and demonstrated the Air Force's inability to maintain a monopoly on American airpower.

One important way the jet engine revolution affected U.S. deployment of airpower is through the mission sets employed. Specifically, the close air support, or CAS, mission set gained a new level of effectiveness during the Korean War, in large part due to the adaptability and robustness of the jet aircraft entering the conflict. Ironically however, jet aircraft were initially ill suited for the task thanks to their short range with the F-80, the first operational jet fighter used by the USAF, having a range of just 225 miles.¹ If the tip tanks of the Shooting Star were replaced with 1,000 pound bombs, which had obvious benefits for CAS, the range dropped to only 100 miles. This early setback led to some USAF squadrons trading in their F-80s for older, yet proven, F-51s to carry out the desperately needed CAS on behalf of Army and Marine ground units against the communist combatants. This advantage enjoyed by propeller-driven aircraft was not maintained for long, however. Naturally, the North Korean Army increased its use of anti-aircraft artillery, or AAA, as the war progressed. Additionally, as the United States gained air superiority over the battlefield, the amount of targets the communists could target increased. Particularly deadly were the 37mm autocannons which could hit targets from 4,500 feet out.² This increased AAA use made the deployment of CAS especially dangerous as planes were required to fly at low al-

Editor's Note: This article started out as a student paper by now-2d Lt Sean Geither. It won our Foundation's annual award for the best student paper last year.



Four U.S. Air Force Lockheed F-80C *Shooting Star* fighters of the 36th Fighter Bomber Squadron, 8th Fighter Bomber Wing, return from a mission during the Korean War in August 1952. F-80C-10-LO s/n 49-817 was shot down by ground fire January 3, 1953. (USAF)

titudes to drop their weapons. To maximize their chances of surviving, CAS pilots had to make passes at 450 mph while quickly pulling up to 2,000 feet.³ Such maneuvers were only possible with jet aircraft which possessed the necessary speed and energy to make the agile passes to avoid enemy AAA and small arms fire. Thus as the enemy came to rely on AAA more and more, and as the range of jet aircraft improved, the early advantage that propeller aircraft had enjoyed in CAS disappeared.

In fact, the F-51s quickly racked up losses thanks to their slow speed and more vulnerable liquid-cooled engines. In total, 172 F-51s were lost to ground fire, nearly half of the Mustang's total losses during the war. Only 113 F-80s and 122 F-84s were lost due to ground fire in comparison.⁴ The Mustangs were finally removed when the F-86F, a variant of the final iteration of U.S. jet fighters in the Korean War, entered service in early 1953.

The rise in CAS employment during the Korean War is not just a matter of speculation. General Weyland argued that the use of CAS in the last two years of Korea far overshadowed that in Germany during WWII—30 percent ver-

sus 10 percent of all sorties.⁵ Naturally, however, the dramatic increase in CAS missions was not due to the involvement of jet aircraft alone. Rather, jet aircraft are what allowed the increased need for CAS to be supported and sustained. While the establishment of air superiority, more readily available in Korea than over Germany, gave U.S. airpower the ability to maintain close support, jet aircraft are what enabled the rapidity and consistency of the strikes themselves. Lacking adequate supporting artillery in the early parts of the war, airpower had to make up for the deficient firepower being supplied on the ground.⁶ One reason CAS heavily benefited from jet aircraft is due to the timeliness it demanded. The much higher thrust afforded by jet aircraft meant that more firepower could be delivered quicker. Consider the F-84, a CAS instrument of choice used by the USAF during the Korean War, with the potential to carry combinations of conventional armament weighing 4,000 pounds.⁷ Compare this to an F-51 Mustang which was capable of carrying approximately 2,000 pounds of payload.⁸ This nearly doubling of firepower capacity, which could be delivered quicker at 622 mph versus 437 mph, had a profound effect on the warfighter on the ground as they watched hundreds of retreating enemies disintegrate from napalm drop tanks on multiple occasions. The positive effect CAS had on ground forces meant that more was always demanded such as when 286 and 361 sorties were flown on September 18 and 19, 1950. Jet aircraft allowed the demand to be met.⁹

As alluded to in the introduction, the introduction of jet engines had an effect on the type of aircraft that were subsequently developed and deployed in times of war. The Korean War, closely following this development, is a prime example where the type of aircraft being used dramatically changed. Specifically, the light and medium bomber role, used most extensively during WWII in the form of two-engine bombers such as the B-26 *Invader* and B-25 *Mitchell*, saw a sharp decline in their effectiveness in Korea which led to changes in post-war employment. To be clear, light and medium bombers such as the B-26 and B-29, which was reclassified from "heavy" to "medium" in 1950, were used extensively during the Korean War, but the way in which they were used highlighted their increasing vulnerabilities and decreasing effectiveness.¹⁰ Owing to their relatively slow speeds, these bombers were not able to perform the overt daylight bombing they were accustomed to in WWII. Given that the U.S. did not have a monopoly on jet engine technology, it is unsurprising that the enemy's use of MiG-15s, a jet-powered fighter similar to the U.S.'s own F-86, was what ultimately exposed the limitations of these light and medium prop-bombers. Even the heavily armed B-29 was no match for the highly maneuverable and quick MiG-15. Ironically, the lack of range alluded to previously of the U.S.'s early jet aircraft, which served as escorts for the B-29s, was yet another problem that precluded these bombers from carrying out daytime raids. Because of these deficiencies in survivability, Bomber Command shifted the bombers from daylight to nighttime raids which used short-range navigation, or "shoran", in combination with a vast array of radio transmitters dis-

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A U.S. Air Force Lockheed F-80C Shooting Star drops napalm bombs in Korea, May 1952. Note what appears to be a tracer below the plane. (USAF)

persed along the ground.¹¹ This limitation of nighttime only raids caused frustrations such as when B-29s were unable to be used against the Suiho generator complex in June, 1952 due to their unsuitability for nighttime attack, leaving the mission for Navy and Air Force fighter-bombers.¹² Thus while light and medium bombers continued to be used in the Korean War, they operated under very specific constraints which relied on both the cover of darkness and a ground-based navigation network to achieve their results. It is not difficult to see why their limited operating conditions caused a subsequent disappearance from post-war U.S. military use.

Naturally, the limitations of light and medium bombers during the Korean War listed above seem more a damnation of their use of radial, propeller-based engines rather than the role of the light or medium bomber itself. One might assume then that a jet-powered light or medium bomber might have a viable role in the U.S. arsenal. The problem with these assumptions are that they fail to realize that the light and medium bomber roles are tied to propeller-driven aircraft themselves. This is because of the comparatively lower power output of these older engine types as compared to jet engines. A propeller-driven aircraft may need two engines, making it larger and heavier in the process, to carry a similar armament that a jet-powered fighter-bomber can carry with one engine. Thus the jet fighter-bomber can have a similar armament while weighing less, increasing its survivability against the enemy's use of jet aircraft. Such was the case in the Korean War with the USAF's use of the F-84 and F-80 as fighter-bombers. Variants of these aircraft, such as the F-84G which had aerial refueling and nuclear bomb delivery capabilities, further cemented the role of the fighter-bomber

as a replacement for the light and medium bombers.¹³ The arrival of the F-86 only furthered the gap between jet-powered fighter-bombers and the earlier light and medium bombers. As noted by 2d Lt Bob Rawlings, an F-86F pilot during the war, "The F-86F proved to be an effective fighter-bomber with the ability to get into and away from a target with much more speed than the F-80. The F-86F became a real workhorse for air-to-ground work."¹⁴ These lighter, more agile fighter-bombers could carry out the ground mission while tangling with MiGs over the skies of Korea, something the light and medium bombers, carrying a similar bomb payload, could not do. The advent of jet-engine technology meant that there was little advantage of light and medium bombers when fighter-bombers could perform a similar mission with less constraints. Thus these bomber types fell by the wayside as the engine technology matured during and after the Korean War.

Perhaps the last major result of the U.S.'s transition from propeller-driven to jet-powered aircraft was its effects on how airpower efforts were consolidated within the U.S. military itself. The early limitations of jet-powered aircraft were obvious, especially in terms of the range afforded by the fuel-hungry turbojets. An unintended consequence of this limitation was the effect it had on the airpower dynamic between the U.S.'s Air Force, Navy, and Marine Corps. Early on in the war, carrier operations had the advantage over their land-based counterparts of the Air Force. These carriers could be placed around the Korean peninsula and made for much shorter flights compared to the USAF assets which had to operate from further away. As mentioned previously, the Air Force initially resorted to using older F-51s which afforded greater range for the critical mission of close air support. Even still, these aircraft were forced to operate out of the Taegu airfield in Southeast Korea which was much further from the fight than the carriers could be placed. Additionally, this airfield, initially made of dirt and gravel which was susceptible of turning to mud in the rain, posed a limit to the operations that could be carried out by the land-based fighters. All of the U.S.'s tactical airfields, including Taegu, were overrun



Four U.S. Air Force North American F-86E Sabre fighters of the 51st Fighter Interceptor Wing over Korea on May 22, 1953. (USAF)



1st Lt John Geither (the author's grandfather) poses with his F-84G as part of the 8th Fighter Bomber Squadron at Taegu Air Base, Korea. The F-84 proved to be a competent fighter-bomber used for close air support and interdiction during the Korean War. (Photo courtesy of the author.)

at some point during the war, further limiting their use compared to carriers.¹⁵ Further still, early on in the war, there were no airfields in the country which could handle jet aircraft, meaning that the Air Force's F-80s had to travel from Japan. Once the aircraft did arrive to the battlefield for their assigned mission, they had less time on station than their Navy and Marine counterparts. The F-80s in particular had mere minutes to provide support due to their 225 mile combat radius and could not carry 1,000 pound bombs lest they made a one-way trip.¹⁶ The Navy and Marine Corps did not suffer from these issues to the extent the Air Force did.

The relative balance of airpower as a result of jet-engine aircraft was further swayed in favor of the Navy and Marine Corps when it came to the implementation of CAS. As previously mentioned, the Air Force had difficulty early on in the Korean War in getting its aircraft to the frontlines for support with enough fuel to remain on station for more than a few minutes. This created issues when Air Force as-

sets were given targeting priority due to their limited time. The Navy and USMC aircraft, carrying heavier loads of bombs, napalm, and rockets than their Air Force counterparts, were often forced to jettison their armament after orbiting for hours waiting for a target.¹⁷ Further frustrations came as the Army demanded ever more CAS which contrasted with the Air Force's greater emphasis on interdiction instead.¹⁸ Ironically, the Air Force's quicker adoption of jet-engine technology is what initially gave the sea-based airpower components greater leverage. This was in part due to the infantile nature of the early jets, which suffered from shorter ranges, but also due to the inferior support structures of ground-based airpower, such as the primitive runways near enemy territory. These deficiencies were ironed out as jet aircraft gained sophistication and reliability, especially in terms of increased range, but the damage had been done on the USAF's ability to consolidate a majority share of airpower relevance.

The transition to jet-powered aircraft during the Korean War was not seamless for the U.S. military. However, it did represent an important shift in the way airpower was utilized by the countries' services. Despite early technological constraints pertaining to jets, they elevated the effectiveness of the close air support mission due to their increased payload capabilities and survivability, especially as compared to more vulnerable propeller-driven aircraft. Another effect of the transition was the doubt it cast on the relevance of the light and medium bomber roles. These aircraft were gradually relegated to constrained operations as the more versatile fighter-bomber jets began to carry out missions with similar payloads and with less risk of being jumped by enemy fighters. Finally, owing to many of the early problems faced by jet technology, the Air Force was unable to dominate air operations in Korea as the Navy and Marine Corps were able to operate closer to the frontlines in a more reliable manner. Though it had its problems, the advent of jet engine technology and its use in a major air war provided the U.S. with both valuable lessons on airpower doctrine and debate on the role of each service. ■

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The National Museum of the United States Air Force: The World's Largest and Oldest Military Aviation Museum



All photos on pages 71 and 72 courtesy of the National Museum of the United States Air Force.

Everyone who has ever been part of the Air Force family should, at some point in their lives, take a trip to Dayton, Ohio. There, located adjacent to Wright-Patterson AFB in a complex of hangar-like buildings, is housed the single largest and most complete collection of U.S. Air Force aircraft and artifacts in the world. More than 75,000 small items, including flight suits, G-suits, and space suits; trophies and memorabilia; technical equipment and more than 300 aircraft and missiles are displayed and stored throughout the open Quonset hut-shaped hangars. It is a treasure trove of Air Force history—heaven for those seeking to understand the evolution of American military airpower.

Since 1918, artifacts related to Army aviation have been collected and displayed in a variety of locations. The original museum opened at McCook Field, near Dayton, Ohio, in the spring of 1923 and its name has changed four times since. The most recent change occurred in 2004 when it was redesignated as the National Museum of the United States Air Force.

On display at the museum are balloons and aircraft made of wire, wood, and fabric dating from the early 1900s. Nearby are displayed many of today's most modern aircraft, molded of composite materials formed to reflect radar energy—some piloted, some not. Creative displays invite visitors to imagine the challenges faced by pilots and support troops throughout Air Force history.

For example, a whimsical, yet familiar, life-exhibit of an early military training aircraft transports anyone who has ever flown or maintained training aircraft back to a moment immediately following a minor “ground looping” accident. A mannequin represents the angry instructor pilot; the dejected student, the irritated maintenance chief, and the dumbfounded apprentice all attest to the consequences arising from the crash of the nosed-over propeller-driven plane. For every piece of hardware in the museum there are personal stories related to its creation, construction, and utilization. Diorama displays help to expose the personality of the artifact instead of simply glorifying the technology itself. Of course, this type of display cannot be created for each airplane and missile in the museum's inventory. There is still ample opportunity to wander through acres and acres of some of the most rare and iconic aircraft ever flown by America's air arm.

Editor's Note: The Air Force Historical Foundation's charter linked its programing to the original "Technical Museum." The Foundation has supported AF Museum programs through articles in the *Journal* and its other publications. Reprinted here are two such pieces, one from 1955 and another from 2006. The third is a look at new exhibit soon to open at the NMUSAF in Dayton. Names of Journals have changed, names of museums have changed, but the object has always been to **Know the Past...Shape the Future.**

The museum, the world's largest and oldest military aviation museum, today is charged with portraying the heritage and traditions of the Air Force through specialized exhibits. But the NMUSAF is far more than just one museum in Dayton. As a large part of the Office of Air Force History, the staff provides technical and professional guidance to the U.S. Air Force Heritage Program. This extensive includes 12

field museums and 260 domestic and international heritage sites. In addition, the staff is required to maintain accountability for more than 6,000 historical artifacts and aircraft and spacecraft on loan to 450 civilian museums, cities, municipalities, and veterans' organizations throughout the world. It is a daunting task, but the reward for those who make the journey will be enjoyed for a lifetime.■



Restoration work on the *Memphis Belle*.



B-29 *BOCKSCAR* on display at the Museum.

THE AIR FORCE MUSEUM

by

Mark C. Sloan, Director

Much of the story of over a half century of American aeronautical development as well as many foreign developments which have contributed to the growth of American Military aviation are depicted in the Air Force Museum, Wright-Patterson Air Force Base, Ohio. Here the story is told through one of the largest individual collections of aeronautical equipment which has been assembled. This collection did not appear over night, but represents years of concentrated effort on the part of many persons to preserve the foundations upon which the Air Force, as we know it today, has been built.



Mr. Mark C. Sloan

In order to acquaint you, the members of the Air Force Historical Foundation, with the Air Force Museum, let us review some of its history. As early as 1923 it was realized that the actual physical item could provide more authentic firsthand information to the American aeronautical engineer than written reports. Therefore, the Army Aeronautical Museum was activated at McCook Field, Dayton, Ohio, to provide for the care of the captured enemy equipment of the World War I era.

In the years that followed many changes occurred. A new airfield, constructed near Dayton, Ohio, and known as Wright Field has superseded old McCook Field. Also the Museum collections, consisting of both foreign and domestic items, had increased tremendously. Thus an area approximately 8100 square feet was set aside in the Engineering Building at Wright Field for the Museum function.

In a very short time the Museum outgrew this space and authorization was received to proceed with the construction of a separate Museum Building at Wright Field. Its doors were opened to the public in February 1936, but with the advent of another World War the doors were closed in 1940 and the Museum remained on an inactive status until 1945. World War II with its many aeronautical achievements renewed interest in the Museum program, and so in 1948 Building 89 at Wright-Patterson Air Force Base was turned over to the Museum for its collections.

The Air Force Museum occupies this same building today; however, many alterations have been made in an effort to convert it from an engine overhaul facility to a Museum. This rehabilitation program has paved the way for the construction of exhibit areas. In fact, many exhibits have been completed and others are still in the planning and construction stage. The Museum is open for conducted tours as well as for casual visitors. Already many organized groups of Boy and Girl Scouts, college educators, Air Cadets, Civil Air Patrol and ROTC units from all corners of the United States and many foreign visitors from all over the world have visited the Museum.

Here the visitor finds exhibited aircraft, engines of all types, portraits of pioneers in the field of aviation, propellers, windtunnels, gliders, captured enemy oil and water color paintings, and even a B-61 "Matador" missile.

Several items which seem to be of extreme interest to visitors are: the XH-20 "Little Henry" — the first helicopter to be powered by ram jets, a prototype of one of the Air Force's research aircraft — the X-3, and a deceleration sled used by Lt. Col. John Stapp in his early experiments in the study of human reactions to suddenly applied decelerations.

Another item of prime interest is "Stumpy John Silver," a carrier pigeon, who because of his heroic deed has been preserved by taxidermy. John Silver was born in a dug-out just behind the front lines in France in January 1918, and received his training in action before he was many months old. During the Meuse-Argonne drive in October 1918, John Silver was called upon to deliver an important message to Allied Headquarters during heavy German firing. He arrived at Allied Headquarters, although he had been critically wounded in flight. A bullet had pierced his breast, bits of shrapnel had ripped his body and his right leg was missing, but the message tube, intact, was dangling to the stump of his leg.



The exhibition of historical items is only one phase of the Museum mission. As set forth in Air Force Regulation 210-4, the Museum is responsible for providing a suitable repository and curatorial and other services and facilities which are needed to receive, record, exhibit and dispose of historical material. At present, the Museum has custody over nearly 20,000 end items. Many of these are on long term loan to educational institutions and other Air Force installations, while others are on loan for special exhibits, events and celebrations on a short term basis. Currently there are approximately 1500 items on long and short term loans scattered throughout the United States.

An important function of the Museum, is the maintenance of a library in which literary and documentary material can be preserved which illustrates the technological advancement in the aeronautical field. The Library's holdings consist of Air Force technical reports, Air Service Information Circulars, magazines, photographs, one of the most complete sets of technical orders — some of which date back to 1917, and personal data and material associated with persons and events important in the Air Force history. Besides furnishing historical reference service to other organizations of the Air Force, government agencies, and private industry, the Library is extremely useful to the Museum staff in the identification and evaluation of Museum items.

Other phases of the Air Force Museums operation include the preparation of historical data which authenticates the development of aeronautical equipment physically exhibited in the Museum, and provides displays for educational institutions, museums, and specific Air Force exhibits.

To accomplish the latter the Museum has its own shops where a small group of artists, designers, wood workers, and model makers are engaged in this work as well as restoring ancient aircraft and constructing dioramas and scale models of aircraft. At the present time a project is under way to furnish the newly established Air Force Academy with 42 scale model aircraft, each to be placed in a separate diorama which will depict the growth of the Air Force.



Aircraft Display Showing the Prototype of the Douglas X-3, the XB-61, "Matador" Guided Missile and Suspended From the Ceiling the DM-1 Lippisch Glider.

The Air Force Museum may accept from individuals or organizations loans of historical or artistic interest. Also the Museum is responsible for the supervision of the establishment and operation of museums at other Air Force installations. The Museum has taken steps to carry out this function by assisting in the establishment of museums at Air Force Training Bases at Lackland, Samson, Parks, and Kelly.

Mr. Mark C. Sloan, Director of the Air Force Museum, his assistant, Laurence B. Jarnagin, and the Museum staff, are constantly on the watch for historical material to fill the gaps in the Museum's history of flight. In fact it has become almost an endless task due to the many scientific and technological developments of the Air Force.

As members of the Air Force Historical Foundation dedicated to preserving and perpetuating the annals of American air power, you too can assist in this task. Who knows, maybe that one piece of equipment, paper or photograph in your attic, laboratory or office will fill a gap in the Museum's story of aviation.

That Others May Live New Search and Rescue in Southeast Asia Exhibit

The U.S. Air Force drove the evolution of Search and Rescue (SAR) tactics, techniques, and equipment during the Southeast Asia War. These changes set the foundation for today's national and international rescue capabilities.

In honor of the rescue community's service, the National Museum of the U.S. Air Force will keep their story alive with roughly 6,000 square feet of exhibit space dedicated to sharing their story to the public.

Rooted in harsh experiences and lessons learned during the war in Southeast Asia, the ability to quickly control the airspace above and below a downed aircrew, while protecting them from enemy threats, contributed to the overall success of rescue missions.

SAR units developed innovations such as heavy-lift helicopters, rescue escorts, airborne command and control, helicopter aerial refueling, and close integration of intelligence assets.

The exhibit consists of seven exhibit cases, three mannequins, four busts, and more than 90 objects. Together the displays highlight the accomplishments of the Aerospace

Rescue and Recovery Service, the A-1 Skyraider "Sandy" and "Prairie Fire" missions, along with the *Raven* Forward Air Controllers and the Hmong people who helped those needing rescued during the "Secret War" in Laos, just to name a few.

Through this exhibit, visitors will follow the progression of SAR development from the earliest days in Southeast Asia up until the official U.S. withdrawal in 1973. Intertwined in the storyline are the Cessna O-1G Bird Dog, Sikorsky CH-3E *Black Mariah* and HH-3E Jolly Green Giant, the Kaman HH-43B Huskie, and the newly restored A-1H Skyraider representing *The Proud American*.

During the Southeast Asia War, SAR personnel had a significant positive impact on the morale and preservation of U.S. forces. They saved approximately 4,000 people, including around 2,800 in combat situations. The dedication shown by the SAR units exemplified their motto: *That Others May Live*.

Today, combat search and rescue (CSAR) is the USAF's preferred method to recover downed aircrew. Using the most advanced aircraft technology and constantly evolving tactics, techniques, and procedures, our CSAR forces and Airmen are organized, trained, and equipped to support our larger national commitment to the recovery of American and allied personnel in hostile environments worldwide. ■

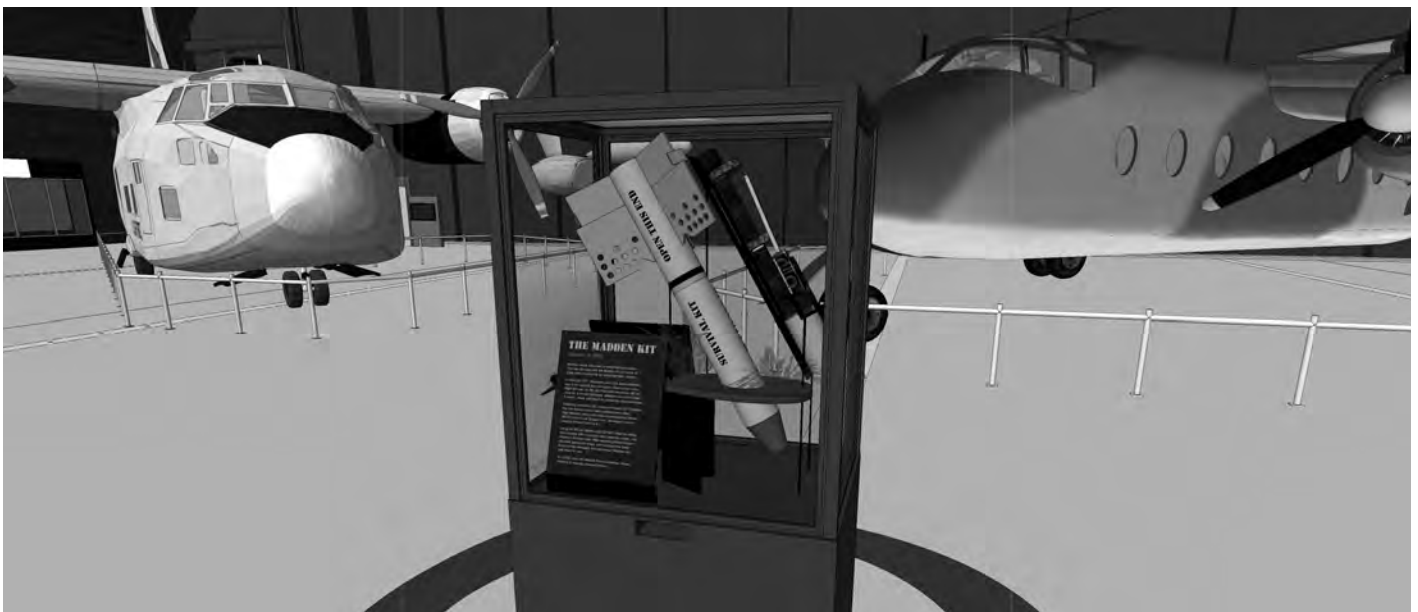
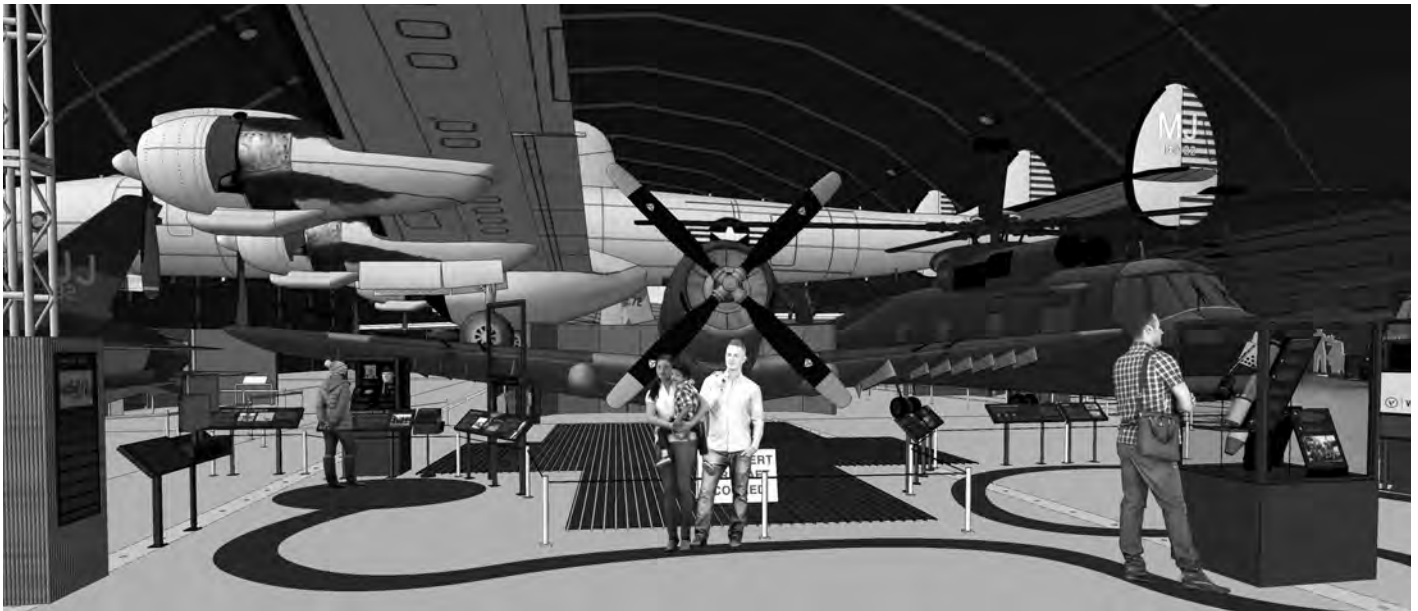


(Above) A rendering of the entrance to the Search and Rescue exhibit, which will open to the public on June 3, 2023, at the National Museum of the U.S. Air Force.

(Opposite page top) Visitors will follow a thematic path as they explore the development of Search and Rescue in Southeast Asia.

(Opposite page middle) Various displays highlight the accomplishments of those who served in Southeast Asia to support and rescue downed aircrew.

(Opposite page bottom) A reproduction Madden Kit, developed by A-1 Skyraider pilot Captain James Madden and an NCO from his Life Support unit, was intended to deliver crucial supplies to downed aircrew until rescue units recovered them.



Flying the C-130 Hercules in Vietnam

by David K. Vaughn



U.S. Marine equipment is loaded aboard an Air Force C-130 at Don Muang Air Base, Thailand, during the withdrawal of Marines from Thailand, July 1962.

Wing Cmdr. Udomsuk Mahavasu (l), of the Royal Thailand Air Force, learns about the C-130 overhead instrument panel from Lockheed pilot instructor Bob Hill. Looking on is Capt. Surawit Khemananta. (Lockheed-Georgia photo)



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I was impressed with the C-130 from the first time I saw it. There was something about its appearance and deportment that conveyed a sense of strength, self-confidence, and grace. This impression was most evident as it taxied on an airfield: at taxi speed it moved with dignity and ease, and the growl of its four Allison T56 turboprop engines suggested an unlimited reservoir of power. When it finally was my fortune to fly the C-130, I found it to be a reliable, safe, tough, forgiving aircraft, and a great pleasure to fly. But it was while flying the C-130 in Southeast Asia as co-pilot, aircraft commander, and instructor pilot that I fully discovered its and my own capabilities and achieved that exhilarating sense of oneness with an aircraft in a high-performance environment.

I always had wanted to fly the C-130 and intended to be assigned to a C-130 unit after graduating from pilot training. But I failed to anticipate the higher designs of Air Force planners and found myself, late in the summer of 1963, channeled into SAC's KC-97s. Two years later, the KC-97s were finally phased out of the Air Force inventory, and once again the Air Force channeled me into another flying assignment, but this time one I would have chosen myself — C-130s, at Dyess AFB, Texas.

I learned many lessons flying the Boeing KC-97, but the most important insight was to appreciate how much easier the C-130 was to fly. In contrast to the KC-97, which flew like a truck, the C-130 handled like a Cadillac with power steering — an effect achieved by its hydraulically-assisted flight controls. Instead of feeling as if you were flying a house while sitting on its front porch — which was my impression the first time I was airborne in the spherical, many-windowed front end of the KC-97, the pilot of the C-130 had the sense of efficiency of design, outwardly for aerodynamic stability and inwardly for crew comfort. In contrast to the KC-97, which could accommodate only coffee and water jugs and box lunches, the C-130E featured an oven and upper and lower crew bunks at the rear end of the crew deck. The pilot's and co-pilot's seats were comfortable, and, when tilted to the rear, could easily allow periods of intermittent resting on long flights.

The pilot in the left seat had easy access to all controls — the throttles and condition levers to the right on the center console, the engine emergency shutdown T-handles on the overhead panel, and the nose-wheel steering to the left next to the pilot's lower window. In front of the pilot was a full array of modern control and flight instruments. In the center of the instrument panel were four sets of dials showing turbine inlet temperature (TIT), turbine speed (in percent of rated rpm), fuel flow, and oil temperature for each of the four engines.

The co-pilot's position — the right seat — had its set of flight instruments as well. The co-pilot had immediate access to the engine-condition levers, for they were located next to his left arm, and he also operated the air-drop light signals from a panel on the right side. On the top center of the instrument panel was a radar scope, which repeated the information displayed on the primary scope at the navigator's position. This piece of equipment was invaluable for finding your way through the thunderstorm-infested skies of Vietnam and the South China Seas between Saigon and Manila.

The flight engineer's seat was situated immediately behind the center console, a location that allowed the engineer easy access to the throttles and condition levers, and to the engine emergency shutdown T-handles, fire-extinguisher controls, fuel-flow controls, air-conditioning and pressurization systems, and GTC (Gas-Turbine Compressor) controls on the overhead panel. The engineer had a clear view of the outside through the cockpit windows and sat at the hub of cockpit activity. The navigator's position was at the back right, behind the co-pilot's seat. The navigator's table was just large enough to accommodate the essential items from the navigator's kit: cigarettes, an adventure novel, the latest *Stars and Stripes*, a box lunch, a coffee cup, and maybe a map. Above the table were installed the navigator's black boxes, including the radar and Loran sets.

The loadmaster, the fifth member of the crew, roamed the length of the aircraft, checking the condition of the cavernous cargo compartment at the beginning and conclusion of the flight, resting on the crew bunk at cruise altitude, and working at the galley — located just inside the crew entrance door in the left rear of the cabin compartment — on a regular basis.

The C-130 school at that time (1965) was held at Sewart AFB, near Smyrna, Tennessee, not far from Nashville, where we became equally familiar with the intricacies of C-130 systems operation and the charms of Nashville's Printers' Alley. Both were necessary to a successful TAC education.

BASIC checkout completed, we moved on to the next level of training, which was conducted at Dyess AFB, where I became acquainted with the members of my new unit, the 347th Tactical Airlift Squadron. At Dyess we were introduced to the wonderful world of tactical airlift operations: low-level navigation at 300 to 500 feet over the West Texas plains; heavy equipment and personnel air drops; low-altitude parachute cargo extractions (LAPES); ground proximity cargo extractions (GPES); tactical formation flying,

including pitchouts on initial; and — the essential tactical airlift requirement — the assault landing.

To make a good assault landing consistently was the goal of every fledgling C-130 pilot, and the instructor pilots who demonstrated the maneuver to us were held in high esteem. Well executed, the assault landing was as smooth as any "grease job" one could make on a long, wet runway. Poorly executed, it was a teeth-rattling, torso-wrenching, wing-warping, tire-busting experience, an unnaturally violent contact between airplane and earth, an event the participant wanted never to witness again.

A textbook assault landing was entered from a 500-foot downwind, half flaps, gear down. As the aircraft turned final, full flaps (35°) were set, and airspeed was reduced to threshold airspeed, which was stall speed plus ten knots. A typical threshold speed would be 125 knots with touchdown occurring at about 105 knots. The pilot attempted to maintain the approach speed while descending at a rate of between 300 and 500 feet per minute until making contact with the runway at a point not farther than 500 feet from the near end.

At the moment of contact, the pilot promptly retarded the throttles to flight idle, lifted the throttles up and back over the throttle stop into the ground idle range, paused — to allow the flight engineer to check the torque indicators to ensure that all four propeller blade angles had moved to the reverse pitch range — and then pulled the throttles fully to the rear, to the throttle stops, to obtain maximum reverse thrust from the four big four-bladed props. The stopping power of the Hamilton Standard props in full reverse pitch was impressive to anyone inside or outside the aircraft.

Simultaneously with the application of reverse thrust, the pilot applied maximum brake pressure by depressing the toes of the rudder pedals. The pilot also released the yoke to the co-pilot and grabbed the nose-wheel steering control wheel in the event additional directional control was necessary. The pilot wanted to avoid putting on too much brake pressure initially to avoid locking the brakes. The aircraft was supplied with an anti-skid system, however; if you stood on the brakes with too much force or for too long a period of time, a bright yellow light on the instrument panel blinked at you to let you know that the anti-skid system was performing the kind of braking job you should be doing — alternately applying and releasing brake pressure to prevent locked brakes and perhaps a blown tire.

This kind of approach and landing, the book said, would allow a normally loaded C-130 to come to a complete stop in under

2,000 feet. But in actual combat conditions in Vietnam we flew a modified version of the assault landing. In the first place, we never, *never* flew any part of a landing pattern under 1,000 feet, an altitude from which we descended only on a steep final approach. To fly lower than 1,000 feet near any airfield, including Tan Son Nhut at Saigon, was to invite ground fire, which was usually accurate enough to cause concern if not damage. In addition to flying a higher pattern and a steeper approach, we eventually — with enough experience — could put a little flare in the final seconds before making contact with the runway, to kill excess airspeed and cushion the landing.

AFTER completing the final phase of training at Dyess, I was assigned to an operational crew and was promptly dispatched on a 60-day TDY rotation to Europe, where I soon became familiar with the exigencies of tactical airlift and the challenge of flying in European weather in a sky full of airplanes. After flying into and out of such varied fields at Bitburg, Hahn, Berlin, Torrejon, Athens, Incirlik, Wheelus, Dakar, Istanbul, the Azores, Chateauroux, Bentwaters, and our primary fields, Evreux and Mildenhall, I began to feel that I could speak with some authority about the life of a tactical airlift pilot.

But in 1965 and 1966 the American involvement in Southeast Asia increased significantly, and the requirement for tactical airlift personnel in that area increased accordingly. On 6 February 1967, I stepped off the airplane that had brought me to Ching Chuan Kang AB, near Taichung, Taiwan, my home for the next 15 months. At Ching Chuan Kang (CCK for short), I learned a little about the Far East, something about the war, and much about the C-130E.

CCK was one of two primary Southeast Asia operating locations for the E-model C-130; Mactan AB in the Philippines was the other. CCK was the home of three squadrons: the 50th, the 776th, and mine, the 345th. The B-models flew out of Clark AB in the Philippines, and the A-models were based at Naha AB, Okinawa. I felt that the E-models had the best mission in the Southeast Asian theater, for in addition to our “in-country” airlift missions, our extended range (due to our large external tanks) brought us a number of other aircraft assignments, including visits to Japan, Korea, Guam, Hong Kong, and Burma. The E-models also flew the Airborne Combat Communication Capsule (ABC²) out of Udorn, Thailand; in these missions we orbited for 12 to 13 hours over northeast Thailand and Laos at altitudes beginning at 16,000 feet and ending at 24,000 feet as our fuel load decreased. On the



The C-130 on the ground.



Troops and cargo aboard the C-130.

“Bangkok Shuttle,” the passenger and cargo run which operated out of Don Muang AB, we flew to all American bases in Thailand. But the “in-country shuttle,” the airlift effort in South Vietnam, was the central C-130 mission.

When I first arrived, the E-models were flying their Vietnam shuttle missions from Nha Trang AB, a lovely resort town on the coast of the South China Sea. In Nha Trang city a large white buddha on a hill faced east; we used it to establish spacing on downwind. Later on, we alternated between Cam Ranh Bay and Tuy Hoa; both of these locations were sand traps disguised as air bases. The O-Clubs were where you went when you weren’t flying to write letters, drink warm beer, and listen to a fren-

zied GI band play that wonderfully appropriate song, “We Gotta Get Out of This Place.”

The housing at Nha Trang and Tuy Hoa consisted of hooches with showers that featured two temperatures — cold and cool. At Cam Ranh Bay we had a choice of air-conditioned trailers (claustrophobic, ill-smelling caves) or non-air conditioned huts in the RMK area, buildings which had previously housed the personnel who had built the place (and thus named RMK for that construction company). I preferred the RMK huts because although they were not air-conditioned, they sat on a hill on the east side of the base, offered a view of the sea, and were usually blessed with a breeze.



American Marines rush a wounded comrade to a waiting USAF C-130 during the battle at Khe Sanh, South Vietnam. The hole in the ramp (foreground) was caused by enemy shelling, 4-5 Feb. 1968.

Shuttle missions were launched from before sunrise until nine or ten o'clock at night. The typical Cam Ranh mission began with a get-up at 0600, shower, shave, breakfast, then a ride in the bread van from the east side of the base around to the C-130 operations and loading ramp on the west side. The operations building was a small, two-story wood structure with the mission planning and briefing room upstairs, the logistics area and crew lounge downstairs, and the maintenance control room in the back. While the pilots and navigator went in to receive their route briefing for the day, the flight engineer and loadmaster saw to the aircraft preflight and loading.

If the day's schedule took the crew to a field they hadn't flown into before, they reviewed a field folder which contained aerial photographs and pithy comments to prepare them for their arrival. Typical observations might be: "Phang Rang: ground fire s. of river"; "An Khe: primary

hazards to flight — Army artillery and Army helicopters."

The usual load was 20,000 pounds on four pallets; the maximum gross weight for C-130s operating into unimproved strips in Vietnam was about 135,000 pounds. Aircraft scheduled for passenger runs had the center seats installed and were used on these runs for several days at a time to save time reconfiguring the cargo compartment.

The loading ramp at Cam Ranh was a concrete dock in a sea of sand. Located just north of the field tower, it was usually full of B and E models parks wingtip-to-wingtip and nose-to-nose or nose-to-sand, with their cargo loading ramps open to receive pallets of mail, foot lockers, engine parts, fuel bladders (full of JP-4 for the Army Huey helicopters), and construction equipment.

AFTER the final preflight was completed, we installed ourselves in our

crew positions and commenced engine start procedures. First we started up the GTC, located in the side of the fuselage just forward of the left main gear. This small-scale version of a jet engine produced an unpleasantly shrill noise as it wound up to speed, but it was absolutely necessary for providing the initial power to our electrical and hydraulic systems and for producing the compressed air essential to start our first engine — number three engine. If we were ever unable to start our GTC at any enroute stops, we had to keep our #3 engine running on the ground to provide electrical and hydraulic power and compressed air to start the others.

Once the GTC was on line, we started the engines in this order: #3 (inboard right), #4 (outboard right), #2, #1. After the co-pilot placed the engine condition levers in the "run" position, the pilot reached up to the engine start button on the overhead panel and pushed in the #3 button with the

left hand. The pilot kept the right hand on the engine condition lever in case of malfunction during the engine start procedure so that it could be returned to the "stop" position if necessary. Engine malfunctions were usually caused by a bleed air valve not opening fully, thus preventing compressed air from entering the engine to enable it to turn up to the rpm necessary to sustain combustion. The engine start process complete, the co-pilot and flight engineer checked out the hydraulic, electrical, and pressurization systems, and the crew was ready to taxi.

Taxiing into and out of the loading ramp at Cam Ranh was one of the most hazardous portions of the day's mission. Because loading space was scarce — and this was true of all airfields in Southeast Asia — C-130s were parked with minimum wingtip clearance. The large wingspan of the C-130 — 132 feet, 7 inches — necessitated extreme care when maneuvering on a crowded ramp. In addition, aircraft usually were parked with the nose on the edge of the ramp, thus requiring the maneuver which no other USAF aircraft could perform — backing up.

Backing the C-130 was easily accomplished, providing you remembered two important items: don't overheat the engines, and *never* step on the brakes when moving backwards. In order to back the aircraft, the pilot placed either the inboard or outboard engines in reverse thrust. Usually the max reverse thrust position would provide adequate power to start the ship moving backwards. After the aircraft started to roll, the throttles were returned to the minimum reverse thrust position because once started, the aircraft rolled very easily. The pilot always felt a little discomfort when taxiing in reverse because he could not see where he was going and had to rely on the verbal directions of the loadmaster, who was looking out the back end of the aircraft.

If the engines remained in the reverse thrust position for too long, the oil temperatures would rise, and the throttles had to be placed in the ground idle position for normal engine cooling to occur. The brakes were never used to stop the aircraft when it was moving in reverse; if you were so unfortunate as to do so, two embarrassing and even dangerous events could occur: the aircraft could rock back upon its tailskid (especially with a tail-heavy load), and then the nose-wheel strut could be damaged when the aircraft rocked forward again.

Once out of the loading area, we taxied along the parallel taxiway to the north or south end of the runway for our engine runup check. This was a simple process in which we checked the inboards first and then the outboards at a high power setting

to ensure that our torque rpm, fuel flow, and oil temperatures were within normal limits. The Allison engines, in addition to being wonderfully simplified in design (especially compared to conventional reciprocating engines) were also wonderfully efficient, powerful, and reliable; in over 1,000 hours of flying in Southeast Asia, I experienced only one sudden engine failure in flight, which we shut down easily and with little noticeable reduction in aircraft performance.

Emergency engine-shutdown procedures in the C-130 were simple: engine condition lever to the feather position (full rear); engine emergency shutdown T-handle pulled out. Pulling the T-handle accomplished, among other things, three primary actions: it shut off fuel and oil to the engine; it feathered the propeller (a backup for the condition lever); and it armed the internal fire-extinguisher system.

After completing our engine-power check, we set our flaps at 50 percent, made sure our cargo area was secure, and we were ready for takeoff. Takeoff was a straightforward procedure; although the propellers were turning over at a high rpm, there was almost no sensation of torque in the aircraft due to its size. Directional control was maintained initially with the nose-wheel steering until the rudders became effective at about 65 knots. At about 95 knots, you pulled the yoke back about halfway to the rear and the aircraft began to fly at about 105 knots. Then gear up, flaps up; initial climb speed was 180 knots. With the aircraft cleaned up, we usually turned out over the water to proceed "feet wet" up or down the coast to our first stop of the day. Flying "feet wet" was the preferable method of traveling up or down the coast for several reasons: first, the problem of terrain clearance was eliminated; second, we had good Ground Control (GCI) site coverage; and third, we didn't have to worry about ground fire.

During 15 months of flying the C-130 in Southeast Asia, I landed at every major and minor airfield in the theater. My logbook shows that I visited 7 airfields in Thailand and 36 airfields in Vietnam. I classified these airfields in three major categories: challenging airfields — those with under 3,000 feet of runway length; interesting airfields — 3,000 to 4,000 feet; and MAC airfields — those over 4,000 feet.

Actually, all airfields were challenging in one respect or another; even the longest airfields — Tan Son Nhut (Saigon), Bien Hoa, Danang — offered some excitement. At these fields the challenge lay not in landing but in trying to break into the nonstop flow of VFR traffic that surrounded them. At Tan Son Nhut, for instance, we quickly learned to shoo horn our way into downwind

wherever we detected the smallest gap in traffic and to proceed around the pattern to the final approach. There, if the tower operator paused to catch his breath during his continuous monologue directed at departing and arriving aircraft, we announced our presence briefly: "Humpty 20, final." If we were unable to announce ourselves, we continued our approach and landing unless specifically told not to, in which case we obeyed instructions exactly and without argument.

The short stopping distance of the C-130 could be an advantage even at a field the length of Tan Son Nhut; in one distance a South Vietnamese pilot stood with too much vigor upon the brakes of a C-46 in his attempt to turn off the runway, causing the aircraft to perch on its main gear and nose. The remaining amount of runway available was adequate for light aircraft and C-130s only; all other aircraft had to wait their turn to use the outside runway or were diverted to other fields.

The "interesting" and "challenging" categories of airfields included a number of fields that created vivid impressions in the minds of any pilot who visited them: Dalat, the vegetable garden of Vietnam, located in the hills northeast of Saigon, cool and lovely, largely untouched by the war; Phan Thiet, a coastal airfield where, when you landed to the west, your propwash blew dirt over a melange of aircraft assembled in the so-called "parking ramp" which was actually the east end of the runway, slightly widened; Quan Loi, located in a rubber plantation not far from the Cambodian border, where the fine red dust colored everything — faces, clothes, food; Minh Thanh, close to Quan Loi, where they widened the road through the rubber trees to make the runway but didn't make it quite long enough and you had to be adept at carrying just enough power suddenly, and checking the sudden rapid descent with back pressure on the yoke and a quick burst of power at the last moment before the aircraft slammed into the runway; Landing Zone (LZ) English, where even the C-130s seemed to disappear as they landed through the cut in the hill at the south end of the field and where you tried to time your arrival at lunch time to partake of the good Army chow; Quang Tri, south of the DMZ, where we busted a ceiling lower than 300 feet under the perfect guidance of a mobile Ground Controlled Approach (GCA) unit; Hue, where we rigged for litters on short notice to evacuate a number of wounded Vietnamese soldiers and civilians; Dong Ha, where we brought back some black bags with a bad smell.

