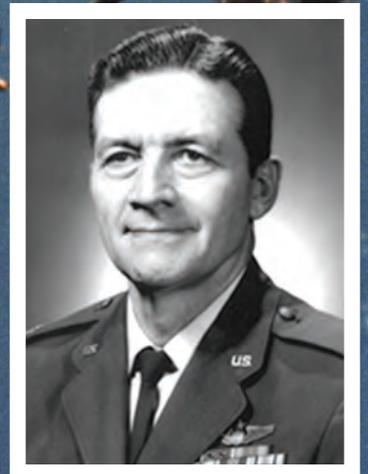
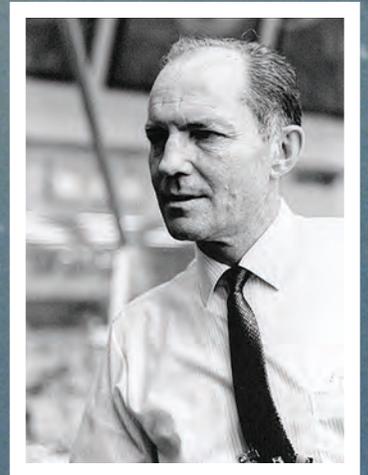


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WINTER 2011 - Volume 58, Number 4
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History





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COVER: Background photo is the Lunar Module practicing its lunar landing approach during Apollo 9. (NASA photo)
Thumbnail photo overlays are drawn from the subjects of the four articles in this issue, which focuses on people.



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I wish that I could claim to have planed it that way. But, in fact, the theme of biography in the Winter 2011 issue of *Air Power History* simply evolved. Of course, I am pleased that it did because my formulation of history is: “change over time, plus people.”

“Stalag 17B,” by Joseph Kurtenbach, is a personal account of the author’s grandfather, Technical Sergeant Kenneth Kurtenbach. After his capture and internment during World War II, the latter was elected to represent the non-commissioned officer POWs. In contrast with the descriptions in the film and Broadway play versions of Stalag 17, this account tells what life behind the wire was really like.

In the second article, Zachary Matusheski, delves into the controversy between Air Force Gen. Curtis E. LeMay and Secretary of Defense Robert S. McNamara. Matusheski uses the protagonists’ sharp differences over funding for the B-70 bomber to illustrate their basic disagreement over the meaning of strategic deterrence. Learn how the background and experience of each man influenced his position.

Col. John R. Boyd was another controversial individual. In the third feature article, author Scott McIntosh examines Boyd’s limited combat experience in the Korean War. However, Boyd had an outstanding talent for teaching fighter tactics. Boyd’s influence continued on to the Vietnam War and his development of the energy maneuverability theory. That theory figured prominently in the design of the F-15 fighter. Boyd went even farther. In any endeavor, he posited, victory went to the combatant best able to manage the rate of change. For example, in air-to-air combat, Boyd believed that a pilot had to get inside his opponent’s OODA Loop. While there, in order to win, one had to Observe, Orient, Decide, and Act as quickly as possible.

Finally, Jeffery Bateman presents the extraordinary accomplishments of Gen. Samuel C. Phillips, the *ultimate* program manager. Here Phillips emerges as the steady force behind the success of some of America’s most important programs. Two examples should suffice: first, working under the legendary Gen. Bernard A. Schriever, Phillips managed the research and development of the Air Force’s Minuteman ICBM; second, although he was overshadowed by media darling Wernher von Braun, Phillips was the one who managed NASA’s Apollo Program through the Moon landing.

Twenty new books on a variety of subjects are reviewed in this issue. Our book review editor, Scott Willey, lists books received on page 54, and invites readers to review them. Bob Dorr’s History Mystery appears on page 64. The remainder of the departments appear in their usual places.

This issue also includes, on pages 57-59, a photo-essay on the “2011 Symposium and Awards Luncheon,” held November 17 and 18, at Andrews AFB, Maryland.”

Be sure to read the “President’s Message” on page 56, especially his flagging 2014 as the sixtieth anniversary of the Air Force Historical Foundation.