But the three places that stand out with special significance in my mind are Bao Loc, Dak To, and Khe Sanh. Located halfway between Saigon and Cam Ranh, in an

area of gently rolling upland hills and valleys, Bao Loc was one of the most unusual fields in Vietnam. It was situated on the top of one of those rolling hills, and it had the most pronounced curvature of any field I've seen. Although the field was only about 3,500 feet long, a C-130 parked at one end was not visible to a C-130 parked at the other end — not even the tail, which stuck up into the air 38½ feet. The only point at which both ends of the runway were visible was at the center of the runway, at the top of the hill, where a taxiway linked the runway and the loading ramp. The field, therefore, presented both real and imaginary challenges for takeoff.

From the end of the runway, as you prepared to take off, it appeared as though you had only one-half of the total distance — about 1,500 feet — which you knew was not adequate. You had to remind yourself that it was possible to make the takeoff successfully: "Don't worry — you'll make it — when you get to the top you'll see that there really is another 1,500 feet of runway." And there was the final argument: "Well, that last crew just took off, and if they can make it, you can make it too." But you never began your takeoff roll at Bao Loc without a knot of nervousness sitting in your stomach. My last takeoff there was almost the last one of my flying career.

THE standard load we hauled in or out of Bao Loc consisted of U.S. Army troops and equipment. In this particular instance, several C-130s were moving a good-sized contingent of the Army to Song Be; every time we moved the Army to Song Be we knew a major push was afoot. And whenever we moved the Army, we always cranked in a hefty fudge factor to the weight estimates they provided; first, because we were never sure of the accuracy of their methods of weight determination, and second, because their equipment always seemed to be burdened with inestimable pounds of dirt and mud. We added anywhere from 10 to 25 percent of the total weight figures they provided so that our aircraft would not attempt a takeoff when it was too heavily loaded. Our loadmaster was familiar with the procedure.

Our situation at Bao Loc this day was complicated by the fact that it was now early afternoon and the temperature was rising into the high 80s, an important consideration at a field that was well above sea-level. Added to these factors was the unknown effect of the humped runway on takeoff performance. Our aircraft manual, the Dash One, contained a lot of helpful information about computing takeoff roll, but it had precious little to say on the subject of humped runways.

We taxied out of the loading area and down the hill to the west end of the runway



A forklift carries away supplies delivered by a USAF C-130 to American Marines at the beleaguered outpost at Khe Sanh, South Vietnam. Even the mail was delivered during the siege (note sacks in foreground), 4-5 Feb. 1968.

for a takeoff to the east. On board we had an Army truck, a jeep, and a trailer, and about ten GIs with packs. We turned around carefully in the limited area at the end of the runway, backed up to take advantage of every foot of runway space, and ran the engine up to full power.

I tried not to think about the accident that had occurred at Bao Loc earlier that year — when a C-130, heavily loaded with ammunition, failed to get safely airborne and crashed into the ravine at the west end of the field. Two crewmembers had perished in the fire and explosion. All C-130 crew members flying in Southeast Asia knew of that accident.

The flight engineer checked the instrument readings, the co-pilot grabbed the yoke, and I, left hand pushing the throttles forward, released the brakes. Usually when the brakes were released the aircraft gave a marked surge forward; such was not the case this time. Slowly, very slowly, we began to roll up the runway. It seemed as if it took forever to get to the top of the hill. But as we came over the top it also seemed evident that we would be able to attain our predicted takeoff speed with runway to spare. At this point I had released the nose-wheel steering and had grasped the yoke in my left hand.

As we passed the predicted takeoff speed, I pulled back firmly on the yoke, expecting the nose to lift. But it did not budge; the aircraft was not about to fly. So

much for our takeoff calculations. Figuring there was no point in creating any extra drag, I pushed the nose forward again, and we continued to accelerate.

We now had about 500 feet of runway remaining. The pronounced downhill slope of the runway should help us to increase our airspeed. Anyway, we really didn't have much choice in the matter. Attempting to stop the aircraft now was out of the question.

These thoughts occurred to all of us in the cockpit simultaneously. No one said anything. There was nothing to say. We all recognized the problem, and commentary seemed inappropriate. When there was about 100 feet of runway remaining before the sandy reaches of the field perimeter began, I again pulled back on the yoke as firmly as I could. The aircraft slammed off the last dip in the runway and staggered into the air. It was airborne, but it didn't feel as if it really wanted to fly. I had the sensation that I was single-handedly holding the aircraft in the air through will power and determination. Fortunately, the terrain sloped gradually away from the edge of the field, and we were able to follow a depression in the ground caused by a dry stream bed for about three-quarters of a mile until we managed to gain enough altitude to begin milking the flaps up ten degrees at a time. When we landed at Song Be, we found pieces of the perimeter fence embedded in the gear doors.

At Dak To, in addition to heavy loads, we were also worried about the condition of our tires due to the problem of shrapnel on the runway. Dak To was located in rugged terrain about 30 miles north of Pleiku, in the central highlands. Extended stretches of level ground were difficult to find, and the Dak To runway ran in a SE-NW direction in a narrow valley bordered by two high ridges. Dak To was never a totally safe place to visit, because enemy troops occasionally would haul a mortar and some shells up to the top of one of the ridges and fire them down into the camp below. The morning that the Tet offensive of 1968 started was one of these times.

We were supposed to have an early take-off out of Tuy Hoa with a load of ammunition for the troops at Dak To. However, because the Tet offensive was underway, we were delayed until someone somewhere said it was safe to go to Dak To. We were also delayed because I had to explain to a newly arrived pilot that despite the fact that the Air Force had issued us survival vests, flak jackets, and hard hats (and .38 caliber pistols), it was physically impossible to strap on those bulky accessories and still sit in the pilot's seat and fly the aircraft.

The flight over from Tuy Hoa was uneventful. The countryside below looked peaceful and scenic as it always did, especially in the early morning sunlight. I spotted what looked like several good trout fishing streams. About 20 miles southeast of the field we called Dak To tower for landing instructions. There was no answer.

I double-checked the frequency in our flight publications; no, that wasn't the problem. We called again. No response. We decided we should orbit for a while until we could get more information. Then we noticed smoke rising slowly over the field. About that time a very nervous, out-of-breath voice came over the radio: "Aircraft approaching Dak To, remain clear of the area. We are under mortar attack."

After a minute or so, the same voice, now calmer: "Aircraft in the vicinity of Dak To, say type."

"C-130."

"Carrying what?"

"Ammunition."

"Cleared to land."

The tower operator cautioned us to stop in the first 1,500 feet, because at that point a mortar round had cratered the runway, showering the area with jagged pieces of metal capable of puncturing our tires. As we approached on short final we could clearly see the debris littering the runway ahead of us. We stopped in the necessary distance and turned left off the runway onto the parking ramp, where we saw men with brooms and shovels cleaning up bits and pieces of shrapnel.

We waited nervously while the fork lift offloaded our ammunition pallets. The flight engineer checked our tires to make sure we hadn't damaged them during the landing. We scanned the field from one side to the other, looking for the tell-tale signs of rising dust and smoke which would mark the arrival of an incoming mortar round, knowing full well that we would never see the rounds that would do us the most damage, but nevertheless straining our eyes to see and our ears to hear. I had briefed the crew that at the first sign of an attack we would make a hasty departure from the field, God willing and the airplane in one piece. Fortunately, no mortar rounds fell while we were there. After we took off we could see why.

As we climbed up the valley, we could see two Army gunship helicopters firing rockets into the north ridge, off to our right. The rockets slammed into the top of the ridge, and the white smoke that trailed in their wake seemed like ropes tied to harpoons that had been fired into the humped back of a passive, immobile, tree-covered leviathan. As we turned to our right around the ridge, heading toward Danang, we saw two more gunships hovering on the other side of the ridge, smoke eddying from their guns. We were pleased with the efficiency and speed of our offloading methods at Dak To. But that was before we went to Khe Sanh.

WE had been to Khe Sanh on a regular basis in the past; we flew there fairly often on resupply runs out of Danang. Before the Tet offensive began, the primary hazard to safe flight was the psychological impact of seeing that yawning chasm at the east end of the field. There a vertical rock face dropped down 1,000 feet into a relatively innocuous river at the bottom of the canyon. Although the Khe Sanh runway was of an acceptable length—3,500 feet or so—it seemed as if the east end was perched on the edge of a cliff.

Standard operating procedure at Khe Sanh was to land to the west and take off to the east. There was a pronounced uphill slope from east to west which helped you decelerate on landing and accelerate on takeoff. If you landed to the east your approach was slightly blocked by a large mound of dirt—a small hill, in effect—and in addition to the downslope of the hill towards the east, you were faced with the visual image of a runway that dropped off into a void. Our usual approach at Khe Sanh—as at almost every field in Vietnam—was to come in high and descend in a tight spiral. Our standard load for Khe Sanh during the Tet offensive was three or four pallets of 105mm rockets; we never liked to expose ourselves to ground fire any time we were flying in-country, but that was

especially true when we were carrying 10 to 15 tons of high explosives.

During the first few days of the Khe Sanh resupply effort, the weather was sufficiently clear to allow standard VFR approaches. The primary hazard was the large number of aircraft in the area—Air Force F-4s, Navy F-7s, Huey gunships, slicks (passenger carriers), and Med-evacs, FACs in O-1s and O-2s, C-123s, C-130s—all dodging ground fire and each other. Each time we landed at Khe Sanh we tried to shorten our ground time to the minimum to reduce our exposure to incoming mortar rounds, which always increased when a cargo plane was parked on the ramp.

Then the good weather left and the bad weather moved in. The clouds lay low over the Khe Sanh plateau, eliminating both the usual VFR approaches and close air support. But the influx of supplies and ammunition continued. We were unable to use our favorite TACAN approach to the west runway because those who tried it had received heavy ground fire from a hill north of the final approach course. How then to get into a field blanketed by clouds with no usable instrument approaches? The advice from the Air Liaison Officer (ALO): "Look for a hole in the clouds and come in underneath." Ceiling? "Estimated five hundred feet." At a place like Tan Son Nhut, a 500-foot ceiling would be almost ideal VFR conditions, for the terrain around Saigon was as flat as a table top. But a 500-foot ceiling at Khe Sanh provided no sure clearance from the hills to the west, north, and south. Were there any holes in the clouds in the vicinity? "Other pilots have reported small breaks in the clouds to the west." The west: Laos.

We continued on a westerly heading, scanning the sky for breaks in the clouds, doubtful that we would find anything. The ALO had been talking to two other C-130s since we checked in on frequency, one on the ground about to depart, the other inbound. The ALO was controlling traffic—the tower had been abandoned; the last mortar attack had put it out of commission. Suddenly we saw another C-130 far below us about to disappear into a minute hole in the clouds. It dipped into an opening no larger than the aircraft itself and then vanished from sight. We orbited for a few minutes, keeping our eyes on that preposterously small hole. Then came the go-ahead call from the ALO—the field was clear.

We dropped our gear and 50 percent flaps and began a controlled descent at 145 knots. Once again we found ourselves led forward by that in-country rule of thumb: if the aircraft ahead of us made it, we can too. As we approached the hole—it seemed to grow smaller every second—we could see that the cloud layer was relatively thin, though solid, and that we could probably

maneuver safely beneath it. We dropped through and turned toward the field. We were approaching the field from the southwest, over relatively flat and open terrain, countryside not likely to harbor any hostile forces. At least I hoped not; we were so close to the ground that someone could hit one of our props with a rock.

The navigator checked our position with his radar. "Five miles to the field," he said. "Stand by for full flaps," I told the co-pilot. The engineer ran the rest of the checklist while the co-pilot and I scanned the approaching ridgeline.

There was the rise that marked the western boundary of the field. The cloud layer seemed to be resting on it. We were so low we would have to climb slightly to avoid it. "Flaps full," I called. As the co-pilot dropped the flaps I could feel the aircraft rising because of the increased lift they created. I gradually retarded the throttles to slow the aircraft to approach speed.

We cleared the rise by feet. But we did not have any time to comment on the fact, for there was the runway, at a 30° angle to the right; we were in the process of overshooting it. Throttles to idle. Back pressure to control the descent to the runway. Twenty degrees of right bank — too much at that altitude, but I really didn't want to circle around for another try. Right rudder.

The engineer was calling the airspeed: "One twenty. One fifteen. One ten." One final yank on the yoke to slow the descent. Riding the thin edge of controllability, we touched down within 50 feet of the end of the runway. Power to ground idle, stop, lift into reverse thrust range, pause. Feet on the brakes. "You've got the yoke," I told the co-pilot. As he reached for the yoke, I grabbed the nose-wheel steering with my left hand.

The engineer announced "Clear to reverse," and I pulled all four throttles into full reverse, as far back as they would go. The props moved rapidly into full reverse pitch and the aircraft decelerated abruptly, throwing us forward against our shoulder straps. The aircraft slowed to taxi speed. We had been on the ground for about seven seconds.

We turned off at the mid-field taxiway. Our landing roll was somewhere between 1,200 and 1,500 feet. Even before we turned off the runway, towards the off-loading ramp on the south side of the field, the loadmaster opened the cargo door and ramp. We taxied to the southeast corner of the ramp, pausing as we waited for the upper cargo door to raise fully and the lower cargo ramp to lower to within four to six inches of ground level. It took about 15 seconds for the door and ramp to reach position. We were then ready to execute our rapid offload procedure.

I taxied forward slowly, throttles ground

in idle, riding the brakes. The loadmaster called over the interphone, "Ready to off-load." I let the ship move forward, then gently stepped on the brakes. The resulting forward-rocking movement of the aircraft temporarily released pressure on the cargo compartment pallet locks, which the loadmaster quickly unlocked. "Pallets unlocked," he called over the interphone. I acknowledged his call and told the crew to hang on. I simultaneously released the brakes and rapidly brought all four throttles forward nearly to the takeoff position. The ship accelerated quickly and the pallets started to roll backwards, off the cargo loading ramp and onto the surface of the parking ramp. The accelerating forward movement of the aircraft offset the tendency of the heavily loaded pallets to tilt the aircraft to the rear or to temporarily overload the cargo ramp. The pallets dropped out one after another, plop! plop! plop! plop! We had taxied out from underneath our load. "Pallets clear," the loadmaster called.

WE paused for a short count — 10 to 15 seconds — to see if anyone wanted a ride out. The loadmaster squatted down and peered out the open cargo ramp across our row of pallets to see if anyone would appear from the depths of the Khe Sanh bunker system. The Army and Marine troops knew that if they wanted a ride, they had to make a fast break for the airplane the instant the pallet load had been deposited. Otherwise, after a brief pause, the cargo ramp would close and the ship would depart.

As we waited, I surveyed the camp area. It was a scene of destruction and desolation. Where once, a few weeks ago, there was an efficient outpost that had a chow hall, maintenance and supply shacks, a tower, and rows of helicopters chambered in revetments, all had been leveled by mortar and rocket attacks and the entire population lived in bunkers and trenches. Enough heavy equipment had survived to keep the runway and ramp in operation and to repair a few revetments for the helicopters. But the place looked literally like a dump.

The low-lying clouds prohibited close air support from Air Force and Navy aircraft, and the only flying activity that could be seen were some Army Hueys maneuvering cautiously around the neighboring ridges. But the clouds also seemed to have had an inhibiting effect on the North Vietnamese forces as well, for we had not observed any tell-tale smoke signaling incoming mortar rounds.

Someone asked me how long C-130s would land at Khe Sanh under conditions like these. Until they get one of us, I said. And within days they did, but it was a

Marine C-130 that took the hit and not one of the Air Force's fleet. A mortar round caught it squarely at the junction of the wing root and the fuselage. After that only C-123s were allowed to land at Khe Sanh, until one of them received ground fire on final approach and flew into the canyon wall with a full load of replacements on board. Then C-130s took up the primary responsibility for resupply for a few more days through low-altitude extraction system (LAPES) drops. And then, abruptly, the Battle of Khe Sanh was over.

THE loadmaster told us no one seemed to be interested in catching a ride, and as he closed up the cargo ramp we taxied to the west taxiway. The loadmaster locked the cargo ramp as we pulled out onto the runway. With no cargo and a reduced fuel load we accelerated quickly and were soon airborne. We left the flaps down until we entered the protective custody of the cloud deck where we flew briefly on instruments until we broke out between layers. We leveled off, raised the flaps, and headed for Danang.

Ours was the last aircraft to land at Khe Sanh that day. As it happened, it was my last mission to Khe Sanh.

Our ground time there was just under three minutes.



During his 20-year career in the Air Force, **David K. Vaughan** flew KC-97s, C-130s, T-29s, and T-41s. He also taught English at the Air Force Academy and served as a liaison officer with the Civil Air Patrol. He compiled a total of 3,500 hours of flying time, of which over 1,000 were in the C-130E. He is currently an Assistant Professor of English at the University of Maine, where he specializes in Technical Writing and the Literature of Technology. He has written "An Introduction to the Literature of Flight," published by the Civil Air Patrol, and he is working on a book about the writings of Anne Morrow Lindbergh.

USAF Special Operations Forces: Past, Present, and Future

by James L. Cole, Jr.



SPECIAL Operations constitute a unique facet of airpower which is often discussed but less often understood. Limited resources and constrained budgets invariably relegate Special Operations Forces to a low level or even elimination. But the requirement for Special Operations capability is timeless and clearly validated by history. The current international situation and probable global trends portend no change in this regard.

The United States Air Force is a relatively young service with a limited institutional memory. There is a tendency in some quarters to associate Air Force Special Operations solely with the Vietnam War and relegate both to a "never again" drawer of past history. Special Operations originated well before our Vietnam experience, however, and if the past is any indication, we will be faced with similar requirements in the future. The past history of Special Air Operations provides essential insights into the generation and employment of such forces as well as clues for future requirements and operations.

The Early Years

Allied guerrilla support operations during World War II quickly incorporated the airplane as a key element. The American Office of Strategic Services (OSS), and the British Special Operations Executive (SOE) used aircraft extensively, particularly in the personnel airdrop and aerial resupply mode. But airland operations also were conducted whenever possible. On 4 September 1941 a British Lysander delivered Maj. Gerard Morel to France. This was the first time an RAF aircraft had landed on French soil since the fall of France in 1940.¹

American assets and activities interfaced with the British air effort as American participation in the war in Europe increased. The resistance groups in Europe increased in number and size, and by 1944 British and American aircraft were conducting mass daylight resupply airdrops in support of these guerrilla forces, in addition to the more traditional night clandestine airdrops.

Opposite, top: The Sikorsky CH-3E Sea King, a long-range support helicopter for special operations forces. CH-3E helicopters are currently flown by the 20th Special Operations Squadron of the 1st Special Operations Wing (SOW) at Hurlburt Field, FL.

Below: The Lockheed AC-130H Spectre gunship with a side-firing weapons system. In combat the AC-130H is used in an interdiction role or for close air support. AC-130H gunships are assigned to the 16th Special Operations Squadron of the 1st Special Operations Wing. (Photos courtesy 1st Special Operations Wing.)

One of the more unusual arrangements for these activities was the so-called Balkan Air Force, a composite international Special Operations Force consisting of British, Greeks, Poles, Yugoslavs, Italians, and Americans. Commanded by a British Air Vice Marshal, this organization provided indispensable and politically sensitive support to partisans in Yugoslavia. The USAAF "component" was the 60th Troop Carrier Group, commanded by Col. Clarence Galligan. Flying C-47s, this unit performed airlift, airdrop, infiltration, exfiltration, and medical air evacuation missions in a very difficult operational environment.

These Special Operations were essential to the survival and combat effectiveness of resistance groups in the European Theater of Operations. They provided a significant boost to the morale of the captive populations of occupied Europe and contributed significantly to the eventual Allied victory

Special Operations originated well before our Vietnam experience . . . and if the past is any indication, we will be faced with similar requirements in the future.

over the Axis powers. But equally interesting and significant, Special Operations were in progress halfway around the world, and the particular air unit's organization and employment portended a significant concept of operations as well as a philosophical tradition for the future.

The China-Burma-India (CBI) Theater of Operations during World War II provided the major institutionalized example of unusual requirements generating peculiar missions for air forces. British Brig. Orde Wingate's long-range raids into Burma presented a particularly thorny logistical problem. Keeping 10,000 men supplied with provisions in a rugged combination of mountains and jungle was no mean feat. The fact that Wingate's Chindit Raiders were operating in the enemy's back yard further complicated the problem. The Japanese held Burma, and they would hardly stand for the construction of airstrips, however rough, which could provide the means to supply Wingate's Raiders with food, ammunition, and other supplies.

Aerial resupply was the only answer, but keeping 10,000 men supplied solely by airdrops was difficult, at best. The problems of hazardous terrain, miserable flying weather, timely coordination with a highly mobile ground force, and a multitude of well armed and highly belligerent Japanese combined to make the mission a

very high risk operation.

During 1943, American C-47s and British Dakotas of Transport Command formed an aerial lifeline to Wingate's Raiders that was never broken. Food, ammunition, clothing, and medical supplies were dropped by parachute from 200 feet during the day and 400 feet at night.² Grain for Wingate's pack mules was dropped "free" in triple canvas sacks two-thirds full. This procedure allowed room for the grain to shift when the sacks hit the ground, thus preventing them from bursting on impact. Wingate's men had complete faith in this unconventional supply system. In their own words: "... it was a ruddy marvel."³

Wingate's successful 1943 campaign promoted further efforts of the same nature. The unusual combination of strategic and tactical requirements led to the creation of one of the most bizarre units in the history of military aviation. The 1st Air Commando Group, USAAF, was formed, in Gen. H. H. Arnold's words, "to spearhead General Wingate's operations."⁴

The 1st Air Commando Group was commanded by Col. Philip G. Cochran and was responsible for a multiplicity of missions in support of Wingate's Raiders. Thus, the aircraft inventory reflected as odd an assortment of hardware that could be imagined. The 1st Air Commando Group boasted C-47 transports, P-51 fighters, B-25 bombers, UC-64 utility aircraft, L-1 and L-5 observation aircraft, and a glider force consisting of CG-4As and TG-5s.⁵ Because its primary mission was to provide Wingate's forces with the mobility they needed to operate behind Japanese lines, the 1st Air Commando Group was authorized to operate separately from the normal chain of command in the CBI Theater of Operations.⁶ This autonomy precluded diversion from the task of supporting Wingate's effort. The unconventional unit thus was not even integrated into the CBI Theater's organizational and administrative apparatus, and it received its replacements and supplies directly from the United States. Naturally, other commanders in the CBI Theater, hungry for personnel and aircraft, resented the 1st Air Commando Group's special status. In the words of Col. John Alison, Group Deputy Commander: "We made some people mad, and we're sorry about that, but it couldn't be helped."⁷

For the 1944 airborne invasion of Burma (*Operation Thursday*) Cochran's group was charged with the responsibility of delivering Wingate's forces into Burma and providing a covering and striking force for their support. Cochran's group was specifically organized to support Wingate's unconventional operation. The general plan for the initial assault involved a gliderborne force seizing and holding an airhead. The remainder of Wingate's Long Range



War Theater #20, Burma. A North-American P-51 of the 1st Air Command Group commanded by Col. Philip Cochran, in flight over Burma.

Penetration Group (LRPG) then would be airlifted into a speedily constructed airstrip in the jungle clearing which had served as the landing zone for the gliders. Wingate's Raiders, in contrast to their 1943 campaign, this time would be able to launch offensive operations against the Japanese in a fresh and rested condition. Flying over hundreds of miles of dense jungle to get at the Japanese was far superior to marching through it. After delivering Wingate's forces, the 1st Air Commando Group would commence its versatile air support of the LRPG columns.

India was the departure point for the unconventional air assault operation, but the rugged Imphal Range presented a formidable mountain barrier to any aerial invasion of Burma. The highest point in the Imphal Range was approximately 7,200 feet above sea level, and this in itself constituted a formidable hurdle for a fully loaded C-47. The plan called for a glider tow by C-47s, however, and the average load of a fully loaded CG-4A glider was 3,750 pounds. To tow such a load over a 7,000-foot mountain range might be asking too much, even of a C-47, and many planners simply shook their heads and said it couldn't be done.⁸

The men of the 1st Air Commando Group had much more than their share of bravado, however, and they needed it all for this unconventional air assault operation. The prevalent attitude in the Group was aptly expressed by their credo: "If Phil (Cochran) or John (Alison) says we do

Col. Philip Cochran, Commanding Officer of the 1st Air Commando Group in Burma.



it, then by God we do it!" Phil and John said "do it," and the pace of preparations accelerated.

At 1812 hours on 5 March 1944, the first C-47 of the aerial invasion force broke ground at Lalaghat, India, and began its climb into the deepening night.¹⁰ Those who witnessed the event no doubt were startled to observe that the laboring C-47 had not one, but two, heavy gliders in tow. Twenty-five more C-47s, each with a double tow of gliders, followed at ten-minute intervals. Cochran's final admonition to his men weighed heavily on everyone: "Tonight you are going to find out if you have a soul."¹¹ The aerial invasion of Burma was underway.

The struggling C-47s cleared the mountains and released their burdens 100 miles behind Japanese lines. The gliders commenced their silent descent to Landing Zone "Broadway," and the C-47s returned to India to commence the airlift portion of the operation. Maintenance, refueling, and loading commenced immediately after landing. At dusk the aircraft again prepared for takeoff.

The immediate task at hand was to airlift the rest of Wingate's force into "Broadway." Twenty-four hours after the landing zone was seized by the glider-borne force, it had been converted into a 5,000-foot long, 300-foot wide assault airstrip. At 1920 hours on 6 March 1944, the first C-47 landed.¹² Thus commenced one of the most intense air shuttle operations in the history of military aviation. The scene was described by AVM Sir John Baldwin, RAF:

Nobody has ever seen a transport operation until he has stood at Broadway under the light of a Burma full moon and watched Dakotas (C-47s) coming in and taking off in opposite directions on a single landing strip all night long at the rate of one landing or takeoff every three minutes.¹³

Soon after the "Broadway" airstrip became operational, C-47s of the Troop Carrier Command under Brig. Gen. William D. Old joined Cochran's 1st Air Commando Group in delivering men, pack animals, and supplies to the tenuous airhead. Another rough airstrip was hacked out in a nearby jungle clearing, and the buildup of men and materiel continued. The C-47s of the 1st Air Commando Group and the Troop Carrier Command recorded an impressive set of statistics for their first week of operations into the two jungle airstrips: 9,052 personnel, 1,183 pack mules, 175 pack ponies, and 509,083 pounds of stores were delivered to Wingate by D-Day plus six days.¹⁴

The 1st Air Commando Group then commenced aerial resupply operations for Wingate's forces. Food, ammunition, and



Brig. Gen. William D. Old (l), the pilot, and the co-pilot of his North American B-25 discuss the raid on a Japanese supply base at Kamaing, Burma, before their early dawn takeoff from their base in India, 1943.

medical supplies were airdropped on a regular basis. In addition to their airdrop commitments, the 1st Air Commando group provided yeoman service in the speedy evacuation of Wingate's casualties. The mission of Cochran's air group was rapidly evolving into an "as required/ad hoc" activity whenever and wherever needed.

When a man was wounded, a tiny L-5 would land in a specially prepared site (300 feet in length) and quickly fly him to a concentration point.¹⁵ C-47s would then air evacuate the wounded to hospitals in India. A man wounded in a firefight during the early morning hours often was resting comfortably in a hospital that evening. This expeditious medical evacuation procedure had a salutary effect on everyone's morale, and the combat effectiveness of the Burma raiders was increased significantly by Colonel Cochran's flying ambulance service.

One of the more unusual missions of the 1st Air Commando Group was the aerial resupply of hill stations in the Signal Air Warning System.¹⁶ During the monsoon season, low ceilings and poor visibility severely complicated this already difficult mission. Accuracy was very important, for the supplies had to be dropped precisely upon the crown of the hill. If they were not, they were lost to the Japanese or the jungle.¹⁶

On one particular occasion, the cloud bases were so low that the resupply C-47 was unable to descend below the ceiling to complete the airdrop. The station was short of food and fuel, and it was imperative that the supplies be successfully delivered. The pilot decided to attempt delivery through the clouds if the ground party would provide him with an indication of the aircraft's position relative to the hill station. After a long and involved radio conversation, the



First Air Commando Force B-25s in formation over the field in Burma.

men on the ground guided the pilot to their position by means of the sonorous drone of the C-47s engines. When the sound of the aircraft's engines was almost directly overhead, the ground controller keyed his mike and yelled: "Let 'er go!"

After four passes over the hill station, the C-47 was empty and the ground party was ecstatic. The score was three direct hits and one miss. The only loss was a large barrel of gasoline. It had hit the side, rather than the crown, of the hill, and had rolled down the slope and into the jungle. Doing the unconventional and the impossible was becoming standard procedure for the 1st Air Commando Group.

The 1st Air Commando Group was a unique organization specifically formed to perform unusual and extremely difficult missions. Wingate's Burma Raiders received the air support they needed, and much more at that. This unique unit performed a wide range of other unconventional missions, and it performed them in an exceptional manner. The creation of the 1st Air Commando Group and its subsequent superlative performance vindicated Gen. H. H. Arnold's assertion that the two-dimensional movement of infantrymen could be transformed into three-dimensional mobility by airpower even in the most austere and difficult operating conditions.¹⁷ This assignment was performed in a superior manner by the first Air Commando Group. For the outstanding performance in the aerial invasion of

Burma it was awarded the Distinguished Unit Citation.

Even more important than the superlative performance in the CBI Theater during World War II was the doctrinal and tactical precedent set by the 1st Air Commando Group. The technology of the aircraft was exploited to the utmost in an unconventional environment. With a premium on successful performance, the capabilities of the aircraft and the men were pressed to their limits and tactical innovations became the rule rather than the exception. Reliable equipment coupled with highly motivated and experienced aircrews and support personnel produced operational successes that staggered the imagination.

The Postwar Years

The massive demobilization which followed World War II effectively eliminated Special Operations capability. But in 1950 the U.S. Air Force received authorization to activate specialized air units termed Air Resupply and Communications Wings. These units represented a rejuvenation of the World War II Special Operations capability and included activities in support of downed aircrew members as well. The policy of containment spawned an interesting set of operational requirements beyond the new nuclear considerations.¹⁸ Interestingly enough, these wings were assigned to Military Air Transport Service (MATS), and MATS activated its new Air Resupply and Communications Service

(ARCS) on 28 February 1951.¹⁹

Brig. Gen. Monro MacCloskey was the originator of the ARC wing concept, and in 1952 he became the ARCS commander. Three wings were formed, and each had a headquarters and staff, an Air Resupply Squadron, an Airborne Materials Assembly Squadron, a Holding and Briefing Squadron, and a Communications Squadron. There was some degree of confusion, however, regarding peacetime and wartime roles and missions as well as administrative and operational control for the three wings. A letter from Chief of Staff, USAF, Gen. Hoyt S. Vandenberg, to Lt. Gen. Thomas D. White, DCS/Operations, Headquarters USAF, reflected this uncertainty.

Thursday, 6 Nov. 1952

Dear Tommy,

MacCloskey and I have been talking about the proper place for the control of the ARC wings — he said that it seemed to you that his proposal to put them (ARC Hq.) under Hq USAF appeared to be okay — It looks okay to me since I think that as they really get operational they should be pulled together and under someone who realizes their future importance and MATS already has almost too many cats and dogs . . . so — if you agree it appears okay with me.²⁰

Van

Such grand plans were overcome by events, however, for the trauma of Korea

AEROSPACE HISTORIAN

and the advent of the Eisenhower administration's policy of "Massive Retaliation" portended the demise of units of an unconventional nature. The 580th, 581st, and 582nd ARC Wings were downgraded to group status in 1953, and in 1956 all three groups were deactivated and their personnel reassigned to other units throughout the Air Force.²¹

A New Era

Almost as soon as the Air Resupply and Communications Wings passed into history, U.S. national policy again changed and the United States Air Force responded again to a disturbing set of operational requirements. President John F. Kennedy defined the nature and scope of the twilight war of shadows in 1962.

There is another type of war, new in its intensity, ancient in its origin — war by guerrillas, subversives, insurgents, assassins, war by ambush instead of by combat. . . . it requires . . . where we must counter it . . . a whole new kind of strategy, a wholly different kind of force and therefore a new and wholly different kind of military training.²²

The Free World found itself confronted with so-called "Wars of National Liberation" which found violent expression throughout the world in the form of communist directed insurgency movements. The underdeveloped areas of the world were particularly vulnerable to this threat, for the communists were quick to exploit the fervent nationalism and rising expectations of newly emerging nations. Genuine nationalistic and anticolonial sentiments notwithstanding, the United States government had viewed the British anti-terrorist campaign in Malaya and the French war in Indochina with foreboding. The United States perceived the nature of the eventual threat embodied therein to its own vital national interests and began to actively assist established governments in combating communist subversion.

The issues were drawn, and the United States set about to discourage the use of violent insurgency as a credible option for communist expansion. The Kennedy administration and the advent of a policy of "Flexible Response" revived the interest in Special Operations.

The unique challenges posed by insurgency movements constituted a particularly thorny set of problems for the United States Air Force. New combat tactics, techniques, and procedures were required to define the role of airpower in counterinsurgency operations. Developing a conceptual frame of reference for air operations in an unconventional warfare environment was, as in the past, a difficult problem. Again, as in the past, the translation of conceptual theory into operational reality was to prove even more difficult.

The prospect of developing a significant Special Operations capability was not warmly received in all quarters of the Air Force. Some leaders had serious reservations with regard to the new emphasis on counterinsurgency, particularly when non-nuclear Tactical Air Forces were in need of attention.²³ Conversely, some members of the Kennedy administration were critical of their "lack of imagination" in developing a meaningful counterinsurgency capability.²⁴ Nevertheless, in March 1961, Gen. Curtis E. LeMay, Chief of Staff, USAF, directed the establishment of the 4400th Combat Crew Training Squadron within the Tactical Air Command to provide the Air Force with a counterinsurgency military assistance capability.²⁵ The types of aircraft chosen for this squadron were determined naturally by the operational requirements peculiar to counterinsurgency and unconventional warfare. The initial inventory of the 4400th CCTS consisted of 16 C-47s, 8 B-26s and 8 T-28s.²⁶

In September 1961, the squadron was certified operationally ready, and a detachment was sent to Mali (formerly French West Africa) as part of a Joint Army-Air Force Mobile Training Team (MTT). Commanded by Capt. Thomas C. McEwen, "Sandy Beach" detachment consisted of two C-47s and seventeen men to assist U.S. Army personnel in training Mali paratroopers.²⁷ On 11 October 1961, Detachment 2A of the 4400th CCTS deployed to Bien Hoa Air Base, Republic of Vietnam. Code named *Farm Gate*, this detachment consisted of eight T-28s, four C-47s and four B-26s — the first USAF unit to conduct combat missions in the Vietnam War.²⁸

As the Vietnam War expanded in scope and intensity, the U.S. Air Force increased its counterinsurgency capability. On 27 April 1962, General LeMay announced the formal activation of the USAF Special Air Warfare Center (SAWC).²⁹ The tactical element of this organization was the 1st Air Commando Group, and a 1st Combat Applications Group was responsible for developing and testing concepts, doctrine, tactics, and hardware.³⁰ This organizational structure supplanted the 4400th CCTS, and the 1st Air Commando Group soon became heavily committed to increased U.S. operations in Vietnam. Although the Air Commando credo, "Anytime, Anyplace," subsumed a worldwide concept of operations, most USAF Special Operations resources were dedicated to the war in Southeast Asia. Consequently many interesting special operations tactics and techniques evolved from the peculiar requirements of the war in Vietnam.

Many pundits, civilian and military alike, were amused at the vintage aircraft of the Air Commando units. Propeller aircraft such as T-28s, B-26s, C-47s and A-1s

appeared strangely out of place in the jet age Air Force. But reliability, durability, and simplicity were more valuable than technology, sophistication, and speed in the unconventional warfare and foreign internal defense environment, particularly when a key facet of the mission was training the host nation's Air Force. As one Air Commando cryptically commented: "Our planes may be obsolete and unsophisticated, but they can do our kind of job."³¹

A typical mission in the early days of the Vietnam War was exemplified by a combined C-47 and B-26 "Night Flare Strike" operation. On 29 July 1963, for example, a C-47 flareship on airborne alert was diverted to an outpost under attack seventeen miles north of Bien Hoa Air Base. While the C-47 dropped flares to illuminate the target area, a B-26 made repeated strafing, rocket, and bombing passes until the attackers were driven off.³² This type of episode was repeated time after time as the burgeoning conflict in Vietnam increased in scope and intensity.

Air Commando units also were involved in psychological operations as well as in unconventional warfare and foreign internal defense activities. Air Force aircraft were used as the means of delivery for other agencies' material, and speaker broadcasts and leaflet drops by C-47s and U-10s constituted a primary facet of U.S. psychological warfare operations. Both speaker and leaflet missions proved to be extremely effective, especially when coordinated with other activities, but the speaker broadcasts lent a somewhat humorous note to an otherwise grim conflict. In the words of one observer:

Programs broadcast from 3,000 feet high are clearly audible on the ground. Broadcasts are often pleas to guerrillas in the jungle to surrender. It is an eerie thing to hear a DC-3 (C-47) droning high overhead, from which a monstrous, celestial voice is enjoining sinners to repent.³³

Such a collage of air operations was far removed from the typical USAF activities of the "Massive Retaliation" era. A composite unit, the 1st Air Commando Squadron, was formed to meet the expanded requirements of air operations in Vietnam. Mission activities included unconventional warfare, foreign internal defense, psychological operations, and just about anything else that needed doing in the Vietnam War. In 1965, this squadron became the first USAF unit to win the Presidential Unit Citation since the Korean War.³⁴ This unit performed in a superlative manner under the most adverse operational conditions imaginable.

The spectrum of activities in Vietnam generated some mission requirements for which the U.S. Air Force was not particularly well prepared. Special Forces camps,



SSgt. James Coates of Det-2, 440th Combat Crew Training Squadron, smooths rough spots out of a T-28 propeller at Bien Hoa Air Base, South Vietnam, December 1961.

fortified hamlets, isolated outposts, and Long Range Reconnaissance Patrols suffered numerous attacks from hostile forces, and it was imperative that the friendly units successfully be defended. Guerrilla harassment as well as massive onslaughts often occurred during the hours of darkness, and the concomitant requirement for extensive night air operations further complicated the problem with respect to target identification and target illumination. USAF jet fighters were unable to remain on target for an extended period of time, and the hours between sunset and sunrise gave the hostile forces ample time to renew their attack after the aircraft had departed. A weapon system was required that combined illumination capability, potent and accurate ordnance delivery, and an extended loiter time.

Necessity is the mother of invention. The Special Air Warfare/Air Commando forces had developed a reputation for solving difficult problems, and a solution to night close air support in an unconventional warfare environment was soon forthcoming.

The C-47 had proved its mettle as a

flaeship with an extended loiter capability, and a USAF pilot, Capt. Ronald W. Terry, conceived the idea of adding weapons and using the aircraft as a lateral-firing gun platform.³⁵ Various tests of this concept were conducted, and one of the more novel experiments utilized ten .30-caliber machine guns jutting from the passenger windows and cargo door of a C-47. Optimal results were finally realized when three 7.62mm GAU-2B/A automatic guns, commonly referred to as miniguns, were installed in the port side of the aircraft's cargo compartment. A standard Mark 20 Mod 4 gunsight was mounted at the pilot's side window near his left shoulder, and a trigger was installed on the control wheel. The guns thus were both sighted and fired by the pilot while the aircraft was in a left bank. The AC-47 was deployed to South Vietnam to test the effectiveness of the sidefire concept under combat conditions.³⁶ Results surpassed the wildest expectations, and an entire squadron of the aircraft was deployed to Vietnam in 1965.

Each aircraft normally carried 21,000 rounds of 7.62mm ammunition and forty-five Mark 24 illumination flares. The AC-47

was particularly well suited for the night close air support mission. It could illuminate its own targets; fire one, two, or three guns at a time, and remain overhead for hours if necessary. Hostile forces could no longer confidently wait for strike aircraft to depart before resuming their attack. The aircraft provided an effective counter for the multitude of attacks, ranging from harassment to full-scale assaults, that occurred during the hours of darkness.

Despite its specific mission of providing firepower and flare support for outposts, hamlets, and friendly field units under night attack, the AC-47s were capable of other missions as well. The aircraft performed armed reconnaissance and interdiction missions against truck traffic on the Ho Chi Minh Trail until the volume and intensity of anti-aircraft fire became prohibitive. The AC-47 also was effectively employed as a convoy escort. Because the aircraft normally flew airborne alert above the major U.S. bases in South Vietnam, they were extensively involved in air base defense. AC-47s also served as forward air controllers for night fixed-wing fighter strikes. Finally, when there were no other priority missions, AC-47s performed yeoman service in a harassment and interdiction role.

AC-47s continued to represent a significant night close air support capability even as the spectrum of conflict in Vietnam expanded to include large-scale conventional type battles. After sundown on 5 September 1967, for example, a force of 1,200 Viet Cong and North Vietnamese regulars launched a massive attack on Tam Ky, the capital city of Quang Tin Province. Three AC-47s working in shifts and flying multiple sorties, provided firepower and flare illumination support for the city's defenders throughout the night.³⁷ Instead of overrunning the city and making a bloody example of its inhabitants, the attackers were repulsed with heavy losses before dawn.

The AC-47 indeed vindicated the concept of sidefiring gunships, but advanced technology exploited this unique Special Operations capability. The AC-119G, with four 7.62mm miniguns, and the AC-119K, with two 20mm cannon and four 7.62mm miniguns, were developed and deployed to the war. But the AC-130 Spectre Gunship surpassed all previous developments with a greatly expanded capability. This aircraft was equipped with sophisticated sensors and was initially armed with four 7.62mm miniguns and four 20mm cannons.³⁸ Later models sported 40mm cannon and even a 105mm howitzer. Sophisticated sensors and

a computerized target acquisition system yielded great accuracy and a significant standoff capability. The AC-130 performed the interdiction mission in an outstanding manner and proved to be the most effective "truck killer" of the war.³⁹ The aircraft's close air support effectiveness was equally impressive.

Other specialized air missions evolved from the Vietnam War. The Combat Talon C-130 performed infiltration, exfiltration, resupply, and other specialized missions. Equipped with sophisticated electronic equipment and the Fulton Surface to Air Recovery System (Skyhook), the Combat Talon represented a significant capability for a great variety of Special Operations missions, particularly in support of other services.

USAF helicopters also played a significant role in Special Operations in the Vietnam War. The vertical airlift capability facilitated a great variety of infiltration, exfiltration, resupply, and reconnaissance activities which were impossible with fixed-wing assets. Arming the helicopters enhanced their survivability and effectiveness throughout a broad mission spectrum. As with the Combat Talon, a significant portion of the helicopter missions were in support of other service activities.

Conclusion

As the Vietnam War became history, the requirement for a USAF Special Operations capability remained. The 1st Special Operations Wing (SOW) reflects this capability.⁴⁰ The unit is a unique and highly specialized force. But it basically reflects the three key aspects of Special Operations: unconventional warfare, foreign internal defense, and psychological operations. As in the past, the joint aspect of Special Operations constitutes a fundamental assumption.⁴¹ Aircraft assets include the AC-130H Spectre Gunship, the MC-130E Combat Talon, as well as the CH-3E and UH-1N Huey helicopters. In addition, the USAF Special Operations School (USAF-SOS) provides detailed courses of academic instruction in the three basic aspects of Special Operations. Realistic training to include a great number of joint exercises coupled with extensive experience and a high degree of professionalism constitute the hallmarks of the USAF Special Operations Forces. Significant technological advances and operational applications have enhanced capability to the point of adding new dimensions to the traditional Air Commando credo, "Anytime, Anyplace."

Some experts predict that Air Force Special Operations of the future will focus upon continuing support of security assistance programs (foreign internal defense) and improved direct action capabilities (unconventional warfare).⁴² Such prognosti-



U.S. Air Force Chief of Staff Gen. Curtis E. LeMay is briefed during his tour of facilities in South Vietnam, April 1962.



An AC-47 in flight in South Vietnam.

cations are probably accurate, but international political turmoil and technological innovations portend many additional opportunities for the effective employment of Special Operations Forces, particularly since they can be employed independently

or in support of conventional activities.

Emphasis on hardware and technology must not supersede the essential relevance of philosophy and flexibility in Special Operations. Many Special Operations missions and functions may appear doctrinally

inappropriate or philosophically disagreeable, but they represent a high return for a relatively low risk when properly performed in a timely manner. The 1st Special Operations Wing might well add "Anything" to its "Anytime, Anyplace" credo in its preparation for response to appropriate direction from the National Command Authority.

Special Operations indeed are extremely effective when properly employed, throughout the entire spectrum of conflict from Cold War to General War. The key to this effectiveness, however, is when they are committed and how they are employed. The lessons of the past should not be forgotten in future conflicts. Technology should not supersede simplicity unless there really are significant dividends. Simplicity, reliability, and durability often are more important than speed and sophistication. The enemy threat must be correctly assessed and carefully evaluated. For example, the presence of hostile, night, all-weather fighter aircraft normally precludes the employment of Special Operations Forces as does significant heavy anti-aircraft artillery (AAA) or surface-to-air missile (SAM) capability with extensive numbers and great coverage. Compatibility with host forces is a key consideration in foreign internal defense operations. Security and surprise have been and will be essential for the effective employment of Special Operations Forces. A small unilateral or joint Special Operations Force or a Joint Unconventional Warfare Task Force employed incisively early in a developing conflict can often achieve more than a large conventional commitment later.

History has vindicated the need for well trained and highly capable Special Operations Forces, and the 1st Air Commando Group's support of Wingate during World War II marks the watershed of a tradition that includes such activities as the Son Tay Raid and the Israeli rescue mission to Entebbe. The current and foreseeable international scene includes tension and conflict at varying levels of intensity, and the terrorist threat adds an additional irrational element of danger for U.S. interests.

The past is indeed prologue. The utility of USAF Special Operations Forces is clearly vindicated by past experience, and future requirements promise even greater returns.

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Misty FACs of the Vietnam War



Phil Haun

An F-100F used as a Fast FAC.

One of the most successful tactical innovations of the Vietnam War was the introduction of the F-100 Super Sabre to perform the new mission of “Fast FAC” (Forward Air Control). Under the call sign of “Misty,” F-100F pilots interdicted equipment and supplies flowing into South Vietnam. Their story is important because it provides key insights into how the Air Force flies, fights, and adapts during combat.

This article reviews the early years of the Vietnam War and how the need for Fast FACs evolved. Prior to the spring of 1967, the USAF tasked O-1 and O-2 FACs to conduct visual reconnaissance missions over the southern area of North Vietnam. In response, the North Vietnamese deployed additional air defenses, driving the slow and vulnerable propeller-driven aircraft back across the border. Operation Commando Sabre was the first test of the Fast FAC concept. Jet aircraft would perform FAC duties, adapting the two-seat version of the F-100 Super Sabre to the visual reconnaissance and strike control mission. This article also highlights the build-up and operations over the Misty FACs three-year history until the unit’s dissolution in May 1970. Commando Sabre operations never consisted of more than twenty-two pilots at any given time and rarely involved more than six single-ship missions per day. Yet, they succeeded in finding and destroying targets where other methods had failed. This success came at a price, though, as the low altitude Misty FAC missions proved to be among the most dangerous missions flown in the Vietnam War. Nonetheless, the tactics developed by the Misty FACs—including visual reconnaissance, strike control, and search and rescue operations—formed the foundation for FAC and Killer Scout operations employed during Operations Desert Storm and Allied Force, and remain valid today.

Vietnam: The Interdiction Campaign

Prior to August 1964, the U.S. military presence in South Vietnam was limited to an advisory role. However, instability within the South Vietnamese government led President Lyndon Johnson to question Saigon’s ability to withstand the increasing threat from North Vietnam.¹ In the wake of the Gulf of Tonkin incident of August 2, 1964, Johnson’s position shifted towards more aggressive and offensive measures, leading ultimately to the commencement of the Rolling Thunder air campaign in March 1965.

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Johnson's primary goal for Rolling Thunder was to demonstrate the resolve of the United States, believing that a series of graduated air strikes on North Vietnam would compel Hanoi to withdraw support from the Viet Cong in South Vietnam.² A secondary goal was to improve morale and help stabilize the South Vietnamese government. Additionally, the air strikes were to limit the flow of reinforcements, weapons, and supplies to the Viet Cong.³

While Rolling Thunder was an offensive campaign, target selection was limited by the President to those approved during his Tuesday Rose Garden luncheons. This fell well short of the strategic air campaign proposed by the Air Staff, consisting of over ninety-four strategic targets. These limited air strikes alone, however, did not achieve Johnson's objectives and, by July 1965, he concluded that victory in Vietnam required a protracted campaign with more emphasis on military action in South Vietnam.⁴

As the Johnson administration shifted its emphasis toward ground operations and increased U.S. troop strength, the importance of close air support and the interdiction of supplies from North Vietnam to the Viet Cong in the south was likewise elevated.⁵ Under the direction of Military Assistance Command, Vietnam (MACV) Commander, Gen. William C. Westmoreland, the U.S. Army concentrated on direct military action in South Vietnam against Viet Cong and North Vietnamese regular forces. Restricted to South Vietnam, these ground operations relied heavily on close air support.⁶ While the Air Force provided CAS within South Vietnam, it was also responsible for conducting the Rolling Thunder strikes in the North, including interdiction missions.

The North Vietnamese logistics and transportation system was centered in Hanoi. Chinese supplies flowed into Hanoi along roads and the rail system leading north, while Soviet supplies reached Hanoi via ships through Haiphong Harbor. These were then moved along rail and

major road routes toward the South and transferred to smaller convoys, that maneuvered along a series of redundant roads and trails. The supplies were further dispersed as they approached the demilitarized zone (DMZ) and carried by truck, bicycle, or packed on foot along trails at night. The North Vietnamese also moved supplies through the Laos panhandle and into Cambodia to more easily access Viet Cong positions in central and southern South Vietnam. Known as the Ho Chi Minh Trail, this network of thousands of miles of redundant roads concealed North Vietnamese trucks under a dense triple canopy forest.⁷

The aerial interdiction campaign focused on four areas: on the Rolling Thunder air campaign in North Vietnam in Route Packages IV, V and VI; on the area in southern North Vietnam near the DMZ in route Package I; on the Ho Chi Minh Trail in southern Laos; and on trails within South Vietnam.⁸

The most lucrative targets were those found at the head of the transportation system around Hanoi.⁹ These included railheads, major bridges, and repair and support facilities for the entire logistics systems. However, many of these targets were within the restricted and prohibited zones imposed by the Johnson administration around Hanoi and Haiphong Harbor and were thus off limits to attack for much of the war.¹⁰

Interdiction near the DMZ and along the Ho Chi Minh Trail proved more difficult.¹¹ Bombing the roads was ineffective due to the redundancy of road systems and the relative ease with which the roads were repaired.¹² For interdiction to be effective, convoys had to be attacked directly. Target identification was further complicated as the North Vietnamese adapted to traveling at night and in poor weather, while camouflaging their positions during the day.

The interdiction campaign in South Vietnam, Laos, and near the DMZ in North Vietnam instead relied heavily on airborne FACs for target identification and strike control. Three types of aircraft were used for these missions: slow moving, propeller-driven aircraft; armed transport aircraft; and jet fighters.

The 19th Tactical Air Support Squadron (TASS) began deploying 22 Cessna O-1 Bird Dogs and 44 FAC pilots in June 1963, in support of the South Vietnamese Air Force.¹³ By January 1965, the number of FAC pilots in Southeast Asia had grown to 144. An additional three TASSs were activated in March; by December, 224 FACs were in country.¹⁴ With continued high demand for these airborne FACs their number swelled to 668 by October 1968, operating more than 324 O-1 and O-2A Super Skymaster aircraft in 5 TASSs.¹⁴ In 1968 alone, these aircraft flew more than one-third of the total U.S. combat time in Vietnam, averaging over 29,000 flying hours a month.¹⁵

The single-engine O-1's slow speed proved both an advantage and a disadvantage. The advantage lay in its slow speed and extended loiter capability, that allowed controllers ample time to observe enemy positions and control strikes. By June 1965, General Westmoreland divided South Vietnam into sectors that could be patrolled by the O-1 on a daily basis and all major ground units had as-

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An F-100F rests in a shelter.

signed FACs.¹⁶ Although always in high demand for CAS and visual reconnaissance missions, the O-1 had its limitations. Its slow speed delayed its response time, once alerted, it had limited target marking and night flying capability, and it was susceptible to enemy ground fire. The introduction of the two-engine O-2 in 1966 somewhat improved speed, target marking and night capability, but did little to enhance survivability.¹⁷ The introduction of the OV-10 Bronco in 1968 brought in more firepower but, while the OV-10 was less susceptible to small arms fire, it was still vulnerable to larger antiaircraft artillery (AAA) and surface-to-air missiles (SAMs).¹⁸

To increase tactical air's ability to support the U.S. Army at night, the Air Force introduced the first gunships to South Vietnam in 1965. The AC-47 Spooky was a C-47 fitted with either three six-barrel, 7.62 mm Gatling Guns or ten side-firing 30-caliber machine guns. The AC-47 had a long loiter time, could accurately fire from above 3,000 feet, and had flare dispensers. Spooky's potential was soon realized during CAS missions and its role expanded to include strike and flare missions along the Ho Chi Minh trail.¹⁹ The success of the AC-47 led to the introduction of the AC-119K and to the development of the AC-130 by 1967. With an improved fire control system, increased firepower, and sensors for better night capability, the AC-130 proved to be the best platform for destroying trucks of the war.²⁰

By spring 1967, the success of U.S. military activity in South Vietnam, Laos, and North Vietnam convinced Communist states that the North Vietnamese needed additional support. The Soviets stepped up shipments of SAMs, AAA, and small arms, making the O-1 and O-2 FAC and

AC-130 operations along the Ho Chi Minh Trail and DMZ considerably more dangerous.²¹

Operation Commando Sabre and Misty FAC Operations in 1967

The influx of antiaircraft weapons into Route Package I and the Laos panhandle significantly increased the risk to U.S. FACs by May 1967. In response to the loss of two O-1s to SA-2 surface-to-air missiles, Seventh Air Force Commander, Lt. Gen. William W. Mommyer, approved a test program to place FACs into the rear seat of fighter aircraft.²² Their higher speed allowed fighters to operate in the high threat areas deemed too dangerous for the slow O-1s and O-2s. Codenamed Operation Commando Sabre, the initial test selected the F-100F, the two-seat version of the North American F-100 Super Sabre, to fly single-ship missions in the Route I and Tally Ho areas of the southern panhandle of North Vietnam.²³

Under the call sign "Misty," the FACs mission was to "impede the enemy logistic flow within and through Route Package One/Tally Ho to the maximum extent possible."²⁴ They were also to "suppress enemy defenses as practicable to maintain a permissive environment for strike reconnaissance and FAC operations."²⁵

On June 28, the Commando Sabre mission was assigned to Detachment 1 of the 416th Tactical Fighter Squadron (TFS), 37th Tactical Fighter Wing (TFW), stationed at Phu Cat AB, South Vietnam.²⁶ The 37th TFW consisted of two squadrons of F-100s.²⁷ Commando Sabre came with neither aircraft nor maintenance, relying instead on the 37th TFW to supply both.



A Cessna O-1A Birddog used by Forward Air Controllers.

Commando Sabre operations initially consisted of 16 to 18 pilots and a dedicated intelligence officer.²⁸ The pilots, including a commander and operations officer, were drawn primarily from the 37th TFW, with other F-100 units in Vietnam providing extra pilots on a temporary duty basis.²⁹ Initially, four FACs from the 504th Tactical Air Support Group were also included to instruct the F-100 pilots in FAC techniques.³⁰ The checkout program consisted of on-the-job training in the rear cockpit with an experienced Misty FAC in the front. The FAC would also demonstrate visual reconnaissance, strike control and battle damage assessment techniques.³¹

The lengthy operations at low altitude and over heavily defended territory made the Misty FAC mission extremely dangerous. Pilots were, therefore, solicited on a volunteer basis to perform the duty for 120 days or 60 missions, whichever came first.³² All F-100 pilots selected for Misty had combat experience in Close Air Support missions in South Vietnam. Some also had prior FAC experience.

By the beginning of July, Commando Sabre Operations were scheduling two sorties a day, with a single air refueling per sortie.³³ Initially unopposed, Misty FACs began encountering small arms and AAA fire on July 5, after which enemy ground fire became common.³⁴ Through July and August, the Misty FACs continued to refine their tactics and sharpened their skills at visual reconnaissance and air strike control. They located truck parks, bridges, and air defense sites. In July alone, Misty FACs flew 82 missions and directed 126 strikes.³⁵ Although Misty FACs could locate and mark the targets, the inability of fighters to drop unguided bombs for direct hits on such hardened targets as AAA pieces reduced the overall extent of battle damage.

The first setback for the Misty FACs occurred on August 26, when Misty commander Major George "Bud" Day

and Captain Corwin M. Kippenhan were conducting visual reconnaissance of an active SAM site twenty miles north of the DMZ. They were forced to eject when their F-100F was hit by 37mm flak.³⁶ While Kippenhan was rescued, Day was eventually captured.³⁷ From July 1967 to October 1968, Misty FACs flew 1,498 sorties over Tally Ho and Route Package I, losing 9 aircraft for a loss rate of 6.01 per thousand sorties.³⁸ Of the 18 pilots who ejected, 12 were rescued, 3 were captured, and 3 were listed as Missing in Action.³⁹ From November 1968 to May 1970, interdiction operations shifted to Laos, for which Misty FACs flew a total of 3,072 sorties, losing 11 aircraft for a loss rate of 3.58.⁴⁰ Of the 22 pilots who ejected, 18 were rescued and 4 were listed as Missing in Action.⁴¹ Misty FAC missions had a loss rate more than three times higher than the wing's other F-100s, which conducted CAS and strike missions.⁴²

The Tet Offensive and Misty FAC Operations in 1968

On January 30, 1968, the North Vietnamese commenced a conventional ground offensive into Vietnam during the traditional Vietnamese holiday of Tet.⁴³ U.S. air efforts focused throughout January and February on close air support in South Vietnam.⁴⁴ The elevated consumption rate of supplies incurred by the offensive forced the North Vietnamese to increase the number and size of their truck convoys. Though the northeast monsoon season severely hampered Misty interdiction efforts in January and February, March ushered in clearer skies and a higher interdiction success rate. On the single most successful Misty FAC mission, "The Great Truck Massacre" of March 20, Misty FACs located and controlled strikes on a large truck convoy, damaging or destroying some 79 trucks.⁴⁵

Misty FACs' detailed knowledge of the terrain and North Vietnamese defenses in Route Package I and Tally



The O-2A Super Skymaster helped meet the demand for FACs.

Ho proved invaluable, not only for FAC operations, but for rescue efforts as well. Misty FACs assisted in many successful Search and Rescue (SAR) operations, locating the position of downed aircrew and suppressing enemy ground fire for rescue helicopters.⁴⁶ The versatility of the Misty FACs was further demonstrated in May and July when they began spotting for naval gun fire on fixed positions in Route Package I.⁴⁷

The capability of the Misty FAC to locate and strike trucks did not go unnoticed by the North Vietnamese. By June 1968, Tally Ho and Route Package I were free of daylight enemy truck traffic.⁴⁸ On June 12-13, Misty FACs conducted two night sorties to test the F-100F for night visual reconnaissance. The results were positive and Seventh Air Force gave immediate approval for night operations in Route Package I. While Misty FACs flew 46 night sorties in July and August, regularly scheduled night missions were discontinued on August 21.⁴⁹ Continual difficulties in marking targets and conducting attacks, coupled with the risk of mid-air collision, plagued night strike control. Night sorties were then irregularly scheduled until completely halted in October.⁵⁰

The success of Misty FAC operations was somewhat offset by the limited number of F-100F airframes available and the plans to remove the jets from Vietnam by 1970. In response, Seventh Air Force turned to another multi-role fighter to augment and eventually replace the F-100F. The first F-4s to join the Fast FAC mission were those of the 366th TFW at DaNang Air Base. Misty FACs flew F-4 pilots in the back seat of F-100Fs on upgrade and area orientation sorties. Select Misty FAC pilots also went to DaNang to fly with the F-4 "Stormy" FACs to complete their checkout.⁵¹

Another initiative, introduced in August 1968, was the Sun Valley Test, a hunter-killer concept capitalizing on the

F-100 strikers already collocated with Operation Commando Sabre at Phu Cat.⁵² The F-100 strikers carried a full load of bombs and flew at medium altitude, trailing several miles behind a faster and more maneuverable Misty FAC on visual reconnaissance at low altitude. Once targets were located, the F-100 strikers were already in position for a quick attack. While the concept showed great potential, the loss of two Misty aircraft compelled the Seventh Air Force to direct a review of operations. It was concluded that the North Vietnamese restriction on daylight movement had been forcing Misty FACs to increase their exposure time in locating targets. Seventh Air Force, therefore, imposed restrictions to reduce exposure time, which temporarily halted hunter-killer operations and reduced the overall effectiveness of Misty FACs in locating valid targets.⁵³

November 1968 Bombing Halt and Misty FAC Operations in Laos in 1969

Misty FACs continued flying missions into Tally Ho and Route Package I until President Johnson issued the Executive Order of November 1, 1968, prohibiting bombing in North Vietnam.⁵⁴ Attacks were then shifted into Laos, redirecting the Misty FAC mission to visual reconnaissance of the southern areas of Steel Tiger in the Laotian panhandle. The decreased AAA threat in Laos further allowed Misty FACs to perform visual reconnaissance at lower altitude and to reintroduce hunter-killer tactics.⁵⁵

February 1969 brought the additional task of photo reconnaissance to the mission. While Misty FACs had been using 35mm high-speed cameras in the rear cockpit to photograph potential target areas for some time, Operation Search formalized a working arrangement between Misty and the 460th Tactical Reconnaissance Wing.⁵⁶ This was a



OV-10 Bronco with 2 A-1H TC 56 SOW 1 SOS on FAC mission

four-month long effort to familiarize RF-4C crews with Misty FAC tactics.⁵⁷

During this period the 37th TFW at Phu Cat converted from the F-100 to the F-4. In May, Misty FAC operations deployed with the 416th TFS to Tuy Hoa Air Base where F-100 operations continued with the 31st TFW.⁵⁸ Misty's

area of responsibility expanded in August from the southern areas of the Laotian panhandle to include the entire Steel Tiger region.⁵⁹ However, the number of daily missions scheduled was reduced from seven to five at the behest of the 31st TFW, which was in need of additional F-100F airframes to train incoming F-100 pilots.⁶⁰ In response to the



An F-100F of the 120th Tactical Fighter Squadron, Colorado National Guard, takes off from Phan Rang Air Base. (U.S. Air Force)



Misty FAC Capt. Ted Powell examines his battle-damaged F-100F.

overall lower experience level of the 31st TFW F-100 pilots, the Misty FACs were forced to reevaluate their own manning and training program. Roughly half of the pilots they began receiving were inexperienced. The inexperienced pilots flew with Misty FAC instructors and completed a FAC upgrade program prior even to becoming flight leads.⁶¹

In October 1969, the number of daily missions scheduled was further reduced from five to four and a theater-wide shortage of tanker support cut back the length of each mission.⁶² Misty FAC time on station was reduced from ten hours a day, based on a six sortie schedule, to just under three and one-half hours with the four sortie schedule. A combination of good weather, increased ground activity, and the arrival of three replacement F-100Fs in early 1970 returned the daily schedule to six missions, but the lack of tanker support continued to limit on-station times.⁶³

The loss of two aircraft on January 18 and 19, along with 8 hits on aircraft in just 19 days, brought about a change of tactics for Misty operations. Whereas visual reconnaissance had been conducted at altitudes as low as treetop level, Seventh Air Force raised the altitude to 4,500 feet Above Ground Level (AGL) and confined strafing to the support of rescue missions only.⁶⁴ This greatly reduced the ability to visually acquire targets and forced Misty FACs to rely more heavily on photographs shot by the back seater.

The additional loss of an aircraft in late March and heavy battle damage of aircraft in late April and early May compelled Seventh Air Force to review the entire Commando Sabre program. Given the limited number of available F-100F airframes and experienced pilots, Misty FAC operations were discontinued. The Commando Sabre Operation was officially terminated on May 14, 1970.⁶⁵ Although the F-100F was no longer used, the F-4 continued flying Fast FAC missions through the end of the Vietnam War.

Legacy of the Misty FACs

The Fast FAC mission was introduced into the Vietnam War to fill a void for visual reconnaissance and strike control over areas of North Vietnam and Laos too heavily defended for the O-1 and O-2 FACs. The fact that the Misty FACs conducted these missions for three years and that the Fast FAC mission expanded to the F-4 indicates that Air Force leaders in Southeast Asia considered the mission as successful. Twenty years later over the Persian Gulf, A-10 FACs and F-16 "Killer Scouts" continued the Misty tradition locating and destroying mobile targets. Likewise, over Kosovo A-10 and F-16 FACs used Misty tactics to attack the Serbian 3d Army.

The Misty FACs were a brave and courageous group

of men who developed effective tactics to directly attack mobile targets over heavily defended territory. As important as their contributions were to tactical aviation has been the lasting influence on aviation and the U.S. Air Force. The 155 men who flew as Misty FACs produced sev-

eral general officers including two Air Force Chiefs of Staff, Gens. Merrill A. "Tony" McPeak and Ronald "Ron" Fogleman. They also include a medal of honor winner Colonel "Bud" Day, and the first man to fly non-stop around the world, Dick Rutan. ■

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20. *Ibid.*, p. 237; Mark, p. 336; and Momyer, p. 211.
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27. 37th TFW History Jan-Mar 1968, vol. I, 17. In February, 1968 the wing expanded to three squadrons with the arrival of the 355th TFS.
28. The total number of pilots fluctuated over the three-year period, sometimes rising to as many as 22 or dropping to as low as 14, depending on the daily flying schedule. The schedule, in turn, was dependent on the number of F-100Fs available.
29. History of 37th TFW, Jul-Sep 67, 416th Detachment 1 Operation Commando Sabre Roster.
30. Rowley, p. 173.
31. Dick Durant, "Dick Durant's Observations," in *Misty: First Person Stories of the F-100 Misty Fast FACs in the Vietnam War*, (Austin, Tex.: The Misty FAC Foundation, 2002), Don Shepperd (ed.), p. 246. The Misty upgrade program consisted of five missions in the back seat, followed by additional missions in the front seat with a Misty instructor pilot in back. Checkout varied but, following the initial five backseat missions, pilots alternated between front and back seats for an additional 5-15 missions in training status until fully checked out.
32. Interview, author with Maj. Gen. Donald Shepperd, USAF (Ret.); History of 37th TFW Jul-September 1967, memo from Lt. Col. Donald Jones to Col. Edwin Schneider. These limits would later be extended, as evidenced by Capt. Dick Rutan being hit on his 104th mission after flying as a Misty from January 30-August 17, 1968. History of Commando Sabre Operation July-September 1968, History of 37th TFW, Jul-Sep 68, vol. II, p. 93.
33. History of 37th TFW, Jul-Sep 67, p. 20.
34. Rowley, p. 179.
35. *Ibid.*
36. History of 37th TFW, Jul-Sep 67, p. 23.
37. Major Day would eventually receive the Medal of Honor for his evasion efforts and conduct as a POW.
38. *Summary of F-100 & F-4 Losses in the FAC/VR Role July 1967-July 1970*, p. 7.
39. *Ibid.*, table D2.
40. *Ibid.*, p. 7.
41. *Ibid.*, table D2.
42. History of 37th TFW, Jan-Mar 69, volume II, p. 21.
43. Schlight, p. 282.
44. Momyer, p. 319.
45. History of 37th TFW, Jan-Mar 68, p. 21.
46. History of 37th TFW, Jan-Mar 68, pp. 24-5.
47. History of 37th TFW, Jul-Sep 68, p. 25.
48. History of 37th TFW, Apr-Jun 68, p. 21.
49. Rowley, p. 181.
50. *Ibid.*, p. 182.
51. History of Commando Sabre Operations, Jul-Sep 68, p. 40.
52. *Ibid.*, p. 41.
53. *Ibid.*, p. 17.
54. *Ibid.*, p. viii.
55. History of Commando Sabre Operations Oct-Dec 1968, p. 11.
56. History of Commando Sabre Operations, Jan-Mar 69, p. 10.
57. History of Commando Sabre Operations, Apr-Jun 69, p. 16.
58. History of 37th TFW, Apr-Jun 69, p. 15.
59. History of Commando Sabre Operations, Jul-Sep 69, vii.
60. *Ibid.*, p. 9.
61. *Ibid.*, p. 5.
62. History of Commando Sabre Operations, Oct-Dec 69, p. 9.
63. History of Commando Sabre Operations, Jan-Mar 70, p. 8.
64. *Ibid.*, p. 12.
65. History of Commando Sabre Operations, Apr-Jun 70, p. 13.

100 MISSIONS NORTH: HISTORY AND TRADITIONS



Jeff Duford

Two F-105s taxi home after a mission. (Except where noted, all photos courtesy of the author.)

In November 1965, the United States Air Force instituted a 100 combat mission tour for aircrews flying *out country* over North Vietnam and Laos. Before then, these aircrews rotated in and out of theater on temporary duty. With Operation Rolling Thunder heating up, however, the need to station and replace aircrews in Southeast Asia on a long-term, stable basis became evident. The 100 mission tour policy spawned a rich tradition among Air Force aircrews which included a special patch, elaborate end-of-tour celebrations, and many humorous customs. This tradition provides a meaningful insight into the unique culture of Air Force Airmen who flew over North Vietnam during the war in Southeast Asia.

History

Mission-based tours date back to the U.S. Army Air Forces' experience during World War II. Initially, a tour was determined by time, typically one year in a combat theater. In late 1942, numbered air force commanders were authorized to determine tour lengths. Commanders periodically raised the required number, in some cases up to 100 combat missions, to maintain aircrew numbers and because the odds of survival rose as the Axis war machine declined. For some USAAF aircrews, however, tour length depended on time in theater or the number of combat hours flown.¹

Maintaining combat effectiveness was the most important reason to rotate crews on some fixed basis. Exposure to battle over time eventually led to combat fatigue, rendering an Airman ineffective or incapable of performing his duties. Other reasons included spreading hazards equally and getting combat-trained Airmen back to the States to train new ones. USAAF Airmen appreciated having a fixed tour based on missions, and they felt it improved morale considerably. They preferred having something to work for and look forward to, rather than the hopeless alternative where they would fly in combat until they were seriously injured, captured, or killed.²

During the Korean War, the Air Force also utilized a mission-based tour policy. In 1951, the criteria for a tour was established at 100 combat missions for single-engine fighters, forward air controllers, tactical reconnaissance aircraft, and fifty combat missions for twin-engine fighters, bombers, and multi-engine reconnaissance aircraft. In 1952, the benchmark rose to 100 combat missions for fighter and reconnaissance aircrews, 100 missions (or nine months in theater) for forward

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During World War II, the Eighth Air Force's Memphis Belle and its crew became famous as the first to complete a 25-mission tour and return to the United States. The Memphis Belle is currently in restoration at the National Museum of the U.S. Air Force, where it will be put on future display. (Photo from the collection of the National Museum of the USAF, hereafter NMUSAF.)

air controllers, seventy combat missions (or nine months in theater) for all-weather fighters, fifty combat missions for light bombers (B-26s), and six months for medium bombers (B-29s).³

During the early part of the Southeast Asia War, from 1961 to 1965, Air Force aircrews based in South Vietnam stayed for one to two years, while those based in Thailand served on a temporary duty basis, typically 90-120 days. By fall 1965, Operation Rolling Thunder strikes against North Vietnam placed higher demands on personnel rotation. In early November, tour length became one year or 100 missions out-country (meaning Laos or North Vietnam), whichever came first.^{4,5}

This policy permitted aircrews to count previously flown missions over North Vietnam and Laos, and the first Airman completed a 100 mission tour less than two weeks after the policy began. On November 15, 1965, Capt. Donald Beck, an RF-101C pilot in the 15th Tactical Reconnaissance Squadron, completed his 100th out-country mission (Beck's total included missions over Laos and North Vietnam).⁶ The first Airman to fly 100 missions over only North

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Some units celebrated the 100 mission mark during the Korean War. This 18th Fighter-Bomber Wing F-51D pilot has donned a 100-mission "Century Flight" lucky horseshoe. (NMUSAF)

Vietnam was Capt. Eldon "Joe" Canady, an RB-66C electronic warfare officer (EWO), who completed his 100th on December 13, 1965.⁷

Perhaps the most difficult 100-mission tour to complete involved the F-105 Thunderchief aircrews. "Thud" losses represented nearly twenty percent of all USAF combat losses during the war, and most of these occurred during Operation Rolling Thunder. On January 11, 1966, Captains Donald Totten and Benjamin Bowthorpe, 334th Tactical Fighter Squadron, 355th Tactical Fighter Wing, Takhli Royal Thai Air Force Base (RTAFB), became the first F-105 pilots to achieve 100 missions out-country.⁸

Three months into the 100-mission policy, the Air Force made two changes. First, it addressed the pilot shortage issue and the fact that aircrews were completing tours faster than expected. Consequently, as of February 1, 1966, only missions over North Vietnam counted. This change in policy caused understandable anger among aircrews who continued to fly hazardous non-counters over Laos. The total USAF wartime losses numbered more than fifty F-105s and 130 F-4/RF-4s, among others, from combat damage over Laos. The second change was a time credit for missions. Aircrews could have their tour length reduced by one month for every twenty counters they flew. For instance, an Airman with 80 counters would have his year tour reduced by four months, and so he could go home after eight months. But, this time credit did not last, and it was eliminated at the end of October 1966.⁹

Apparently, granting of counters varied slightly among units. In some cases, conflicts arose between leaders of units, who had to maintain aircrew numbers and fulfill command responsibilities, and the aircrews flying the missions, who watched the finish line being pushed back. The experiences of the aircrews in the F-105-equipped 388th Tactical Fighter Wing at Korat RTAFB illustrate how the



Capt. Donald Beck exiting his RF-101C after his 100th counter on November 15, 1965. (NMUSAF)



Capt. Eldon "Joe" Canady, an RB-66C electronic warfare officer (EWO), who completed his 100th on December 13, 1965. (NMUSAF)

counter/ non-counter policy affected them, their relationship with their commander, and some of the ways in which they coped.

A few weeks after the change in policy, Maj. Robert Krone, 469th TFS Operations Officer, wrote in a letter home, "The morale is sagging a little now with the ruling on counting missions. The last few days have been mostly missions that don't shorten the tour any." Particularly frustrating was the ebb and flow of the Rolling Thunder campaign. When missions over North Vietnam stopped because of weather or peace talks, the missions over Laos (none of which counted) surged. Captain Charles "Clint" Murphy,

an F-105 pilot, later wrote "we were scheduled for Laos, which is a non-counter. Our target was in an area worse than most other areas except Hanoi. They have lots of guns, plus they are known for not taking prisoners. When you go on one like that and it doesn't count, it really burns."¹⁰

To offset the loss of counters in Laos, it became common practice to fly quick "weather checks" over southern North Vietnam on the way to or from a combat mission over Laos, thereby making it a counter. The 388th TFW commander, however, stopped this practice by requiring that for a mission to count, ordnance had to be expended over North



(Left to right) Captains Bruce Holmes, William May, Richard Ely, and William Ramage, flying from Korat RTAFB. This photo was taken on January 15, 1966, during the first formal 100 mission celebration. Note the 100-mission patches on their left shoulders. (NMUSAF)



Ground crews played an essential role in completing a 100 mission tour. Here, F-105 pilot Maj. Robert Krone gives his crew chief his thanks with the customary case of beer after completing his 100th on June 3, 1966. (NMUSAF)

Vietnam. In December 1966, F-105 pilot Maj. Edward Kohlmeier wrote in his diary, “wing morale hit rock bottom...the new rule is to drop in RT [Rolling Thunder] or no counter. No more weather checks. This is fantastically bad news.” He wrote again a few days later, “The squadron flew 14 missions today and got zero counters. Isn’t that nice? The morale is at a worm’s belly level here tonight.” At the same time, Murphy wrote, “I was madder today than I have been since I arrived here. The rotten system of counters and no-counters got to me.”¹¹

The importance of counters to aircrews cannot be understated. In fact, for many, time was not measured by weeks or months, but rather in missions that counted. In October 1966, Kohlmeier wrote, “It amazes me how over here everything is so associated and tied up with that word ‘counter’.... Unlike days, each one is a question of survival and the pressure is truly fantastic.” The next day he added, “counters are morale raisers.”¹²

The anger and frustration grew worse. Some aircrews simply flew across the North Vietnamese border and fired their cannons, thereby filling the new wing requirement of expending ordnance over the North to obtain a counter. In January 1967, the issue exploded after a pilot flying over Laos was killed. Murphy wrote:

*When we returned, the pilots were literally in a boil. One of their friends had been killed on one of [the wing commander’s] non-counters...The fact is that one of our friends and an American fighting man’s body is lying in a ravine tonight unable to be recovered, and he will not receive credit for having flown the mission because of a silly rule...I have seen morale at a low ebb before, but never to the extent that it has fallen among the pilots here.*¹³

Four days later, the issue was resolved in the pilots’ favor when, as Murphy wrote, “We almost had a rebellion over counters versus non-counters” after the wing com-



Capt. William Koenitzer marking his 100th on the mission board, wearing the legendary 100 mission patch he and Bruce Holmes designed. (NMUSAF)

mander tried to take away counters from some of the pilots. The wing commander, however, “finally backed down and let them count.”¹⁴

The 100-mission policy ended in the summer of 1968, as Operation Rolling Thunder began winding down and Air Force crews flew fewer missions over the North. Personnel leaving the continental United States on or after July 1, 1968, would serve one year in theater regardless of where or how many missions they flew. Those who were already in Southeast Asia before July 1 remained under the old policy—they came home after completing 100 counters or one year in theater, whichever came first.¹⁵

Traditions

The traditions that became associated with the 100-mission tour in Southeast Asia did not start with the first completions. Although some recognition was given to the early crews for finishing a tour, there were no parades or special memorabilia handed out. Two of the most significant traditions, the 100-mission patch and formal end-of-tour celebration, began among the 388th Tactical Fighter Wing F-105 aircrews flying out of Korat. In late 1965, planning began to formally celebrate upcoming tour completions in the 388th TFW.

In December 1965, Captains William Koenitzer and Gilbert “Bruce” Holmes were assigned to create a special patch to commemorate the completion of 100 “out-country” missions. Koenitzer and Holmes worked together on many design ideas, including a map of North Vietnam, SAMs, AAA, and an F-105 silhouette. Koenitzer made numerous sketches over several days mixing these elements. In the end, they discarded these complicated designs, and created a simple patch based the standard Air Force shield using the red, white, and blue colors of the American flag.¹⁶



Capt. Richard Hamaker, an RF-4C backseater in the 14th TRS, being thrown into a vat of stagnant water, shark repellent, and anti-freeze kept just for end-of-tour dunkings. Other units hosed down aircrews with fire hoses or threw them in the base pool. (NMUSAF)

On January 15, 1966, the first four 388th TFW F-105 pilots finished their 100-mission tours—Captains Holmes and William May of the 469th TFS, and Captains Richard Ely and William Ramage of the 421st TFS. The elaborate event these pilots enjoyed quickly became a tradition.¹⁷ A few days later, Koenitzer finished his 100th, and Major Krone wrote about his celebration in a letter home:

*When Willy finished up two days ago, we had fire engines to meet him at the end of the runway, smoke flares, champagne, Col. Sams [388th TFW Wing Commander], the 100-mission patch, and everyone out to meet him. He was really touched and it did a lot of good for everyone. The morale went up...as everyone could see that people are finishing up.*¹⁸

In the military, there seems to be a patch for nearly everything, and it is easy to overlook any one in particular. The 100-mission patch, however, was unique. Although unofficial, it became a powerful, recognized mark of respect that identified one's place in their culture. Captain (later Brigadier General) Kenneth Bell had these thoughts when he received his ceremonial 100-mission flight suit:

*Instinctively, my eyes found the patch we coveted most... The bold embroidered words read: 'North Vietnam—100 Missions F-105.' It was beautiful and signaled the finale I had dreamed about... My gaze fixed on the patch, and I felt tears well up in my eyes.*¹⁹

Thud aircrews continued to use the 100-mission patch as Koenitzer and Holmes designed it, but others simply changed "F-105" to their aircraft type, while others created their own unique 100-mission patches. The custom of the 100-mission patch spread to include those who did not fly most (or in some cases any) of their missions over the North. They simply copied the design of the original F-105 patch, but changed "North Vietnam" to "South Vietnam" or "Vietnam." The 100-mission patch also became the basis for look-alike patches that reflected important cultural aspects of Airmen in Southeast Asia, like humor or family back home.

Another ubiquitous custom of the 100-mission tour was the "go-to-hell" hat, alternately called a "Sierra Hotel" hat or "Boonie" hat. Airmen in Southeast Asia began wearing these bush hats early on, but the 100-mission policy turned them into wearable scoreboards. Aircrews kept a running tally of their missions by scribing hash marks on their go-



From 1971-1972, the 34th and 469th TFS at Korat RTAFB escorted end-of-tour aircraft with the humorous 5-man team called the “Thunderbuz zards.” Mimicking the famous Air Force Thunderbirds, this five-man team wore special red, white, and blue suits and rode motor scooters in various formations while leading the parade. Pictured here are three of the five. (NMUSAF)

to-hell hats, and differentiating between counters and non-counters in some fashion. These hats provided a recognizable means to show an Airmen’s experience—the “new guy” had a crisp, vibrantly green hat with only a few hash marks, while the “short-timer” had a beat-up, sun-bleached hat covered with hash marks. In addition to individual hats, many units kept 100-mission tallies on scoreboards, plaques, red carpets, and flying scarves, among others.

Even with the end of the 100-mission tour policy in 1968, many of the traditions continued. The 100 mission

parade and party became the “end-of-tour” or *Sawadee* (for good-bye in Thai) celebration with the same parades and dunkings. Airmen still wore 100-mission patches and continued to mark their missions on their go-to-hell hats until the war ended.

The significance of the 100-mission tradition was evident in the treatment given to Air Force POWs after they came home. Since misfortune cheated them of enjoying their end-of-tour celebration, 152 returnees received Operation Homecoming “champagne flights” in T-38s at Randolph AFB, Texas. These Airmen were hosed down when they exited the cockpit just as if they were completing a 100-mission tour in Southeast Asia. They also received special patches, called “Three’s In.” (In a “missing man” formation, aircraft number three pulls up and out as the “missing man.” “Three’s In” symbolically means number three is back in formation).²⁰

The traditions of the 100-mission tour are too rich and varied to include all of them here. Even so, what has been described illustrates the unique culture of Air Force Airmen who fought under challenging circumstances, who regularly faced death or capture at the hands of a brutal enemy, and who could yet still find humor and laughter in their surroundings. These traditions demonstrate both the depths of their frustration and the heights of their elation. Moreover, though nearly fifty years have passed since Bruce Holmes and Will Koenitzer designed the simple patch that described “100 Missions—North Vietnam,” this bold symbol remains in artifacts and photographs to remind us of the honor and courage of those who earned the right to wear it, and the sacrifice of those lost on the way. ■

NOTES

1. *Combat Crew Rotation, World War II and Korean War*, Historical Studies Branch, USAF Historical Division, Aerospace Studies Institute, Air University, Maxwell AFB, Ala., January 1968, pp. 7, 25.

2. *Ibid.*, pp. 1-2, 19-20.

3. *Ibid.*, pp. 23-24.

4. Don Little and Barry Spink, *USAF Rotation in Southeast Asia (A Chronology), 1961 through 1968*, Air Force Historical Research Agency, April 2008, pp. 5-7.

5. This policy also covered aircrews stationed in South Vietnam. Those who did not fly missions over North Vietnam served one year, regardless of the number of missions flown. This caused resentment for some Airmen who ended up flying 200+ combat missions in Cambodia, Laos, South Vietnam, and North Vietnam during their one year tour. The 100 mission policy did not apply to Strategic Air Command aircrews, such as those flying in B-52s or KC-135s. These SAC crews typically flew six-month temporary duty (TDY) tours.

6. Donald Beck Collection, AR.2007.156, National Museum of the U.S. Air Force (NMUSAF).

7. Eldon Canady Collection, AR.2007.176, NMUSAF. Determining the first Airmen to fly 100 missions over North Vietnam was problematic, since the mission codes in the flight records did not differentiate between Laos and North Vietnam. But, early RB-66C jammer aircraft had to fly into North Vietnamese airspace to perform their mission, and all combat missions at this time were over the North because there was no need for jamming in South Vietnam or Laos.

8. Donald Totten Collection, AR.2007.162, NMUSAF. Some sources, including newspaper articles and a Republic Aviation certificate presented to Totten and Bowthorpe, incorrectly list the date for their 100th as January 12, 1966, but other sources convincingly corroborate the January 11, 1966, date.

9. Little and Spink, *USAF Rotation in Southeast Asia*, pp. 9-11 and 19-20.

10. Howard Plunkett, *469th TFS F-105 History Report/ Research Notes*, September 1, 2009, ER.2009.165, NMUSAF, 64, 214. The author would like to extend his thanks and appreciation to Mr. Plunkett for his helpful suggestions and for making his valuable research available for use.

11. *Ibid.*, pp. 212, 215, 220.

12. *Ibid.*, p. 169.

13. *Ibid.*, p. 236.

14. *Ibid.*, pp. 239, 240.

15. Little and Spink, *USAF Rotation in Southeast Asia*, p. 27.

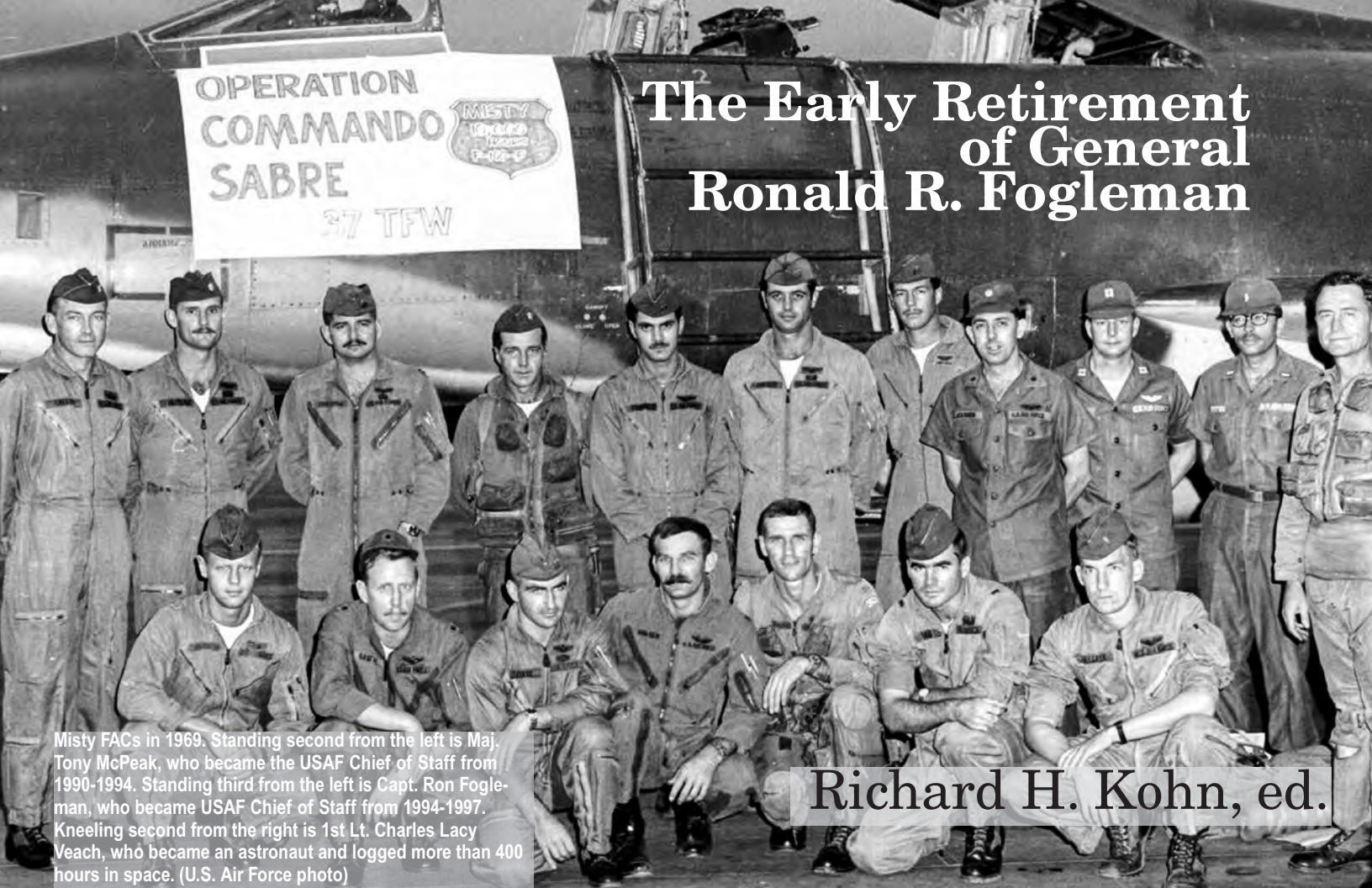
16. William Koenitzer Collection, AR.2008.017, NMUSAF. The 100 mission patch bears a striking resemblance to red, white, and blue U.S. interstate highway signs. Even so, Koenitzer related that these road signs had nothing to do with the design of the 100 mission patch.

17. Robert Krone Collection, AR.2007.032, NMUSAF.

18. Plunkett, *469th TFS F-105 Report*, p. 57.

19. Ken Bell, *100 Missions North: A Fighter Pilot’s Story of the Vietnam War* (New York, Brassey’s, 1993), xii, p. 281.

20. MSgt Rossi, *Operation Homecoming*, 12 TFW History Office, January 22, 1998.



The Early Retirement of General Ronald R. Fogleman

Misty FACs in 1969. Standing second from the left is Maj. Tony McPeak, who became the USAF Chief of Staff from 1990-1994. Standing third from the left is Capt. Ron Fogleman, who became USAF Chief of Staff from 1994-1997. Kneeling second from the right is 1st Lt. Charles Lacy Veach, who became an astronaut and logged more than 400 hours in space. (U.S. Air Force photo)

Richard H. Kohn, ed.

On Monday July 28, 1997, Gen Ronald R. Fogleman asked Secretary of the Air Force Sheila Widnall to be relieved of his duties as chief of staff of the Air Force and retired as soon as possible, a year before the end of his four-year term. At the time, the press and electronic media overwhelmingly interpreted General Fogleman's act as a resignation in protest over the secretary of defense's intention to block the promotion of Brig Gen Terry "Terry" Schwalier to major general. Schwalier had commanded the 4404th Composite Wing in Saudi Arabia the previous year when a terrorist bomb had destroyed the Air Force housing complex known as Khobar Towers outside Dhahran Air Base, killing 19 airmen and wounding a total of some three hundred Americans. After one Department of Defense (DOD) and two Air Force investigations, Fogleman had concluded that Schwalier had done everything that could be expected of a commander and had no culpability in the tragedy; punishing him would have a chilling effect on commanders around the world who might then infer that protecting their forces outweighed accomplishing their missions.

Reports had circulated some weeks earlier that General Fogleman would resign if the secretary blocked Schwalier's promotion. But the truth of the matter was that General Fogleman's decision to leave was neither a resignation nor an act of protest; it was a retirement. Had he resigned in protest, he would have waited until after the secretary of defense announced his decision in the Schwalier case and explained publicly and unambiguously that the request for retirement was the product of disagreements over specific decisions and policies. Instead, General Fogleman chose to leave quietly. In a brief public statement written and issued the same day, the chief stated, "My values and sense of loyalty to our soldiers, sailors, Marines and especially our airmen led me to the conclusion that I may be out of step with the times and some of the thinking of the establishment. This puts me in an awkward position. If I were to continue to serve as chief of staff of the Air Force and speak out, I could be seen as a divisive force and not a team player. I do not want the Air Force to suffer for my judgment and convictions."

Until now, General Fogleman has not elaborated on or clarified that brief public statement he issued at the end of July 1997. His public statement at the time stated specifically that he "was driven by the desire to defuse the perceived confrontation between myself and the secretary of defense over his impending decision on the Khobar Towers terrorist attack." As he explains below, it "was a request for retirement versus a resignation. . . . My request was very

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General Ronald R. Fogleman, USAF (Ret.) former Chief of Staff, United States Air Force.

carefully worded and consistent with historical practice and precedent. . . . I wanted to take that off the table and give him [the secretary of defense] one last opportunity to act on the Schwalier case on the merit and facts of the case, rather than the issue of the secretary of defense's power vis-à-vis some service chief." In leaving, General Fogleman recognized that a resignation in protest over policy would encroach on civilian control of the military, one of the foundations of American government and national defense, by setting a precedent that military leaders might resign instead of accept a decision they opposed. Fogleman knew that there was no tradition or practice of resignation in protest in the United States military.

Indeed, the causes of General Fogleman's action were complex and lay rooted in a series of issues that went back many months. He had contemplated early

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retirement for at least a year and a half. "I said publicly from the beginning that Miss Jane [Mrs. Fogleman] and I considered being chief a four-year tour, not a sentence. . . . There were certain things that I intended to accomplish, and when they were done, I felt that I might want to leave rather than hang on. I had watched people hang on into that fourth year and just did not think it was value gained for them or the organization." Fundamentally, he believed that his continued service depended on his effectiveness as an adviser to the national leadership and as an advocate for, and leader of, his service. While he had good relationships with the other chiefs and the chairman and vice chairman of the joint chiefs, he was disappointed in some of the discussions and some of the positions taken by the group. There had been disagreements over the modernization of the tactical aircraft inventory of the Air Force, Navy, and Marines; he disagreed with the determination of the Quadrennial Defense Review in early 1997 to reduce the number of F-22 airplanes to be purchased and, worse, was disgusted by the process which produced the decision. There were other conflicts: "Some serious resource allocation decisions were being made on the basis of superficial, often mistaken, thinking." In the summer of 1997, General Fogleman clashed with Air Force Secretary Widnall over the punishment of 1st Lt Kelly Flinn, the first woman B-52 pilot, whose impending court-martial for adultery, disobeying orders, and lying to an investigating officer led to national headlines, much criticism of the Air Force, and her separation with a general rather than an honorable discharge.