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War behind the Wire: Life and



Joseph R. Kurtenbach

and Escape from Stalag 17B



(Overleaf) The warning wire and one of the barracks. (Kurtenbach family photograph.)

THERE WAS LITTLE DIFFERENCE IN THE CONDITIONS THAT AMERICAN OFFICERS AND ENLISTED PERSONNEL ENDURED DURING THE COURSE OF THE WAR. BOTH PILOTS AND AIRCREW COULD BE THE VICTIMS OF SUMMARY EXECUTIONS

The air war over Europe saw an unprecedented number of casualties, primarily attributed to the emergence of new technology in both aviation and anti-air capabilities. Many attacks by the U.S. Army Air Corps used the massive B-17 and B-24 bombers, which each carried up to ten crewmembers. A single raid on a fortified position sometimes resulted in the loss of dozens of aircraft and hundreds of airmen: by the end of the war, the Axis powers had shot down 32,730 U.S. airmen over Europe.¹

A downed airman, who either bailed out or survived the crash, typically was captured and ultimately found his way to a German *Luftwaffe*-run prison camp, or “*stalag*” (the common abbreviation of *stamm lager*, literally translated to mean ‘prison for “common stock”’).² Although the German Army differentiated between camps for officers and enlisted by referring to them as “*oflags*”, similarly abbreviated from *offizier lager*, and *stalags*, respectively, the *Luftwaffe* referred to all of their prisons for Allied flyers as *stalag lufts* (*luft* meaning “flight”).³

The separation of enlisted and officers was due, in part, to the decision of both Germany and the United States to sign the 1929 Geneva Convention “relative to the Treatment of Prisoners of War.” This treaty mandated slightly different treatment for officers who flew the downed Allied planes and their enlisted aircrews.⁴ In the end, however, there was little difference in the conditions that American officers and enlisted personnel endured during the course of the war. Both pilots and aircrew could be the victims of summary executions and other ruthless acts at the hands of their Nazi captors.

There were hundreds of stalags in existence during World War II. After 1945, many former *kriegsgefangenen*—or “*kriegies*,” as they called

themselves—told their stories in a variety of ways.⁵ Quite a few converted their wartime journals to books (some of which are cited in this paper) while others wrote novels or plays. Perhaps the most famous theatrical adaptation of any work by *kriegies* was “*Stalag 17*,” a play written by Donald Bevan and Edmund Trzcinski. Both of the playwrights were prisoners of the actual Stalag 17B and collaborated on the project after the war. “*Stalag 17*” made it to both Broadway and the silver screen—William Holden received the Academy Award for Best Actor for his performance in the 1953 film.⁶ The film is, at times, comedic in nature, but it also reveals many of the hardships that POWs suffered throughout the war.⁷ The real Stalag 17B was a dangerous place, where any attempt at escape could mean death.

The Opening of Stalag 17B

Stalag 17B was built in 1939 near Krems, Austria, initially as a transition camp for Polish and French civilians who were captured early in the war before they had trained to become soldiers.⁸ The camp was designated “17B” because it was the second prison camp (B) located in Germany’s 17th military district.⁹ As the war progressed, Stalag 17B was converted to a camp for Allied POWs.

The first American airmen arrived at Stalag 17B in October 1943, from Stalag 7A, a military transition camp for prisoners of all branches, in Moosburg, Germany. At its peak size, Stalag 17B held over 50,000 men. William Chapin writes in *Milk Run*, “Of those 50,000 men, 4,500 were American airmen; the others were Russian, French, Italian, Serb, and a scattering of other nationalities.”¹⁰ Since the American airmen were only a fraction of the prisoners at the camp, it was always for-

The entrance to Stalag 17B. (Collection of William J. Doubledee. Obtained from <http://members.cox.net/stalag17/index.shtml>. Used by permission of Bill Doubledee, website administrator.)



Joseph R. Kurtenbach graduated from the U.S. Naval Academy in May 2011, and is currently pursuing a graduate degree in Security Studies at Georgetown University. Kurtenbach is the grandson of Stalag 17B’s camp leader, Kenneth J. Kurtenbach.