Then came the Schwalier decision. "As chief of staff of the United States Air Force, charged with providing military advice to the civilian leadership that the civilian leadership did not value for whatever reason, I had become ineffective as a spokesman." "When you sense that you have lost the confidence of the folks you're dealing with—almost to the extent where the service will be punished—that's one reason to leave." Another was that he had "simply lost respect and confidence in the leadership that I was supposed to be following." General Fogleman "watched the way the United States Air Force as an institution was treated, for purely political reasons, and the way an individual was treated and came to the conclusion that it was fundamentally wrong." He remembered, "You really do have to get up and look at yourself in the mirror every day and ask, 'Do I feel honorable and clean?' I just could not begin to imagine facing the Air Force after Secretary [William S.] Cohen made the decision to cancel General Schwalier's promotion. It wasn't only Cohen. It was the Washington scene, the pressure from the Hill—from people who were uninformed—it was the way DOD treated this man and the Air Force. To merely shrug this off and say, 'Hey, it's okay guys, we'll do better next time. . . .'"

General Fogleman had also recently read H. R. McMaster's *Dereliction of Duty: Lyndon Johnson, Robert McNamara, the Joint Chiefs of Staff, and the Lies That Led to Vietnam*, a book detailing how the joint chiefs in 1964–65

had failed to insist on giving their advice directly to the president and had gone along with having their views misrepresented, thus contributing to the decision to intervene in Vietnam and pursue a strategy of gradual escalation. "There was the incredible performance of the joint chiefs at that time and then seeing some of the things that were going on in the tank and now, maybe not on the same scale, but the same sickness . . . service parochialism, the willingness to collectively go along with something because there was at least some payoff for your service somewhere in there . . . a slippery slope."

Thus, as General Fogleman makes clear below, he had come to believe that he could no longer serve effectively as chief of staff. "I felt out of step—the [Quadrennial Defense Review], discussions, and decisions that I saw being made in the tank, problems with the Air Force leadership over the Kelly Flinn affair. A whole series of things convinced me that perhaps I was riding the wrong horse here. After a while, you look around and experience some serious doubts about whether you can be right and everybody else is wrong." As he concluded, "We also serve on a personal level. Unless you really believe, and see, that you are continuing to contribute . . . , when you begin to believe that your continued service is detrimental," then "the pressure" is to leave. "In my heart, I concluded that my continued service was not in the best interest of the Air Force."

In December 1997, some four-and-a-half months after his decision, the editor interviewed General Fogleman by telephone. What follows is a transcript of that conversation, transcribed by Ms. Jacqueline Gorman of the Curriculum in Peace, War, and Defense of the University of North Carolina at Chapel Hill. The transcript was then edited, reviewed by General Fogleman, annotated by the editor, and returned to General Fogleman for final approval. The purpose of publishing it is to clarify why he took the unprecedented step of asking for early retirement and doing so with so little explanation at the time—not resigning in protest but leaving out of a sense of obligation that the Air Force and the nation would be served more effectively if a new chief of staff were to take his place.

Interview conducted by Dr. Richard H. Kohn, former Chief of Air Force History on December 11, 1997

Richard H. Kohn: General Fogleman, why did you decide to ask for early retirement?

Ronald R. Fogleman: The answer to that question is complex: on one level, simple. But on another, more complicated. Let me begin on one level. When I became the chief, I received a number of letters from people like you who essentially said that they thought the chief needed to restore the soul of the Air Force. That caught me somewhat by surprise because I was not sure exactly what the soul of the Air Force was, or what was required to fix it. But my conclusion was that somehow we had found our-

selves, or allowed ourselves, through a series of decisions and actions, to lose sight of our values. The trouble came not from some overriding set of principles, but more from employing situational ethics (i.e., cronyism and other things) that made it seem as though the institution lacked integrity. So in the back of my mind, there seemed a necessity, or charge if you will, to work this issue on my watch.

Another factor grew out of a meeting in the fall of 1994 with all the other four-stars, before I became the chief, in which we discussed what we thought the Air Force needed more than anything else in the near term.¹ We concluded generally that the Air Force had been through an extraordinary period of change, most of it necessary in the altered world where we were heading. The change was both externally and internally driven. But it would be extremely valuable if we could give the Air Force some stability for a period of time from internal turbulence.

These two elements lay in the background as I began my tenure—my tour, if you will. I looked very carefully at the law specifying my duties as chief of staff: the responsibilities relative to organizing, training, and equipping the force and the separation of duties between the secretary of the Air Force and the chief.² So as I began the job, I thought I had a good understanding of what needed to be done in the Air Force. I did not have any special agenda. As we kicked off the tour, we ran into a series of things that we had to deal with: changing the uniform and a lack of confidence in the personnel system, promotions, and the evaluation system.³ I think our decisions in these areas were generally very well received.

I had also inherited two pieces of unfinished business. One was the F-15 shoot-down of the Black Hawk helicopter over Iraq.⁴ The other one was the B-52 crash up at Fairchild.⁵ The F-15 shoot-down was making its way through the legal process, and there wasn't much I could do about it until the process called for my action.

As I dealt with day-to-day business, stabilizing the Air Force (in terms of internal changes), I continued to think about the soul of the Air Force as an issue. As I dealt with these issues, the stress on accountability emerged—without my intending at the beginning of my watch to focus on accountability. At the completion of the court-martial of the AWACS captain at Tinker (I had been reading all the background investigation material), I was satisfied that the outcome was appropriate and just: no one was court-martialed who should not have been, or vice-versa, or issued letters of reprimand, Article 15s, and so forth.⁶ But I was appalled when I asked the question, "Let me see the evaluation reports on the people." I discovered that none of what they had done was reflected in those reports, and from that, I then began to see the connectivity to standards, values, and core beliefs.⁷ That's when I made the tape⁸ in which I talked about Air Force values and accountability—not because I was some zealot, but because I have always believed that if you want people, or an institution, to do something, you must explain what you expect of their be-

havior. The rules and standards for the behavior of any individual, group, or unit must be universally known and uniformly applied. That tape was designed for an internal audience, but it got much more play than that, and from then on, I believe we began to see a change all through the chain of command on the issue of accountability. If anything, it may have started to go too far. Commanders were deferring to lawyers rather than taking action, short of legal action, to correct the shortcomings of people. As I continued to work on other things that I thought were very important—the long-range planning effort for one—this issue of accountability and standards took on a kind of life of its own. The secretary of the Air Force and I emphasized very strongly the ideas of core values: excellence in all we do, service before self, and integrity.⁹ These became identified with me and with the secretary, but largely with me. This is important background leading up to the events of 1997.

On another level—viewing the Air Force from the outside as a military historian,¹⁰ as someone who has tried to stay involved in academic affairs as well as national security affairs—I sincerely believed that the nation was at a unique crossroads, that the country had a tremendous number of internal needs, that the external threats were lower than we had faced in half a century, and that we had an opportunity—if we could have a serious discussion about national security strategy and defense issues—to restructure our military into a smaller, better focused institution to respond to the kinds of challenges coming in the next 10 to 15 years. It was not a military that was going to be shaped by some force-structure slogan like two MRCs,¹¹ and it had to include a fundamental understanding of whether there really was a “revolution in military affairs” and how we could and should fight future wars. So I had begun to speak out about the Quadrennial Defense Review,¹² and I was hopeful that the QDR would start us down that path.

In this regard, in “the tank”¹³ I began to question some of things that we were doing, or that we were planning to do, based on old paradigms—but not very successfully. As we began talking more and more about the QDR, an event occurred in September of 1996 which kind of put the QDR in a context that struck me as all wrong. An Army two-star from the JCS came by to see all the chiefs, and when he came to see me, he sat on that couch in the chief’s office and said, “I have a message from the chairman,¹⁴ and the message is, that in the QDR we want to work hard to try and maintain as close to the status quo as we can. In fact, the chairman says we don’t need any Billy Mitchells during this process.” That shocked me a little bit. I replied, “Well, that’s an unfortunate use of a term, but I understand the message.” From that point on, I really did not have much hope for the QDR. I guess I lost all hope when Bill Perry¹⁵ left because he had the stature to have given the services the blueprint, and I think the services would have fallen in line.

Kohn: Did you or the other chiefs ask Secretary Perry to stay or to press for that?

Fogleman: I did. I went to see him in early November of 1996, after completing my second year in office. I had a policy of visiting him to talk about the year in review and the future. There were strong rumors that he would go. I told him, “Mr. Secretary, you have the stature and you have the confidence and the vote; if the QDR is going to go anywhere, you need to come down to the tank, and you need to give us your vision.” Short of that, I said I didn’t have much hope. A week later, he announced his retirement.

Secretary Cohen faced a very difficult challenge in the QDR and was, quite frankly, not as well grounded in real military issues as one might have thought, given his time on the Senate Armed Services Committee.¹⁶ He worked hard but was at the mercy, like all of us, of his advisers, and particularly what I thought was a rather close circle of people who lacked much experience in the issues. Once Bill Perry left, work on the QDR went into suspended animation until Cohen arrived because no one wanted to get out in front of the new boss. He arrived with a very limited amount of time to deliver the QDR to the Hill, a difficult challenge. I came to believe that the QDR could not be completed in three months, or even six. To an extent, he tried to solicit the advice of his military people, but it became clear that this QDR was to be more a political response than a sincere effort to reshape our military. It was driven by the consideration to come up with \$60 billion in savings to apply to the procurement of new weapons. From an Air Force perspective, we had no problem with procurement reform; our modernization program was fully funded, fully budgeted, so it was interesting to watch this unfold. The major issue that concerned me was TACAIR modernization.¹⁷ This issue had been inflamed by Bill Owens,¹⁸ who had incorrectly quoted some statistics that got over onto the Hill and into the public about how large a part of the budget the TACAIR program would consume vis-à-vis other things. This line of argument took on a life of its own. If you look at the history of TACAIR, anytime the amateurs mess with it, it gets screwed up; and when the pros put together a program and follow through, the result is a pretty solid program.

Kohn: Do you mean the design of the aircraft, its requirements, its role, and its mission?

Fogleman: Exactly. After the Second World War, the Navy, in its battles internally over carrier air, essentially allowed their program to atrophy. The Air Force, on the impetus from Arnold¹⁹ and the others who came after him, worked very hard to achieve a balanced program. When Korea²⁰ came along, the Air Force had an air superiority fighter, a fighter-bomber, bomber forces coming on stream. In the air superiority realm, there are many similar experiences in the past. In Korea, who had the aces? Who did the daytime patrolling? It wasn’t that there weren’t great naval aviators or great Marine aviators, but the Navy did not have equipment since they had been diverted to thinking about things other than the core issue of airpower. Who thinks about airpower full-time for the nation? The Air Force.

After Korea, TACAIR lost to the domination of nukes. So the Air Force began building fighter-bombers like F-105s. The Navy studied airplanes like Vigilantes that could deliver tactical nukes off of carriers. The US did not possess an air superiority fighter when Vietnam began.²¹ We did a dismal job in Vietnam in the air-to-air business and used not an air-to-air fighter but a missile platform, the F-4, and it became the backbone of the forces. But it was never a great air superiority fighter.

Kohn: Was the issue at this time (1996 and 1997) the F-22?

Fogleman: No, the whole TACAIR program, not just a single aircraft. But eventually it came down to that, and so we took a fully funded program, the F-22, into the QDR, whereupon the folks at OSD [Office of the Secretary of Defense] decided to make major disruptions in this program for no good reason at all.²² On the one hand you have somebody who is fairly well grounded in the air-power business giving advice to the senior leadership, and on the other side a bunch of number crunchers, and in the end, the decision gets made, I think, on political grounds more than anything else.

Kohn: How did this differ from most major aircraft programs or even most major defense issues, historically and in the last 20 years? Isn't what you describe the nature of the business—in "the building" [the Pentagon], in the budget process, and in programming?

Fogleman: Yes, in the macro sense. But in the micro sense, I'm not so sure because of the internal nature of the debate. If somebody can show me that something makes sense from a resource allocation or budgetary standpoint, or similarly reasonable measures, I'm more than willing to lose the argument—and have lost lots of those arguments, walked away none the worse for wear. But this was an issue in which the nature of the presentation, the nature of the discussion, and the rationale for the changes, were basically going to upset an integrated tactical air modernization program that included the F-18, the Joint Strike Fighter, and the F-22. I think just fundamentally, OSD ignored the military rationale.

Kohn: Is it inconsistent to speak about a fundamental restructuring of the armed forces, in part to prepare for a possible revolution in warfare and a lower threat than at any time since the 1920s, while advocating a modernization program that looks to many on the outside as incremental: that is, purchasing some old technologies, even purchasing the newest technology (the F-22), which could, perhaps, be skipped? How would you respond to that criticism?

Fogleman: If this was argued by someone in OSD, I would ask if they knew the true capability of this airplane. In the "black world" [very highly classified programs], the F-22 is a truly revolutionary airplane. On the surface, it looks conventional, like an F-15 with some stealth capabilities. But the combination of stealth, supercruise, and integrated avionics is a quantum jump. It will allow the United States to cease worrying about air superiority for the first 35 years of the next century. With

air superiority so critical to everything we do and considering the double-digit SAMs [surface-to-air missiles] of the next 10 to 15 years, it looks like a program we must have. One of the side benefits of the end of the cold war was our gaining access to foreign weapons; we discovered that the SA-10s, -11s, and -12s are much better than we thought. In planning for asymmetrical warfare—people's ability to deny us things we need in such situations as the Taiwan Strait crisis, when we sent two carriers in and watched the Chinese move their SA-10s up—we need that airplane.²³ Those two carriers did nothing more than make a political statement, which is fine as long as that is all that's necessary. So one understands why a service chief begins saying he will try and be as balanced in his tour as he possibly can be, as joint, but then a weapon system comes along that truly is revolutionary. There are only two revolutionary weapon systems in the entire DOD budget: the F-22 and the airborne laser.²⁴ There are no others. I will acknowledge that I may be wrong on this, but I don't think so. I guess my problem was arguing from facts and knowledge and finding decisions being made by people without a fundamental understanding of what the weapon system contributed. Somehow that just didn't strike me as right.

Kohn: In the past, some of your predecessors and some other service chiefs would have taken this fight into the bureaucratic world of beltway and national politics. They would have leaked, they would have struggled, they would have made allies, they would have gone to the Congress. . . .

Fogleman: I think I did a lot of fighting in that arena. That's how we were able to get a lot of the funds restored. And the fight is not over. We will get the F-22, but the issue from my perspective was this: you pay me to give you military advice, and I'm giving you military advice; I'm watching not just whether or not you take it but how the advice is considered, part of a larger web of what became my relationship with Secretary Cohen and OSD.

Kohn: Can you translate this background into the decision to retire early?

Fogleman: Let me draw one more thread, one more part of the equation: Khobar Towers.²⁵ My side of that story has not been well told. I watched with great interest as that event happened and subsequent events unfolded. I watched people in Washington make statements on the basis of no factual knowledge whatsoever. I waited for about a week until after all the high profile people had gone through Dhahran and then went to Saudi Arabia myself. I sat down with the commander,²⁶ listened to what he had to say—to include his offering to retire to remove any kind of a target for people to attack both the institution and individuals. I told him at that time that I did not want him to retire but to get the facts out. "This goes beyond you. This is an important issue having to do with whether we support our troops in the field when we send them out there, and if you have screwed up, you can expect to be held accountable. If you haven't, then I will support you." I then watched the way the investigations unfolded.²⁷ I watched the way the

United States Air Force as an institution was treated, for purely political reasons, and the way an individual was treated and came to the conclusion that it was fundamentally wrong. I think a hell of a lot of other people came to that same conclusion.

As chief of staff of the United States Air Force, charged with providing military advice to the civilian leadership that the civilian leadership did not value for whatever reason, I had become ineffective as a spokesman. This was a crowd that took any kind of military advice that ran counter to administration policy or desires as a sign of disloyalty on the part of the person providing the advice. That was one element; the other was based on what I had seen and the way the Khobar Towers tragedy had been handled. I simply lost respect and confidence in the leadership that I was supposed to be following.

Kohn: By this do you mean OSD?

Fogleman: Yes.

Kohn: JCS, too?

Fogleman: Not so much the JCS, although I was disappointed in the JCS. There were some discussions and decisions in the tank that I thought were just absolutely absurd, some at fairly high levels of classification. More and more in the tank I found myself being the one who was raising the b——— flag, and it resulted in a couple of fairly high-profile articles on arms control—things of that nature—that made some of the civilian leadership uncomfortable.²⁸

Kohn: Relative to theater ballistic missile and strategic nuclear defense?

Fogleman: Yes, both.

Kohn: Did your disenchantment with the leadership extend to the president, the NSC [National Security Council], or Congress?

Fogleman: I don't think so. I had one confidant within the NSC with whom I would talk occasionally. This really did not involve the president; frankly, my dealings with the president, both as a CINC²⁹ and as a service chief, led me to conclude that he executed his commander-in-chief responsibilities pretty well, at least his interface with the military. As a service chief, your primary responsibility is to advocate for your service, and when you sense that you have lost the confidence of the folks you're dealing with—almost to the extent where the service will be punished—that's one reason to leave. Then there was the internal pressure which says: here's a guy who has talked about integrity, talked about doing what's right, talked about taking care of the troops and all of these things, and you realize that the secretary of defense is going to make a decision that is just fundamentally wrong.

Kohn: Many people believed that perhaps General Schwalier should not be punished, but promoting him after such a disaster seemed to fly in the face of any sense of accountability. How would you respond to that point, and who, if anyone, should be held accountable for the Khobar Towers disaster?

Fogleman: Well, I recognized, and I think General

Schwalier recognized, everybody recognized, that no matter what happened, his career was over. This was a man who had, at the tactical and operational levels, done everything reasonable (and beyond) to protect his troops. Have you seen an article by Matt Labash in the November 24, 1997 issue of *The Weekly Standard*?

Kohn: No.

Fogleman: Labash has done as fine a job of researching and reporting on Khobar Towers as I have seen anywhere.

Kohn: Does that article explain your view of what really happened and who should be held accountable, if anyone?

Fogleman: Yes.³⁰

Kohn: When did you first consider the idea of leaving office early?

Fogleman: First of all, I said publicly from the very beginning that Miss Jane and I considered being chief a four-year tour, not a sentence. I had not been the choice of the Air Force to become chief. Frankly, that had a sort of liberating effect on me because I felt I could deal on a different level with the secretary. There were certain things that I intended to accomplish, and when they were done, I felt that I might want to leave rather than hang on. I had watched people hang on into that fourth year and just did not think it was value gained for them or the organization.

Kohn: That they had ceased to be effective?

Fogleman: Yes. They were going through the motions rather than working for the good of the institution.

Kohn: Were some other items involved in your decision to leave early? Perhaps one was personnel issues, such as the pilot shortage, the lower retention of airmen, the promotion system, the dominance of below-the-zone promotions, and the difficulties of the OER [Officer Efficiency Report] system, a lot of which were related to the ops tempo of the force. Were frustrations in those areas at all involved?

Fogleman: No. In fact, those were what I considered unfinished business and really argued against leaving because early on in the tour, we addressed the issues of confidence in the OER and personnel system.³¹ We did that very openly, and we seemed to put that stuff to rest.

The real challenges that I saw facing us as I got ready to step over the side was pilot retention, and we put into place nine months before I left, some of the actions that are starting to bear fruit now, specifically the ops tempo problem.³² We have worked that in several ways. We went to the chairman and got relief from the responsibility for some weapon systems.³³ One of the ideas that I was disappointed did not succeed (although I knew it could) was the Air Expeditionary Force. We wanted to demonstrate to the CINCs that because of technology and logistics—mobility—forces did not have to be stationed in deserts to be responsive within 36 or 48 hours. We could demonstrate that the Air Force had the capability to deploy very rapidly and had several times. We were just on the verge of getting to that next step.

But what frustrated me was that some serious re-

source-allocation decisions were being made on the basis of superficial, often mistaken, thinking.

Kohn: Was your relationship with Secretary Widnall involved in the decision?

Fogleman: I think we generally had a good relationship right up to the Kelly Flinn controversy.³⁴ Until then, I thought the Air Force senior leadership, both civilian and military, understood the issue of accountability and how important it was to apply the UCMJ [Uniform Code of Military Justice] universally. I don't know what pressure Secretary Widnall was getting, but I came into work one morning, and she indicated that she was contemplating an honorable discharge for Kelly Flinn. I said, "Madam Secretary, if you give her an honorable discharge, you can also select a new chief of staff." That was the only time I ever talked that way to any direct supervisor or leader because I felt so strongly about it.

Kohn: The Flinn case sounds like one more drip on the forehead, moving you towards something that you had been thinking about increasingly for six months or so previous to the decision.

Fogleman: Yes. The Flinn case was a cut-and-dried thing as far as I was concerned, and I had studied the facts intensively.

Kohn: Was Gen Joseph Ralston's failure to be appointed chairman of the JCS part of the decision at all?³⁵

Fogleman: No, not really, although it was a great personal and professional disappointment because we had worked for a long time to give him an opportunity. First of all, he was the right person for the job. Secretary Cohen was more a victim of circumstance than anything else. I don't have harsh feelings about this.

Kohn: What historical precedents guided you in the decision? Did Vietnam, and particularly H. R. McMaster's book *Dereliction of Duty*, influence you?³⁶

Fogleman: Yes, I did read that book, as you know, and I must say that it did play a part. History is a series of events, and when you analyze major crises and reconstruct chains of events, asking, what could someone have done at one point or another that might have changed the outcome, you are encouraged to act. There was the incredible performance of the joint chiefs at that time, and then seeing some of the things that were going on in the tank and now, maybe not on the same scale, but the same sickness . . . service parochialism, the willingness to collectively go along with something because there was at least some payoff for your service somewhere in there.

Kohn: In other words, horse-trading and being bought off.

Fogleman: Yes, and it is a slippery slope.

Kohn: How would your leaving alter that equation?

Fogleman: In two ways. One is personal; you really do have to get up and look at yourself in the mirror every day and ask, "Do I feel honorable and clean?" I just could not begin to imagine facing the Air Force after Secretary Cohen made the decision to cancel General Schwalier's promotion. It wasn't only Cohen. It was the Washington scene, the pressure from the Hill—from people who were uninformed—it was the way DOD treated this man and

the Air Force. To merely shrug this off and say, "Hey, it's okay guys, we'll do better next time. . . ." It wasn't just the Air Force. The other services' commanders—lieutenant commanders, marines, Army types—were really watching this case. People who are or will be out there as tactical commanders are a lot less comfortable today than they were before this decision. They may not have read the detailed reports, but I think they've read the articles. There was an incredibly large number of people at Dhahran, and what is interesting is the number of letters I received from various locations around the world, from people who were there sometime during that year, who watched the kinds of actions and preparations that were being taken. These people exist almost as emissaries within other organizations. In the same way morale is established and affected—you know, the whisper factor, not a major force but they are there—this will affect our military forces.

You asked a larger question: what difference will it make? No one has told me this, but as I have sat and observed what has occurred in Washington since my departure, I can give one example of how my leaving may have made a major difference or had some influence, and that is the big debate about whether the United States would sign the land-mine treaty.³⁷ This was an item that the service chiefs cared very deeply about. We said, "Look, these things are critical to us in Korea, and while we are committed to working for some replacement, to allow some very altruistic motive to put our forces in the field at risk is wrong." And so we had consistently opposed signing the treaty. But about the time I made my decision to leave, tremendous pressure was being exerted by people within the NSC and elsewhere, and it began to have a telling effect, I think, on the chiefs because we were about to get beat up worldwide in the media over the US not going to Ottawa to sign the big treaty. My departure may have alerted people to remember to pay attention, every now and then, to the military judgment of the chiefs because those guys over there have other options than to sit still and take their licks. I can't prove that, but I suspect it very strongly. I think the politicians were reluctant to take on the chiefs because they didn't want somebody else to step over the side.

Kohn: Whom did you consult about your decision and when? What, in general, did your advisers say?

Fogleman: I really did not consult. To the extent that I talked to anybody, I corresponded with you by E-mail and with Perry Smith.³⁸ This was a very personal decision. When I left home that morning, I had not made the decision to submit my request for early retirement. When I went to work that morning, Miss Jane and I had talked about it over the weekend. It was Monday, the 28th of July (I had recently returned from a trip overseas). I don't think there was any one thing that day that triggered it. It was just that when I went in, and sat there, and thought about events—saw what was coming up, looking down the road—I decided I was going to preempt the decision on the Khobar Towers so that my leaving would not be in response to the decision on General Schwalier, to

defuse that conflict.

Kohn: You did not want your request to be seen as a reaction to Khobar Towers?

Fogleman: Correct. And, in fact, the reason it was a request for retirement versus a resignation is that it was consistent with everything that I had said up to that date—which was, this is a tour and not a sentence. My request was very carefully worded and consistent with historical practice and precedent.³⁹

Kohn: So you do not view your departure as a resignation in protest?

Fogleman: No.

Kohn: You wrote specifically about stepping aside to avoid a perceived conflict with the secretary of defense. What, exactly, did you mean and have in mind?

Fogleman: There had been stories in the media that I had gone to the secretary of defense and threatened to resign if he canceled Schwalier's promotion.⁴⁰ That was simply untrue, but the secretary being a political animal and having watched him respond more to press stories than to the intel briefings, the perception of a conflict was clearly going to affect his decision. So I wanted to take that off the table and give him one last opportunity to act on the Schwalier case on the merit and facts of the case, rather than the issue of the secretary of defense's power vis-à-vis some service chief.

Kohn: Was there anything further that you hoped to accomplish by stepping down, beyond what you have said previously about losing your effectiveness with the civilian leadership and timing the request to avoid a confrontation?

Fogleman: My statement to the troops captured my perspective in very general terms.⁴¹ I felt out of step—the QDR, discussions and decisions that I saw being made in the tank, problems with the Air Force leadership over the Kelly Flinn affair. A whole series of things convinced me that perhaps I was riding the wrong horse here. After a while, you look around and experience some serious doubts about whether you can be right and everybody else is wrong.

Kohn: Are there guidelines under which military leaders working directly for the highest civilians can—appropriately—request early retirement? Did you consider the precedent you might be setting and try to think through what is proper and what is improper in our system of government?

Fogleman: I thought it through to this extent: when you reach that level, you are a product of all your years, and hopefully one of the reasons you are appointed is that people recognize that you possess some kind of internal moral compass and some expertise in the profession of arms in a democracy. I was not thinking about trying to establish some future norm; I was thinking about it more in terms of my own personal views and perspectives on the substance of my service as chief of staff. I think I was selected because folks thought I knew something about the business and that I stood for certain values. When you reach a point in your tenure where (1) you think you've accomplished most of the things that you set out to do and

(2) you begin to see evidence that your values and your advice, your expertise, are not valued by those in charge. . . . Having spent three tours in Washington, I have watched how people can be gracefully continued in a position but just frozen out of any kind of effective participation. Knowing how bad that is for an institution, it is better to step aside and let the leadership appoint someone who they are more comfortable with, who will be able to represent the institution and play in the arena.

Kohn: Why did you choose a retirement ceremony in Colorado rather than in Washington, D.C.?

Fogleman: Well, first, I was in Colorado [establishing residence after leaving Washington on terminal leave] and, second, I was the first Air Force chief of staff to graduate from the Academy. It seemed to complete a circle for me.

Kohn: The location was not a statement about not wanting the Washington establishment to be present at your retirement?

Fogleman: No, it really wasn't.

Kohn: Why have you remained silent about leaving until now? Do you plan to write anything or grant other interviews?

Fogleman: No I don't, particularly, and I have grave misgivings about this interview. Perhaps, some day, I may want to write something, but I am not sure that (1) I would be able to present this in a way that made any sense, and (2) I do not consider myself to be bearing any particular cross. I don't believe anybody out there is breathlessly awaiting the Ron Fogleman story. That's just sort of my take on all of this. This may be a story that does not need to be told.

Kohn: Reflect on the pressures in the Office of Chief of Staff in general. Would you do anything differently in your approach, style, or relationships in the office as you look back upon it now?

Fogleman: It's kind of interesting. I don't know if I would categorize this as the pressures of the office, but I had never really thought about the fact that the senior military guy in a service finds himself in a unique position. As you come up through the ranks, if you are the A Flight commander and somebody screws up in A Flight, you are responsible for that. But you are also in a position to take some direct action to try to fix that; the squadron is not necessarily harmed by what happened in A Flight, nor the wing or higher echelons. Think of it at every level. If you are the squadron commander, or the wing commander, the responsibility is finite, and the impact of decisions or disciplinary actions or whatever is always finite, all the way up through and including commanding a major command. In other words, as you look at the institution, if you happen to be in C Flight and someone messed up in A Flight, you felt a little sorry for the A Flight commander, but there was never any blow to you personally, or to your beliefs. When I was the Air Mobility Command commander and I read something about an event in Air Combat Command or Materiel Command, I thought, "I'm sure glad that's not happening in my command; I wonder what I can do to

help them.” The problem is for that commander. But for the chief of staff of the Air Force, no matter where something happens within your institution, it’s a personal blow for you. When you see both accurate and inaccurate representations of events in the media, it’s a different kind of feeling.

The Washington routine never pressured me greatly. I knew when I went there that my job was to deal with the Washington scene. That was my job. As I moved from one position to another in my career, I tried to read the job description, bring to bear all the expertise that I developed through the years, and apply it to the current job and not worry about the fact that I’m no longer wearing a G suit, or in the case of the chief of staff, no longer in command. And so Miss Jane and I, I don’t think, found it onerous from that perspective.

Kohn: You felt you were prepared for the job? Three tours in Washington, having the historical perspective, ready both by experience and personality.

Fogleman: I never felt any trepidation from that perspective. I remember a social occasion when General Piotrowski was the Ninth Air Force commander.⁴² Someone was flattering him and asked, “Well, General Pete, what did you do to prepare yourself to be the Ninth Air Force commander? How did you do that?” General Piotrowski thought for a moment and then replied, “I did it one day at a time.” I think that’s how you find yourself in whatever job you are in; you prepare yourself one day at a time.

Kohn: My last question is a tough one, Ron. You have

been a very respected and popular chief. But there are people in the force who are unhappy with your decision to step down. They disagree with you, feel a sense of loss and in some very few cases, perhaps, even a sense of betrayal. They—officer and enlisted—identified with you, believed that you were in step. If you think you were out of step, then they think they are out of step also. How are they supposed to carry on? Do you have any thoughts for them?

Fogleman: I may not have a good answer. But I go back to our ethic that says we serve on two levels. First, we serve as part of a profession: service before self, integrity, strive for excellence in all that you do. From this perspective, the answer is that it doesn’t matter what happens. You ignore it. You keep soldiering on, you just keep slugging away. But we also serve on a personal level. Unless you really believe, and feel, that you are continuing to contribute to the Air Force and thus to the country and to the national defense, when you begin to believe that your continued service is detrimental to the Air Force, the pressure is in the opposite direction. Then the institution becomes more important than the individual, and, looking at the core value of service before self, the choice becomes staying another year and going through the motions or stepping down. In my heart, on the personal level and on the professional level, I concluded that my continued service was not in the best interest of the Air Force, in Washington where I was serving, given my beliefs, and considering the advice I was offering to our national leadership. ■

NOTES

1. The day before taking office, General Fogleman met in the secretary of the Air Force’s conference room in the Pentagon with the other Air Force four-stars, who were in Washington to attend the retirement of his predecessor.

2. The duties of the Air Force chief of staff are specified in *U.S. Code*, Title 10, chap. 805, sec. 8033 (1996).

3. General Fogleman’s predecessor, Gen Merrill “Tony” McPeak, had overseen what many considered a radical change in the style and insignia of the Air Force officer uniform. A uniform board review in January 1995 reduced over twenty-five hundred suggestions to 363 proposals, 55 of which General Fogleman approved, including restoring the traditional shoulder insignia instead of sleeve rings to identify officer rank. See Suzann Chapman, “Last Uniform Changes?” *Air Force Magazine* 78 (May 1995): 24; and “Air Force Announces Uniform Changes,” *Air Force News*, on-line, Internet, 11 September 2000, available from http://www.af.mil/news/Mar1995/n19950313_208.html.

4. On 14 April 1994, two F-15Cs of the 53d Fighter Squadron enforcing the “no fly” zone over northern Iraq mistakenly shot down two Army Black Hawk helicopters engaged in UN humanitarian missions for the Kurds, killing all 26 passengers, including 15 Americans; five Kurdish civilians; and British, French, and Turkish military officers. John F. Harris, “Four May Receive Court-Martial for Copter Mishap,” *Washington Post*, 30 August 1994, 2; and Eric Schmitt, “Inquiry Urges Crew Stand Trial in Downing of Copters over Iraq,” *New York Times*, 30 August 1994, A2.

5. On 24 June 1994, a B-52H of the 325th Bomb Squadron,

92d Bomb Wing at Fairchild Air Force Base (AFB), Wash., crashed while preparing to land after practicing maneuvers for an air show, killing all four crewmen. The pilot in command had over a long period of time demonstrated a disregard for Air Force flying rules and regulations, and this was known by the senior commanders in the wing. No appropriate action had been taken to discipline him or rein in his noncompliant behavior.

6. Investigations by the Air Force resulted in charges of dereliction of duty against Capt James Wang, a crew member of the airborne warning and control system (AWACS) aircraft from the 963d Airborne Control Squadron controlling the airspace at the time, and charges of negligent homicide and dereliction of duty against one of the F-15 pilots and four other AWACS crew members. Captain Wang was acquitted, and charges against the others were dropped following Article 32 (the equivalent to grand jury) investigations. Altogether, eight officers were reprimanded, counseled, or admonished, and one punished non-judicially. See news briefing, Maj Gen Nolan Sklute, Office of the Assistant Secretary of Defense (Public Affairs), 15 August 1995, on-line, Internet, 26 November 2000, available from http://www.defenselink.mil/news/Aug1995/t081795_tsklu-81.html; Susanne M. Schafer, “U.S. Pilot Charged for Downing Copters,” *Chicago Sun Times*, 8 September 1994, 3; Owen Canfield, “Air Force Closes Case on 26 Deaths,” *Chicago Sun Times*, 21 June 1995, 26; Frank Oliveri, “USAF Accuses Six in Iraq Shootdown,” *Air Force Magazine* 77 (November 1994): 15; and Bruce B. Auster, “Strange Justice, Air Force Style,” *U.S. News & World Report* 118 (15 May 1995): 42, 44. Article 15 of the *Uniform*

Code of Military Justice outlines the punishments commanders can impose on the men and women under their command without resort to court-martial or other judicial proceedings.

7. In August 1995, General Fogleman (in the words of the Air Force judge advocate general) “concluded that the failures of certain officers to meet Air Force standards were not appropriately reflected in their performance evaluations” and “therefore, personally issued letters of evaluation . . . describing their failure” that became “a permanent part of each individual’s record.” For the two F-15 pilots, three officers on the AWACS aircraft, and two generals in the chain of command, this action effectively ended their careers in the Air Force. The chief of staff also grounded the pilots and AWACS crew members and disqualified them from duties in flying operations for three years. Sklute; Eric Schmitt, “Chief of Air Force Grounds 5 Pilots,” *New York Times*, 15 August 1995, A1; and Chris Black, “Shifts in Air Force Policy Are Seen after Reprimands,” *Boston Globe*, 16 August 1995, 3.

8. In a short videotape released in mid-August 1995, required to be viewed by every Air Force officer, Senior Executive Service civilian, and noncommissioned officer in the top three grades, General Fogleman reviewed the Black Hawk accident, as well as the actions taken against the individuals involved and the officers who wrote their performance evaluations. He used the affair to emphasize Air Force standards; personal accountability; and the necessity for officers to lead, to pursue excellence in the performance of their duties, to act always with integrity, and to place service before self. See transcript, on-line, Internet, 13 September 2000, available from <http://www.usafa.af.mil/core-value/accountability.html>. For background, see Sklute.

9. Sheila E. Widnall, previously professor of aeronautics and astronautics, director of the Fluid Dynamics Research Laboratory, and associate provost at the Massachusetts Institute of Technology, was secretary of the Air Force from August 1993 to October 1997.

10. General Fogleman earned a master’s degree in history at Duke University and taught military history at the Air Force Academy from December 1970 to November 1972, when he went back to combat-crew training for his second flying tour in Southeast Asia.

11. MRCs were *major regional conflicts*, a term for large conventional wars in a limited geographical area, such as the Persian Gulf War of 1990–1991 or an invasion of South Korea by North Korea which would involve American forces. The shift in defense policy, planning, and force structure from deterring and preparing for a world war against the Soviet Union to focusing on regional conflicts began with the reconsideration that resulted in the Bush administration’s base force policy of 1990. Lorna S. Jaffe, *The Development of the Base Force* (Washington, D.C.: Joint History Office, Office of the Chairman of the Joint Chiefs of Staff, July 1993), 2–9, 11–13, 16, 18, 21–22, 25–26, 29, 33, 36, 45; and *National Security Strategy of the United States* (Washington, D.C.: White House, August 1991), 7–11, 27–29, 31. The ability to fight nearly simultaneously two MRCs (now called major theater wars) became the chief planning factor shaping the size and configuration of the American armed forces after the “Bottom-Up Review” of defense policy and force structure undertaken by the Clinton administration in 1993. Defense Department briefing, Gen Colin Powell and Les Aspin, subject: DOD Bottom-Up Review, 1 September 1993, Federal Information Systems Corporation, Federal News Service, accessed through Academic Universe, “bottom up review” Search Terms, 13 December 2000; and Les Aspin, *Report on the Bottom-Up Review*, October 1993, sec. 2, “Addressing Regional Dangers and Seizing Opportunities,” on-line, Internet, 15 December 2000, available from <http://stinet.dtic.mil/str/index.html> (search “Les Aspin”).

12. The Quadrennial Defense Review (QDR)—a comprehensive reconsideration of American national security policy, de-

fense strategy, and force structure expected to be repeated every four years at the beginning of a presidential administration—originated in a recommendation by DOD’s 1995 Commission on the Roles and Missions of the Armed Forces. DOD undertook its first QDR in 1996–1997; the report in the spring of 1997 listed a number of reductions, adjustments, realignments, and planned changes in defense posture. See *Directions for Defense, Roles and Missions Commission of the Armed Forces, Report to Congress, the Secretary of Defense, and the Chairman of the Joint Chiefs of Staff*, 24 May 1995, executive summary, on-line, Internet, 26 November 2000, available from <http://www.fas.org/man/docs/corm95/di1062.html>; William S. Cohen, *Report of the Quadrennial Defense Review*, May 1997, on-line, Internet, 26 November 2000, available from <http://www.defenselink.mil/pubs/qdr/index.html>; and Background on the Quadrennial Defense Review, May 1997, H.R. 3230, National Defense Authorization Act for Fiscal Year 1997, Title IX, subtitle B, sec. 923, Quadrennial Defense Review/Force Structure Review, on-line, Internet, 16 January 2001, available from <http://www.comw.org/qdr/backgrd.htm>. General Fogleman discussed the QDR at greater length with reporter George Wilson. See Wilson, *This War Really Matters: Inside the Fight for Defense Dollars* (Washington, D.C.: Congressional Quarterly Press, 2000), 38–44.

13. The “tank” is the conference room in the Pentagon where the Joint Chiefs of Staff (JCS) meet, so named, according to popular lore, because “access to the entrance used by staff officers was down a flight of stairs through an arched portal, supposedly giving the impression of entering a tank.” Ronald H. Cole et al., *The Chairmanship of the Joint Chiefs of Staff* (Washington, D.C.: Office of the Chairman of the Joint Chiefs of Staff, 1995), 177.

14. Gen John M. D. Shalikashvili, US Army, was chairman of the JCS from October 1993 to September 1997.

15. William J. Perry, who had worked in the defense and financial industries in technical and executive capacities and served on the Stanford University faculty in engineering and international security, was secretary of defense from February 1994 to January 1997. He had been undersecretary of defense for research and engineering from 1977 to 1981 and deputy secretary of defense in 1993–1994. Roger R. Trask and Alfred Goldberg, *The Department of Defense, 1947–1997: Organization and Leaders* (Washington, D.C.: Historical Office, Office of the Secretary of Defense, 1997), 121, 141.

16. William S. Cohen became secretary of defense on 24 January 1997. A lawyer and former elected official in Bangor, Maine, he served in the US House of Representatives (1973–1979) and US Senate (1979–1997), where he was a member of the Armed Services and Governmental Affairs Committees. Trask and Goldberg, 127. For a more personal profile, see John Donnelly, “The Evolution of William Cohen,” *Boston Globe Magazine*, 22 October 2000, 14–15, 28–36.

17. The 1997 DOD tactical air (TACAIR) modernization program proposed to replace completely by the year 2030 the A-10, F-15, F-16, and F-117 aircraft of the Air Force and the F-14, F/A-18, and AV-8B aircraft of the Navy and Marine Corps with F/A-18E/F, F-22, and Joint Strike Fighter aircraft, for the air superiority, anti-air-warfare, suppression of enemy air defenses, fleet air defense, interdiction, short- and long-range attack, reconnaissance, and close air support missions. The overall purpose was to secure “overwhelming air domination for US forces” for the next generation. See *Statement of Dr. Paul G. Kaminski, Undersecretary of Defense for Acquisition and Technology before the Subcommittee on Research and Development and the Subcommittee on Procurement of the House Committee on National Security on the DOD Tactical Aviation Modernization Program*, Committee on National Security, Military Research and Development Subcommittee meeting jointly with the Military Procurement Committee, US House of Representatives, 105th Cong., 1st sess., 5 March 1997, 242–66, on-line, Internet, 16 Jan-

uary 2001, available from http://www.acq.osd.mil/ousda/kaminski/aviation_modernization.html.

18. Adm William A. Owens was vice chairman of the JCS, March 1994–February 1996.

19. General of the Air Force Henry H. “Hap” Arnold was chief of the Army Air Corps and commanding general of the Army Air Forces from September 1938 to his retirement in June 1946. His five-star rank was awarded by act of Congress in 1949, the year before his death.

20. The Korean War began in June 1950.

21. The United States intervened with its own ground-force units and Americanized the Vietnam War during the first half of 1965.

22. The QDR reduced the total planned procurement of F-22s from 438 to 339, to provide three wings of the aircraft. Ramp-up to full production was to be slowed, and the maximum production rate reduced from 48 aircraft per year to 36. However, DOD promised in the future to consider other F-22 variants to replace F-15E and F-117 long-range interdiction aircraft “when they reach the end of their service lives beyond 2015.” Cohen, sec. 7, 45. For an analysis of the QDR, see Wilson, 25ff.

23. In March 1996, prior to the election for president on Taiwan, the People’s Republic of China moved military forces to its coast on the Straits of Taiwan and fired missiles over the island in an apparent attempt to intimidate Taiwan into voting against Lee Teng-hui, who had taken steps that appeared to move the island toward independence. In response, the United States repositioned into the area the aircraft carriers *Independence* and *Nimitz* with their support vessels, implying that any attempt to invade or harass Taiwan with military force would be opposed by the use of US forces. News briefing, Kenneth H. Bacon, Office of the Assistant Secretary of Defense (Public Affairs), 19 March 1996, on-line, Internet, 16 January 2001, available from http://www.defenselink.mil/news/Mar1996/t031996_t0319asd.html; Geoffrey Crothall and Dennis Engbarth, “US Sends Second Carrier, Support Ships to Strait,” *South China Morning Post*, 12 March 1996, 1; Geoffrey Crothall, “Li Warns US against Show of Force in Strait,” *South China Morning Post*, 18 March 1996, 1; and Michael Dobbs, “Chinese Revert to Mao Formula in New War of Nerves on Taiwan,” *Washington Post*, 16 March 1996, A20.

24. For a more extended discussion of the F-22 program, see Michael J. Costigan, *The F-22: The Right Fighter for the Twenty-first Century?* Air War College Maxwell Paper no. 9 (Maxwell AFB, Ala.: Air University Press, August 1997). The airborne laser (ABL) program originated in the aftermath of the Gulf War to find a defense against theater ballistic missiles. Transferred from the Strategic Defense Initiative Office to the Air Force in 1992, the program has been developing a high-energy laser mounted in a Boeing 747 designed to destroy missiles during their boost phase. In 1995 General Fogleman listened to a briefing on the program at Kirtland AFB, N. Mex., and threw his full support behind the effort. “The Airborne Laser is going to be to directed-energy weapons what the F-117 was to stealth and precision munitions,” he told an interviewer. John A. Tirpak, “First Force: The USAF Chief of Staff Talks about Airpower, the Air Force, and the Future,” *Air Force Magazine* 79 (September 1996): 41. “Given the nature of this revolutionary weapon system, the ABL will be studied in other roles. . . , other uses will be found.” Johan Benson, “Conversations . . . with Gen. Ronald Fogleman,” *Aerospace America* 34 (July 1996): 15. See also Suzann Chapman, “The Airborne Laser,” *Air Force Magazine* 79 (January 1996): 54–55; Airborne Laser History, on-line, Internet, 26 November 2000, available from <http://www.airbornelaser.com/special/abl/history>; and Capt Gilles Van Nederveen, “A Light Dawns: The Airborne Laser,” *Aerospace Power Journal* (PIREP, Spring 2001).

25. On 25 June 1996, terrorists exploded a large truck bomb outside the American air base at Dhahran, Saudi Arabia, killing

19 air- men and wounding some three hundred Americans in the high-rise housing complex named Khobar Towers.

26. The commander of the 4404th Composite Wing (Provisional) was Brig Gen Terryl J. Schwalier, USAF.

27. The bombing was investigated by Congress (hearings before the Senate Armed Services and House National Security Committees); a task force appointed by the secretary of defense and headed by Gen Wayne A. Downing, USA, Retired, the most recent former commander of US Special Operations Command; and by two separate Air Force groups, the first headed by Lt Gen James Record and the second by Lt Gen Richard Swope (Air Force inspector general) and Maj Gen Bryan Hawley (Air Force judge advocate general). Matt Labash, “The Scapegoat: How the Secretary of Defense Ended the Career of an Exemplary Air Force General,” *The Weekly Standard* 3 (24 November 1997): 20–29.

28. In an interview with Bill Gertz of the *Washington Times*, described on 10 March 1997 (“Service Chiefs Fear Missile Defense Deal with Russia Could Blunt U.S. Edge, General Says”), General Fogleman was reported as saying that “the military service chiefs are worried that an agreement being negotiated with Russia could impose harmful restrictions on future U.S. missile defenses as part of a side agreement to a U.S.-Russian defense treaty. ‘All the chiefs have great concerns about this,’ Gen. Fogleman told *The Washington Times*. ‘I would hate to see us negotiate away any kind of advantage we might have in space-based sensors, or in the airborne laser or anything like that.’” The previous week, there had been discussions in Moscow over a possible side agreement between the two countries “expanding the . . . 1972 Anti-Ballistic Missile treaty to cover short-range missile defenses.”

29. General Fogleman was commander in chief (CINC) of US Transportation Command, August 1992–October 1994.

30. In “The Scapegoat,” Labash, a staff writer at *The Weekly Standard*, used numerous interviews with (and public statements by) people involved in the incident and the investigations afterward, as well as the conclusions of the investigation reports, to argue that General Schwalier had been extremely aggressive and had done everything in his power to protect the people under his command, and that political pressures to hold someone accountable for the deaths led the secretary of defense to deny Schwalier promotion to major general.

31. The changes in the officer promotion and assignment systems in 1995 were outlined in Bruce D. Callander, “A New Shot at the Officer Promotion System,” and “The New Way of Officer Assignments,” *Air Force Magazine* 78 (July 1995): 70–73, and 78 (September 1995): 90–93, respectively. A quality-of-life survey (answered by 356,409 Air Force uniformed and civilian members) in 1995 revealed that 50 and 53 percent of enlisted and officers, respectively, did not think their promotion systems were fair. See Peter Grier, “The Quality of Military Life,” *Air Force Magazine* 79 (December 1996): 33–34. Dissatisfaction with the evaluation and assignment systems diminished in the 1996 survey. See Suzann Chapman, “USAF Survey Shows Positive Trends,” *Air Force Magazine* 79 (October 1996): 12.

32. Predictions about a pilot shortage and retention problems were detailed in Bruce D. Callander, “And Now, the Pilot Shortage,” *Air Force Magazine* 79 (March 1996): 70–74.

33. General Shalikashvili permitted General Fogleman for a period of time to set the level of tasking for certain weapon systems like the AWACS and airborne battlefield command and control center—which were small in numbers of aircraft but in almost continuous use—for the purposes of training crews and expanding their numbers.

34. 1st Lt Kelly Flinn, the first female B-52 line pilot in the Air Force, graduated from the Air Force Academy in 1993 and joined the 23d Bomb Squadron, Minot AFB, N. Dak., in October 1995. At the base, she had a brief affair with an enlisted man and then with the husband of an enlisted woman in her wing. She was ordered to break off the affair and allegedly told investigators

first that she was not involved with the man and then that she had ended the relationship when she was at the time living with him. Her case became national news when she asked the secretary of the Air Force for permission to resign from the service with an honorable discharge rather than face court-martial. See Frank Spinner, attorney, "Military Career of Lt Kelly Flinn," 20 May 1997, on-line, Internet, 26 November 2000, available from <http://www.kellyflinnfoundation.org/military.htm>; David Van Biema, "Sex in the Military: The Rules of Engagement," *Time* 149 (2 June 1997): 36–37; Elaine Sciolino, "Air Force Chief Has Harsh Words for Pilot Facing Adultery Charge," *New York Times*, 22 May 1997, A1, B12; and editorial, "The Discharge of Kelly Flinn," *New York Times*, 23 May 1997, A30.

35. Gen Joseph Ralston, USAF, the vice chairman of the JCS, was named by the secretary of defense to succeed General Shalikashvili, but in June 1997, in the wake of the controversy over Kelly Flinn, General Ralston withdrew from consideration because of involvement in an extramarital affair some 13 years earlier, when he was a student at the National War College. "Ralston: Uproar Ends Bid," *The News-Hour with Jim Lehrer*, 9 June 1997, on-line, Internet, 16 January 2001, available from http://www.pbs.org/newshour/bb/military/jan_june97/ralston_6-9.html.

36. H. R. McMaster argues in *Dereliction of Duty: Lyndon Johnson, Robert McNamara, the Joint Chiefs of Staff, and the Lies That Led to Vietnam* (New York: HarperCollins, 1997) that the joint chiefs contributed to the American failure in the Vietnam War by not expressing their disagreements—with the policy of gradual escalation—directly to the president, and by allowing their views to be misrepresented to Congress and the public by the Johnson administration in 1964–1965. According to McMaster, the chiefs went along with a policy they opposed in part out of loyalty to their civilian superiors, in part because of benefits each gained for their service in bargains with the secretary of defense, and in part because they expected later to be able to negotiate changes in the policy and strategy. The editor was McMaster's primary adviser at the University of North Carolina at Chapel Hill for the MA and PhD theses on which the book was based.

37. The treaty to ban the development, production, acquisition, and use of antipersonnel land mines in war, and to remove those in use and eliminate stockpiles, was signed in Ottawa, Canada, in December 1997. Some 133 countries signed the treaty. Because of opposition from the Pentagon, but after much consultation and last-minute diplomacy, the United States refused to be a signatory. Raymond Bonner, "U.S. Seeks Compromise to Save Treaty Banning Land Mines," "Land Mine Treaty Takes Final Form over U.S. Dissent," *New York Times*, 17 September 1997, A6, and 18 September 1997, A1, respectively; Dana Priest and Charles Trueheart, "U.S. Makes One Last Pitch on Mine Treaty," Dana Priest, "Mine Decision Boosts Clinton-Military Relations," Howard Schneider, "Dozens of Nations, but Not U.S., Sign Land-Mine Treaty," *Washington Post*, 16 September 1997, A14, 21 September 1997, A22, 4 December 1997, A33, respectively; editorial, "Land Mine Foe Wins Peace Prize," *San Francisco Chronicle*, 11 October 1997, A20; and "Land Mine Treaty Goes into Effect—Without the U.S.," *Chicago Sun-Times*, 2 March 1999, 18.

38. Maj Gen Perry McCoy Smith, who retired from the Air Force in 1986, served with General Fogleman in the F-15 fighter wing in Bitburg, Germany, in 1977. A PhD in political science from Columbia University and the author of numerous books (most recently a biography of the hero Jimmie Dyess), General Smith is also a television analyst and teacher of leadership, ethics, and strategic thinking to corporations and nonprofit and government organizations. He lives in Augusta, Georgia.

39. General Fogleman's handwritten note, misdated "27 Jul 97," read in its entirety: "Secretary Widnall[,] I request that I be retired from active duty at the earliest possible date, but not

later than 1 Sep 1997, the fifth anniversary of my promotion to my current grade/rank. Very Respectfully[,] Ron Fogleman [signature] [.] Ronald R. Fogleman[,] General, USAF[.]"

40. In June, reports reached the press that General Fogleman was telling associates privately that he might seek early retirement if General Schwalier's promotion was withdrawn. See Bradley Graham, "Cohen Near Decision on Fatal Saudi Blast," *Washington Post*, 29 June 1997, A4; Michael Hedges, "Air Force Chief Decides to Quit," *The Detroit News*, 29 July 1997, on-line, Internet, 27 November 2000, available from <http://www.detnews.com/1997/nation/9707/29/07290078.htm>; and Susanne M. Schafer, "Head of Air Force Asks to Step Down," *Las Vegas Review-Journal*, 29 July 1997, on-line, Internet, 27 November 2000, available from http://lvj.com/lvrj_home/1997/Jul-29-Tue-1997/news/5796823.html.

41. The entire statement, written personally by General Fogleman and dated 30 July 1997 but released on 28 July, was published in *Air Force Times*, 11 August 1997, 15:

As my tenure as your chief of staff ends, I want to tell you what an honor and a privilege it has been to represent everyone in the United States Air Force.

The timing of my announcement was driven by the desire to defuse the perceived confrontation between myself and the secretary of defense over his impending decision on the Khobar Towers terrorist attack. The decision to retire was made after considerable deliberation over the past several weeks.

On one level, I've always said that my serving as the chief of staff was a "tour" not a "sentence" and that I would leave when I made all the contributions that I could. After I accepted this position in 1994, I met with other senior leaders of the Air Force to discuss our goals for my tenure. We wanted to take care of the troops and their families, to stabilize the force, to set a course for modernization and to develop a new strategic vision. During some difficult and challenging times we have worked hard to accomplish that and more. Certainly there is more to be done, but the framework of the plan and the leadership [are] in place to move forward with the support and efforts of the magnificent men and women of our Air Force.

On another level, military service is the only life I have ever known. My stock in trade after 34 years of service is my military judgment and advice. After serving as chief of staff for almost three years, my values and sense of loyalty to our soldiers, sailors, Marines and especially our airmen led me to the conclusion that I may be out of step with the times and some of the thinking of the establishment.

This puts me in an awkward position. If I were to continue to serve as chief of staff of the Air Force and speak out, I could be seen as a divisive force and not a team player. I do not want the Air Force to suffer for my judgment and convictions. In my view this would happen if I continue as your chief. For these reasons I have decided to retire and devote more time to personal interests and my family . . . but the Air Force will always be in my thoughts.

Miss Jane and I have met a lot of wonderful American service men and women—active duty, Guard, Reserve, civilians and family members—and they will continue to be a part of our lives. We have been proud to represent the men and women of the United States Air Force around the globe and to serve in the finest Air Force in the world. God bless and keep you all as you continue to serve this great nation.

42. Gen John L. Piotrowski commanded Ninth Air Force from October 1982 to July 1985 as a lieutenant general and then was promoted to four stars to serve as vice chief of staff of the Air Force and commander of US Space Command. He retired in March 1990.

After 50 years the Vietnam War continues to haunt many Americans. It was the first war we lost and, domestically, it nearly tore the country apart.

By 1963 the US was becoming entangled in the war in South Vietnam. Presidents John Kennedy and Lyndon Johnson were determined to “bear any burden” to protect freedom abroad, so slowly but inexorably our commitment grew. Dave Richard Palmer’s *Summons of the Trumpet—U.S.-Vietnam in Perspective* (Presidio, 1978), offers an excellent perspective. Palmer was an Army officer who served in Vietnam, was superintendent of West Point, and retired as a lieutenant general. Though dated, his insights into how the Army fought are most interesting. He notes, for example, the Army’s unique rotation policy in this war: units did not rotate in and out, individual soldiers did. Thus, the U.S. did not have an army there for 12 years, but had 12 armies there for one year each. The president refused to call up the National Guard, fearing it would upset the public. Instead, young men were drafted and sent overseas. Few knew why they were there.

When the Viet Cong guerrillas, backed by Hanoi, escalated the conflict by attacking several US base camps, we responded by sending in more troops—from a force of 23,000 in 1964, the US presence bloomed to over 385,000 by the end of 1966 and two years later would peak at over 536,000. The war was ferocious; the enemy courageous and creative. US Army doctrine posited a conventional war against a European-style opponent that emphasized mobility and firepower. This, says Palmer, was a mistake. The infantry stopped marching. Instead, it traveled by air, was dropped into a landing zone and then spread out to find the enemy. When discovered, air strikes or artillery were called in to eradicate them. Afterwards, the soldiers got back into their helicopters and returned to base camp—there was no pursuit of the enemy. Palmer refers to this as “firebase psychosis” and to him it symbolized the disconnect between the tactics used versus those needed.

As the war intensified, so did US casualties. The turning point was the Tet Offensive of 1968. The Viet Cong launched major attacks against urban centers throughout South Vietnam. The US embassy wall in Saigon was breached. The major city of Hue was overrun. US and South Vietnamese casualties were high, but those of the Viet Cong were even greater. Afterwards, the US claimed that Tet was a victory—the back of the Viet Cong had been broken. Strategically, however, it was a disaster. The American pub-

lic had been assured the enemy was nearing defeat and there “was light at the end of the tunnel.” After Tet, they felt betrayed; the American will was broken. Riots, demonstrations, and violence erupted in America, and President Johnson announced he would not run for reelection. A contentious campaign would introduce a new president and a new ground commander who instituted a policy of Vietnamization—a withdrawal of American forces while turning the war over to the South Vietnamese.

The war was also controversial within the military. Its conduct was dominated by soldiers, and to a lesser extent sailors. Pacific Command (PACOM) led the war effort from its headquarters in Hawaii under the leadership of an admiral. The fighting in South Vietnam was directed by Military Assistance Command Vietnam (MACV), located in Saigon and headed by Army generals. Though subordinate to PACOM, MACV largely determined the pace, strategy and tactics of the war in the South. Likewise, the three Chairman of the Joint Chiefs of Staff during the war were either Army generals (twice) or an admiral (once). The ambassador to South Vietnam was retired Army general Maxwell Taylor—who had previously been the JCS chairman when US involvement began to escalate. Airmen were not present at these higher levels.

Based on their experiences in World War II, MACV commanders took it as axiomatic that this war would be won on the ground. It was a war of occupation and destruction: the Viet Cong and the North Vietnamese had to be met in decisive battle and annihilated. Army leaders viewed aircraft as an auxiliary to the land forces, and decided how, where and when airpower would be used.

Vietnam was contentious even within the Army itself. Although Gen. William Westmoreland and others were dedicated to the large, conventional strategy of search-and-destroy missions utilizing massed firepower, there were dissenters.

Andrew Krepinevich, an Army officer, wrote *The US Army and Vietnam* (Johns Hopkins, 1986), which criticized how the army had fought the war. He argued that soldiers traditionally fought conventional battles using firepower to substitute for manpower. This was the American way of war. Vietnam and its guerrilla warfare did not fit this model. The Viet Cong determined the pace and location of operations. They attacked when they wished, inflicted damage and death, and then faded away. By the time US firepower was called in, the enemy was usually gone. To Krepinevich, the solution should have been a counterinsurgency strategy based on highly trained “special forces” who were mobile, smart, and familiar with the countryside and its people. The Army balked at such views, and Gen. Earle Wheeler, the Army chief of staff, stated bluntly that “any good soldier can handle guerrillas.”

Nonetheless, President Kennedy favored the Green Berets and pushed for their growth. According to Krepinevich, the Army responded half-heartedly, and the conventional war advocates remained in charge. The Army

Col. Meilinger, USAF (Ret.), a USAFA grad. received his PhD in military history from the University of Michigan. A command pilot, he has served as a C-130 aircraft commander and instructor pilot in both Europe and the Pacific. He taught at the USAFA and the Naval War College. He was an original instructor and third Dean of the School of Advanced Airpower Studies and is this year's I.B. Holley Award Recipient.

thus conducted a war of attrition, Westmoreland ruefully claiming there was no other alternative. Ideas such as the Civil Action Program, an attempt to win over individual villages, protect them, and expand the area of government control, were, Krepinevich writes, never pursued with vigor—95 percent of Army operations were engaged in search-and-destroy missions, not counterinsurgency. He concluded by stating that the Army “learned little of value” from its Vietnam experience.

In *Learning to Forget: U.S. Army Counterinsurgency Doctrine and Practice from Vietnam to Iraq* (Stanford Security Services, 2013), David Fitzgerald concurs with this assessment, arguing that “Defeat in Vietnam led the Army to consciously turn away from its experience there and discard what it had learned about counterinsurgency.” He further argues that this deliberate effort to expunge its unconventional warfare experiences resulted in disaster in Iraq and Afghanistan forty years later.

Col. Harry S. Summers argues precisely the opposite in *On Strategy: A Critical Analysis of the Vietnam War* (Presidio, 1982). To Summers, Vietnam was a conventional war, but the American public and leaders in Washington became distracted by the guerrillas. It became “fashionable” to view the war as an insurgency. Quoting Clausewitz frequently, Summers concluded that the war should have been taken to the North—the real aggressor—via invasion. At the least, the Army should have occupied Laos and Cambodia to drive out the communists and secure the South Vietnamese flank. Fears that China might enter the war, as it had in Korea a decade earlier, were based on bluffs, says Summers. The debate continues.

Initially, the air components sent to Southeast Asia were of limited quantity and quality. The intent was to assist, not dominate, our South Vietnamese allies, and we trained them in the vintage aircraft provided. Often, American pilots flew along as “observers.” By early 1964, that model began to fade as the Viet Cong became increasingly aggressive. After they attacked several US base camps, killing or wounding dozens of Americans and destroying several aircraft, President Johnson acted. His determination was steeled when it appeared North Vietnamese patrol boats attacked two US destroyers in the Tonkin Gulf in August 1964.

Westmoreland requested and received a large influx of heavy ground forces to launch offensives in the South. But in addition, the subject of punitive air strikes arose. Air Force Chief of Staff Gen. Curtis Le May—another World War II veteran famous as a bomb commander—argued strongly for this, pushing for an air campaign to destroy the war-making capability of North Vietnam. The Army opposed this idea, reiterating that the war was to be won in the South. It was a ground war. Attacks on North Vietnam would be of little use, and indeed, would merely escalate the war. Johnson’s advisers agreed with the Army, and Defense Secretary Robert McNamara stated in June 1965 that he did not want even one plane dropping bombs on North Vietnam if that plane could be used advantageously in South Vietnam. This policy and strategic focus would remain fixed until US ground forces were withdrawn from South Vietnam in 1972.

The president’s response was therefore a series of air strikes, and eventually thousands of combat sorties were flown over North Vietnam. The targets, strategy, policy and even tactics for those missions—occurring between 1965 and 1968 and termed *Rolling Thunder*—were rigidly controlled by Washington. Lunch meetings consisting of the president and his key civilian advisers were held in the White House on Tuesdays to decide the targets for the following week. No airman ever attended those meetings, although after two years, JCS chairman Gen. Earle Wheeler, an infantryman, was finally allowed entrance.

The decisions made at these meetings were based heavily on political factors: How would the US public react; how would the news media? What were the opinions of our allies? Overshadowing all was fear of China and the Soviet Union. Johnson never forgot that China had intervened forcefully in Korea in 1950. Although military advisers downplayed the chances of intervention, Johnson was not convinced; he did not want to widen the war.

This story is told in Jacob Van Staaveren’s *Gradual Failure: The Air War over North Vietnam, 1965-1966* (AF History and Museums Program, 2002). Because of the political sensitivity regarding air strikes both in the US and abroad, Johnson was determined to maintain control. As a result, the number of sorties to be flown, consisting of what types of aircraft, carrying what weapons and against which targets, were decisions made in Washington. Prohibited areas were established around the two major cities of Hanoi and Haiphong, and a no-fly buffer zone fronted the Vietnamese/Chinese border. Naturally, most of the lucrative targets in North Vietnam were located inside the prohibited zones.

Because decisions were made in Washington, there were inevitable delays in execution. Thus, if a strike was approved for a certain day but weather cancelled it, weeks might pass before Washington would allow the mission to be rescheduled—and by then the target may have disappeared or moved elsewhere.

Rolling Thunder was all about signals. We were signaling Hanoi that we wanted them to negotiate, so we offered them carrots and sticks. If they agreed to talks and ceased their support of the war in the South, there would be economic aid in their future. If they refused, we would strike them harder. This policy was termed “Gradual Escalation.” We would strike; wait for a Vietnamese response; strike again, only perhaps a bit harder this time; wait some more; and then repeat the cycle, hoping that the North Vietnamese would succumb to our gradually increasing pressure.

Strict rules of engagement (ROE) were established: North Vietnamese airfields were not struck—Washington seeing this as a provocative escalation—so the deadly MiGs could not be attacked while on the ground and vulnerable. When surface-to-air missile (SAM) sites were established in the North in April 1965, they were declared off limits—one of Johnson’s advisors stated the missiles were there simply to boost the morale of the North Vietnamese: they would not be used. The first US aircraft was downed by a SAM three months later—109 more SAM shootdowns

would follow by the end of the war. Air superiority could not be established over the North because of these rules, so strike missions would be costly. The ships in the port of Haiphong delivering these deadly weapons, along with tons of additional military equipment and precious fuel, were protected, because many were crewed by Russians, Chinese or neutrals. Fuel sites and storage facilities were seldom targeted. Targets such as bridges, rail lines, marshalling yards, power plants and steel mills were also off limits most of the time. When they were struck, it was a decision often made by the president himself. Johnson once commented that airmen couldn't hit an outhouse in North Vietnam without his approval.

ROE restrictions rankled the airmen. They understood that war had to be guided by political leaders, but there seemed little rationale for the constraints placed on them. This must be understood in context: Our military today has spent their careers guided by strict and detailed ROE. They are accustomed to it. That was not the case in Vietnam where such restrictions were viewed as new, nonsensical and dangerous.

The story is continued in Wayne Thompson, *To Hanoi and Back: The USAF and North Vietnam, 1966-1973* (AF History and Museums Program, 1998). He describes the arguments between American military and civilian leaders regarding the goals of *Rolling Thunder*. Was it to defeat the North, or merely to get them to negotiate? Was it to destroy their war-making capability, or just to stop the flow of supplies to the South? Unfortunately, different objectives demanded different types of air campaigns, and these would require different aircraft using different weapons against different targets.

Thompson's account illustrates the adage that excellent tactics cannot overcome a flawed strategy. No matter how ingenious, professional and courageous were our airmen, the odds were stacked against them. New weapons, new tactics, new aircraft and new ideas were tried endlessly. The life of the aircrews depended on their adaptability, but of course, the enemy was evolving as well, introducing new weapons and technology provided by China and the Soviet Union. The result was a stalemate. As the ground war in the South was a war of attrition, so too was the air war over North Vietnam.

Although little by little, in dribs and drabs, key targets were approved, they were not attacked as hard as they could have been nor in a timely manner. Thompson notes that "President Johnson repeatedly assured the communist rulers of North Vietnam that his forces would not hurt them, and he clearly meant it. Government buildings in downtown Hanoi were never targeted." Similarly, the president announced periodic bombing halts intended to bring enemy leaders to their senses and negotiate seriously. In actuality, that time was used to move men and supplies unimpeded and build more formidable defenses for when the air strikes resumed.

Rolling Thunder shuddered on inconclusively. In November 1968, President Johnson announced another bombing halt, his sixteenth. This one would last for nearly four years. During *Rolling Thunder*, the USAF had flown almost

154,000 strike sorties over the North, as well as 129,000 support sorties. It had dropped around 500,000 tons of bombs, but it had lost 638 aircraft, including over half of the F-105 fleet. These losses meant the deaths of 413 airmen, and an additional 333 who became prisoners of war.

Two memoirs by leading air commanders during the war should be read. The first is Adm. U.S. Grant Sharp's *Strategy for Defeat: Vietnam in Retrospect* (Presidio, 1978). Sharp, who commanded PACOM during *Rolling Thunder*, states his conclusion early on: "We were never allowed to move decisively with our tremendous air and naval power." To him, the blame was clear: "For the real tragedy of Vietnam is that this war was not won by the other side, by Hanoi or Moscow or Peiping. It was lost in Washington, DC." Although not an airman himself, he believed, like LeMay, that a robust air campaign against the North, carried out in 1964, would have been decisive in ending the war. Instead, politics shaped an air war that was ineffective: "we could have flown ten times as many sorties as were permitted." Throughout his memoir, Sharp argues that civilian leaders in Washington made crucial decisions—even down to the tactical level—that were inane and cost American lives. What he does not acknowledge is that those orders were relayed to him from the JCS, and he in turn passed them on to his forces. There was plenty of blame to go around in this war, from both the civilian and military sides.

Another memoir is Gen. William W. Momyer's *Air Power in Three Wars* (GPO, 1978). As a full general commanding 7AF during the war, Momyer's in-depth look at air operations and how they were conducted are insightful. Like Sharp, he was bitter over the constraints and restrictions placed on him. More importantly, he looked closely at the command and control (C2) arrangements, which were a mess.

North Vietnam was divided into seven geographic "route packages." Some were given to the Navy and the others to the Air Force. Navy strikes were planned and conducted through naval channels, while Air Force missions were run through Pacific Air Forces (PACAF) in Hawaii. There was no one in overall operational control of the air war; indeed, often it seemed that competition between the services took precedence over a joint effort.

The Air Force had two tactical air forces fighting in Vietnam, 7AF headquartered in Saigon and 13AF in the Philippines. Aircraft based in South Vietnam were controlled by 7AF and usually did not strike targets in Laos. Aircraft stationed in Thailand were controlled by 13AF, but generally did not hit targets in South Vietnam. When either air force went to North Vietnam, they received their targets from PACAF in Hawaii. When targets were struck in South Vietnam, they were chosen by the MACV staff in Saigon. There were two different air command posts in Saigon—one termed "in-country" for strikes in South Vietnam, and the other called "out-country" for attacks against the North or in Laos. Thus, from one day to the next aircraft could fly against targets in three different countries, be controlled by two different agencies, and receive targets from two other agencies. It was confusing.

Procedurally, targets in the North were decided in Washington and passed on to Hawaii to be doled out to Air Force and Navy units. In the South, MACV would pass targets to the air components—the Air Force, Navy, Army and Marines. (The South Vietnamese Air Force did not take orders from MACV). There was little or no coordination between these five air arms. The MACV staff was dominated by soldiers, and as a result, airmen had little input into which targets were struck nor were they told *why* these targets were selected or what their destruction was meant to achieve.

There were attempts to bridge these organizational gaps: Momyer was dual-hatted as commander of 7AF plus MACV's deputy for air, and because 13AF also controlled aircraft in the theater, a single individual was named the vice commander of *both* air forces to help smooth cooperation. These steps were inadequate. Note too that the 8AF was also involved, bringing B-52s, KC-135s, U-2s and SR-71s belonging to Strategic Air Command (SAC). Because these assets needed to be available for the nuclear deterrence mission, SAC refused to relinquish control, so they were commanded from Offutt AFB in Nebraska, through an 8AF forward headquarters based on Guam. In addition, strategic airlifters like C-141s and C-5s belonged to Military Airlift Command, headquartered at Scott AFB in Illinois. Seen as global assets, they were not controlled by the theater commanders either.

These C2 issues were never resolved, largely because there was no airman in charge to ensure unity of command among the various air arms. The position of a Joint Force Air Component Commander, now enshrined in US joint doctrine, would not exist until the mid-1980s.

The result is a depressing tale of mismanagement, disorganization, and both interservice and intra-service rivalry. Momyer's conclusion is accurate though depressing: "Airpower can win battles, or it can win wars. All commanders since Pyrrhus have been tempted at one time or another to confuse the two, but few distinctions are more important." Momyer was relegated to being a high-ranking tactician—strategic decisions were made elsewhere.

Air superiority is the cardinal rule of air warfare, because it makes other air missions possible. Without it, close air support, interdiction, strategic bombing, airlift, air refueling, battle management, reconnaissance, surveillance and search and rescue, are difficult if not impossible to perform. The joint force depends on air superiority, and the US has not had to fight without it since the Vietnam War. Therein lies the rub, because after World War II the prospect of nuclear war dominated the military services, including Tactical Air Command, and so the traditional mission of air superiority was downplayed. In Vietnam that would become a serious problem. Moreover, the USAF had not developed an air superiority fighter after the F-86. Going into Vietnam, the standard fighters were the F-100, F-101, and F-105. The first two were too slow for operations over North Vietnam. The Republic F-105, nicknamed the Thud—allegedly because of the sound it made when hitting the ground—was designed to carry a nuclear weapon in its bomb bay. It was fast and strong, but it did not have the ma-

neuverability to dogfight with a MiG. Col. Jack Broughton, a Thud pilot in the war, said blandly that the plane needed a rearward firing missile—because the rear is where the enemy seemed to end up most of the time. Nonetheless, it was the F-105 that became the workhorse of *Rolling Thunder*. Three excellent books on the air-to-air battle are Marshall Michel, *Air Clashes* (Naval Institute, 1997), Craig Hannah, *Striving for Air Superiority* (Texas A&M, 2002), and Robin Olds with Christina Olds and Ed Rasimus, *Fighter Pilot* (St. Martin's, 2010).

When US aircraft first flew north to attack targets in early-1965, the North Vietnamese air defenses were rudimentary. There were some tracking radars, as well as anti-aircraft artillery guns (AAA), but not too many. There were a few dozen interceptors, mostly MiG-17s, and there were no SAMs. Had the US acted quickly and vigorously, these modest air defenses could have been overwhelmed. But the US did not act quickly or vigorously, and the gradual escalation policy meant the enemy had time to build formidable air defenses, with the help of the Soviets and Chinese, that our aircraft found difficult to overcome.

In early 1966 the MiG-21 made its appearance, and USAF aircraft were outclassed. North Vietnam's Ground Control Intercept (GCI) radars made the MiGs even more formidable, because they could see our strike aircraft coming from Thailand or South Vietnam, scramble interceptors, and vector them to a position where they could set an ambush. Because enemy airfields were off limits until October 1967, there was little to be done about this dangerous advantage. Moreover, the SAMs were surprisingly effective. The SA-2 was most dangerous for high altitude aircraft, so the F-105s and F-4s dropped lower to avoid them. Unfortunately, this put them in the range of ubiquitous and deadly AAA.

Jammers were employed to disrupt enemy radars. EB-66s served this role, but due to its vulnerability it stood off and orbited. EC-121s also orbited at a distance to act as early warning assets for the strike force, calling out the location of MiGs to help prevent surprises. What was needed was a jammer aircraft fast enough to accompany the strike package. The solution would be two-seat F-105Fs equipped with special radars and radar-homing missiles, called Shrikes, that were to identify, jam and attack the SAM radars. The two-seat F-105s were termed Wild Weasels. This helped, but not enough.

In 1966, airmen devised a plan to destroy MiGs while still adhering to the ROE. Col. Robin Olds a wing commander at Ubon Airbase in Thailand, took the lead in this effort. Olds was a legend in the Air Force; he had been an All-American football player at West Point, an ace in World War II with 13 victories, and had married movie actress Ella Raines. Olds devised a plan, operation *Bolo*, to sucker the MiGs into air combat.

When bomb-laden F-105s went north they were usually escorted by F-4s and Weasels. If MiGs showed up, the Thuds would continue to the target while the Phantoms engaged the MiGs. The North Vietnamese were aware of these tactics, so they avoided the Phantoms when possible.

Bolo proposed that F-4s mimic an F-105 strike package. The Phantoms would be loaded with air-to-air missiles instead of bombs; they would use standard Thud routing, altitudes, speeds, tactics and call signs. It was hoped North Vietnamese radar operators would paint the incoming aircraft and assume they were unescorted F-105s. They would then scramble MiG interceptors from the five airfields ringing Hanoi and direct them to the incoming bombers. Not until sighting the Phantoms would the MiGs realize they had been duped. It was expected they would then peel off and head for home, knowing their landing fields were protected sanctuaries. Olds was prepared for that: F-4s stationed at Da Nang airbase in South Vietnam, also mimicking F-105s, would head towards Hanoi from the east. Enemy radar would assume these aircraft were also bombers intending to strike targets near the capital. Instead, the Da Nang fighters would head for the MiG bases and orbit overhead. When the MiGs fled from the Thailand-based F-4s to recover at their airfields, the Da Nang F-4s would be there waiting.

Timing was crucial for the plan to succeed. Not only did the F-4s need to copy the airspeed, altitude and tactics of the F-105s, they had to arrive in separate waves. Studying the actions of the MiGs over the previous months, Olds knew they remained airborne for only 50 minutes, less if using afterburner. The F-4s, even though hitting tankers just prior to entering North Vietnamese airspace, had only five minutes to engage over the target. Accordingly, the MiGs would encounter several waves of USAF fighters—arriving at five-minute intervals—allowing successive aircraft to continue the fight while others departed for home. In addition, the Da Nang aircraft also had to arrive over the MiG airfields in a series of waves so as to meet enemy aircraft attempting to flee. If those F-4s arrived too soon, they would run low on fuel before the MiGs showed up; if they arrived too late, the MiGs would have already landed.

As is often the case, the mission did not go as planned. Bad weather prevented the Da Nang aircraft from arriving over the MiG bases. Nonetheless, Olds led his wing as scheduled; the North Vietnamese were tricked; twelve MiG-21s scrambled to intercept what they supposed were unescorted F-105s; and they did run into a buzz saw. For no loss, seven MiGs were downed, one by Olds. Unfortunately, the lack of the Da Nang force meant the remaining MiGs were able to recover safely.

Olds and others later complained that US air-to-air missile technology was deficient during the war. The AIM-4 Falcon was ineffective and quickly discarded. The AIM-7 Sparrow was radar guided and early on it was unreliable—during *Rolling Thunder* it malfunctioned 63 percent of the time. The AIM-9 Sidewinder did slightly better. A heat-seeker, it was smaller, cheaper and more reliable than its radar-controlled brothers. Its failure rate was not much better than the Sparrow, but pilots preferred it. Over the course of the war, the Sparrow and Sidewinder each had around 58 kills (Navy and Air Force).

Pilots like the idea of a gun, but that on the F-105 was not very effective because the plane itself was so unsuited to dogfighting. The F-4 did not initially carry a gun, al-

though later a gun pod was strapped beneath the fuselage. The F-4E with an internal 20mm Vulcan cannon arrived in Vietnam after *Rolling Thunder* but in time for *Linebacker* operations in 1972.

Training was a separate issue. As noted, when the war began fighter pilots had not trained extensively in air-to-air combat—their skills had atrophied. The Navy realized this problem first and opened its Top Gun school, and the results were dramatic. Surprisingly, the Air Force did not open its own intensive air combat training, Red Flag, until the war was over.

Nonetheless, when our aircraft went back North during *Linebacker*, it did so with better planes, better missiles, better electronics, and a better gun. The enemy had evolved too during the four-year hiatus, but the numbers show that the US improved more. During the nine months of *Linebacker* I and II, the Air Force shot down 48 MiGs and the Navy a further 24: the USAF lost 24 aircraft in dogfights; the Navy only four. Throughout the war, 40 of the Air Force's 135 kills were with the gun—29 percent. Future fighters would be built with an internal gun. Of importance, not a single USAF aircraft has been lost in air-to-air combat in the fifty years since the Vietnam War ended. We learned our lesson.

The air war in the South was more intensive than *Rolling Thunder*, even if the latter received most of the glamour and press. Two good books on the subject are John Schlight, *The Years of the Offensive, 1965-1968* and Bernard C. Nalty, *Air War Over South Vietnam, 1968-1975* (published by the AF History Program, 1988 and 2000, respectively).

From a slow beginning in 1962, US forces began to build, and by the end of 1968 there were over 56,000 airmen and nearly 1,100 aircraft stationed in South Vietnam, Guam, Okinawa and Thailand. Unlike in the North, the US enjoyed air superiority in the South; Hanoi's aircraft never crossed the DMZ. Ground fire was another matter. As in most wars, it was ground fire that accounted for the vast majority of aircraft downed. For the Air Force, that number was high—over 1,500 aircraft were lost in the South, as well as the lives of over 2,100 men.

US missions were flown by F-100s, A-1s, F-4s, B-57s, gunships of several types, A-7s, F-111s and others. All told, the Air Force flew 3.9 million combat sorties in support of the Army and Marines in South Vietnam, of which over 630,000 were attack sorties. These strike missions included over 67,000 flown by B-52s based in Guam and Thailand. This amounted to an incredible 8 million tons of bombs dropped—three times more than had been dropped in all of World War II. As noted, firepower was seen by the soldiers who directed these air strikes as being the decisive and unique feature of US military capability. Casualties were always paramount, so firepower was to be the great equalizer that saved American lives.

An example of this notion was the Marine base at Khe Sanh that was surrounded by the North Vietnamese during the Tet Offensive. US leaders feared for its survival—many remembered the siege of the French base at Dien Bien Phu, which the North Vietnamese had surrounded in 1954. Its

fall ended French military operations in its former colony. President Johnson and other leaders were loath to allow that to happen at Khe Sanh. Gen. Westmoreland demanded and received increased airpower, especially B-52s, to save the basecamp. Over the next two months, the heavy bombers flew over 2,500 sorties and dropped nearly 60,000 tons of bombs—more than all other US aircraft combined. It is believed that 15,000 enemy died at Khe Sanh, and Westmoreland attributed the base's survival to the B-52s.

The war also bled over into Laos and Cambodia. Rather than infiltrating men and supplies across the DMZ, the North Vietnamese established a road system through its neighbors that terminated in various locations in South Vietnam. This huge and complex system, termed The Ho Chi Minh Trail, became a constant target of American airpower. These operations are covered in Jacob Van Staavren's *Interdiction in Southern Laos, 1960-1968*, and Bernard C. Nalty's *The War Against Trucks: Aerial Interdiction in Southern Laos, 1968-1972* (published by the AF History and Museums Program, 1993 and 2005, respectively).

Reconnaissance missions over Laos began in 1963, and over the next decade thousands of US aircraft would patrol the Trail looking for targets. This interdiction effort was termed *Barrell Roll* for missions over northern Laos and *Steel Tiger*—later named *Commando Hunt*—for operations over southern Laos. These missions were sensitive—the Laotian government sought to maintain the semblance of neutrality. Nonetheless, an early lesson learned was that to stop the flow of supplies, aircraft needed to be over the Trail both day and night and in all weather. This was difficult to achieve. By the end of 1967 the Air Force had flown over 183,000 sorties in Laos and allegedly destroyed over 8,000 targets, mostly structures and vehicles. This was achieved at the cost of 122 aircraft. By the end of the war, it was claimed that over 50,000 North Vietnamese trucks had been destroyed during the decade of interdiction efforts along the Trail, but few believed these figures.

To understand the war from the other side, John Prados offers *The Blood Road: The Ho Chi Minh Trail and the Vietnam War* (NY: John Wiley, 1999). The Vietnamese were every bit as determined, clever, and innovative as the Americans, maybe more so. Hanoi estimated a mere twenty to thirty tons of supplies per day would sustain the insurgency in the South. This was easily maintained, and soon ten times that much was on the move. Indeed, by the end, the Trail—which consisted of 12,000 miles of roads—supplied almost 500 tons per day, enough to supply nearly twelve regular divisions plus the Viet Cong. Although our aircraft came every day, 100,000 Vietnamese and Chinese workers were there every night to make repairs—rebuilding bridges or trails, clearing damaged vehicles out of the way or repairing them, and ensuring the supplies kept moving. It came at a price. Prados does not give an overall figure of the number of Vietnamese who died, but notes tellingly that there are 72 military cemeteries along the Trail, holding the remains of those who labored there.

It was one of the many tragedies of the war in Southeast Asia that the clandestine wars being carried on in Laos

and Cambodia were officially denied but were an open secret. The lies, when they eventually became known, only further undermined the credibility of the government in the eyes of the American people.

In spring 1972 the North Vietnamese launched a conventional invasion across the DMZ. Termed the “Easter Offensive,” it occurred after the withdrawal of American ground forces. Sending them back in was not an option for President Richard Nixon; instead, he sent airpower.

The story of this air response, termed *Linebacker I* and *Linebacker II*, is told in Wayne Thompson's *To Hanoi and Back* and by John T. Smith in *The Linebacker Raids: The Bombing of North Vietnam, 1972* (Arms and Armour, 1998). The Vietnamese assault began on 30 March with 100,000 regular troops supported by 400 tanks. Eventually, 14 North Vietnamese divisions were involved. Nixon reacted quickly, even mining Haiphong harbor, an idea that had been suggested for years but never implemented. Aircraft not only blunted the invasion, but also went far north again for the first time since *Rolling Thunder*. This time, a remarkable new weapon was available: the laser-guided bomb. Precision-guided munitions had been tested in WWII, but it was in Vietnam that they were first used extensively. An example of their effect was Hanoi's Than Hoa bridge. During *Rolling Thunder*, hundreds of sorties had been flown against the bridge resulting in eleven aircraft shot down but no real damage inflicted. During *Linebacker*, a flight of F-4s carrying laser bombs dropped the bridge while suffering no losses. Precision-guided munitions would revolutionize war.

Secretary of State Henry Kissinger was meeting with North Vietnamese representatives in Paris during *Linebacker*, and it appeared progress was finally being made in peace negotiations. After weeks of bitter haggling, an agreement was reached: the North Vietnamese would stop their attacks, the Americans would withdraw, and the hundreds of POWs in Hanoi's prisons would be released. However, President Thieu of South Vietnam objected to these terms and demanded changes. Hanoi used this intransigence as a chance to renege on its own agreements. The pact was not signed. Nixon was furious. He then launched *Linebacker II*—intensive strikes against North Vietnamese targets that had hitherto been off limits, and employing B-52s for the first time over North Vietnam. Sensitive to endless complaints regarding restrictions placed on the military, he lifted most such constraints, noting: “The bastards have never been bombed the way they're going to be bombed this time.”

Sometimes referred to as “The Christmas Bombing,” because the heaviest raids took place in late December, the B-52s plus dozens of other strike aircraft went North to pummel targets in Hanoi and Haiphong. The North Vietnamese returned to Paris on 26 December. The heavy bombing did not change the terms of the original agreement, but this time the North Vietnamese signed.

The B-52s flew 729 missions north dropping 15,000 tons of bombs on 34 separate targets. They lost 15 aircraft carrying 92 crewmembers. Of these, 26 were rescued, 34 became POWs, and 28 are still listed as missing.

One of the most tragic stories of the Vietnam War was, paradoxically, also one of the most uplifting. It involved the plight of our prisoners of war (POWs) held in North Vietnam. The first airman shot down was Navy Lt. Everett Alvarez, whose A-4 went down on August 5, 1964. At first, his captors were not sure what to do with him, and he was largely left alone in a rat-infested cell. That would soon change as dozens of Air Force and Navy crewmembers would join him in prison.

Beginning in October 1965, the first airman, Rodney Knutson, was brutally tortured. Others soon suffered the same fate, repeatedly. The captives claimed they were POWs, protected by the Geneva Conventions, which the North Vietnamese had signed. The jailors denied this, saying they were war criminals and had no rights. Initially, the prisoners gave only the required name, rank, and serial number, but this was not good enough. More was beaten out of them. John G. Hubbell in *P.O.W.* (NY: Thomas Crowell, 1976) relates all of this in shattering detail. A similarly informative, if depressing account, is by Stuart I. Rochester and Frederick Kiley, *Honor Bound* (Office of the Secretary of Defense, 1998). The description of the torture these men suffered is stomach turning, and many would die while others endured lifelong injuries. At first the captors wanted personal information—where they were from, families, etc. Then it was details on their planes, base/aircraft carrier, commanders, tactics. Finally, it became propaganda. The POWs were to read statements before a camera or sign statements admitting they were war criminals who deserved their punishment. For over seven years the POWs fought their captors in the only way they could: they delayed, told lies, and spread disinformation. Ultimately, all were broken.

There was an upside related by Hubbell that is moving. The POWs maintained unity as much as was possible. They developed sophisticated methods of communicating by tap code, hand signals and notes on scraps of paper left in toilets or buckets. They constantly tried to keep up the spirits of their comrades, urging them to “forgive themselves” after they had been broken. The goal was survival. Hubbell gives the story of one man, Lt. Cmdr. Richard Stratton, but his experiences were replicated by scores of his fellow prisoners. “Stratton was choked, kicked and beaten until his face and head were bloody and his eardrums were ruptured. Twice he was tortured in ropes and hell cuffs and burned cigarettes, and there was a painful although incomplete effort to pull out his thumbnails. He was left with no choice but to admit that he had bombed Hanoi.”

There were efforts to trick the Vietnamese, by listing squadron mates as Ben Casey (a TV character at the time) or Clark Kent (Superman’s alter ego); for radio broadcasts they would deliberately mispronounce Ho Chi Minh as Horseshit Men; or when on video they would use their hands or eye blinks to send morse code messages. It does not sound like much, but it did wonders for the POWs—it made them feel they were still fighting the enemy.

Over time the treatment of the POWs waxed and waned depending on the mood of the prison guards or the political situation. When Americans raided the POW camp at Son

Tay on November 21, 1970, only to find it empty, the Vietnamese hurriedly moved all prisoners into one camp, the Hanoi Hilton, so as to avoid the risk of another prison raid.

The Paris Peace Accords were signed on January 27, 1973. One of its key provisions was the release of the POWs. Food immediately improved and became plentiful: the Vietnamese did not want gaunt skeletons returning to the US. Eight men who had collaborated with the enemy faced no punishment from the military upon their return, although some ex-POWs did file charges. All were dismissed or acquitted. It was time to heal. The Department of Defense states that 684 POWs returned from Southeast Asia—most from North Vietnam (470) and South Vietnam (167), but also from Cambodia (26) Laos (19), and even China (2). Distressingly, nearly 1,600 are still listed as Missing in Action, but the search for remains continues.

There are few happy endings to any histories or memoirs from the Vietnam War. Those who served in Southeast Asia often returned home bitter, while at the same time being rejected by their fellow Americans. It has taken decades for the rancor and anger to subside.

A number of excellent air novels have emerged from the Vietnam War, most dealing with missions over North Vietnam. Pilots had to fly 100 missions over the North to complete a tour. During *Rolling Thunder*, the odds of doing so were against them. I have chosen three from the dozens of novels written that to me are the most interesting and well written, all by combat veterans of the war.

Cadillac Flight, by Marshall Harrison (Lyford, 1991) begins with a major general sitting on board a C-141 as it approaches for landing in Hanoi. He looks out the window and sees the bridges, the Red River, Thud Ridge, old anti-aircraft gun sites, and he remembers what it was like twenty years before, flying his F-105 over this same real estate. He is there to pick up the remains of Americans lost long ago during that miserable war. As he leaves the plane there is the usual receiving line of dignitaries. At the end of it is a short, stocky colonel—different than the others. Both the general and the colonel are fighter pilots, and they size each other up. The Vietnamese colonel, Nguyen Minh, says, “Perhaps we have met before, General? In another time?” Perhaps.

The scene shifts back twenty years to Takhli Airbase, Thailand, home of an F-105 wing. One of the flights in that wing, *Cadillac Flight*, consists of four pilots: Major “Donkey” Sheehan, Captain Jim Broussard—the new guy—and Lieutenants Andy Pritchard and Bob Packard. “Donkey” is a passed-over major, shaped like a pear, crude, hard-drinking, yet he’s also an outstanding fighter pilot. He loves his job and his troops. Pritchard is handsome, cool, an outstanding stick; he’s decided on an Air Force career. He’s already survived one combat tour and immediately signed up for another. Packard is a good pilot, but anticipates flying an airliner when he gets home. Broussard has just arrived. He’s been flying trainers for the last four years and had not intended to go to war. He too wants simply to survive his 100 missions and then fly for Pan Am.

The F-105 is armed with three tons of bombs and a 20 mm cannon, but it’s too ungainly to dogfight with the nim-

ble MiG-19s and 21s of North Vietnam. If they're lucky, F-4s will fly escort, but sometimes they don't have a choice and have to go in alone.

Broussard's first mission is into "Route Pack VI," the area around heavily defended Hanoi and Haiphong. Usually, new pilots are given missions further south to allow them to get the feel of things, but Jim won't get that chance. Donkey takes him up as his wingman. They all survive, but exactly what happened during the mission is not at all clear to Broussard. He was scared to death the whole flight and was so busy just trying to stay close to Donkey that he saw little of what was going on. That was probably a good thing. *Had* he seen the AAA, SAMs and MiGs, he would have been even more terrified. Yet, Donkey is impressed. The kid stayed with him.

Lieutenant Minh has just finished pilot training in the Soviet Union and upon returning home is undergoing local orientation before he will be permitted to fly combat. He can't wait to get in the cockpit. He gets his wish and begins doing very well against the F-105s that streak down Thud Ridge to attack his capital. Soon, he'll be an ace.

Harrison does a superb job of describing the life of Thud pilots. They drink copious amounts of beer and liquor; they sing and talk in loud voices; they swagger; and each sincerely believes he is the world's greatest pilot. The parties after the missions where everyone from colonel to lieutenant is drunk and on a first name basis is the necessary ritual to expel tension and fear. It is the bonding of the warriors.

Several days a week Cadillac Flight goes into combat. Sometimes they're lucky and fly missions into Laos or South Vietnam. But such missions usually don't count towards the required 100, so these "easy" missions have a downside. The big missions in Route Pack VI almost always mean losses. The Rules of Engagement state that SAM sites may not be attacked, nor may stockpiles of missiles, unless and until the SAM site is active and takes aggressive action. If the site shoots, and misses, you can then retaliate. The MiG airfields are similarly off limits, and the sleek little jets can take off and land unimpeded. Often, the targets struck seem meaningless, and the pilots refer to it as "moving dirt around." There is a bomb shortage, but because 7AF in Saigon insists they "keep up the sortie count" so as not to fall behind the Navy, the Thuds sometimes launch with only two bombs—thus exposing themselves to risk knowing there will be little or no gain. The Administration in Washington periodically announces bombing halts—presumably to let the North Vietnamese reflect on their sins and agree to peace. In reality, they merely position more guns and more SAMs to greet the Americans when they return.