Kenneth J. Kurtenbach, Stalag 17B's Man of Confidence, prior to his time as a POW. (Kurtenbach family photograph.)



CAMPS FOR OFFICERS WERE SIMPLY LED BY THE MOST SENIOR PRISONER, WHEREAS ENLISTED AIRMEN (MOST OF WHOM WERE EITHER STAFF SERGEANTS OR TECHNICAL SERGEANTS, AS PRIVATES DID NOT FLY COMBAT MISSIONS) ELECTED THEIR REPRESENTATIVE

mally referred to as a *stalag*, rather than a *stalag luft*.¹¹ Typically, the camp held only 10,000 prisoners, as the junior enlisted of other nationalities, as well as all prisoners from non-signatory states—whom the Nazis did not allow rights under the Geneva Convention—were sent to nearby satellite work camps.¹²

Numbering about 1,500, the first contingent of American prisoners consisted of non-commissioned officers of the Army Air Corps, led by Technical Sergeant Kenneth J. Kurtenbach, a B-17 tail gunner.¹³ The Geneva Convention authorized prisoners to “appoint representatives to represent them before the military authorities and the protecting powers.”¹⁴ Camps for officers were simply led by the most senior prisoner, whereas enlisted airmen (most of whom were either staff sergeants or technical sergeants, as privates did not fly combat missions) elected their representative.¹⁵

Kurtenbach was referred to as the “Man of Confidence,” continuing in this position after his fellow flyers elected him leader of Stalag 7A. He wrote the following description of Stalag 17B in 1943: “There were initially 18 barracks, capable of holding 300 men to a complete barracks, with 150 men in each end and the wash facilities located in the center. The American compounds, four barracks to each compound, were at the far eastern end of the camp, completely isolated by guard towers from the balance of the camp. Gone were the days of nationalities intermingling.”¹⁶

For the American POWs, imprisonment only

T/Sgt. Kenneth J. Kurtenbach, Stalag 17B's Man of Confidence, served as a B-17 tailgunner before he was shot down over Romilly-sur-Seine, France on December 12, 1942. After evading capture for over two weeks, he was ultimately captured by the German Gestapo on Christmas Day, 1942. Kurtenbach was initially held at Stalag 7-A, where he was elected to lead the American Air Corps contingent of POWs. He served in this position at both Stalag 7A and 17B until the end of the war.

Although he was offered a direct commission with the rank of major after the Army liberated Stalag 17B, Kurtenbach decided to return to civilian life. He moved to Iowa where he raised a family of ten, worked as a district court reporter, and operated a fixed-base airport operation in Waterloo, Iowa.

His fellow POWs credited him with saving numerous American lives during his internment at Stalag 17B: “negotiating with the Germans for better conditions and improved rations, directing suicide watches on prisoners near their breaking point, and remaining behind in the closing days of the war to protect some 60 men too sick or injured to tolerate a proposed march to safer territory.”⁶⁹ In an attempt to recognize his actions, the ex-POWs of Stalag 17B nominated him twice for the Medal of Honor.

Kurtenbach passed away on April 9, 1999 in Tucson, Arizona.

meant that their location happened to be behind German sentries and guard towers, as their state of mind was still very much in fighting the “war behind the wire.” Confinement at Stalag 17B was just another way to contribute to the war effort behind enemy lines. This required organization and a commitment to the central military value of discipline. In addition to Kurtenbach's position of “Man of Confidence,” the American flyers established a full military command structure. This included positions such as Camp Adjutant, Secretary, and Chief of Security.¹⁷ All of the camp leaders lived in Barracks 15A, which the other kriegies referred to as “The White House.”¹⁸ The camp leaders separated the camp into four battalions of roughly 1,000 men, along with a barracks chief for each of the twenty-eight buildings once the camp had grown to its full size.¹⁹