Bob Packard goes down, and his place is taken by Major Nelson Stark, an Academy grad, B-52 pilot, and fast-burner who wants to make general. He's a lousy fighter pilot and is also gutless, but he has friends in high places. Donkey makes him his wingman so he can keep an eye on him. Stark is a menace. The Thud is not a B-52, and he simply can't keep up either mentally or physically. Because of his incompetence, Donkey goes down. Broussard and Stark have it out and almost come to blows, but it's time to go

North again. The target for the day is the infamous Paul Doumer Bridge north of Hanoi. It is unusually well defended, even by Route Pack VI standards. Stark, as usual, blows the mission and Cadillac Flight is in jeopardy as a result. Captain Minh is now an ace flying a MiG with its tail painted red and who is now closing in on Cadillac Flight.

Harrison, himself a fighter pilot with three combat tours in Vietnam, tells a wonderful tale. His prose is fast-paced and his attention to detail is meticulous. Especially riveting are the air battle scenes—the cacophony of excited radio calls, bursting flak, radar warning alarms, emergency beepers "sobbing in the ether" to indicate someone has punched out, the telltale burble of a "Fansong" tracking radar.

The General and Col. Minh meet after the formal dinner and warily begin to talk about the battles of their youth. The General discovers Minh is the pilot with the red-tailed MiG they had all feared. But they drink and sigh; so long ago, so many good men gone. As Minh puts it: "They are the ones willing to do the things that everyone should, but seldom do." The rancor is gone; the old foes salute each other.

The next day the General goes to the warehouse where the remains of the six Americans wait to be flown home. Stunned, he sees the rusting dogtags and realizes he'll be escorting one of his old mates from Cadillac Flight. On their departure leg, they are intercepted and escorted out of Vietnam by an aging MiG that still sports a bright red tail.

Twenty-three miles west of Hanoi near the Da River is a low mountain, barren, desolate and pocked with deep craters. American pilots called it Termite Hill. Local villagers believed the mountain was inhabited by evil spirits and called it Dead Mountain; they avoided it. An American airman had once parachuted from his crippled F-105 and landed near Termite Hill. North Vietnamese soldiers soon captured, tortured and then murdered him there. His comrades knew this, and for the rest of the war the F-105s, to honor his memory, would use Termite Hill as their bomb disposal target for ordnance they did not want to bring back home. Bombs hit the mountain often, day and night, for no apparent reason, so the villagers assumed the Americans were trying to kill the evil spirits.

So begins *Termite Hill* (Doubleday, 1992), by Tom Wilson. It is a stirring account of the dangerous and deadly battles between the Weasels and the SAM operators.

The cast of characters is typical, and based at Takhli Airbase in Thailand. A small number of the Wing's Thuds are the two-seat versions that have been converted into Wild Weasels. The main characters are a Weasel crew, Benny Lewis the pilot and Mal Stewart, his Bear (back seat weapons officer). We follow them through their combat tour, and we see their professionalism, fear, fatalism, frustration and personal turmoil. Benny, for example, is shot down but soon rescued. While recovering in the Philippines, he calls his wife back in Nevada. A man answers the phone. Benny's wife then tells him she wants a divorce.

Wilson's portrayal of air combat, specifically the Weasel operations, is outstanding. One cannot help but be impressed by the courage and resourcefulness of the crews

who went North day in and day out to face the most powerful and concentrated air defenses in the world. It is a wonder any of them survived their required 100 missions.

Political restrictions placed on air operations, and an overall strategy that was fatally flawed, could never be overcome, even by the ingenuity and courage of aircrews that devised increasingly sophisticated tactics in order to survive. One of the real ironies of this situation was that it was not just the poor or inexperienced pilots who were shot down. Although statistically the man who survived his first ten missions had a good chance of surviving the remaining 90, many still did not. The environment was simply too fraught with danger. And so, in this account the lead Weasel crew goes down, with no chutes, on its 98th mission.

Benny and Mal, the next most senior Weasels, take over as the lead crew with less than ten missions remaining till their rotation. Mal has married, a stewardess he met in Bangkok, and she is pregnant. He now has something to live for. Benny worries about his children that will stay with the wife he has lost; and so both men approach one of their biggest missions yet—against the Thai Nguyen steel mill north of Hanoi—distracted and moody. Their F-105F will lead the wing and will have to go against the most deadly SAM site in the region. None of them will survive intact, and one will die on Termite Hill.

The Laotian Fragments, by John Clark Pratt (Viking, 1974) takes an unusual approach. Pratt posits a political science professor obtaining a collection of documents and diaries that had belonged to a Major William Blake, who had been a student in his graduate class several years earlier. He was surprised to receive the collection: obviously, his class had struck a chord in at least one of his students. The professor decides to publish the papers, but without attempting to organize or edit them; rather, he will merely present them in chronological order with only minor explanatory comments. Together, the story told by this fragmentary record is that of a forward air controller (FAC) who had flown in the secret war in Laos in 1967 and 1968. The call sign of the squadron was “Raven.”

The Ravens flew light or obsolete aircraft like the O-1 and T-28, and because Laos was officially neutral, the planes were unmarked, and the American pilots wore civilian clothes. The book presents a vibrant and clear picture of the clandestine war in Laos. Virtually every page contains lyrical passages; for example, here Blake describes his arrival in Southeast Asia:

And the *heat*. Ceiling fans in the terminal straight out of a grade B Bogart movie. And the noise—airplanes, Honda traffic like a constant Indy 500, the go-go music at the Officers’ Club (God, will I ever forget the perpetual boom-boom), the Army choppers blatting overhead all day and night, sirens, and in the background (like in another world), the crunch and thump of artillery and bombs, like thunder on the horizon (but far off—far off that first day).

Blake arrives in Laos after serving six months as a FAC in South Vietnam where he won a Silver Star. He is to be the Ravens’ new commander; but one of the officers, Dante Hamilton, expected the commander’s job himself. He is not happy with Blake’s arrival, and complains to the air attaché

in Vientiane that the newcomer will not understand the different kind of war going on in Laos and would undoubtedly cause trouble.

Blake quickly runs afoul of the CIA station chief in Laos, Horowitz. Because of the covert nature of the US involvement, “The Company” plays a major role in the war. Blake must get along, but Horowitz dislikes him. For six months Blake will navigate these shoals, attempting to keep off the rocks represented by the two men supposed to be his allies but who’d rather he disappear.

Blake sees up close the political infighting between the various factions within Laos, as well as the often ham-fisted efforts of the US ambassador to control the situation. Blake’s journal entries, interspersed with newspaper clippings and magazine articles he has heavily annotated, become increasingly bitter as he witnesses the actions of Laotian leaders, who are more concerned with their positions than they are with the welfare of their country. The attitudes of his countrymen are hardly less uplifting. On one occasion he has a biting exchange with Horowitz over the conduct of the war. The CIA chief states that it should not be the US intention to kill the communists—except for those that are attempting to kill them. Let sleeping dogs lie. Blake realizes the goal is not to win, but merely to maintain some type of bizarre status quo. Indeed, reading the *Fragments* one is left with the distressing impression that both sides in the Laotian war—the government forces on one side and the communists on the other—operated according to their own rhythms and fulfilling their own agendas. Thus, countless air strikes are flown against suspected enemy positions, only to discover—if indeed it was not known all along—that the enemy was already long gone.

Because Blake spends a great deal of his time up-country in Laos, he sees more of the war and its effects on the populace than do most. In fact, a recurring theme is the ignorance of the American news media regarding what is actually happening. Virtually everything they write is wrong, usually because they have not bothered to leave their hotels in the capital. Over time, Blake is torn by the beauty of the country and its people, contrasted with the corruption of its leaders. At the same time, we are left in admiration of the Ravens who fight and die for a forsaken cause, as well as the individual Laotian soldiers who are so poorly led.

Given the fact that the *Fragments* were given to a political science professor in the States, it is not difficult to guess Blake’s fate. Indeed, we learn in one of the last entries that his aircraft was shot down on a combat mission in northern Laos. Blake was observed bailing out and with a good chute, but like hundreds of other Americans lost over Laos, no trace was ever found of him. The file containing the journal, official messages, letters, newspaper clippings and cassette tapes was in the hands of Blake’s wife. It is she who turns it over to the professor.

This is an exceptional story. The format is most unusual, and the result is an insightful, poignant and realistic account of the secret war in Laos.

As in most histories and memoirs of the Vietnam War, there are few happy endings in these novels. ■

Bomb Group: The Eighth Air Force's 381st and the Allied Air Offensive Over Europe. By Paul Bingley and Mike Peters. Havertown PA: Casemate Publishers, 2022. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. x, 406. \$37.95. ISBN: 978-1-61200-960-5

Paul Bingley and Mike Peters have the necessary aviation background to write on the 381st Bomb Group. Bingley worked in civil aviation for over thirty years and is the chairman of the Ridgewell Airfield Commentative Museum (the field where the 381st was based). Peters retired from the British Army after thirty years' service in the Air Corps. He is a full-time military historian and has published a number of books, including several on the Glider Pilot Regiment.

Bingley and Peters use the stories of individual members of the 381st Bomb Group—principally the group's chaplain—from a rattlesnake-infested, wartime-constructed airfield in west Texas to the front lines of the aerial war in Europe. The 381st was one of the early groups activated to form the armada that became the Eighth Air Force and propagated the air war in the European theater.

The authors do a good job using the diaries, interviews, and books written by group members to convey a vivid—sometimes too vivid—picture of war at its most elemental. The human element is portrayed using the actual words of those who participated. Particularly poignant are the stories of rude awakenings of fresh arrivals to the cost of war on their first few missions.

The book's 27 chapters are separated by intermissions that explain nuances of the task of a bomb group at war. "The Bomb Group" explains the composition of a group, the number of squadrons within a group, and the numbers of planes assigned to each squadron. "The Airfield" discusses the tasks that went into establishing airfields to bed down the large numbers and different types of airplanes that would be coming to Great Britain in 1943 and 1944.

The book's forward and prologue set the scene and provide context for the history that follows, much as the opening scenes in *Saving Private Ryan* did for that movie. The epilogue provides synopses of the careers of several of the protagonists and a summary of the 381st's record from Peyote AAF to VE-Day. Also included are an excellent glossary and appendices. Appendix 1 lists the group's missions with date, location (target), target type, and numbers of B-17's lost. Appendix 2 is a table of the group's organization when it ceased operations on April 25, 1945. Appendix 3 provides casualty statistics broken down by aircrew positions.

The book is an easy read, although some of the more descriptive sections are worthy of extra reading time. Unfortunately, as in many books published these days, the use of endnotes instead of footnotes interrupts the flow of the narrative. The bibliography is excellent and draws attention to the original source documents used by the authors. I would recommend the book to anyone interested in the

prosecution of the bomber offensive in Europe from the view of the participants.

Al Mongeon, MSgt, USAF (Ret)



The Black Cats of Osan: U-2 Spy Plane Escapades and Calamities in Korea. By Lt Col Rick Bishop, USAF (Ret). Havertown PA: Casemate Publishers, 2023 (pre-publication book). Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Index. Pp. 288. \$37.95. ISBN: 978-1-63624353-5

Rick Bishop's fascinating book takes the reader into the dark world of aerial espionage operating in the East Asia area. Devised by Kelly Johnson and initially operated by the CIA, the U-2 is the world's most famous "spy plane." It flew at unprecedented altitudes and carried the most sophisticated sensors available, all in the greatest secrecy.

For over 25 years, Rick Bishop was a military pilot in both the US Army and Air Force. His extensive flying experience includes over 1000 hours in heavy-lift helicopters (including combat in Vietnam), the T-37, T-38, KC-135, and the U-2 Dragon Lady. He commanded the 99th Reconnaissance Squadron at Beale AFB CA and was director of U-2 Operations at Osan AB, South Korea, home of the 5th Reconnaissance Squadron—*The Black Cats*. Bishop retired after 50 years of piloting civilian, military, and airline aircraft. Drawing from his extensive aviation experience, he spent many hours researching Air Force records and interviewing U-2 operators, intelligence officers, and physiological support and maintenance personnel who served with *The Black Cats* at Osan. In this book, Bishop journeys deep into the black world of aerial reconnaissance and reveals how *The Black Cats'* handpicked personnel became "... the most reliable and productive unit to utilize the U-2 Dragon Lady during the Cold War, and to this day."

Throughout the Cold War, the U-2 Dragon Lady was considered a "national asset." As such, its operations—and, particularly, its acquired intelligence data—were closely guarded. The pilots wore a full-pressure suit (space suit) and operated not only in very dangerous areas of the world, but also in a very hazardous physiological environment. Exposure to the elements at the altitudes at which the U-2 operated (and still does) would cause instant death as the blood immediately boiled (Boyles Law and Armstrong's Line). Bishop also describes how, at the edge of the earth's atmosphere, the U-2 flies and collects highly sensitive intelligence that is distributed to the highest levels of the National Command Authority. On rare occasions, these data may lead to precarious situations.

Further, Bishop reveals how a 9th Strategic Reconnaissance Wing detachment in Osan grew and evolved into a full-up Air Force squadron operating 7000 miles away from its parent USAF wing. He also emphasizes that these

sensitive and highly classified missions could not be done without the dedicated work of the many intelligence, maintenance, logistics, civilian technical representatives, operations, and physiological support personnel. All of these people are needed to get the airplane into the sky; keep the pilot alive; and gather, process, and distribute the acquired intelligence.

For the historian and U-2 Dragon Lady enthusiast, *The Black Cats of Osan* is a must read.

Colonel Charles P “Chuck” Wilson, USAF (Ret.), NASM docent and Chairman of The Cold War Museum



C-130 Hercules: A History. By Martin W. Bowman. Barnsley UK: Pen & Sword Books, 2022. Notes. Appendices. Acknowledgements. Photographs. Maps. Pp. 320. \$34.95 paperback. ISBN: 9-781-39907-485-8

Martin Bowman is one of Britain’s leading aviation authors. He has written well over one hundred books on aviation history and military subjects. He specializes in World War II history and post-war aviation. His interest in these subjects was fired by the proliferation of USAAF and RAF air bases that were established in his native East Anglia. His previous books include *Legend of the Lancaster*, *Confound the Reich*, *Duxford and The Big Wings*, and numerous titles that cover D-Day and Market Garden operations. His research has led him into many of the world’s war zones.

In 1950 the USAF developed requirements for a new tactical aircraft based on the lessons learned from World War II and being learned in the Korean War. The service needed an aircraft that could carry a 30,000-pound payload of freight or troops, over a distance of 1500 nautical miles, with the ability to land on and take off from difficult terrain. At that time, because of the limits of engine and airframe development, the request for proposal was technologically challenging. Lockheed opted for an uncomplicated, efficient, easily maintainable design for their airlifter. They also rejected conventional piston engines and selected less-proven turboprop technology. Their prototype C-130 Hercules first flew in August 1954. More than 2100 aircraft have since been produced in over 80 different variants. The Hercules serves more than 60 air forces as well as many civilian cargo operations. It has multiple roles in addition to logistical support, including ECM platform, psyops platform, Mother of All Bombs (MOAB) bomber, airborne refueler, gunship, airborne command post, flying hospital, and firefighter.

Bowman begins with a chapter on C-130 development and evolution, including overviews of many variants and their operations. He next describes “Trash Hauler” operations in the Vietnam conflict, a period he considers as the C-130’s finest hour. He provides operations vignettes that

give the reader an excellent picture of what it was really like to conduct logistical air service in-country. He goes on to describe “Haul On Call” operations of airlift and paratroop dispersion from bases in Vietnam and Thailand. He relates crew interviews and stories of success and failure, of routine operations, and of maintenance and reliability nightmares. Bowman also provides details of aircraft configurations, electronics, and equipment requirements for the differing operations. Several chapters are dedicated to C-130 involvement in humanitarian operations including *Red Dragon* in the former Belgian Congo, *Thunderbolt* in Uganda, and *Eagle Claw* in Iran. He briefly describes C-130 operations by the USAF and RAF in the Falkland Islands, Gulf, and Balkan conflicts. His last chapter provides a brief overview of the changes to systems and performance of the twenty-first-century J-model Hercules. Three appendices include information on commercial and humanitarian operators, world military users, and various C-130 models and variants.

This is a good reference book. It provides an excellent overview of the C-130 development, design configurations, and operational use in diverse environments. Inclusion of an acronyms list and an index would make it even more valuable to the military aviation enthusiast and researcher. It is a good read.

Frank Willingham, NASM Docent



Scramble! The Memoir of Britain’s Most-Decorated Fighter Pilot. Wing Commander J.R.D. “Bob” Braham. Croydon UK: Greenhill Books, 2021. Photographs. Pp. 208. \$24.95 paperback. ISBN 978-1-78438-670-2

Originally published in 1961, this reprint is the personal memoir of Wing Commander Braham. He begins with a brief history of how he wound up in the RAF when he intended to join the colonial police force. After a year as a boy clerk in a police station, he opted to apply for a short service commission in the RAF in 1937.

Braham completed flight training and became an RAF pilot at the age of 18. He received orders to No. 29 Squadron, which was equipped with the Hawker Demon and, shortly thereafter, with the Bristol Blenheim. During this assignment, Braham received the nickname/callsign that stuck with him his entire life. At that time, pilots used their names when on the radio. Several squadron pilots were named John, so Braham was given the “radio” name of “Bob” to reduce confusion!

The squadron converted to Hawker Hurricanes, briefly, but converted back to Blenheims adapted to the role of a night fighter. It later converted to the radar-equipped Bristol Beaufighter. Flying night fighters was where Braham excelled. He steadily increased his victory totals and rose to increasingly higher ranks and levels of responsibility, cul-

minating as a Wing Commander at the age of 22. Braham candidly shares his high and low points, pointing out when he survived brushes with death at the hands of the enemy and occasional errors in judgment. He goes into great detail by including dialogues with his Ground Control Intercept (GCI) controller, himself, and his navigator. Braham makes it clear that being a success came from teamwork.

Braham also discusses being a wartime newlywed with young children. After meeting his future wife, Joan, the couple had a whirlwind courtship and marriage. Braham discusses the challenges of being away both physically and mentally (on leave, he was still thinking primarily about flying). What some might perceive as a distracting rabbit hole, this discussion provides readers with an increased understanding of not only Braham, but also of his contemporaries.

With the allied transition from the defensive to the offensive, Braham's unit transitioned from defending against night bombing to flying along with RAF night bombers in order to attack German night fighters. By 1944, the mission transitioned again to include daylight ranger missions intended to attack the Germans by surprise. Even when on staff and able to opt out of flying combat sorties, Braham requested permission to fly combat sorties. After scoring 29 aerial victories, Braham's need for constant action, apart from a four-month break to attend the staff college, caught up with him. In May 1944, he and his navigator were shot down over Denmark while flying a de Havilland Mosquito. He spent the rest of the war as a POW. After the war, Braham immigrated to Canada where he served in the Royal Canadian Air Force. He ended his memoir in 1961, when he met former German fighter ace Robert Spreckels, the pilot who shot him down.

Braham shares his wartime story in an easy-to-read fashion, providing an excellent view of life both in and out of the cockpit. *Scramble!* leaves readers wanting more. Hopefully, Greenhill Books will find and republish more of these out-of-print memoirs.

Lt Col Daniel J. Simonsen, USAF (Ret), Alexandria VA



Zeppelin Inferno: The Forgotten Blitz 1916. By Ian Castle. Yorkshire UK: Frontline Books, 2022. Photographs. Appendices. Bibliography. Notes. Index. Maps. Pp. 382. \$42.95. ISBN: 978-1-39909-392-4

August 1914 saw Europe erupt into what would become a world war. Almost immediately, the Royal Navy shut down the North Sea; shortages of food and raw material affected both the German civilian population and the war effort. Germany exercised three options in retaliation: High Seas Fleet units shelled towns on England's east coast; they established a submarine blockade of England (first under internationally accepted prize rules and then with unrestricted submarine warfare); and they executed

air strikes via Zeppelins and, later, fixed-wing aircraft.

This is the second of three volumes dealing with the first blitz on England. The first covered the Zeppelin raids of 1914-1915. The final volume will deal with the heavier-than-air strikes of 1917-1918. In all, the Germans conducted 103 air raids on England throughout the war. Castle intends to fully document these raids and the considerable damage and losses suffered by the English populace fully 26 years before the Battle of Britain, and to honor those who perished on both sides.

Through painstaking research of archival materials available at the UK's National Archives, Castle describes experiences of aircrews (British and German) as well as victims on the ground. Using first-hand accounts, he takes the reader to altitudes of 15,000 feet without oxygen or heated flight suits, in the darkest of nights, and at a time when weather predictions were nonexistent, navigation incredibly difficult, and Zeppelin engines were unreliable. The Zeppelins were armed with high-explosive and incendiary bombs, each equally unreliable. Descriptions of the deaths of Zeppelin crewmen are horrific (they had no parachutes and were forced to either jump to their deaths or burn alive).

Throughout 1916, both the Royal Flying Corps and Royal Navy developed innovative technologies and means of command, control, and communications to establish a homeland-defense system that included coastal listening and early-warning stations, searchlights, anti-aircraft artillery, and night interceptors. Tactics and countermeasures are well-documented to include attempts to bomb Zeppelins from above or tear their envelopes with grappling hooks. These were nearly impossible to achieve, since all high-performing aircraft had been sent to the front. Those left to home defense were anemic at best. Ultimately, the Zeppelin was defeated through use of incendiary bullets; Castle provides a detailed account of their development.

In honoring the civilian populace that endured this ordeal, Castle's work bogs down. He wrote for a decidedly British audience familiar with England's cities and towns. I struggled with this aspect of the book. He details damage done to a particular church or street corner in a small village, or unexploded ordnance that landed in a field or marsh, with no indication of their locations. Local maps would have been helpful. Additionally, there is incredible minutia (e.g., numbers of windowpanes broken, livestock destroyed, property damaged) that make these sections read like a compilation of newspaper reports.

All in all, Castle provides a fine account of Zeppelin development, alteration of German tactics and equipment, airmanship of aviators on both sides, and British countermeasures and tactics that ultimately defeated the Zeppelin threat. It is a good book, but be advised that there are sections that are excruciatingly slow.

John F. "Jack" Keane, LCDR, USN (Ret)



Because of their similarity, these three paperback books from Key Books, Stamford UK, were combined into one review. Key probably is best known in the US for its first-class aviation magazines *Aeroplane*, *Airforces Monthly*, and *FlyPast*. **British Interwar Aircraft**. By Lee Chapman. 2022. Photographs. Bibliography. Pp. 128. \$29.95. ISBN: 978-1-80282-135-2, and **Junkers Ju 88**. By Malcolm V. Lowe. 2022. Table. Diagrams. Photographs. Glossary. Pp. 127. \$24.95. ISBN: 978-0-1-80282-314-1, and **F-111: Fort Worth Swinger**. By Bob Archer. 2021. Photographs. Appendix. Pp. 95. \$24.95. ISBN: 978-1-913870-67-8.

Chapman, an accomplished professional photographer, in recent years has produced several picture books featuring historic aircraft. *Interwar Aircraft* is his more recent, in which he features photographs representative of surviving British aircraft built between World Wars I and II. Many have been restored to flying condition and can be seen at UK air shows. The majority can be found at Royal Air Force museums and the Shuttleworth Collection in Bedfordshire.

Besides assembling numerous attractive photos, Chapman has included sufficient historical context in the narrative. Besides an introduction and summary, he has divided the eight remaining chapters into civilian and military categories. Most readers probably will be familiar with the later military types, but the inclusion of earlier combat aircraft and various civilian planes provides a foundation for understanding British aviation between the wars. For historical aviation enthusiasts unable to visit Britain's aviation museums, *Interwar Aircraft* offers a glimpse of some of the more significant items in their collections.

Lowe, an historian and writer, has produced numerous books, mostly on military aircraft. In 2018, Key released Lowe's first version on the Ju 88, Germany's most versatile World War II aircraft. In *Junkers Ju 88's* introduction, Lowe briefly summarizes Junkers' efforts before the Nazi regime nationalized the company in the mid-1930s. Placed under house arrest, founder Hugo Junkers died in 1935. In his first chapter, Lowe discusses how engineers in Germany's aircraft development bureau successfully pursued the design of the Ju 88, first flown in 1936.

From there, Lowe devotes succeeding chapters to all the variants. The most numerous were bombers, night fighters, and reconnaissance aircraft. Some were outfitted with torpedoes for the anti-shipping mission. Jumo inline engines powered the vast majority of Ju 88 variants, but BMW radials equipped some models.

Lowe favors detailed descriptions of the variants over the Ju 88's impact on operations. The wide variety of photographs provides a glimpse of the many ways and many places the Ju 88 served. This effort is probably best suited for readers seeking an introduction to this aircraft.

Archer, a lifelong UK aviation enthusiast, initially wrote magazine articles. Over the years, he photographed

military aircraft and began producing books based on those photos. While he contributed many of his own photographs to *F-111*, he also acquired relevant images from many different sources.

He begins by briefly recalling the aircraft's controversial origins. In the early 1960s, Secretary of Defense McNamara required the Air Force and Navy to jointly pursue a new bomber, the TFX. Boeing appeared to win the contract competition before political forces intervened, and General Dynamics got the go-ahead. The Navy dropped out with only two aircraft built for that branch.

The Air Force version had a significant production run. Archer examines the variants and recognizes their roles in Vietnam and the Middle East. The many detailed color photographs make this book indispensable for those wishing to correctly portray models of the F-111.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle



Solomons Air War Volume 1: Guadalcanal August-September 1942. By Michael Claringbould and Peter Ingman. Kent Town, Australia: Avonmore Books, 2023. Glossary. Notes. Appendices. Bibliography. Index. Maps. Tables. Photographs. Illustrations. Pp. 248. \$37.67 paperback. ISBN: 978-0-6452469-3-3

Claringbould is a three-dimensional, digital aviation artist and globally recognized expert in Japanese aviation. He has written many books on Pacific war aviation and is an executive member of Pacific Air War History Associates. He holds a pilot's license and paraglider rating and is the author of several books on the Fifth Air Force and World War II Pacific history. Ingman, acclaimed military aviation historian, is a former business executive with a key interest in the early stages of the Pacific war. He has traveled widely throughout northern Australia and the South Pacific conducting research for his books, including several widely acclaimed Australian World War II history books.

This first volume of *Solomon's Air War* chronicles the critical initial phase of the truly complex air campaign during August and September 1942. This centered on the struggle for Guadalcanal. The volume first presents an overview of the Japanese position at the start of the Pacific war, the organization of the Imperial Japanese Navy and its sea- and air-borne equipment. It covers Japanese operations in the Solomons prior to the subject air campaign. Allied airpower and carrier strength at the start of the Battle of Guadalcanal (Operation *Watchtower*) are described. The volume then documents USN fighter combat and air activity by the USMC, USAAF, and other allied bomber and support units. Also included are non-fighter USN operations, such as those by PBYS and carrier-based SBD and TBF detachments, which also operated from shore bases.

In addition, the authors provide an equal amount of detail on similar operations from the Japanese side, often providing corroborative primary source data on individual actions from both sides. Conclusions are presented that summarize the campaign status at the end of the subject period. Tactical and strategic decision are reviewed, as well as losses and fatalities. At the end of September, the campaign was by no means over and remained in balance. Readers are led to anxiously await the succeeding volume.

As with previous volumes which cover the air war in the South Pacific, the authors provide short vignettes of daily sorties by both sides. Where possible, pilots are named along with combat outcomes, including aircraft damage and consequences for involved crew members and ground or naval personnel. Narratives also describe how the pilots had to deal with constantly changing weather across the theater of operations and were hindered not only by the terrain, but also by poor communications and often poorly informed strategy.

The authors provide data on personnel involved on both sides. Photographs and graphics are widely used throughout. Several theater maps are presented. The three-dimensional graphic portrayals of aircraft in action are particularly well-done and add much to the total presentation.

All-in-all, as with previous volumes by these authors, I found this to be an excellent book. It is well-written, easy to comprehend, and supported by its index and resources. It is an excellent source for the Pacific air war researcher and enthusiast alike.

Frank Willingham, docent, NASM's Udvar-Hazy Center



Gothic Line 1944-45: The USAAF Starves Out the German Army. By Thomas McKelvey Cleaver. New York: Osprey Publishing, 2022. Maps. Table. Diagrams. Illustrations. Photographs. Bibliography. Index. Pp. 96. \$24.00 paperback. ISBN: 976-1-4728-5341-7

Cleaver is a widely published aviation and military history with more than a dozen books to his credit. His writing ranges from World War II to Korea and Vietnam. He also has been a regular contributor to many of the leading aviation magazines.

This is one of Osprey's Air Campaign books, where each author follows the same outline: introduction (establishes the strategic environment), attacker's capabilities, defender's capabilities, campaign objectives, the campaign, and aftermath.

Once Allied forces invaded France in June and August 1944, both sides increasingly limited forces in Italy. To push across France and the Low Countries into Germany, Allied planners withdrew air and ground units from Italy. German forces, particularly air units, suffered a similar fate. Axis land units made excellent use of mountainous terrain.

The Germans established the Gothic Line 40 miles south of, and roughly parallel to, the Po River.

Four North American B-25 bomb groups conducted almost all of the interdiction bombing that focused on the Brenner Pass railway line linking Innsbruck, Austria, with northern Italy. Republic P-47 fighters sometimes engaged transportation targets or tried to suppress numerous anti-aircraft batteries. Enemy fighters—mostly from the Italian National Republican Air Force that continued to support the Germans in northern Italy after the rest of the country had sided with the Allies—occasionally inflicted significant losses on the B-25s.

Cleaver points out that relatively large numbers of B-25s flying in close formation had considerable success in knocking out bridges; possibly the best use of the Norden bombsight during World War II. Certain groups also made very effective use of "jinking" (quick changes in altitude and bearing) to reduce the accuracy of anti-aircraft gunners. The B-25s were also the first aircraft to use SHORAN (Short Range Navigation) equipment, a ground-based system that allowed specially equipped aircraft to accurately bomb in bad weather.

Despite their efforts, the bombers had only limited impact on the Allies' ability to breach the Gothic Line until the spring of 1945. The Germans were very adept at building bypasses and repairing bridges. Perhaps one of the most positive contributions the bombers made was delaying the withdrawal of German units from Italy.

One B-25 squadron included Joseph Heller, author of *Catch-22*. Due to personnel shortages, he was among dozens of aircrew members told they would continue flying, no matter how many missions they completed, until the cessation of hostilities.

This book is appropriate for anyone interested in how medium-bomber crews coped with the interdiction mission. Cleaver interviewed several veterans before their passing. Unfortunately, despite his apparently thorough research, there are no sources cited. Despite this, the story he tells is engaging.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle



CIA Paramilitary Operations in Tibet: 1957-1975. By Ken Conboy. Warwick UK: Helion, 2022. Maps. Illustrations. Photographs. Glossary. Bibliography. Pp. 72. \$29.95. ISBN: 978-1-804510-21-6

Tibet seems to hold a unique fascination for many people in the United States. Many readers can probably remember seeing Free Tibet license plates issued by their state's DMV. The country is a unique place in many ways. What are considered lowlands in Tibet are at higher elevations than most of us have ever even visited; it's the

home to the Dalai Lama and a centuries-old tradition of Buddhist life; and it is one of the gateways to the highest mountain range in the world (which includes Mt Everest). So, what was the CIA doing there and why is there a book on their operations that would appeal to readers of A&SPH?

As with many other countries unfortunate enough to live alongside a more powerful and imperialistic neighbor, Tibet came under increasing pressure from Communist China to align itself with Beijing and its policies after World War II. This eventually led to outright invasion and occupation. Against this backdrop, the CIA recruited, trained, and supported a variety of Tibetan resistance groups in the hopes of negatively impacting China's efforts in the region. This is where the connection with airpower history comes in. Tibet is a landlocked country, surrounded by inhospitable mountains and vast deserts. The fastest (although not necessarily the easiest) way to insert and supply resistance fighters was to fly them in. The book chronicles these efforts—and their successes and failures—as part of the larger CIA effort against China in Tibet.

Conboy seems especially well qualified to write this book. He lived and worked in Asia for many years and studied and participated in the history and politics of the region in general. The bibliography shows extensive interviews with many of the players identified in the book. Conboy seems to do a good job of balancing his sources, not relying too heavily on any one person's or group's perspectives or memories.

The book itself is well-written and engaging. There are a number of maps which give a very general idea of the area but in no way convey the ruggedness of the terrain facing combatants. This latest Conboy effort has more text and fewer pictures than many other Helion products I've read. Although the title says the book covers 1957-1975, the first half covers only the period through the Dalai Lama's exile in 1959, with a rather extensive discussion of the political climate and activities leading up to 1957. Of note to readers, airpower is almost incidental to the theme and story. There is an airplane on the cover, but most of the action took place on the ground. Still, this is an interesting look at how covert operations used airpower in a variety of ways. This book is a useful study of a little-known aspect of American covert operations.

Golda Eldridge, Lt Col, USAF (Ret), EdD



The Erawan War Volume 3: The Royal Lao Armed Forces 1961-1974. By Ken Conboy. Warwick UK: Helion Company, 2022. Bibliography. Photographs. Illustrations. Pp. 68. \$ 25.00 paperback. ISBN: 978-1-804510-22-3

This third volume of the "Erawan" War departs from the earlier volumes that had concentrated on the CIA's

clandestine operations in Laos from 1961 to 1974. In volume three, Conboy discusses the various units that collectively comprised the Royal Lao Armed Forces. It very quickly becomes apparent that many units were also tools of the various political factions vying for control of the country or functioning as regional centers of power. Chain-of-command was often driven by allegiances and personal loyalties. Reading this monograph about the convoluted politics will probably convert readers into cynics of the war and question why the United States invested so much in this remote country and its military. In hindsight, it is difficult to believe that President Eisenhower, concerned about what was then called the "Domino Theory," briefed incoming President Kennedy about Laos, warning him that events there should have his full attention.

Major Kong Le, a well-known personality at the time (he appeared on the cover of the June 26, 1964 *Time Magazine* issue) who later promoted himself to major general, is highlighted in this volume. He was an important player and iconic of the shifting nature of key personalities. Kong Le was a highly competent commander of one of the best Lao units in the war: the 2nd Parachute Battalion. When not leading a coup against the government, the nominally neutralist leader would switch sides when it suited him. At one point in the war, he joined with the communist Pathet Lao and the North Vietnamese and received assistance from the Soviet Union. In the end, he became irrelevant and departed Laos in October 1966.

However, Le was not alone in staging coups. The Rightists were keen to overthrow the Geneva Accords-directed coalition government and pursued that end through repeated coups. Because political allegiances were the driving factor in the Lao military, one has to really pay attention when reading this monograph to follow who was doing what to whom at any given time. Only when the war ended and the communists had taken total and vindictive control could one see how tragic it was that the Lao military failed to have unity of effort and focus its energies on defeating the true enemy.

Readers who otherwise have some familiarity with the war in Laos may be wondering where the name in the book's title came from. Erawan is the mythological three-headed elephant common in Thai, Lao, and Khmer culture. It had prominently appeared in the center of the red Lao flag in use until the end of the war.

This monograph is rich in photographs and illustrations, addressing not only the land forces, but also the navy and air force as well. Careful reading will reveal the tragedy that befell Laos despite all the aid that the United States provided. From that perspective, it is important to read the entire three-volume series.

John Cirafici, Milford DE



Hitler's Air Bridges: The Luftwaffe's Supply Operations of the Second War. By Dmitry Degtev and Dmitry Zubov. Barnsley UK: Air World, 2022. Tables. Photographs. Notes. Bibliography. Index. Pp. xii, 265. \$42.95. ISBN: 978-1-39901-562-2

Dmitry Degtev's works have been published widely in Russia. A lecturer at a Russian university, he has spent more than 20 years accumulating information on aviation, with an emphasis on the pre-Cold War Soviet Air Force and the German *Luftwaffe*. Dmitry Zubov has co-authored with Degtev several aviation-history books published in English. A professor at the same university, he also has published extensively in Russia.

In this work, Degtev and Zubov try their best to correlate Russian claims versus reported *Luftwaffe* transport losses during various efforts to supply surrounded German troops. The German airlifts generally followed the same pattern. A counteroffensive typically gave the Soviets the operational-level initiative. While a measured withdrawal often would seem prudent, German Chancellor Adolph Hitler repeatedly insisted on a no-surrender, no-retreat approach. Additionally, his stand-and-hold orders frequently occurred in the middle of winter.

Degtev and Zubov begin with the relatively successful airlift into Demyansk near Moscow in early 1942. This was followed by a similar success at Holm. About 3500 Germans held on for more than three months before relieved by reinforcements breaking through the Russian lines.

The first failure noted in the book occurred in late 1942 and early 1943 at Velikiye Luki. Of course, this action occurred as the *Luftwaffe* executed its futile attempt to sustain Germany's Sixth Army at Stalingrad. Understandably, the Stalingrad chapter is the longest.

The authors then switch to North Africa. There the enormous Messerschmitt Me 321 Gigant glider and its later derivative, the Messerschmitt Me 323 six-engine transport, significantly complemented the Junkers Ju 52s and the converted Heinkel He 111s twin-engine bombers.

The final airlift chapters examine operations in support of garrisons in Budapest and Breslau. The last chapter considers the career of Erhard Milch, the man who directed Germany aircraft production for most of the war.

The authors are generally negative in their appraisals of Soviet intercept capabilities. With the war turning against them, German forces increasingly relied on night flights. The Russians had some success using searchlights to direct antiaircraft guns. Besides the extremely bad weather, the Germans found it increasingly difficult to maintain adequate airfields in the pockets. Supplies dropped by parachute often ended up in Russian hands. Gliders, such as the Gotha Go 242, seldom were towed out of a pocket.

To establish context, Degtev and Zubov describe ground and air operations. Despite some shortcomings such as the absence of maps and the somewhat tedious de-

scriptions of losses on a day-by-day basis, this book is recommended for students of transport operations.

Steven D. Ellis, Lt Col, USAFR (Ret); docent, Museum of Flight, Seattle



Keeping the Peace: Marine Fighter Attack Squadron 251 During the Cold War. By Steven K. Dixon. Haver-town PA: Casemate Publishers, 2023. Photographs. Notes. Appendices. Glossary. Index. Pp. viii, 248. \$37.95. ISBN: 978-1-63624-193-7

Well researched. Well written. Steven Dixon actually flew in this squadron, has a passion for its history, and does a masterful job in following their exploits, trials, and triumphs from their World War II and Korean War records and on through, and to the end of, the Cold War.

It is remarkable that throughout many conflicts and squadron designators (Observation, Fighter, Attack, Fighter Attack), 251 prepares for essentially the same skill sets:

- Provide close air supporting dive bombing, glide bombing, and strafing
- Provide adequate air defense by intercepting and destroying enemy aircraft
- Assist in defending against enemy surface attack
- Operate from either a land base or a carrier
- Support offensive operations
- Provide anti-submarine defense
- Spot for naval gunfire and shore artillery
- Provide visual aerial reconnaissance

Dixon is scrupulous in his pursuit of accuracy and completeness. However, his exhaustive research makes for some exhausting reading. The missions flown and training sites and stories tend to be repetitive and tedious. Reading this book can be quite like flying: hours of monotony interrupted periodically by moments of terror. Especially disconcerting are the accounts of emergencies, ejections, and anomalies that are riveting, but quite unfulfilling when they end with "the results of the investigation were obtained through the Freedom of Information Act but remain redacted."

Dixon does, however, disclose some very interesting, little-known facts. One example is the story of Second Lieutenant Douglass Anand, who crashed his F4U-4 Corsair on 10 April 1952 after his engine failed at 150 feet on takeoff. He lost use of his legs and was medically retired, but he went on to earn his private pilot license and was instrumental in the passage of the Americans with Disabilities Act.

The transitions through the types of aircraft flown by the squadron are covered in some detail. Each of the air-

craft is analyzed with respect to its capabilities and limitations. Dixon correctly describes the ordnance capabilities of the aircraft as well as the peculiarities of each. For instance, the F8U Crusader was unique in that its entire wing could be rotated upwards by seven degrees in order to maintain the optimum angle of attack for the landing pattern while affording the pilot a more acceptable field of view of the ship or landing platform.

From the Corsair to the jet-age FJ-3 Fury to the supersonic Crusader, the squadron worked hard to overcome shortages in aircraft and parts and personnel turnover to live up to its motto: *Custos Caelorum* (Guardians of the Sky). I am also reading *Flying Grunt*, a biography of Lieutenant General Richard E. Carey, USMC (Ret). It turns out the VMFA-251 squadron patch was designed by then-Captain Carey. That patch, with its blue background, red shield, white cross, and lightning bolt is pictured on the dust cover of this book and resulted in VMFA-251 being given the moniker of *Thunderbolts*.

I recommend this scholarly and professional account to any aviation historian, but not so much for your average aviation enthusiast.

Joseph T. Anderson, MajGen, USMC (Ret), Fairfax VA



Carrier Killer: China's Anti-Ship Ballistic Missiles and Theater of Operations in the Early 21st Century. By Gerry Doyle and Blake Herzinger. Warwick UK: Helion & Company, 2022. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Bibliography. Pp. 70. \$29.95 paperback. ISBN: 978-1-915070-64-7

With a combined background that includes a decade of reporting on Asia's defense world and US Navy service with a focus on the Pacific, Gerry Doyle and Blake Herzinger seem to have been groomed to write this book. Their personal experiences in the region as well as their prior professional writing and education on topics associated with this book's content are made apparent before the reader can even finish the introduction.

Modern aircraft carriers are the flagships of any sea-going service that can afford to operate them. The US Navy exemplifies this, fielding 11 super-carriers. Their mere presence off the shores of potential adversary coastlines is formidable and awe-inspiring at home; their destruction, however, is not. It is with this notion in mind that one might not jump to read a book with such an ominous title; nevertheless, this is what makes knowledge on the subject all-the-more vital. Just as the implementation of the aircraft nullified the value of dreadnaughts and battleships the world over, modern anti-ship ballistic missile technology can potentially seal the fate of our current fleet's crown jewels.

Carrier Killer does an excellent job narrating the above-mentioned issue. To set the stage, a history on naval

strategy and tactics with a focus on carrier utilization is undertaken, as well as the geopolitical background of the United States, China, and the enormous ocean that links them. The nuts and bolts of the utilization of modern weaponry in this theater are explained, and the authors do not shy away from highlighting uncertainties. On the topic of the debuting of a new Chinese ballistic missile, they state, "From the moment the DF-21D arrived on the scene . . . one question has lingered around it like a launch plume: does it work?" This hits the nail on the head of the, for lack of a better term, "paper tiger" idea surrounding so many other Chinese weapons and strategies that have failed to live up to their posed threats.

The maps, diagrams, illustrations, and photographs throughout the text are all first-rate, and they provide a visual depiction of what a potential future conflict in this region would look like. The lithographs of American and Chinese ships, aircraft, and weapons are worth stressing, for they juxtapose competing orders-of-battle against each other, the way a strategic planner of yesteryear would do so with little models on a giant map laid across a table.

Since this subject is, at its heart, academic in nature, Doyle and Herzinger have a lengthy bibliography and notes section at the end, particularly for a text only 70 pages in length. This is an excellent resource for anyone who wants to know more on the subject. All in all, *Carrier Killer* is worth the price of admission.

LCDR Alexander Buschor, USN



AMARG: America's Strategic Military Aircraft Reserve. By Jim Dunn and Nicholas A. Veronico. Stamford UK: Key Publishing, 2021. Photographs. Pp. 96. \$24.95 paperback. ISBN 978-1-913870-61-4

The authors wrote this for release on the 75th anniversary of "The Boneyard"—or the 309th Aerospace Maintenance and Regeneration Group (AMARG)—a joint-service facility managed by the Air Forces's Materiel Command—where the Department of Defense stores aircraft on behalf of all its services and other national agencies. It adjoins Davis-Monthan AFB AZ

AMARG has four squadrons and employs 550 people (mostly civilians) to run the world's largest aircraft storage area and DoD's sole aviation parts reclamation facility. It also converts retired fighters into aerial-target drones, is an auxiliary facility of the National Museum of the United States Air Force, and stores tooling for out-of-production military aircraft.

Newly arrived aircraft are first washed to remove corrosive chemicals. They are then sealed from dust, sunlight, and high temperatures. Materials used vary from "spray-lat" (a sprayed-on white, opaque, high-tech vinyl plastic compound) to simple garbage bags.

The Group's aircraft are maintained in five different types of storage: Types 1000 and 1500 aircraft have a high potential to return to flying status and are re-preserved every four years. Type 2000 aircraft are available for parts reclamation to keep other aircraft flying. Type 3000 aircraft are kept in near flyable condition waiting for transfer to another unit, sale to another country, or reclassification to the other three types. Finally Type 4000 aircraft are excess to DOD needs. They are gutted of every usable part and then sold as scrap.

With more than 175 color photos, the book provides readers with pictures of rows of F-15, F-16, and F/A-18 fighters; KC-135 tankers; C-130 and C-5 transports; helicopters; and bombers from B-1 to B-52s. Gone are B-52s eliminated under the Strategic Arms Reduction Treaty and Ground Launch Cruise Missiles deleted under the Intermediate Nuclear Forces Treaty. But thousands of others remain, including special-use aircraft such as AWACS, P-3s, aeromedical evacuation aircraft, and reconnaissance planes. An interesting separate chapter entitled "What Happened to ____?" presents the interesting YAL-1 Airborne Laser Test Bed and XC-99 cargo version of the B-36 Peacemaker.

AMARG not only manages over 4,000 aircraft in the Boneyard, but it also works hard promoting itself as a cost-effective, taxpayer-saving operation. It exists to carry out reclamation of spare parts and the eventual disposal of spent airframes. The junkyard appearance belies the fact that these aircraft are controlled by a process of careful parts reclamation on both a scheduled and an ad-hoc basis. There are times that aircraft from the Reclamation Insurance Type-area leave AMARG to become instructional aircraft, targets on military ranges, or museum exhibits, although most end up being reduced to various forms of scrap by nearby metal processors.

The bibliography and suggested readings contain many more items readers can use to increase their knowledge. This book brings together stories of the various aircraft and their missions that are now in AMARC. It is an enjoyable read.

Joseph D. Yount, USAF (Ret), and docent, NASM's Udvar-Hazy Center



Pathfinders: The Definitive Story. By Sean Feast. Stamford UK: Key Publishing, 2022. Photographs. Pp. 288. \$39.95. ISBN: 978-1-80282-211-3

Feast is a public relations professional and journalist with more than 35 years of experience in the defense, technical, and financial service sectors. He runs an international communications agency and is a keen supporter of the military, with a passion for aviation. He has authored or co-authored more than 20 books on Bomber Command and the Pathfinder Force.

RAF Bomber Command was Britain's only way of fighting back in the dark days of 1940, when the German Blitzkrieg had swept through Europe and the Wehrmacht was knocking on the door. Where and how Bomber Command's resources should be best deployed was being constantly changed. One necessity was to attack German industry, with oil as its first priority. Another was to meet an immediate tactical need to destroy enemy communications and airfields, aircraft production, and shipping. At the onset, daylight bombing attacks proved the vulnerability of bombers to German anti-aircraft systems. A switch to night bombing rendered the bombers less vulnerable; however, before the age of practical radar and other technical resources, navigation and bombing accuracy became the primary concerns.

Feast describes the tedious development of the Path Finder Force (PFF), established in August 1942 to improve target acquisition and bombing accuracy. This includes the tools, tactics, and techniques developed and the addition and subsequent application of radio navigation and radar. H2S was the first airborne, ground-scanning radar system and was developed to identify ground targets for night and all-weather bombing. This allowed attacks outside the range of earlier radio-navigation aids such as *Gee* and *Oboe*. It was also widely used as a general navigation system, allowing landmarks to be identified at long range. Pathfinder target-marking aircraft included all bomber types, later including fast and long-ranged Mosquitos.

The book not only describes the PFF development, but also discusses many of the men and women who made it happen. It includes vivid descriptions of how many aircrews dealt with the stress of seemingly unending bombing missions—their techniques, successes, and failures.

Feast has provided a well-researched and interesting story. As with other narratives of the war, it begins with a description of the often-dire operational need; and describes the political, organizational, and technological problems associated with the development of techniques and training of the selected participants. He also offers vignettes of operations and participants throughout the project history and traces the outcome from initial failures through steady improvement to ultimate operational superiority. Feast ends with a summary relating the trials and tribulations leading to the overall success and includes alternatives that might have been better. He points out the unrelenting energy of Bomber Command. However, its victory was bittersweet because of the scope of devastation visited on Germany. Politicians and civilians both, in the safety of peace, would prefer to forget the bombers' part in the war! The book would offer a better platform for research if a detailed index and definitive acronym list were included.

Frank Willingham, docent, National Air and Space Museum



Afghanistan 1979-88: Soviet Air Power Against the Mujahideen. By Mark Galeotti. Oxford UK: Osprey Publishing, 2023. Index. Illustrations. Tables. Photographs. Glossary. Maps. Pp. 96. \$25.00 paperback. ISBN: 978-1-4728-5071-3

Now that Russia is deeply invested in its ill-conceived and poorly executed invasion of Ukraine, this is a good time to look back at its earlier performance in Afghanistan. Galeotti's monograph looks, in particular, at how aviation assets played a role there and what lessons were taken away. It will also be appreciated by those who want to contrast the Russian and American experiences there. Those interested in Soviet aircraft combat performance may gain new insights into Soviet air force employment and tactics. As Galeotti says, Russia's use of airpower in Afghanistan could not have won the war but did prevent its loss. From that perspective, this monograph examines the employment of assets from strategic bombers to tactical airlift to helicopters in the roles of gunships and troop and cargo lifters.

Just as the helicopter came of age for America in Vietnam, it was likewise a similar experience for the Soviet military in Afghanistan. Galeotti looks at the helicopters deployed, their combat employment, and tactics evolution. He also addresses the *Mujahideen* by looking at the evolving weaponry available as the nine-year war progressed and how they, lacking air assets, adapted their tactics to minimize losses. Among the anti-aircraft weapons employed were MANPADS (man portable shoulder fired surface-to-air missiles): captured Soviet *Strelas*, CIA-provided Redeyes, and British Blowpipes. All three were minimally successful. In 1986, the CIA introduced the far-more-effective Stinger. Soviet war documents suggest they had a 10% success probability, and they came in too late to have the impact that is often claimed. The 2007 Tom Hanks film, *Charlie Wilson's War*, showed US Representative Wilson's strong advocacy for providing Stingers. Wilson boasted that "we" never won a set-piece battle until the Stinger arrived and then never lost one afterwards. However, the most effective anti-aircraft weapon in the *Mujahideen* arsenal was the ZPU 14.5mm heavy machine gun supplied by Pakistan. Reminiscent of US experience in Vietnam, the *Mujahadeen* also mined likely helicopter landing zones and baited helicopters into ambush sites. They also attacked airbases. All total, they destroyed 333 Soviet helicopters and 124 fixed-wing aircraft.

Soviet attack aircraft sometimes entered Pakistani airspace to bomb *Mujahadeen* rear bases. However, once Pakistan received F-16s, it was in a better position to defend its territory and downed a Soviet Su-25. The Russians also engaged and destroyed Iranian AH-1 SuperCobra helicopters.

This monograph takes the reader through the five phases of the nine-year Soviet Afghan conflict, fought until Russian leader Gorbachev acknowledged it was unwinnable and withdrew. A telling contrast between Soviet

and American experiences in Afghanistan are the casualties. In the 20-year-long American war in Afghanistan, some 2,400 lives were lost; in nine years, the Soviets lost an estimated 15,000. Tragically for the Russians, they did not embrace many lessons learned in Afghanistan. That war did not resemble war on the plains of Europe that was the focus of Soviet military planning. Thus, in Chechnya in 1994, the Russians were, again, ill-prepared.

This well written and illustrated monograph is well worth reading—especially in light of the poor performance of Russian forces in Ukraine.

John Cirafici, Milford DE



Target Saigon 1973-75; Volume 3: Disaster at Da Nang 1975, and Volume 4: The Final Collapse April May 1975. By Albert Grandolini. Warwick UK: Helion, 2022. Contents. Bibliography. Maps Illustrations. Photographs. Pp. 68. \$29.95 paperback. ISBN: 978-1-912390-19-9 and 978-1-804512-49-4 respectively

Volume 3 of this 4-volume series captures the final days of the Vietnam War in the northern provinces. In March 1975, North Vietnamese (PAVN) forces attacked the two major cities of northern South Vietnam. Within the month they overran their objectives and began the final thrust to Saigon. The disaster at Da Nang, coming soon after a rout in the Central Highlands, presaged the end of South Vietnam. The tragedy is that the finest generals of South Vietnam's army (the ARVN), fighting with forces stretched thin and with limited munitions, put up a stout defense as they tried to outfight equally skilled PAVN generals.

The North had a more cautious plan to achieve victory until the disastrous ARVN retreat from the central Highlands. The PAVN's subsequent successes further reinforced the North's confidence in an early and total victory. The earlier plan for the final phases of the war would be completed by 1976. Instead, exploitation of their rapid successes ended the war in April 1975.

What went wrong? With hindsight, the major event leading to final defeat was the decision by President Thieu to abruptly order ARVN evacuation from the Central Highlands, a nearly impossible task conducted on poor roads. Civilian remembered the North Vietnamese massacre of thousands in Hue during the 1968 Tet Offensive. Consequently, thousands of them flooded the same roads on which army units were attempting to reposition. The same chaos followed in the northern provinces as ARVN general Truong—a highly competent leader—attempted to consolidate his forces into defendable enclaves, first at Hue and then Da Nang. Thieu's confused orders insisting on defense of too much territory exasperated Truong and undermined his efforts. The belatedly authorized repositioning of forces

resulted in a hastily ordered withdrawal compounded by thousands of fleeing civilians. ARVN forces lost 120,000 captured or killed, while only 16,000 troops successfully moved further south to defend Saigon. The Vietnamese Air Force (VNAF) lost 268 aircraft as their air bases in the northern provinces were overrun. Within days Cam Ranh Bay, further to the south, fell. Only weeks later, Saigon itself fell.

Volume 4 opens with preliminary PAVN operations to surround and cut off Saigon. After the Central Highlands and northern portion of South Vietnam fell, the focus changed to areas to the north and west (Tay Ninh) and east (Xuan Loc) of Saigon, and in the Mekong Delta. ARVN forces were led by the highly competent General Nguyen Van Toan. The opposing generals engaged in intense fighting. The PAVN paid heavily for each success as the ARVN strategically withdrew ever closer to Saigon. Likewise in the Delta, attacking PAVN units out in the open, flat Delta terrain were exposed to withering fire by entrenched troops, airstrikes, and navy gunboats.

The battle for Xuan Loc was the fiercest of the 1975 campaign and stopped the PAVN advance in its tracks. Another highly competent ARVN general, Le Minh Dao (commanding the Xuan Loc defense), was able to inflict heavy losses in troops and armor on the PAVN before yielding the city. For eleven days the 18th ARVN Division, reinforced by Airborne and Ranger units and supported by airstrikes, threw back attacking troops and T-54 tanks from six PAVN divisions augmented with armor brigades. The VNAF used C-130As as bombers and dropped 15,000-lb “Daisy Cutter” bombs on concentrations of PAVN troops. Many sorties of A-37 and F-5 attack aircraft inflicted large losses on advancing armor. Only when the PAVN shifted artillery to within range of the air base were they able to bring munitions and aircraft on the ground under fire. When Xuan Loc fell, the end was in sight. President Thieu resigned and escaped to Taiwan. A new government formed under former general Duong Van Minh, leader of the neutralist “Third Force.” His imagined coalition government with the Viet Cong failed.

For the final assault on Saigon, the PAVN had over a quarter million combat troops, 320 tanks, 500 artillery pieces, and 180,000 support troops. The ARVN, with VNAF support, fought tenaciously—but for nothing. On April 30th, Saigon fell. Despite continued fighting in the Delta, the war was over.

For those of us who saw combat in the northern provinces, it is painful to read about the rapid fall of places where American forces had fought. One gets the feeling that it was all for naught. The tragedy is that the ARVN who fought the hardest to defend South Vietnam are the ones who then spent years in PAVN reeducation camps. Some of the most dedicated officers were executed. I had heard other Americans make disparaging comments about the 18th ARVN Division. Yet, it was the 18th that put up heroic resistance until the end. Its commander, General Le Minh Dao, endured 18 years of imprisonment.

Helion, the publisher of the Target Saigon series, always produces quality products. These volumes are certainly two of them.

John Cirafici, Milford DE



French Naval Aviation. By Henri-Pierre Grolleau. Stamford UK: Key Publishing Ltd, 2022. Photographs. Pp 96. US \$24.95. ISBN 978-1-80282-195-6.

Grolleau claims in this fact-filled book that “France has the second largest maritime domain in the world, after the US . . .” *Sacre Bleu!* Who knew? I did not until I read his appealing and informative overview of the modern *Aéronautique Navale*—French Naval Aviation.

Think of the islands of Guadeloupe and Martinique in the Caribbean, Reunion in the Indian Ocean, and French Polynesia and New Caledonia in the South Pacific—all with French DNA—and the need for a robust naval aviation force becomes apparent. France’s myriad foreign associations fall under the rubrics of “overseas possessions,” “collectives,” and “territories” and have all necessitated extensive land, sea, and air support. This book examines the aircraft now dedicated to oversight missions of those affiliations.

French naval aviation experienced a rebirth at the turn of the last century when Cold War “Jurassic airframes” (Grolleau’s term) gave way to a “powerful, agile, flexible, battle-hardened force equipped with the latest generation of fixed-wing and helicopter types.” Long gone are the Vought F-8P Crusaders and the Alouette III helicopter assets (well, almost all gone) that were replaced by the Rafale M fighter and Dauphin, Caiman, and Panther helicopters. The French have upgraded their training and support aircraft as well. This transition has not been completed, but it would appear the bulk of upgrades are essentially in sight. For example, the Navy employs a stable of all-weather, carrier-capable E-2C Hawkeyes, particularly for their over-water operations. And, in late 2020, the French announced that they had ordered the new E-2D Advanced Hawkeye.

Grolleau includes six chapters: “A Powerful, Agile and Multirole Force”; “Aircrew Selection and Training”; “Carrier Aviation”; “Navy Helicopters at Sea”; “Maritime Patrol and Maritime Surveillance”; and “SAR [Search and Rescue] Missions.” Each chapter profiles aircraft types; carrier operations on the 42,000-ton *Charles de Gaulle* (France’s only nuclear-powered strike carrier); submarine patrols; search and rescue missions; and training. With the current focus on drug interdiction and immigration and refugee issues, surveillance flights of the air wing have taken a high priority. For this reason, the *Aéronautique Navale* employs a large fleet of Dassault-produced Atlantique 2, twin-engine, maritime patrol and surveillance aircraft.

France (and many other countries as well) relies heavily upon the US for specific pilot training, a fact that did not escape me when I attended my nephew's Breaking of the Wings Ceremony at Columbus AFB, Mississippi, where I enjoyed visiting with newly trained pilots from Qatar and Japan. Many French pilots have trained at NAS Oceana, Virginia, and Maxwell AFB, Alabama.

This is volume 7 in Key Books' "Modern Military Aircraft Series." Grolleau has written other books on French aviation for other publishers. This small volume is both appealing and approachable and provides a good review with over 200 illuminating color photographs. It will particularly please those interested in a quick reference to French Naval Aviation around the world.

David S. Brown, Jr., volunteer, Museum of Flight, Seattle



Stalingrad Airlift: The Luftwaffe's Broken Promise to the Sixth Army. By William E. Hiestand. Oxford UK: Osprey, 2023. Maps. Tables. Diagrams. Photographs. Illustrations. Bibliography. Index. Pp. 96. \$25.00 paperback. ISBN: 978-1-4728-5431-5

Hiestand has worked more than 30 years as an analyst for the US Department of Defense. He is a relative newcomer to Osprey's stable of contributors. This is his first work on aerial combat and No. 34 in Osprey's Air Campaign series. His three other Osprey books covered armor operations.

Osprey continues to roll out quality products in this series. Each volume follows the same format: introduction, chronology, attacker's capabilities, defender's capabilities, campaign objectives, the campaign, and aftermath and analysis.

By the fall of 1942, German forces had reached the high-water mark of their penetration of the southwestern Soviet Union. If their advance was to continue, the *Wehrmacht* absolutely had to capture the pivotal city of Stalingrad on the Volga River. By this point in the war, the Germans were stretched very thinly, particularly after the Allies successfully invaded North Africa in 1942. To shore up their ranks, the German high command relied on allies such as Italy and Romania to defend their flanks. Also in November, the Soviets launched Operation *Uranus*, the operation that would eventually encircle Germany's Sixth Army.

German Chancellor Adolf Hitler refused to allow the Sixth Army to retreat. *Luftwaffe* chief Hermann Goering claimed his forces could deliver sufficient supplies until relief forces could arrive. The Germans had conducted a successful airlift to support their forces near Moscow the previous winter. However, the circumstances at Stalingrad were vastly different. First, the German force at risk was far larger than the previous one. More significantly, the Soviets were well on their way to rebuilding their air force that had been so badly decimated in July 1941.

While a variety of aircraft were employed, the Germans relied on Junkers Ju 52 trimotor transports and Heinkel He 111 twin-engine bombers. The Soviets countered with an increasingly effective fighter force, particularly since the Germans needed to counter close-air-support and interdiction attacks against their ground forces. Two other elements played decisive roles. The Germans totally underestimated the debilitating effects of the severe winter weather—sub-zero temperatures, fog, and snow. Furthermore, the two airfields inside the pocket proved to be inadequate. Making matters worse was the poor communication between the airlift forces and the Sixth Army staff.

Despite the heroic efforts of aircrews and maintenance personnel, the airlift seldom met its daily minimum-delivery goals.

This campaign demonstrates all the things that can go wrong with an airlift operation lacking realistic objectives and proper planning. This book is a great place to start for anyone involved in airlift planning who is unfamiliar with this debacle. It is also a solid introduction to those unfamiliar with, perhaps, the most pivotal battle on the Eastern Front in World War II.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle



Prisoner of Stalin: The Chilling Story of a Luftwaffe Pilot Shot Down and Captured on the Eastern Front. By Christian Huber. Yorkshire UK: Frontline Books, 2022. Pp. 118. \$28.95. ISBN: 978-1-52673-321-4

Journalist Huber has given us a very interesting memoir on many levels. It is the personal story of Gerhard Ehlert, a young *Luftwaffe* pilot flying his 22nd and final reconnaissance mission over Soviet territory during World War Two. Moreso, it is his reminiscences of mixed experiences as a prisoner of war held deep within the Soviet Union. Finally, in flashbacks, it is about the final years of his childhood in Hitler's Reich and what it was like to live under the spell of the Führer. This story was narrated by a 92-year-old man whose absolute clarity of memory is reflected in the book's many vignettes.

Ehlert trained as a pilot during the early years of the war. His demonstrated aptitude to become a night reconnaissance pilot led to his assignment flying these dangerous missions. Later, when piloting his Dornier 217 on the Eastern Front and counting trainloads of Russian troops, tanks, and artillery heading west, he observed the superiority of Soviet manpower and resources about to be launched against depleted German forces. He quickly realized that the reinvigorated Red Army was going to drive back the once almost unstoppable *Wehrmacht*.

Ehlert's own unit had already suffered heavy losses in

aircraft and crews. It was almost inevitable that he, too, would be brought down in June 1944 by heavy anti-aircraft fire. After a brief period of evasion, he was captured by Russians who treated him decently. Knowing about the horrific conditions that Russian prisoners endured in German hands, he was surprised to learn that the Russians adhered to a somewhat higher standard. So long as the war was still being fought, Ehlert, as an officer, was not required to perform manual labor. Of course, once the war ended, he became a common prisoner. Then he performed hard labor in a lumber-harvesting camp, working under very difficult conditions and on minimum rations.

After reading many other stories of survival in the Soviet gulag, I was interesting to learn about the moments of humanity by Russian prison guards who were also enduring hardships. Interspersed with memories of Ehlert's time as a prisoner are reflections on his family and the region where he grew up. It is interesting to learn that his mother disapproved of Hitler, while his father's thoughts often returned to his time in World War I.

In late 1949, the Soviets began releasing German prisoners. Ehlert describes his anxiety as prisoners are summoned for the long train ride back to Germany. But not him. Up to the last moment, Russian authorities continued to seek former members of the hated SS. Ehlert wondered why he did not qualify for repatriation. Eventually, he was selected for release, but only after signing a resolution to never again make war on the Soviet Union. The book ends on his bittersweet return to his parents' home after five long years as a prisoner. No one welcomed him back, and it took a long time to reconcile with his wife.

While not a comprehensive account, this book is, from beginning to end, informative and interesting to read. Now that few veterans of World War II remain, firsthand accounts such as this could soon be lost to us. *Prisoner of Stalin* is well worth reading.

John Cirafici, Milford DE



Death in Wartime China: A Daughter's Discovery. By Judy Goodman Ikels. Tucson AZ: Wheatmark, 2022. Map. Photographs. Notes. Bibliography. Appendices. Index. Pp. xvii, 217. \$14.95 paperback. ISBN: 978-1-62787-921-7

Ikels, a retired Department of State employee, for many years served as an instructor supporting families of foreign-service officials. Married to a foreign-service officer, she has experienced official stays in six different nations. Her birth father, 2d Lt William H. Wallace, Jr., died in China in June 1944 after baling out of his Consolidated B-24 Liberator. He had remained at the controls allowing his crew to escape the aircraft. He left behind a wife and unborn daughter in the US. Wallace's remains were returned to the United States in 1946.

In 2015, Ikels experienced what she described as a "Eureka" moment. Dr. Patrick Lucas, an American ex-patriot living in China, had for many years worked with the Chinese to commemorate the lives of American servicemen killed while helping to defeat the Japanese invaders. Among the individuals in whom Lucas took an interest was Wallace. Through his efforts, rural Chinese near Kunming erected a memorial marking the place where Wallace's body was found. Lucas somehow tracked down Ikels, who had grown up as Judy Goodman after her mother remarried. Contact with Lucas unleashed a chain of events that enabled her and her late husband, Larry, to visit the memorial site.

Besides detailing the extensive trip to China, Ikels introduces the reader to her birth father as well as describing her own upbringing in Texas. Along the way, she intimately shares her feelings about this most meaningful personal journey.

This book is best suited for a general audience. Ikels does a fine job attempting to discuss her father's wartime record, especially his time in China. He was on his tenth mission at the time of his death. Individuals, who unfortunately may have lost a close relative whom they never knew, may find a special meaning in this work. It is well written and thoroughly researched.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle



Macchi C.202 Folgore: Italy's Best Fighter of the Second World War. By Davide F. Jabes, Alessandro Romanello, and Niccolo Tognarini. London UK: Fonthill, 2021. 212 Pp. Photographs. Diagrams. Tables. ISBN 978-1-78155-830-0

The Macchi C.202 Folgore was a single-seat, high-performance fighter of the Italian Regia Aeronautica during World War II. Powered by an Alfa Romeo-built derivative of the DB 601a liquid-cooled engine, the aircraft was fast and maneuverable but relatively lightly armed with two 12.7 mm (.50 cal) machine guns. Entering service in July 1941, it served throughout the Mediterranean until the Fascist regime fell in September 1943. A few even made it to the Eastern Front. The authors regard the MC.202 as the only truly modern single-seat fighter to emerge from Italy during World War II. In the hands of skilled pilots, the Folgore produced a number of aces. At one point its kill ratio in the North African campaign passed that of the Bf 109.

The book is sourced from official records, correspondence, and interviews. It is illustrated with archival photos, many of which are seen for the first time. There are plenty of diagrams, tables of units, pilots, and kills, all of which reinforce points made in the text. All three authors con-

tributed chapters to this book. Their proficient use of evidence to support conclusions reflects their academic backgrounds. Unfortunately, the book is rather imperfectly proofread, and the captions are mixed up for some photos.

The first few chapters relate the aircraft's design background, pilot training, and predecessor designs. The bulk of the book, however, consists of vivid, crisply related combat action in North Africa, over Malta, Sicily, and even Corfu. There are eyewitness accounts from both Allied as well as Italian pilots. Especially interesting are the analyses of the MC.202's performance against a wide variety of Allied aircraft such as the Spitfire, Hurricane, P-38, P-39, and P-40. A consistent theme running through this book is that of squandered potential. The authors make the MC.202 a case study for the economic, political, technological, and doctrinal factors that doomed the Regia Aeronautica's effort to build and effectively wield airpower. For instance, although the Folgore was in production for almost four years, only about 1000 were completed. This was due in part to heavy use of hand-crafting in the aircraft industry. Mass-assembly technology and techniques played a relatively minor role. As well, the Regia Aeronautica's lack of tactical doctrine, night flying, and instrument training left it as essentially a daylight, fair-weather, one-on-one dog-fighting force. The book concludes that, despite its many accomplishments, the MC.202 could have achieved much more than it did.

Most works on this aircraft focus on aces or photo profiles for modelers. Marco Mattioli's *MC-202/205V Units in Combat* (2022) is the most comprehensive so far. Among the most thorough studies of the wartime Regia Aeronautica until now are Chris Dunning's *Courage Alone* (2009) and John Davis's *Italian Air Force 1930-2019* (2019).

Readers will acquire a thorough picture of the MC.202's design, evolution, and wartime employment from this ground-breaking work. It is a must-read for anyone interested not only in the MC.202, but also the fate of the Regia Aeronautica as a fighting force during World War II.

Steven Agoratus, Hamilton NJ



WW1 Aircraft Performance: Design, Aerodynamics And Flight Performance For The Albatros D.Va, Fokker Dr.I, D.VIIF & D.VIII, Nieuport 28 C.1, Pfalz D.IIIa & D.VIII, SPAD S.XIII, Siemens Schukert D.IV, Sopwith Camel, Sopwith Triplane and S.E.5a. By Anders F. Jonsson. Morrisville NC: LuLu Press, 2023. Photographs. Illustrations. Diagrams. Pp. 330. \$59.99. ISBN: 978-9-19877480-1

In the century since the end of the Great War, a number of research organizations on both sides of the Atlantic have examined various aspects of the aircraft employed during that first major air war. These aspects included

aircraft design, propulsion, armament, manufacturing techniques, materials, aerodynamics, and flying characteristics. These were the more prominent focal points for the analyses. Yet, few of these studies made comprehensive comparisons of the different machines in relationship to one another. Most works selectively discuss either a single design or general relationships between different aircraft.

No work can comprehensively cover the hundreds of designs of World War 1 fighter aircraft that flew from 1915 through 1918. However, by focusing on a select group, Jonsson has accomplished what has been largely missing from the accumulated literature. Through the use of modern computer simulations, he has examined the relative flight performance of many of the top fighter designs. This, in itself, would be rather unexciting if he had not taken the time to put the correlations of these machines into historical context. The same can be said for the different components or processes that came together to create a unified and coherent system.

Jonsson has endeavored to provide detailed evaluations of how each aircraft compared to others in relationship to speed, climb, acceleration, dive, and turn performance. This was done by using computer modeling as well as historical and empirical evidence in ways uniquely suited to this overarching assessment.

Organizationally the book covers the relatively short time span from the emergence of aircraft designed by the Wright Brothers through entirely European developments that resulted from the entrepreneurship and research by European science and engineering giants such as Gustave Eiffel, Albert Betz, Ludwig Prandtl, and Max Munk.

Anders' examination of the various components that, when assembled, resulted in the first fighter aircraft is of particular note. He uses a similar format as he discusses each of the various aircraft examined and reports the strengths and weaknesses inherent in these early machines.

This book is a well-illustrated work that contains 132 monochrome and 19 color photographs along with over 50 diagrams and illustrations. There are detailed analytical charts that illustrate the various aspects examined for each machine and their relationships to other aircraft. Overall, this is a fascinating examination of many of the iconic fighters of the First World War. It is a work that has been long overdue.

Carl Bobrow, former Museum Specialist, National Air and Space Museum



Naval Air: Celebrating a Century of Naval Flying. By Philip Kaplan. South Yorkshire UK: Pen & Sword Aviation, 2022 (2013 reprint). Photographs. Bibliography. Index. Pp. 208. \$29.95. ISBN 9-781-39907-505-3

I have long been a fan of Philip Kaplan's books, particularly his iconic World War II chronicles of the Anglo-American air crews in England. This book is a departure for him in that he focuses solely on the history of naval aviation from the initial fixed-wing flight from a ship in 1910 to the controversial, yet inevitable, introduction of US Naval women pilots on carriers. His book is an informative overview of 100 years of naval aviation, often supplemented by quotations from pilots themselves.

Kaplan is an award-winning, former magazine art director who has a long and successful background in book design, which is evident in his over 40 uniquely stylized and rich military histories that principally focus on World War II in the European Theater and the Atlantic. In *Naval Air*, Kaplan chronicles the history of naval aviation. Among other topics, he highlights the first carrier flights, reviews the development of aircraft carriers, profiles naval aircraft, and describes important air battles.

The book opens with a chapter on "The First Carriers" followed by an excellent and luminous chronicle of the impactful Washington Naval Treaty of 1922. He then includes a chapter on the less-known British success in 1940 of the Italian air battle at Taranto, which many believe influenced the Japanese strategy on the December 7th attack. This is followed by chapters on "Pearl Harbor," "The Doolittle Raid," and "Coral Sea and Midway."

Kaplan concludes with chapters such as "Aces," "Korea," "Yankee Station," "Falklands," "The Planes," "Carrier Strike Group," "Helicopter," and "To the Fleet." "Yankee Station" discusses the Vietnam conflict. I particularly enjoyed the chapter titled "Women on Board," profiling several women pilots and their real carrier experiences, often in their own words. It is obvious from his assessment, that it is not easy being a female pilot in a highly charged, testosterone-filled, military-flying world. This is an enlightening and honest review of the subject.

Although Kaplan's research is both straightforward and lucid, the chapters transition unevenly. Inexplicably, a chapter on aviation movies is sandwiched between capable chapters on the Doolittle raid and the Battles of the Coral Sea and Midway. And curiously, from an individual skilled in art and book design, the book lacks maps which would have enhanced the narrative of the air and sea battles. The few photographs he includes do little to illuminate the chapter themes. And finally, I am particularly troubled by the absence of citations, a trend in publications that I find regrettable.

This book will appeal to anyone who has an interest in an intelligent review of the origins of carrier flying and an interest in the Pearl Harbor attack, Coral Sea, and Midway. Those chapters are very approachable. And although it was peculiar to find in this volume, the aviation movie review chapter will be an important reference in my personal library.

David S. Brown, Jr., volunteer, Museum of Flight, Seattle

British and American Aircraft in Russia Prior to 1941. By Vladimir Kotelnikov. Warwick UK: Helion & Co., 2022. Diagrams. Illustrations. Photographs. Appendices. Glossary. Bibliography. Pp. 325. \$75.00 paperback. ISBN: 978-1-915070-88-3

I have reviewed a number of these Helion publications and have generally been high on them. This one is no exception. Kotelnikov was (he unfortunately passed away recently) a Russian engineer and historian who wrote a number of books and articles on aviation—particularly engines. In this final work, his research abilities are well demonstrated in what has to be the widest coverage of the topic ever written.

The history of Russian aviation is interesting, to say the least. It could be divided into a number of periods: the decade before World War I; the war itself; the Civil War period; the resurgence of aviation in the USSR; and the period leading up to World War II, where mostly indigenous designs became prominent. Kotelnikov chose to combine the convoluted stories of the first three periods into the first chapter. The second chapter covers the resurgence period of Russian aviation. And the final two chapters split the period leading to The Great Patriotic War into separate coverage of British and American aircraft used in the 1930s.

Interestingly, one of the earliest aircraft types in Russian use was the Wright A, although all of them were purchased from the French. In fact, French aircraft were predominant (with the notable exception of the great Sikorsky *Ilya Muromets* bombers) in Russia. The end of the Civil war saw a hodgepodge of aging French, British, and a few American aircraft remaining.

The post-Civil War period required new aircraft to replace the leftovers of the previous times. The British were most influential. In fact, with Soviet modifications, the Avro 504K and de Havilland DH.9 aircraft became the ubiquitous U-1 and R-1 aircraft. These, along with several engine designs purchased abroad really got Soviet military and commercial aviation production up and running.

Even before the US formally recognized the Soviet Union in 1933, delegations of Soviet engineers had visited the US to tour aviation manufacturing facilities. With state recognition came a great relaxation of barriers to exports from the US. Chief among these was the Douglas DC-3, although the Consolidated Catalina was very important as well. Manufactured by Lisunov in modified form as the Li-2, the DC-3 was used as a commercial airliner and in many military roles: bomber, maritime surveillance, transport, navigation trainer, paratroop carrier, and others. Generally speaking, the Soviets produced few American designs (except for the Li-2 and GST Catalinas); but the technologies of the aircraft, engines, and other components vastly boosted local designs. Though beyond the scope of this book, Lend-Lease aircraft and "borrowed designs" (notably the B-29) certainly continued this trend.

The book's only drawback is lack of an index. Aside from that, Hellion has done its usual fine work in photo reproduction. The several hundred black-and-white pictures are of the best fidelity possible. The color side-view illustrations of many of the British and American aircraft enhance the actual photos. And Kotelnikov's narrative is both detailed and comprehensive. While it is a shame that this is his final book, his writing career certainly ended on a very high note.

Col Scott A. Willey, USAF (Ret), Book Review Editor, and former National Air and Space Museum docent



The Great Air Race: Glory, Tragedy, and the Dawn of American Aviation. By John Lancaster. Washington DC: Liveright Publishing Corp. 2023. Notes. Maps. Photographs. Index. Pp. xviii, 346. \$23.99. ISBN: 978-1-63149-637-0

It is a rare and happy surprise to come across an event in the history of 20th century aviation that hasn't already been written about, often from multiple perspectives. It is that much better when the story is told in a way that keeps the reader turning the pages, eager to see what happens next. This is one of those books. Presenting a largely forgotten series of events from the early part of the century, Lancaster deftly manages to tell a complex story without losing the reader. John Lancaster spent 20 years writing for *The Washington Post*, and his background as a journalist shows in the way he weaves together the many story lines that make up this event. Coming in at just under 350 pages, *The Great Air Race* covers a lot of material in a book that easily could have been much longer, yet the reader isn't short-changed.

The Great War brought about rapid advances in aircraft design and aviation in general. For a variety of reasons, the US lagged its contemporaries, and at the end of the war many who had been involved in the Army's aviation efforts saw the momentum generated by the United States as an important beginning that had to be continued. Faced with post-war budget cuts, Generals Charles Menoher and Billy Mitchell staged the Transcontinental Reliability and Endurance Test, a flight demonstration that would simultaneously send pilots on a round trip across the continent from San Francisco and New York and demonstrate the viability of air travel.

Staged in the summer of 1919, a race from New York to Toronto and back had been deemed a success and may have given Mitchell the confidence that a transcontinental air race was feasible, but as Lancaster wrote: "As Americans would soon learn, there were many good reasons why an airplane race on such a scale had never been attempted." In their hurry to stage the race before winter weather made flying too dangerous, the race was organized

for October, when the weather ranged from poor to awful. Landing sites were hastily arranged, and many went unfinished. On the first day of the race, three pilots were killed in crashes. All told, nine pilots were killed, and 54 airplanes crashed. All but 8 of the pilots who completed the first leg refused to continue. As the tale goes on one can't help but think, What else can go wrong?

In telling a story that happened over 100 years ago, Lancaster brings into focus elements of life in the US that are all but forgotten and introduces us to characters who could easily stand next to our modern-day aviation heroes. Flying in open-cockpit aircraft for hours on end in weather ranging from rain to blizzards, these men were fascinating, not to mention very brave. Lancaster could have easily filled a book with profiles of the participants but, instead, uses their idiosyncrasies as highlights to the larger story, mixing in background information, technical discussion, and historical context to give a fully rounded tale to the reader.

In conclusion, this is a very enjoyable read suitable for aviation history buffs as well as those with a passing interest in flight. Moreover, it is a great adventure and well worth the time. Highly recommended.

Mark Winslow, Docent, National Air and Space Museum



Arctic Convoys 1942: The Luftwaffe Cuts Russia's Lifeline. By Mark Lardas. Oxford UK: Osprey, 2022. Maps. Photographs. Illustrations. Bibliography. Index. Pp. 96. \$24.00 paperback. ISBN: 978-1-4720-5245-4

In recent years, Lardas (a former worker on the Space Shuttle program) has been a consistent contributor to Osprey's Air Campaign series. This effort, No. 32 in the series, is his seventh book. All books in this series (including this one) have examined the impact of air power on naval operations and sea control in the Pacific and Atlantic in World War II. Osprey has found a winning formula in this series. Each volume follows the same format: introduction, chronology, attacker's capabilities, defender's capabilities, campaign objectives, the campaign, and aftermath and analysis.

In 1942, the Soviet Union was struggling for its survival against Nazi Germany's onslaught. Britain's Winston Churchill and America's Franklin Roosevelt promised Russia's Joseph Stalin military materiel. The closest Russian ports were Murmansk and Arkhangelsk. To reach them, convoys crossed the Norwegian and Barents Seas.

Lardas explains how the Allies and the Germans struggled to develop operational efficiencies. Germany's Adolf Hitler, concerned about a serious Allied invasion of Norway, ordered his surface fleet north to defend against such an event. Consequently, the British Navy initially became obsessed with this threat.

As with almost every nation in the world, Germany's *Kriegsmarine* and *Luftwaffe* seldom, if ever, cooperated. However, by the summer of 1942, they were making headway. The *Luftwaffe* introduced torpedo-armed bombers, and the *Kriegsmarine* diverted a handful of submarines from the Atlantic. Meanwhile, German surface vessels seldom left port due to fuel limitations.

Focusing almost exclusively on the surface threat, the Royal Navy was unprepared for the aerial attacks that summer. Antiaircraft artillery was woefully inadequate; and, of course, air cover was out of the question except for merchant ships converted to launch a single Hurricane fighter on a one-way mission. The long daylight hours also allowed the *Luftwaffe* more time to find and attack the convoys. Of course, the *Luftwaffe*'s greatest success came when it devastated convoy PQ-17. Ultimately, the Allies temporarily were forced to halt the convoys.

From 1943 on, the Allies coped far better with the challenges posed by the Arctic convoys. Furthermore, Germany's diminishing fortunes resulted in air assets previously based in the north being allocated to other theaters.

From a seamanship standpoint, merchant mariners on the Arctic run faced by far the most challenging environment found anywhere in the world. In addition to the threat posed by the Germans, severe weather also took a toll on men and ships.

This book is well suited for readers interested in how land-based aircraft can affect naval operations that lack adequate air cover. It also shows how the highest-ranking decisionmakers can misjudge a threat but, given enough time, make adequate adjustments.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle



The Turtle and the Dreamboat: The Cold War Flights That Forever Changed the Course of Global Aviation. By Jim Leeke. Lincoln NE: Potomac Books, 2022. Photographs. Appendix. Notes. Bibliography. Index. Pp. 248. \$29.95. ISBN: 978-1-64012413-6

The year 1946 was an incredibly complex time in world history. Just one year after the end of World War II, the Nuremberg trials were winding down; Stalin was exerting his new-found muscle against his former allies; the Able and Baker nuclear tests took place at Bikini Atoll; and, as happened in the 1920s, discussions about unifying all military air forces were underway.

There had been earlier unification attempts in both the US and abroad. In 1918, the Royal Naval Air Service merged with the Army's Royal Flying Corps to become the Royal Air Force. In 1936, the RAF was restructured into Fighter, Bomber, and Coastal Commands. Coastal Com-

mand was to support the anti-submarine effort (ASW) three years later. But ASW was not the most popular mission the RAF would undertake, so Coastal Command suffered funding constraints and lacked the assets to defend Britain against the U-boat threat. It would take some time for this resourcing neglect to be corrected.

During the 1920s, Billy Mitchell advocated US aviation service consolidation. However, the Navy fought back, demonstrating the service's ability to fly long distances by attempting to fly two PN-9 flying boats from California to Honolulu. Though the attempt failed, the Navy made its argument; and naval aviation remained a separate entity within the naval service. During the interwar period, Congress would study unification no fewer than 26 times.

Just after World War II, USAAF General Arnold decreed that the US should be able to strategically strike anywhere on the globe from North America. He wanted a strategic bombing aircraft that could fly at least 10,000 miles. Again, there were calls to merge all military aviation under one commander to support the strategic bombing mission. The Army and USAAF were all for the merger. The Navy vehemently rejected it.

Almost immediately, both services set out to demonstrate their relevance to strategic bombing through demonstrations of long-range flights. In September 1945, the USAAF flew non-stop from Japan to Chicago. Two months later, The B-29 Superfortress *Dreamboat* flew non-stop from Guam to Washington DC. Future flights of *Dreamboat* were planned, to include a non-stop, polar flight from Honolulu to Cairo, Egypt. The Navy was not to be outdone and flew a modified P2V Neptune, the *Truculent Turtle*, non-stop from Perth, Australia, to Columbus OH in early autumn 1946.

This is a wonderful work, because it includes details of both aircraft (which used the same engines) and also includes a very detailed description of the difficulties encountered by weather in an era when weather satellites didn't exist and over-the-pole navigation methods were in their infancy. Leeke discusses the modifications made to both airframes to ensure successful mission completion and includes wonderful profiles of all of the aircrew and other personnel involved in both events.

I'm proud to have this work of history as a part of my military aviation library. My only wish is that Leeke had provided maps of the routes of flight and, perhaps, more details about the technologies that enabled the success of both flights.

John F. "Jack" Keane, LCDR, USN (Ret)



The True Story of Catch 22: The Real Men and Missions of Joseph Heller's 340th Bomb Group in World War II. By Patricia Chapman Meder. Philadelphia: Case-

mate, 2022). Photographs. Illustrations. Appendices. Notes. Pp. 240. \$24.95 paperback. ISBN: 978-1-61200-103-6

I have read Heller's *Catch 22* several times, and my feelings about the book have changed as I have matured. In the 1960s, it seemed memorable for the counter-culture absurdist satire embraced by the youth of the time. As a B-52 aircrew member in the early 1980s, I recognized some of the less-effective leadership styles of the book's characters in my own squadron and wing leadership. In 2020, when the Hulu mini-series premiered (the book was vastly superior), I did not find it funny at all. The dark humor I remembered had gone flat, and the story and its characters were sad—not funny.

Heller had famously and consistently insisted that the characters in his book were not based on real people, i.e., fellow crewmembers of the 340th Bomb Group. When I read or heard his denials, I dismissed them out of hand; his protestations were not believable. So, I was drawn to Meder's book and its promise to link specific characters to actual people—those who populated Heller's memories.

When this book was originally released in 2010, only one member of the 340th BG was still alive. But an active veteran's organization for the 57th Bomb Wing and its four groups kept memories alive. Meder's work offered the chance for me to know these men as the heroes they were. People with strengths and weaknesses who volunteered their young lives to free occupied Europe. These men were three-dimensional humans living and dying in the frightening surreal environment of aerial warfare. Even Heller (described as "weird" by his own mother) found the courage to climb into the confines of the bombardier's compartment in the B-25 and fly through the flak-hell of the Brenner Pass on multiple occasions. The moral contradictions contained in Heller's expression "Catch 22" were not absurd in themselves, but were the outgrowth of the absurdity of war and existing where death was just a wake-up away.

Meder is the daughter of the late Colonel Willis Chapman, the real-life person who became the amoral Colonel Cathcart of Heller's story. She clearly relishes the opportunity to set the record straight about her father. From her work, I came away with a deep respect for the actual men who became fodder for Heller's story. If there is a redeeming quality, it is that Heller treats his own fictional counterpart with the same disdain that he does everyone in his story.

This book's re-release supports the release of Meder's companion work, *The True Story of Catch 22 Illustrated*, which showcases her artistic talents. This book is not a smooth read. Large extracts from Heller's works, along with introductions and explanations, disrupt the narrative flow. The overall organization of the book is choppy, reading like a group of essays or short stories.

The best writing in the book in Scott Carpenter's Foreword. His work is an excellent tone-setter and informs us that fellow Mercury 7 astronaut Deke Slayton flew 56 com-

bat missions with Heller's 340th Bomb Group. There is no character in *Catch 22* that suggests Slayton, so he and Heller may not have overlapped assignments. That is a pity. I would have enjoyed learning what Heller's weird imagination thought of a member of the first astronaut corps.

Gary Connor, docent, Smithsonian National Air and Space Museum's Udvar Hazy Center



First Through The Clouds: The Autobiography of a Box-Kite Pioneer. By Frederick Warren Merriam. Barnsley UK: Pen and Sword Books, 2018. Photographs. Index. Pp. 163. \$39.95. ISBN: 978-1-52672-616-2

This is a reprint of an earlier edition published in 1954. The sub-title might better be "Reminiscences of a Box-Kite Pioneer." It largely, though not entirely, focuses on Merriam's flying before and through World War I. It describes events 40 and more years earlier in his life, written by a man in his early 70s. It reads like the reminiscences of an old man quietly reviewing some of the significant adventures of his youth and indulging in the pleasure of recalling some of the now-famous men he had known and taught to fly, thus starting their careers. For example, ACM Sir Philip Joubert de la Ferté, commander of RAF Coastal Command in the Second World War, was one of Merriam's students. I don't know whether the first edition contained the same pictures, but they are certainly well-chosen black-and-white photos.

Merriman was an English "Early Bird." He was either an unbelievably good, natural pilot with an incredible sense of balance, or a repeatedly very lucky one. The title refers to his (first in the UK) flight out of sight of the ground and through a layer of clouds (zero visibility in the cloud) and into the sun above. He did this in a Bristol Boxkite in 1912. This was blind flying with no reference to a horizon and no instruments whatever! For most people, this is a recipe for disaster. He does point out that he passed his test to get his flying license (no. 179) on February 6, 1912, with "the envied record of having completed my training without damaging a machine." This was not common!

Not long after, he started teaching flying to others. He was apparently very good and quite innovative in his teaching methods. He had a student sit in his lap so he could manipulate the student's arms and legs to do the right things at the right times (of course, the airplane he used seems to have had only one seat)! In doing this, he taught people who became quite well known, reaching the upper ranks of the RAF. With the advent of the First World War, he seems to have been directly commissioned in the Royal Navy as an instructor pilot. There is no mention of recruit training. He just became an RNAS pilot and in-

structor. His poor eyesight kept him out of air-to-air combat flying. He did, however, fly anti-submarine coastal patrols from bases in the UK for a time and sank a German submarine.

After World War I, it was only the toss of a coin at the Royal Aero Club which decided that John Alcock, rather than Merriam, would be the pilot with Arthur Whitten Brown on the first non-stop transatlantic flight. In 1922, he founded Britain's first gliding school in the Isle of Wight and was instrumental in the development of gliding as a sport in the UK. Merriam remained active in aviation for much of the rest of his life (he died in 1956).

A truly enjoyable book to read.

Leslie C. Taylor, docent, National Air & Space Museum's Udvar-Hazy Center



The Flying Grunt: The Story of Lieutenant General Richard Carey United States Marine Corps (Ret). By Alan E. Mesches. Havertown PA: Casemate Publishers, 2023. Photographs. Notes. Bibliography. Glossary. Index. Pp. x, 278. \$37.95. ISBN: 978-1-63624-258-3

Every Marine considers himself, first and foremost, an infantryman. Being called a "Grunt" is a compliment. Some go into specialties such as artillery or aviation, but all understand that they support infantrymen who seize territory and win wars. Marine Aviators are Marines who happen to be pilots, while those flying for the other services are pilots who happen to be in their chosen service. Thus, "Flying Grunt" truly captures Carey's unique accomplishments.

Joining the Corps in 1946, Carey served in Korea at Inchon and Chosin, survived 189 days of combat, and was awarded the Silver and Bronze Stars. He then earned his wings and served three tours of duty in Vietnam, flying 204 combat missions. A Marine colonel described Carey's handling of the evacuation of Saigon: "He got us out. He inspired confidence. I didn't love him. I respected him." Many Marines I knew who served under his command felt this way.

The book brings out many interesting facets of Carey's life. One common flaw was his work/life balance. His wife disliked Washington (few Marine wives do), yet his career flowed in that direction. The decision to leave home at 6 a.m. and return after 8 p.m., including weekends, is not a recipe for domestic tranquility or involvement with dependent children.

Carey appears to have had more than nine lives. In Korea, he once encountered a very large armed North Korean soldier who, thankfully, chose flight over fight. Later that evening, a mortar round knocked him unconscious. Even later that night, Carey stepped out of a foxhole he shared with a close friend just before a mortar hit the foxhole, killing his friend. In Vietnam, a last-minute change of orders removed Carey from a C-130 that was struck on

landing at Khe San, killing all on board.

One anecdote was particularly relevant to Black History Month. During the evacuation of Saigon, a South Vietnamese officer sought to save his family of five by landing his light aircraft on the carrier *Midway*. Captain Lawrence Chambers risked court-martial by pushing \$10 million of helicopters overboard to clear a landing area. Major Ly landed safely. Chambers later became the first black Naval Academy graduate to be promoted to rear admiral.

Lastly, Carey's views of Vietnam reflect those of many veterans. He planned and supervised the successful evacuation of Saigon and wrote in his After Action Report: "My desire to succeed in the evacuation was driven by empathy-compassion for the people and to overcome/block out the shame I felt as an American abandoning the people of a nation that had endured immense suffering who believed in us. Now here we were leaving them without hope...I think we were out strategized. Vietnam was a classic Maoist protracted warfare and the way to win was pursued by North Vietnam."

This well written and researched book is replete with personal recollections and anecdotes faithfully recalled and recorded. If there is a flaw, the book paints Carey as someone who has never erred and was flawless in his decision making. Carey would not make that claim himself. Mesches is slightly tedious and awestruck as he continuously refers to Carey as "The General." But I highly recommend *Flying Grunt* to anyone desiring to get a comprehensive look at one man's successful and varied experiences.

Maj. Gen. Joseph T. Anderson, USMC (Ret.), Fairfax VA



Sun Tzu in Space: What International Relations, History, and Science Fiction Teach Us About Our Future. By Gregory D. Miller. Annapolis MD: Naval Institute Press, 2023. Tables. Endnotes. Bibliography. Index. Pp. x, 366. \$34.95. ISBN: 978-1-68247-845-5

Political scientist Gregory Miller's *Sun Tzu in Space* offers a rather unique approach to divining what might be humanity's future in outer space. His recipe for exploring possible futures begins, in each of seven chapters, with presentation of a different fictionalized scenario. As an intellectual taste test for each of those concoctions, Miller introduces a variety of different worldviews (schools of thought) and related theories commonly espoused in academic international relations (IR) and other social sciences. To flavor key points in his discussion of those various IR viewpoints, he adds apropos anecdotes selected, both chronologically and geographically, from the broad expanse of human history. As a final ingredient for what amounts metaphorically to a hearty meal for hungry minds, he spices each mixture with thoughtfully selected dashes of science fiction.