Daily Life in the Stalag

The airmen of Stalag 17B lived from meal to meal, almost always hungry. William E. Rasmussen was a prisoner who arrived in Stalag 17B, after the Germans cut POW rations in half. He wrote of the typical kriegie diet in his wartime journal. His son, Randall L. Rasmussen, converted the journal into the book *Hell's Belle: From a B-17 to Stalag 17B*:

A typical day's diet started with a cup of hot water in the morning. A lot of men didn't bother to stand in line to get theirs . . . At noon and at night we got small portions of thin soup. Occasionally at night,



A meal in Stalag 17B. (Kurtenbach family photograph.)

we got something solid to eat. If the guards got a horse for their rations, then we got the head ... Sometimes the Germans threw in two potatoes to boil with our main meal; broth that the spuds were boiled in made the soup. On Saturdays and Sundays our guards didn't issue the hot water and didn't bother providing us with an evening meal unless the Red Cross or the Swiss observers were in camp. They were there about every three months. Most of us never saw them.²⁰

Sometimes the POWs also received spoiled vegetables that they used to make soup. Rasmussen reports that there was a time they had turnip soup every day for a month, and notes, "Worms and bugs on the vegetables were included, free of charge."²¹ If not for the food parcels that the Red Cross sent, many prisoners would have died of starvation. The Germans delivered the parcels to the prisoners on Friday, although they often kept many of the parcels for themselves. A parcel was meant to provide

Prisoners around Barracks 36A; probably taken by Ben Phelper with a camera attained by bribing a German guard. (Collection of William J. Doubledee. Obtained from <http://members.cox.net/stalag17/index.shtml>. Used by permission of Bill Doubledee, website administrator.)



enough food for a prisoner to survive for a week. At times, parcels had to be divided among four prisoners.²² Another prisoner, Gerald E. McDowell, documented the typical contents of a Red Cross parcel in his book, *A Tail Gunner's Tale* (the right column notates the trade system that the prisoners created—the D-Bar acted as the "monetary unit"):

Item	Trade Value
2 D-Bars	2 D-Bars
1 can of instant coffee	2 D-Bars
1 one-pound can of powdered milk	3 D-Bars
1 box of lump sugar	1 ½ D-Bars
1 eight-ounce Kraft cheese	1 ½ D-Bar
1 "C" or "K" rations	1 D-Bar
1 tin of jam	1 D-Bar
1 pound tin of margarine	1 ½ D-Bar
1 can of liver paste	1 ½ D-Bar
5 packages of cigarettes	1 D-Bar ²³

For the most part, prisoners never actually ate D-Bars, which were much more valuable as currency in the camp economy. The exchange system was so intricate that some items were valued to be a sixth of a D-Bar, although values fluctuated with supply and demand.²⁴

Given the lack of food and poor living conditions, disease was a constant threat in Stalag 17B. The only way to keep clean was the small bar of soap that the Red Cross provided in their care packages.²⁵ Prisoners often endured mites, lice, and fleas. Rats filled the barracks, looking for scraps and gnawing on the wood in the prisoners' bunks. Dysentery was common, further contributing to unsanitary conditions.²⁶ As paper was a rare commodity, the prisoners used wrappings from cigarette packages as toilet paper. Winters brought on even more illness, with some men suffering from pneumonia or tuberculosis.²⁷

Prisoners in Stalag 17B led a highly regimented life, with roughly the same schedule every day. Richard Hoffman listed the following schedule in his book, *Stalag 17B: Prisoner of War*:

- 0630—reveille—work details to the kitchen
- 0730—chow—eat if you have it
- 0830—roll call in the compound
- 0900-1115—camp activities
- 1115—chow
- 1300-1530—camp activities
- 1530—roll call
- 1700—chow
- 1800-2100—evening activities
- 2100—lights out²⁸



Prisoners outside one of the barracks. (Kurtenbach family photograph.)

SOME OF THE PRISONERS CONVERTED BARRACKS 16A TO A THEATER THEY APTLY NAMED "THE CARDBOARD PLAYHOUSE"

Given the huge amount of free time each day, the POWs found many ways to distract themselves from the constant boredom and insatiable hunger that most of them felt. Many of them devoted their time to escape attempts, while others did their best to make captivity more bearable for their fellow POWs.