Based on this approach, Miller, (Chair, Department of Space Power, Air Command and Staff College), analyzes space futures based on fundamentally different, but widely touted, worldviews from IR literature—realism, liberalism, and constructivism—plus Marxism and “increasingly influential” feminism. Assuming a state of anarchy exists regardless of worldview, he first analyzes two variants of realism: offensive and defensive. Then, he does the same with two variants of liberalism: republican and commercial. Considering the other three worldviews, he admits the influence of Marxism has diminished, “but Marxist theories still exist, and scholars use them to explain certain types of international behavior.” As for feminism and constructivism, they provide “useful lenses for explaining and describing behavior from nontraditional points of view.”

As he approaches the conclusion of *Sun Tzu in Space*, Miller explains his “hope is that this project highlights the importance of staying away from ideological dogma” and realizing “we cannot ignore the pros and cons that exist within each scenario.” Regardless of school of thought, the goal is to minimize cons and maximize pros. For that purpose, his analytical framework for each space-future scenario consists of four measures of human advancement: minimizing war, fostering human expansion, enhancing science and technology, and improving the standard of living. By scoring each of his seven scenarios based on those measures, Miller’s ranking places a Constructivist/Artificial Intelligence worldview a most promising. He cautions, however, that both ideational and material factors drive human interaction, which can lead to unpredictable, ungeneralizable changes that make it hard to theorize about future behaviors and decisions.

While *Sun Tzu in Space* offers a substantial quantity of worthwhile food for thought, many readers might find its distinctly academic tone difficult to digest. In addition, some might become confused by Miller’s frequently qualifying statements, which seem to weaken or possibly negate his analytical assessments. Out of frustration with the IR jargon, others might even be inclined to lose interest before reaching the volume’s last pages. To give up on finishing, however, would be a mistake.

Miller’s social science IR emphasis leads to a cautionary conclusion. It amounts to the same “incredibly pessimistic” outcome that most historians and science fiction writers undoubtedly have already reached about any future colonization in outer space—that human nature suggests “the strong possibility of violent conflict in the long term.” Despite the highbrow IR tone of *Sun Tzu in Space*, Miller confesses in his final sentence that “humanity’s future, ultimately, will be what we make of it.”

Dr. Rick W. Sturdevant, Director of History, HQ Space Training and Readiness Command

The Darkest Hour: The Japanese Offensive in the Indian Ocean 1942. Volume 1—Opening Moves and Volume 2—The Attack Against Ceylon and the Eastern Fleet. By Michał Piegzik. Warwick UK. Helion & Company, 2022. Photographs. Drawings. Maps. Bibliography. Notes. Appendices. Pp. 84 and 80. \$29.95 paperback. ISBN: 978-1-91507061-6 and 978-1-80451023-0 respectively

A quick look at a few search engines will reveal dozens of books, movies, and other works titled *The Darkest Hour*, so Piegzik has subtitled his two volumes (which constitute the entire book) to better help the reader focus on which darkest hour he is addressing. The operations in the Indian Ocean in 1942 pitted the Japanese against the British Empire in South Asia. The Japanese and their Axis partners sought to control the region to deny the Allies access to the vast manpower and natural resources found there and to further reinforce the pincers that would squeeze the United States.

These books are Helion products and follow their standard format—strong research, unique photographs, and a large dose of artwork showcasing aircraft and vessels. The book is in the large paperback format. This is optimum for artwork but not optimum for text—and there are large doses of text that well describe the subject operations.

Piegzik is described as a researcher. He is a lawyer who specializes in researching Japanese family law and military history topics. His writing is very direct and unsophisticated and exceedingly dry. The dryness comes from inclusion of large quantities of extracts from Japanese military orders. These add credibility to his work but do little to bring the narrative to life. That is unfortunate, because much of the story Piegzik tells is fascinating. He is comfortable presenting the entire spectrum of data documenting British and Japanese operational orders. But he also offers the minutiae of day-to-day operations, such as recounting specific aircraft sorties by including aircraft type, mission, aircrew, and mission duration. He orchestrates facts the way a fine tailor arranges fabric to assemble a form-fitting suit. The minutia isn’t necessarily exciting or entertaining, but it is needed for the final product to be pleasing to the eye.

I did not see *The Darkest Hour* so much as a book, but more as an over-illustrated white paper with copious appendices, bibliography, and notes. For the casual reader, it serves as an effective introduction to the southern China-Burma-India theater in the earliest days of World War II. For the more-focused armchair historian, the text and notes will save significant time otherwise spent translating Japanese primary documents and references. But like many Helion products—all of which present interesting facets of history—this book tries to be everything to every reader and ends up leaving them unfulfilled.

Gary Connor, docent, Smithsonian’s Udvar-Hazy Center

McDonnell XP-67 "Moonbat". By Steve Richardson and Peggy Mason. Oxford UK: Osprey Publishing, 2022. Tables. Diagrams. Illustrations. Photographs. Bibliography. Index. Pp. 80. \$22.00 paperback. ISBN: 978-1-4728-5303-5

This is the story of a fairly unfamiliar aircraft that was never put into production and made no contribution to winning World War II. So why is the story important? There are several reasons. First is that this little book well demonstrates the acquisition system of the war years. Second, the design and engineering evolved into several of the Navy's earliest jet fighters. And third, it is a story of the trials and tribulations of engineers attempting to turn requirements into viable hardware.

In 1940, the Army sent out several solicitations to the country's airframe and powerplant firms that sought to produce advanced aircraft that would be ready if and when America got involved in ongoing war. One of the airframers was the fledgling McDonnell Aircraft, whose founder had earned his spurs with Glenn Martin. Out of these solicitations came some radical designs that promised great power-to-weight ratios for engines and greater speed, range, and maneuverability for fighter aircraft. The Vultee XP-54, Curtiss XP-55, and Northrop XP-56 were the airframe winners. McDonnell's entry lost out. But Mr. Mac continued with several more entries and was awarded a contract in July 1941 for the XP-67.

Quickly dubbed the *Flying Fillet* or *Moonbat*, the design was different from anything seen before. It featured highly blended wings/fuselage/nacelles to greatly reduce drag. This was coupled with one of the new engine winners, the compact, inverted-vee, Continental I-1430. But, as with the other three "winners," technological challenges and the realities of war got in the way. Requirements changed as the war progressed. Other contractors, for various reasons, had better luck with their products and schedules. And some promising design ideas just didn't pan out or required many changes. In the end, none of the four 1940 fighters ever saw production. Developments unforeseen in 1940 overtook these designs, and their developments dragged on. The XP-67 didn't fly until 6 January 1944. By that time, it was well understood that the I-1430 would never go into production, and that would necessitate major redesign of the XP-67. The sole aircraft flew over 50 times before an engine/nacelle fire destroyed the bird after landing.

However, the US was already looking toward jets. Several P-67 designs using hybrid reciprocating and jet combinations were designed: the P-67C fighter and the P-67E long-range photo-reconnaissance models. The war ended; pure jets came into being; and these designs just weren't needed. The program officially ended in January 1946.

While the P-67 never entered service, some of its design features did. McDonnell's first jet fighter, the short-lived FH Phantom, and then its improvement, the F2H Banshee, were the Navy's first pure-jet fighters. The design

expertise started on the XP-57 continued on through the F3H Demon and F-4 Phantom II.

Richardson and Mason did an outstanding job of gathering every known piece of documentation about the XP-57. Combined with the proven Osprey formula of excellent photos and illustrations, their well-written text brings this obscure aircraft and its development story to life and is a welcome addition to the history of World War II aircraft.

Col Scott A. Willey, USAF (Ret), Book Review Editor, and former National Air and Space Museum docent



Flying in Defiance of the Reich: A Lancaster Pilot's Rites of Passage. By Peter Russell. Barnsley UK: Pen and Sword, 2007 (reprint 2020). Photographs. Index. Pp. 264. \$24.95 paperback. ISBN: 978-1-52676668-7

Most autobiographical memoirs are formulaic. A brief description on the author's early life, with emphasis on people and events that influence future events. Then a segment on early adulthood leading into the heart of the story when the author really "grows up." Then perhaps a segment describing the author's subsequent life. *Flying in Defiance of the Reich* follows this formula but with something of a twist. Reading the book was like eating a slice of holiday fruit cake; most is dry and tasteless but then you find a tasty piece of literary fruit that encourages you to read on.

Russell served as an RAF pilot during World War II, flying operational tours with Coastal and Bomber Commands. Post war he served in the Far East as part of British forces reestablishing control over Hong Kong. One of the primary themes that pervades the entire work is that Russell is very free in expressing his interest in sex. He recounts his numerous sexual relationships in some detail, explains his thoughts on the importance of "Sexual Therapy" and expresses very distinct opinions on homosexuality among fellow aircrew. My initial reaction was that this was too much information. But I realized it also provided a window into Russell's character in the context of the time. While callous and politically incorrect today, in wartime Britain a free sexual atmosphere was accepted and encouraged. Be advised that some readers could be offended by the sexual detail.

Moving back to the fruit-cake metaphor, there were several tasty details scattered throughout the book. Russell's off-handed remarks about *Fishpond* equipment encouraged me to do further research. *Fishpond* was part of the RAF H2S radar equipment that showed the position of other aircraft within several thousand meters of the transmitting aircraft. While the navigator used the H2S to navigate, the radio operator used the *Fishpond* equipment to monitor the position of other aircraft, friend and foe.

Russell also talks extensively about British post-war activities in the Pacific. Initially he was assigned to the

Shield Force, a lead group designed to build airfields to support operations by RAF Lincoln bombers against Japan. When the war ended before Shield Force could begin their work, they were diverted to Hong Kong. Why Hong Kong? Because the admiral in charge of Shield Force was convinced the United States would move on Hong Kong with the intent of liberating it from its British colonial masters.

Russell's war record is noteworthy. His tour flying Coastal Command Hudsons over the Atlantic in harrowing weather was just as dangerous as flying Lancasters over the Reich in his 25 operational missions. His book is filled with detail. Every operational sortie is followed by an extract from Middlebrook's *The Bomber Command War Diaries*.

Any book contains some value, some kernel of information the reader might find valuable. But, in good conscience, I cannot recommend this book. It has too much cake and not enough tasty bits.

Gary Connor, docent, Smithsonian National Air and Space Museum's Udvar Hazy Center



Spitfire Ace of Aces: The Album: The Photographs of Johnnie Johnson. By Dilip Sarkar. Yorkshire UK: Pen & Sword Air World, 2021. Photographs. Bibliography. Pp. 221. \$39.95. ISBN: 978-1-52679-166-5

Sarkar's book is a photographic tribute to the RAF's top World War II and top Spitfire ace, Air Vice-Marshal James Edgar "Johnnie" Johnson, CB, CBE, DSO & Two Bars, DFC & Bar, DL. This work is a true photo album of Johnson's life both in and out of the military.

Johnson joined the RAF in 1938 after three failed attempts to join due to a poorly healed broken collarbone. He received his wings the following year and was posted to No. 616 Squadron, part of the famed Tangmere Wing. There he honed the skills necessary to survive and succeed in air-to-air combat by flying with the likes of Wing Commander Douglas Bader. Johnson flew with No. 616 Squadron during the Battle of Britain and, by 1942, commanded No. 610 Squadron. He would later command both the Kenley Spitfire Wing and 144 Canadian Wing. As his leadership roles increased, so did his number of aerial victories. Ultimately, he achieved 38 victories (all against single-engine fighters), making him the top allied ace in the European Theater. Johnson continued to serve in the RAF until he retired in 1964 as an air vice-marshal.

To tell the story, Sarkar uses images from Johnson's own photo collection, family photos, and Johnson's friends. Johnson's youngest son, Chris, played a key role in providing access to the images, thus allowing Sarkar to use many previously unpublished pictures. While Johnson is the focus of the book, he is not in every photograph. Sarkar in-

cluded images of squadron mates, friends, and the wartime environment that expand on the story of Johnson. All images include detailed captions that explain both the image itself and the context of the time period. With a maximum of four pictures per page, their quality is excellent. Selection and sizing were clearly well thought out.

Sarkar included iconic images of the ace sitting on the wing of his Spitfire with his beloved Black Labrador, Sally, at St. Croix, France, in 1944. Later, an elderly Johnson recreated that same image, without the dog.

Rather than focusing purely on Johnson's World War II career, Sarkar begins this work with a page from Johnson's youth and his family and ends the work with roughly twenty pages of post-World War II images. These help portray Johnson's life and role as a military leader rather than merely a wartime pilot. By including non-military photos of Johnson, Sarkar adds depth to the story of Johnson as a father, husband, and man.

Sarkar makes clear that this is no replacement for a biography of Johnnie Johnson. Rather, it is best used as a supplement to earlier works about the ace, including Johnson's own book. The images help truly bring such biographies to life.

As a photo album of the top Spitfire ace, the book is a fascinating quick look at Johnson. As a supplement to a biography about Johnson or a history of RAF fighters during World War II, the book is a valuable resource to bring the text to life. The images are well curated and make the book truly enjoyable in both roles.

Lt Col Daniel J. Simonsen, USAF (Ret), Alexandria VA



Reform and Experimentation After the Cold War, 1989-2001. History of Acquisition in the Department of Defense. Volume V. By Philip Shiman, Elliott Vanveltnor Converse, Joseph A. Arena. Washington DC: Historical Office, Office of the Secretary of Defense. 2022. Appendices. Bibliography. Index. Photographs. Illustrations. Tables. Pp. xxi, 656. \$75.00. ISBN: 978-0-16-095927-1

Philip Shiman is a consultant and contractor in military history. He has authored a number of books and articles, served as a senior analyst in Navy and Marine Corps history and technology, worked for the Army Staff at the Pentagon, and conducted history-based training at the Marine Corps Command and Staff College.

Elliott Converse is a retired Air Force colonel and author of the first volume in the Defense Acquisition History series. He served as an intelligence officer, a faculty member at the Air Force Academy and Air War College, was a strategic planner with the Joint Chiefs of Staff, and commanded the Air Force Historical Research Agency.

Joseph Arena is the Senior Historian, Leadership Support, for the Historical Office, Office of the Secretary of De-

fense. He holds doctorates in history and political science. He is writing a history of cybersecurity policy in the Department of Defense.

This volume in the History of Acquisition in the Department of Defense series, focuses on the adoption of new concepts and methods for acquiring major weapon systems in the 1990s. Changes in the process were proposed from several organizations in response to factors such as the decline in defense spending after the end of the Cold War, advances in complex technology, and an acquisition system that was failing to deliver weapon systems when needed and at affordable costs.

The acquisition reform and experimentation initiatives of the period were characterized by a continuing need to maintain advantage over political enemies through development and deployment of technologically advanced weapons systems, acquisition management centralization in the Office of the Secretary of Defense, Congressional oversight, and adoption of private-sector management techniques. Through a combination of these, defense leaders hoped to provide a potential avenue to attain cost savings while maintaining an edge in weapons technology.

While difficult to assess the net impact of acquisition reforms on weapon system programs in the 1990s, it is clear is that numerous successful programs employed acquisition reforms from the start (e.g., F/A-18E/F Super Hornet, FBCB2 communications platform, Joint Direct Attack Munition, Predator UAV, and the *Virginia*-class attack submarine). Other programs applied acquisition reforms after they began (e.g., *Arleigh Burke*-class guided missile destroyer, and C-17 transport program). Reforms were applied in varying degrees to systems which differed widely in function, degree of technological risk, and funding.

This volume employs case studies to show histories of individual major weapons programs and how their acquisitions functioned. These case studies also describe Air Force, Army, and Navy/Marine Corps acquisition processes; defense industry restructuring; acquisition workforce improvements; and overall conclusions regarding reformation, innovation, relationships, quality, and overall acquisition management reform status for the period.

This is definitely not a weekend read, but it is an excellent, well-researched, in-depth reference for those interested in what it takes to acquire the weapon systems that are the backbone of air and space power. Without this convoluted, politically charged system, there would be nothing for the warfighters to operate. This volume well documents changes made during the 1990s in acquisition policies, organizations, and processes and relates the successes, failures, and lessons learned of major weapons programs.

Frank Willingham, docent, NASM's Udvar-Hazy Center



Consolidated B-24 Liberator. By Graham M. Simons. Barnsley UK: Pen & Sword Books, 2022. Diagrams. Illustrations. Photographs. Bibliography. Index. Pp. 256. \$26.95 paperback. ISBN: 978-139901965-1

Simons is an accomplished aviation writer with more than 15 titles to his credit. Most of this United Kingdom-based author's work recounts the story of a single aircraft. He tends to focus on bombers. This volume is a reprint from 2012.

Pen & Sword dispensed with numbering chapters. Instead, sections are labeled. Some that might be considered appendices are tacked on near the end. For the most part, Simons examines the numerous B-24 variants in chronological order, though he occasionally deviates when examining specific missions.

Simons introduces the reader to the start of Consolidated Aircraft. The company's breakthrough came with long-range flying boats supporting naval operations. Thus, the Liberator, which the Army Air Corps sought to complement the Boeing B-17 Flying Fortress, emerged just before the United States entered World War II. Because of its long range and generous payload, the B-24 would become perhaps the most versatile four-engine combat aircraft ever. The US built more B-24s than any other American World War II combat aircraft.

As a heavy bomber intended to help Army aviation leaders achieve their goal of successfully crushing Nazi Germany through strategic bombing, the B-24 was a bit of a disappointment because of performance limitations in a high-threat environment. Other than to note the arrival of variants, Simons devotes little space to its use by the Eighth and Fifteenth Air Forces.

On the other hand, he adequately covers the significant role the Liberator played as an antisubmarine aircraft. Its potential as long-range, land-based patrol plane encouraged the US Navy to acquire two versions, the PB4Y-1 (basically the B-24D) and the PB4Y-2 with its distinctive single tail. Aside from the bomber and patrol variants, the modified B-24D served as a cargo plane, the C-87 Liberator Express.

The absence of citations can undermine a reasonable effort. In this case, Simons introduces the unsuccessful use of the Azon radio-controlled bomb in France. What follows is confusing: "General James Doolittle, the U.S. Air Force Chief in the Pacific, revealed that his bombers too had tried bombing by means of radio-controlled glide bombs..." Perhaps he was referring to the Mediterranean Theater where Doolittle served as commander and where the Azon bomb was used. However, he then goes on to claim the US Navy launched seven Azons unsuccessfully against the Japanese-held atoll of Truk in the west central Pacific Ocean. The Navy was developing its own first-generation "smart" weapons, so it seems unlikely they would turn to the Army. Incidentally, Simons fails to mention that the B-24-equipped 7th Bomb Group used the Azons in Burma in

1945 to interdict Japanese supply lines with a highly effective bridge-busting campaign.

While I was unable to access the 2012 edition, I would be very disappointed to learn that the Doolittle error went uncorrected. This book is best suited for readers unfamiliar with what a terrific aircraft the B-24 proved to be.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle



Dark Horse: General Larry O. Spencer and His Journey from the Horseshoe to the Pentagon. By General Larry O. Spencer, USAF (Ret). Annapolis MD: Naval Institute Press, 2021. Photographs. Notes. Bibliography. Pp. xii, 162. \$26.95. ISBN: 978-168247-021

This autobiography is Spencer's second book. His previous effort was a history of military financial management in wartime. In this book, the general reflects on his life after retiring from the Air Force. As with most autobiographies, Spencer's story unfolds in chronological order. He devotes the early chapters to his upbringing in Washington DC. Besides the positive influence of his parents, he recognizes the influence of his grandfather. The future general worked at his grandfather's farm in rural Virginia during his summer breaks from school.

As a gifted athlete, he harbored dreams of someday playing in the National Football League. For a variety of reasons, Spencer underachieved in high school. As a result, attending college—a necessary stepping stone on the way to a professional career—was initially unobtainable.

Lacking focus in the early 1970s, he serendipitously enlisted in the Air Force. He flourished in that environment, got his act together, and pursued his bachelor's degree on weekends. Eventually, he was faced with an interesting choice: remain in the Air Force and attend Officer Training School, or enroll at Clemson University to play football.

Spencer chose the former and, after commissioning, embarked on his service-long career in finance and budgeting. Because he had been raised in a frugal household, Spencer developed a passion for saving the Air Force money. Before long, career managers viewed him as a rising star. What followed was a series of below-the-zone promotions, highly unusual for a non-flyer.

Despite his knack for numbers, Spencer yearned to command a wing. He had commanded at the squadron and group levels and had completed all necessary military post-graduate courses. Then-Colonel Spencer finally got his opportunity at Hill Air Force Base commanding the 75th Air Base Wing.

In 2004, while serving as director of mission support for Headquarters, Air Force Materiel Command, he pinned on his first star. After a year as vice commander of the

Oklahoma City Air Logistics Center, he moved to the Pentagon for the final nine years of his 44-year career. He completed his Air Force service as Vice Chief of Staff.

In the book's final chapter, "Life's Lessons," Spencer recognizes events and personalities that shaped the seven tenets of his view of the world: 1) Even a Dark Horse Can Succeed; 2) Be an Ant, Not a Grasshopper; 3) Leadership Matters; 4) Issues of Race Remain Persistent in American Society; 5) Prioritize Career and Family Choices; 6) It's Okay to Try and Fail, But It's Not Okay to Try; and 7) Be Kind.

As a Black man, Spencer frankly discusses the challenges he faced dealing with bigotry and stereotypes. Sharing his experiences in this succinct fashion makes this a must read to better understand the attitudes and issues that confront Black Americans on a daily basis.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle



Call-Sign Kluso: An American Fighter Pilot in Mr. Reagan's Air Force. By Rick Tollini. Havertown PA: Casemate Publishers, 2021. Photographs. Diagrams. Pp. vii, 183. \$34.95. ISBN: 978-1-61200-981-0

When he wrote this book, Tollini was a contract instructor pilot in the F-15 Mission Training Center flight simulators at Kadena Air Base, Japan. The book is his life's story and is divided into three parts: growing up, life after joining the USAF and becoming an F-15 pilot in both peace and war, and his post-retirement life.

Born in the mid-1950s and taught to fly by his father, he early on decided upon a career as an airline pilot. After college, he held several jobs, including flight school instructor in order to build up his flying time for a chance at an airline job. A conversation with a friend at a New Year's Eve party in 1981 resulted in his decision to join the USAF rather than continue his airline pursuit.

Following flight training, he was assigned as an operational F-15 pilot in Japan and Florida. He then served on the Pacific Air Forces headquarters staff and flew combat in *Desert Storm*. Readers discover here why Tollini's title includes President Reagan. He believes that the *Desert Storm*-era USAF was largely a product of post-Vietnam military restructuring and Reagan's focus on undermining the Soviet Union. After *Desert Storm*, he thinks that USAF combat potential eroded because of dependence on technology and poor manpower management of both the mid-level non-commissioned officer core and the rated-officer career fields. His assertions on reliance on technology can be debated, but current and future service leaders will have to address them.

His postwar assignments included attendance at staff college, squadron operations officer, and command of the 18th Operations Support Squadron at Kadena. Although

not a flying unit, he unquestionably enjoyed leading this unit. During this period, he struggled with whether to retire or remain in the service. His words about that career choice will resonate with many active, reserve, Guard, and retired service members.

After retirement, his deep Buddhist faith helped him learn about himself and his life's journey. Tollini is not a pacifist. In his own words, "one of the noblest paths a person can take is to serve in the duty to one's sovereign country and make a selfless sacrifice for society as a whole." In that vein he became an F-15 simulator instructor, teaching young pilots to improve their flying skills.

In his short epilogue, he expresses his inability to explain in more explicit terms the fighter pilot culture. He includes a squadron mate's wonderful collection of anecdotes that tell of squadron mates, their antics, lives, and the halloved memories of fallen comrades. He quotes John Gillespie Magee's famous epic poem, *High Flight*, and discusses how it impacted his life choices.

This book is written in a very conversational manner. It is an easy read and will appeal to those who want to learn what it was like to fly the F-15 in combat. Veterans of *Desert Storm*, especially those who flew or supported those combat missions, will enjoy this book.

Joseph D. Yount, USAF (Ret), docent, NASM's Udvar-Hazy Center



Travis Air Force Base: The USAF's Transport Superbase in Action. Scott Cuong Tran and Nick Tran. Stamford UK: Key Books, 2021. Photographs. Pp. 96. \$24.95 paperback. ISBN: 978-1-913295-79-0

Air Mobility Command's (AMC) west-coast hub, Travis Air Force Base, Fairfield CA, is known as the "Gateway to the Pacific." It was first named Fairfield-Suisun AFB but renamed after Brigadier General Robert Travis, who died in a 1950 crash nearby. Local citizens asked to rename the base after him. Today, Travis handles more cargo and passengers than any other AMC base. In six chapters, 96 pages, and over 150 images, the Trans document why Travis, its people, planes, and behind-the-scenes operations continue to earn the "Gateway" accolade. They state that their book highlights only a fraction of the capabilities and operations at Travis.

Two short chapters cover the base's history and its Heritage Center. This center is a museum that displays one of the largest collections of military aircraft on the west coast. The center's collection represents American military aircraft—fighters, bombers, trainers, cargo, and liaison—from various periods. Its exhibits showcase Jimmy Doolittle, the Tuskegee Airmen, and the Berlin Airlift, and place special emphasis on the Korean and Vietnam Wars.

The Trans next cover the 60th Air Mobility Wing

(AMW), the base's host unit, whose two mobility tenants are the Air Force Reserve Command's 349th AMW and 621st Contingency Response Wing (CRW). The base employs over 11,000 active and reserve military personnel plus nearly 4,000 civilians who fly and support KC-10, C-17, C-5M, and KC-46 aircraft. This section contains histories and pictures (both interior and exterior) of the wing's current aircraft, and talks about the impending KC-10 retirement and preparations for its KC-46 replacement.

There are about 75 Travis-based units. The Trans expand on nine of these to highlight the support needed to carry out assigned tasks. These include the base tower, security forces that protect the base and its resources, petroleum assets that service and maintain wing resources, and aeromedical evacuation capabilities.

The fifth chapter provides a short review of how Travis-assigned active and reserve personnel and their aircraft aided in evacuating more than 10,000 people and 170,000 tons of cargo from Kabul, Afghanistan.

In the final section, the Trans describe their orientation flight on one of the wing's C-5M training missions. They include pictures and descriptions of how aircrew carried out their tasks. In addition, they comment on the importance of the United States' air-refueling capability to our nation in both peacetime and during war.

In summary, the Trans demonstrated that Travis' people and equipment can handle any airlift mission they are assigned. The team has distinguished itself in operations at home and worldwide, including the humanitarian evacuation from Kabul. Its logistics capabilities help maintain America's military by supplying people and parts to the right places at the right time. Their book is an enjoyable read for both aviation and non-aviation enthusiasts.

Joseph D. Yount, USAF (Ret), docent, NASM's Udvar-Hazy Center



Red Markers: The Rest of the Story. By Gary N. Willis. Manvel TX: Lulu.com, 2022. Photographs. Diagrams. Maps. Index. Pp. iv, 291. \$39.90. ISBN: 978-1-387-7107-1

Willis' book is a sequel to his *Red Markers, Close Air Support (CAS) for Vietnamese Airborne, 1962-1975*. It documents a small unit of USAF airmen during ten years of the Vietnam War by telling their stories. These airmen maintained and flew Cessna O-1s and O-2s to coordinate CAS to US and South Vietnamese units from 1962-1973. They belonged to Red Marker detachments not assigned or attached to any of the four tactical air support squadrons. They were teams of forward air controllers (FAC), radio operators, and maintainers under an air liaison officer (ALO). Willis also addresses the fate of South Vietnamese soldiers associated with this unit from 1973 to South Vietnam's end in 1975.

Red Markers chronicles unheralded airmen who coordinated air and artillery support along with MACV's advisors working with South Vietnamese Airborne Division units. US Army personnel were known as "Red Hats," and USAF personnel were "Red Markers." Airborne Division (South Vietnam's tactical reserve) units were rushed to hotspots throughout the country during the war. A major factor in their successes was CAS made possible by attached USAF FACs. These airmen wore jaunty red berets and the jungle fatigues of those they supported. Using official records, diaries, and interviews with veteran Red Markers and Red Hats, Willis well documents their ingenuity, dedication, and bravery.

These airmen had a dangerous job and coped with myriad issues such as logistics, language, airfields, incompatible radios, extreme weather conditions, and blistering enemy ground fire. Initially, there was only one USAF ALO assigned to the Vietnamese Airborne. During the 13 years of US involvement, only 175 airmen were assigned. Personal anecdotes, many humorous, taken from interviews with unit veterans and other sources are interspersed with the narratives of battles and changes in policy or military and political circumstances.

The Airborne Division was often deployed to one of the military regions against the North-Vietnamese or Viet Cong forces. Air support provided to the division was provided by a FAC flying over the offending areas. He then coordinated tactical airstrikes after marking targets with white phosphorus rockets. Some had experiences dating back to World War II and came from different USAF careers—fighters, transports, or the school house. Their tactics and organization evolved throughout the conflict.

Ten chapters each cover one year of the war. Four others cover specific combat actions: a medevac recovery which showed the tenacity of battle, and the three 1972 battles of Kontum, An Loc, and Quang Tri.

Willis's level of research is detailed in the six appendices. Here, he presents detailed numbers, rosters, awards, and a list of US Army members who later were promoted to general officer. *Red Markers* is a history of the Vietnam War and tells the tale of the difficulties and hazards of coordinating CAS with troops engaged in firefights. The objective and highly readable stories of the airmen—whether ALO, FAC, radio operator, or maintenance troop—are a tribute to those who served as Red Markers.

Joseph D. Yount, USAF (Ret) and docent, National Air & Space Museum



H6K "Mavis"/H8K "Emily" vs PB4Y-1/2 Liberator/Privateer: Pacific Theater 1943-45. By Edward M. Young. Oxford UK: Osprey Publishing, 2023. Tables. Illustrations. Photographs. Map. Notes. Bibliography. Index. Pp. 80. \$23.00 paperback. ISBN: 978-1-4728-5250-2

This is one fine book. It deals with an aspect of World War II history that is seldom covered. Thousands of books have been written about the fighters and bombers of the war; but far less has appeared on the patrol, transport, and training aircraft. Only the PBY Catalina has received its due share of coverage. Young not only covers three of the other great naval patrol aircraft of the war, but also goes into the niche area of combat between these four-engine behemoths.

Young gives a short but compact history of the development and specifications of the three subjects. Kawanishi had developed *Mavis* before the outbreak of the war. It was somewhat obsolete by middle of the conflict in the Pacific. The larger *Emily* was Kawanishi's attempt to vastly improve on *Mavis*'s shortcomings in range, payload, and defensive armament. *Emily* is still generally recognized as the finest of the flying boat designs of the war.

Both *Emily* and *Mavis* were flying boats whose duties were long-range patrol, anti-submarine attack, and transport. Their adversary in this book (other aircraft engaged these Japanese planes in combat as well) is Consolidated's Liberator and the improved Privateer. Initially, the US Navy needed a long-range, land-based patrol plane and simply took some of the B-24Ds coming off the lines for the USAAF. Eventually, most of these were modified with one major upgrade: the ERCO bow gun turret that gave a different look from the later B-24 models with nose turrets. With major redesign of the defensive armament and the empennage, the Privateer emerged in 1944 and stayed in service for years after the war ended.

Young does a good job of covering one of the most important reasons for the lopsided combat engagements that were to come: training of the Japanese and American crews. He also well lays out the strategic situation in the Pacific as these adversaries started to come into contact, as well as the normal types of missions the aircraft were used for.

So, what happened when PB4Ys met up with their Japanese counterparts? As mentioned previously, the results of air-to-air combat were lopsided in the American's favor: 15 to 0. One could ask, so what? Fifteen Japanese aircraft lost in the 1943-45 period? Big deal. But it was a big deal when one considers that these were the aircraft that were out looking for the US fleet and convoys and reporting on US installations across the far-flung combat theater. It's why military aviation really got started: get intelligence information on the bad guys. These were 15 aircraft that never provided any intelligence or that failed to deliver personnel (sometimes high-ranking) and supplies to Japan's increasingly beleaguered garrisons. And they were lost be-

cause of superior American training and tactics.

This is a fine effort by Young and Osprey that ought to be read by anyone who appreciates the daring-do of the Hellcats, Avengers, Dauntlesses, and B-29s but who understands that there was a lot more involved in victory in the Pacific.

Col Scott A. Willey, USAF (Ret), Book Review Editor, and former National Air and Space Museum docent



Along for the Ride: Navigating through the Cold War, Vietnam, Laos & More. By Henry Zeybel. Philadelphia PA: Casemate, 2021. Diagram. Photographs. Pp. x, 278. \$34.95. ISBN: 978-1-63624-038-1

In this autobiography, Hank Zeybel shares some of his Air Force experiences that inspired three successful novels. The first, *The First Ace*, was published in 1986, followed by *Spectre*, *Gunship of Death* in 1987 and *Wings of Fire* in 1989. He also has written numerous magazine articles about defense issues and, for some time, a weekly column for the *Austin Chronicle*.

Unlike most biographies, Zeybel chooses to hop around chronologically, at least in the first half. Inadequate vision prevented him from becoming a pilot, so he trained as a navigator instead. The opening chapters capture the danger faced by the first Lockheed AC-130 Spectre gunships gunning for trucks on the Ho Chi Minh Trail in Laos. As a crewmember, he graphically describes punishing the enemy's supply efforts and avoiding missiles and antiaircraft fire in a very lethal environment.

From there, he switches over to his upbringing before covering his first Vietnam tour as a navigator on C-130 "trash haulers." He then takes up Operation BOLO, the Robin Olds-inspired trap that enabled four flights of McDonnell Douglas F-4 Phantom IIs to ambush North Vietnamese MiG-21s in a fight that resulted in the loss of seven of the latter. While Zeybel never flew as an F-4 backseater, he obviously is enamored with fighter operations. He also devotes a chapter to the prisoner-of-war experience.

Before reminiscing about his time in Strategic Air Command (SAC) in the late 1950s and early 1960s aboard Boeing B-47s and B-52s, he discusses administrative duties back in the States after his final Vietnam tour. He provides an inside look at SAC operations during the Cold War and the role he played in the US military's Single Integrated Operational Plan (SIOP)—the blueprint to crush the Soviet Union with nuclear weapons.

After retiring in 1976, Zeybel took up writing. A couple of chapters are devoted to researching magazine articles by participating in training with Army and Air Force personnel.

The final 20 percent of the book covers a trip to Moscow, a target he had studied as part of SIOP prepara-

tion; his antiwar sentiments concerning the 1991 Gulf War by reprinting his newspaper columns; and the ups and downs of University of Texas football.

Zeybel seems happiest when he's engaging the enemy and the enemy is engaging him. Without question, he's a terrific storyteller—the opening chapters are certain to grab most readers' attention. This book is best suited for those wanting more insight into both the Vietnam air war and the SIOP. At \$35, it strikes me as overpriced and best acquired on the secondary market.

Steven D. Ellis, Lt Col, USAFR (Ret), docent, Museum of Flight, Seattle



Black Space: The Nazi Superweapons That Launched Humanity Into Orbit. By David Axe. Yorkshire UK: Pen and Sword Military, 2023. Photographs. Illustrations. Sources. Index. Pp. vii, 202. \$34.95. ISBN: 978-1-39901-423-6

Journalists who write history frequently demonstrate storytelling skill that attracts readers in ways most academicians only dream of doing. In *Black Space*, self-described journalist, historian, filmmaker, and former war correspondent David Axe proves the point. Whether in high school or at a senior management level in industry, anyone interested in the history of rocketry and spaceflight likely will find Axe's basic narrative style sufficiently appealing to make them want to finish another chapter before taking a break. Spaceflight aficionados who think a picture is worth a thousand words also should find this book worthwhile, since it contains more than 100 illustrations.

Using details of Wernher von Braun's life as a scaffold, Axe climbs chronologically from the German Society for Space Travel's Max and Moritz in the early 1930s to development of an operational V-2 in the 1940s; upward to Redstone and Jupiter in the 1950s; and, finally, to the massive Saturn V Moon rocket. He digresses along the way, however, to explain von Braun's interest in space planes, orbital space stations, and colonizing Mars. He even manages, without losing the interest of his reading audience, to juxtapose programmatic reasons why the Soviet Union lost, and the United States won, the race to land humans on the Moon.

Questions about von Braun's loyalties and motives linger throughout *Black Space*. Why did he join the Nazi Party and accept appointment to the SS? How could he not have known about the utter horror of conditions for enslaved workers in the Mittelwerk underground rocket factory or speak out in opposition? Why did he work so hard to obscure his Nazi past after he came to America, and why did US government officials assist in the coverup? Did von Braun place his dreams of spaceflight above everything else in his life? Axe answers the last question affirmatively, saying von Braun "happily hitched his extraterrestrial

wagon to the Nazi regime's war horse" when Germany was his home and "rode the Pentagon's space program until NASA began winning the bureaucratic battles." When NASA funding dried up, von Braun joined Fairchild Industries, reportedly for a salary around a million dollars a year.

Perusal of Axe's sources reveals mostly secondary material—newspaper and magazine articles, conference presentations or seminar papers, radio broadcasts, websites, and published biographies. Nonetheless, his citations might entice avid enthusiasts to seek copies of the more obscure items for further reading. Furthermore, he certainly has not erred by referencing Michael Neufeld's *Von Braun: Dreamer of Space, Engineer of War* (2007), Andre Sellier's *A History of the Dora Camp* (2003), and Annie Jacobsen's *Operation Paperclip* (2014).

While Axe probably has not missed the mark in his assessment of von Braun's motives and character, he has given the man too much credit for the US space program's overall success. To say thermonuclear warheads "travel through space on rockets that von Braun and his colleagues invented," ignores the contributions of engineers such as Karel "Charlie" Bossart and Col Albert "Red" Wetzel, who managed development of the Atlas and Titan II rockets, respectively. The US Air Force delivered human-rated versions of those intercontinental ballistic missiles, which carried NASA Mercury and Gemini astronauts, respectively, into orbit during 1963–1966. Since none of von Braun's rockets sent humans into a complete Earth orbit and beyond until 1968, perhaps the author of *Black Space* should have chosen a different subtitle for his book.

Dr. Rick W. Sturdevant, Director of History, HQ Space Training and Readiness Command



Take Charge and Move Out: The Founding Fathers of TACAMO: True Believers and the Rise of Navy Strategic Communications. By Lewis F. McIntyre. Havertown PA: Casemate Publishers, 2022. Photographs. Index. Pp. viii, 230. \$34.95. ISBN: 978-1-63624-154-8

In the mid-1960s, Navy leadership recognized that the land-based, very low frequency (VLF) system of communications, meant to provide a link to the Navy's nuclear submarine force in the event of increased Cold War tensions, was not survivable in a wartime environment. The Naval Air Development Center, NAS Warminster PA, initiated a test program to determine whether an airborne VLF system was feasible. The success of the feasibility test resulted in initiation of a development program. The project was designated "take charge and move out," from which the acronym TACAMO was derived.

Lewis McIntyre, a graduate of the US Naval Academy and Naval Postgraduate School, earned his wings as naval flight officer (NFO) in 1972 and was assigned to Fleet Air

Reconnaissance Squadron Four (VQ-4), flying the EC-130G/Q TACAMO aircraft. His military career in the TACAMO world, first as an active-duty NFO and, following retirement from naval service, as an engineer dedicated to TACAMO support, make him well qualified to assemble the history of the first generation of TACAMO.

Lacking a mission community, early squadron department and leadership positions were filled from the patrol squadron (VP) community. Without a community for this mission, a career path to senior leadership did not exist; thus, early cadre members were reluctant to commit to follow-on assignments and a career in TACAMO. McIntyre has curated stories from the group of young officers who chose to take that chance and take the necessary second and third tours in TACAMO units—against all advice from detailers and other career officers. They became known as the "True Believers." It is this band that created the necessary community.

McIntyre arranged his story into five parts and an epilogue. Each part consists of several chapters that address a period of significance as the TACAMO program came of age. Each part contains narratives contributed by True Believers.

The book includes a complete list of acronyms. For ease of reading by those not familiar with Navy acronyms, it would have been more convenient to place this list at the front of the book. The story would also have benefited from an explanation of the term "strategic communications" to place the mission significance in perspective. Also lacking is an explanation of the mission profile. Tighter editing would have helped, although this does not take away from the story. The photos are not of the highest quality, and they could have had better captions. The illustrations, particularly of the interior equipment layout on the TACAMO IVB, would have substantially helped understanding of the narrative if the components had been labeled.

Although it is a relatively short book, *Take Charge and Move Out* contains a wealth of information on a mission which is essential to the well-being of the US. McIntyre fulfills his aim of telling the story the development of the Navy's strategic communications mission through the eyes of the "Fathers of TACAMO."

Al Mongeon, MSgt, USAF (Ret)



PROSPECTIVE REVIEWERS

Anyone who believes he or she is qualified to substantively assess books for the journal should contact our Book Review Editor for a list of books available and instructions. The Editor can be contacted at:

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Coming Up



Compiled by
George W. Cully

June 7-9, 2023

The **Institute for Political History** and the **Arizona State University Center for American Institutions** will co-host a Policy History Conference in Columbus, Ohio. For registration and other details, see the Institute's website at Policy History Conferences | Journal of Policy History (asu.edu).

July 17-19, 2023

The **American Astronautical Society** will host its annual John Glenn Memorial Symposium at Case Western Reserve University in Cleveland, Ohio. For more details as they become available, see the Society's website at John Glenn Memorial Symposium | American Astronautical Society.

August 14-18, 2023

The **International Committee for the History of Technology** will hold its annual meeting in Tallinn, Estonia. The theme of this year's meeting is "Interdependencies: From Local Microstories to Global Perspectives on the History of Technology." For registration and other information, see the Committee's website at Annual Meeting (icohtec.org).

August 24-26, 2023

The **Tailhook Association** will hold its annual gathering at the Nugget Casino in Reno, Nevada. For additional information, see the Association's website at The Tailhook Association | Tailhook Education | United States.

September 9-13, 2023

The **Air and Space Forces Association** will hold its annual National Convention and Symposium immediately followed by its annual Air, Space and Cyber Conference and Symposium at the Gaylord National Resort in National Harbor, Maryland. For registration and other information, see the Association's website at AFA National Convention | Air & Space Forces Association.

September 15-19, 2023

The **Air Force Historical Foundation** will hold its Annual Symposium and Air and Space Museum Conference at the Hyatt Denver and Wings Over the Rockies Museum. Further information will be forthcoming at www.afhistory.org/events/.

September 27-30, 2023

The **Society of Experimental Test Pilots** will host its 67th annual Symposium and Banquet at the Grand Californian Hotel in Anaheim, California. Additional information can be found at the Society's website at Annual Symposium & Banquet | Symposium/Meetings (setp.org).

October 9, 2023 – January 31, 2024

The **American Society of Aviation Artists** will present its 35th annual International Aerospace Art Exhibition at the Pima Air & Space Museum in Tucson, Arizona. For more information, see the Society's website at ASAA 2023 Call for Entry – The American Society of Aviation Artists (asaa-avart.com).

October 18-21, 2023

The **Oral History Association** will hold its annual meeting at the Hyatt Regency Baltimore Inner Harbor in Baltimore, Maryland. This year's theme is "Oral History As/And Education: Teaching and Learning in the Classroom and Beyond." For registration and other details, see the Association's website at 2023 Call for Proposals | Oral History Association.

October 25-27, 2023

The **American Astronautical Society** will host its 16th annual Wernher von Braun Memorial Symposium at the University of Alabama at Huntsville in Huntsville, Alabama. For more details as they become available, see the Society's website at Wernher von Braun Memorial Symposium | American Astronautical Society.

October 25-29, 2023

The **Society for the History of Technology** will hold its annual meeting in Long Beach, California. For more details as they become available, see the Society's website at News – Society for the History of Technology (SHOT).

November 9-12, 2023

The **History of Science Society** will hold its annual meeting in Portland, Oregon. For more details as they become available, see the Society's webpage at History of Science Society (hssonline.org).

December 11-13, 2023

The **Association of Old Crows** will hold its 60th Annual Symposium and Convention at the Gaylord National Resort & Convention Center in National Harbor, Maryland. For more information, ping a Crow at AOC 2023 (crows.org).

January 18-19, 2024

The **NASA History Office** Call for Papers for Discovery@30, New Frontiers@20: A Symposium on the History of NASA's Discovery and New Frontiers Programs. For more information, see <https://www.nasa.gov/feature/call-for-papers-for-discovery30-new-frontiers20-symposium>.

Readers are invited to submit listings of upcoming events. Please include the name of the organization, title of the event, dates and location of where it will be held, as well as contact information. Send listings to:

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As a member of the Apollo 11 crew, Edwin “Buzz” Aldrin became the first Air Force member to walk on the moon and the second person to walk on the moon only behind Neil Armstrong. Five additional Apollo missions would land on the surface of the moon. As crew members on 2 of those missions, three other Air Force members would walk on the moon. The remaining three Air Force members to walk on the moon were David Scott (#7, Apollo 15), James Irwin (#8, Apollo 15), and Charles Duke (#10, Apollo 16). Of the four Air Force Members to walk on the moon, “Buzz” Aldrin is the only one with air-to-air victories. “Buzz” shot down two MiG-15s during the Korean War. Of the four, Aldrin, Irwin, and Scott retired from the Air Force at the rank of full Colonel while Charles Duke is the only one to become a general officer. Charles Duke achieved the rank of Brigadier General.

Use the following links to learn more about the following topics;

Buzz Aldrin Brief Bios: https://www.nasa.gov/sites/default/files/atoms/files/aldrin_buzz.pdf

Charles Duke Brief Bios: https://www.nasa.gov/sites/default/files/atoms/files/duke_charles.pdf

James Irwin: https://www.nasa.gov/sites/default/files/atoms/files/irwin_james.pdf

David Scott: https://www.nasa.gov/sites/default/files/atoms/files/scott_david.pdf

Apollo 15: <https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/197685/apollo-15-command-module/>

USAF Female Astronauts: <https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/2383476/women-in-the-air-force-displays-in-space-gallery/>

Model A7L Space Suit - <https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/1860315/model-a7l-space-suit1969/>

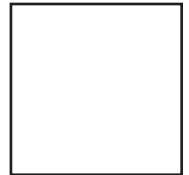
Model A7LB Extravehicular Mobility Unit—1971: <https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/1860428/model-a7lb-extravehicular-mobility-unit1971/>



This Issue's Quiz: Question: Earlier this year, the National Aeronautical and Space Administration (NASA) announced the names of the four astronauts selected for the Artemis mission to the moon. Officially Artemis II, the mission will orbit the moon. Artemis II is scheduled to launch in 2024. Artemis III is scheduled to land on the moon in 2025. When Artemis III lands on the moon, it will mark mankind's return to the lunar surface after a more than 40-year absence. The United States landed on the moon as part of NASA's Apollo program. Twelve astronauts have walked on the surface of the moon. Of the twelve astronauts to walk on the moon, four of the astronauts were from the U.S. Air Force. Can you name the first Air Force veteran to walk on the Moon? Can you name all four Air Force members to walk on the moon?



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