Some of the prisoners converted Barracks 16A to a theater they aptly named "The Cardboard Playhouse," as it was constructed from cardboard in the Red Cross food parcels that the prisoners sparingly received.²⁹ They performed plays, musicals, and even concerts, using instruments provided from the YMCA and Red Cross.³⁰ The actors and musicians took their jobs seriously—every week there was a new show, with a play one week followed by a musical the following week. Donald Bevan and Ed Trczinski, who would later go on to write "Stalag 17B," the Broadway musical based on the camp, were two of the participants in "The Cardboard Playhouse."³¹

Other prisoners passed the time by participating in sports or furthering their education. The POWs competed in formal boxing and wrestling tournaments, which included referees and even a fight promoter—a kriegie by the name of Archie Cothren.³² Basketball, volleyball, track, and baseball were other popular sports the prisoners used to fill their days. Baseball was even organized into leagues, and teams between the different barracks. On one Fourth of July, the prisoners divided themselves into "North" and "South" teams based on their homes in the U.S. As they had 80 years previous, the North secured a victory over the South.³³ Stalag 17B was also home to "The Interned Airmen's Institute," where some of the more educated prisoners taught classes in "algebra, American history, English, French, German, Spanish, auto mechanics, business law, commercial geography, photography, and shorthand." The Institute awarded graduates a "Certificate of Merit" in recognition of their studies.³⁴

Despite these distractions, confinement and living from day to day could be too stressful for some of the prisoners. McKenzie quotes Kurtenbach

regarding the behavior that some prisoners exhibited as the pressure of confinement took its toll. "Some of the prisoners became depressed with confinement and they would become increasingly withdrawn. They would walk incessantly about the perimeter as if contemplating escape by climbing the fences. That would, of course, mean almost certain death from the guns in the towers and outside the fence. [Many were] watched closely by friends who were prepared to try and stop them if it appeared this was about to happen."³⁵ Sometimes, the other prisoners were not able to spot the signs of increasing depression. At least one kriegie met his death by climbing the fence in broad daylight and screaming to the guards, "Shoot me, shoot me, I can't take it anymore!"³⁶

The Escape Committee

The airmen first organized an escape committee while still at Stalag 7A. Kurtenbach appointed Staff Sergeant Joe Dillard, with whom he had served on the same B-17, to be his Chief of Security, or "Big X." Dillard had been trained in the code language that POWs used to communicate with the military's secret organization devoted to freeing prisoners, known as MIS-X. As a trained code user (CU), Dillard was able to send coded letters in order to obtain escape aids such as "compasses, maps, coffee, cigarettes—and especially money."³⁷ Once at Stalag 17B, Kurtenbach, who had also received CU training in London, communicated with the War Department in order to inform the U.S. of the camp's existence and request further instructions. The operatives at MIS-X responded, informing him "a crystal radio and receiver were en route, concealed in a shoe brush."³⁸

This kind of ingenuity in sending contraband to the prisoners was not uncommon. While the Germans censored all of the mail that went in and out of the camp, the CUs and operatives at MIS-X were very good at concealing both their intentions and escape aids in the mail. Depending on the equipment being sent, MIS-X operatives would either conceal it or simply mail it, with prior notification to the prisoners that they needed to obtain the package before the German censors inspected it. Lloyd Shoemaker, a former MIS-X operative, details how the prisoners at Stalag 17B were able to trick the German censors in his book, *The Escape Factory*:

Messages announcing the arrival of special parcels carrying contraband were immediately made known to Sergeants Leonard H. O'Brian and Francis L. Eastham, who worked in the camp parcel office . . . In the most often used ploy, one man picked up a box already examined by the censor; set it on the uncensored hot parcel, and then moved both boxes together to the censored pile . . . At the first opportunity, the handlers would "borrow" the censor's approval stamp and mark the parcels inspected. At the day's end, the handlers carried these parcels through the gates into the camp. The guard, seeing the censored



Two prisoners standing in front of the “warning wire.” (Kurtenbach family photograph.)

*stamp, never bothered to examine the contents.*³⁹

Other times, exchange of equipment would be more discreet. MIS-X would send escape maps hidden in decks of cards, hollow chess pieces filled with German money, pipes that contained compasses, and baseballs filled with radio components.⁴⁰ The prisoners would then hide the equipment throughout the camp so as to prevent the Germans from discovering the contraband during one of their routine searches. One MIS-X radio was hidden inside the false bottom of a “honey bucket,” which was used as the latrine in each barracks after curfew, when the men were not permitted to go outside to use the main latrines.⁴¹ Another radio was stored in a hollow section of wall in the camp’s hospital.⁴²

The attempts at escape were creative and, at times, extremely intricate. Some clever means of escaping took little effort but a great amount of bravery. While the Germans usually allowed escapees who were captured in the countryside to live, POWs caught in the act of attempting escape were shot on sight. Surrounding the American compound was the “warning wire,” which was “a single strand of barbed wire strung about eighteen inches off the ground on short stakes. It was placed twelve feet from and parallel to the outside fences. There were also warning wires along fences separating the American parts of the camp from other areas.” The Germans placed warning posters along the length of the wire, along with small red placards which read: “THEY THAT TOUCH OR CROSS THE WARNING WIRE WILL BE SHOT WITHOUT WARNING.”⁴³

One attempt at escape ended in disaster. On December 2, 1943, James Proakis and Ralph Lavoie attempted to escape under the cover of snow and darkness. Other POWs had tried to bribe a guard to cut the wire, but unbeknownst to Proakis and Lavoie, the other prisoners called off the escape attempt when the guard reported the attempted bribery to his superiors. When Proakis and Lavoie

crawled past the wire, they suddenly found themselves under a hail of gunfire. Proakis began to run to a nearby air-raid trench but was immediately killed by machine gun fire. Lavoie crawled back toward the camp, but found his way blocked by two guards standing over him: one, with a rifle, and the other, an officer brandishing a pistol. When the officer noticed Lavoie was still alive, he repeatedly shot him in the legs, chest, and face. Kurtenbach and a few others ran up to stop the guards and demand access to the men. After a tense argument—during which the guard hit Kurtenbach in the mouth with his rifle butt—the POWs were allowed to take Ralph Lavoie to the hospital.⁴⁴ Lavoie recovered and was repatriated in a prisoner exchange due to his wounds.⁴⁵ The POWs were not allowed to recover the body of James Proakis until the next day.⁴⁶ After the war, the incident was reported to the War Crimes Office under the violation of “unlawful wounding” in the Geneva Convention.⁴⁷

Tunneling was the most common means of attempting escape at Stalag 17B and many other prison camps. Of all the escapes in World War II, the “Great Escape” of Stalag Luft III is by far the most well-known. Seventy-six officers attempted escape from Luft III, but only three succeeded. The others were all recaptured: Hitler personally ordered that fifty of them be executed.⁴⁸ None of the tunnels at Stalag 17B came to fruition: the Germans collapsed one tunnel with a heavy truck and filled another with raw sewage, doing both after being informed of the tunnels by a German mole.⁴⁹

Despite the numerous challenges, some prisoners did manage to find their way outside the perimeter of the camp—but fully successful escape attempts were close to impossible for the American POWs. Getting past the barbed wire and armed guards was comparatively easy. Once the Americans found themselves in the Austrian countryside, however, it was extremely difficult to make it to friendly territory, given the many Nazi-sympathizers behind enemy lines. In one story of escape from Stalag 7A, the escapee made it almost all the way to the Swiss border. Unfortunately, a child saw him walking across a wooden bridge. Realizing that the man’s shoes did not make any sound, the child ran and told his mother, who informed the Nazis. The mother knew the man was not a German, as no Germans wore shoes with rubber heels—all rubber was used in the war effort. The man was captured and returned to the prison camp.⁵⁰

Although successful escape was extremely rare, POWs could be even more valuable to the war effort in captivity. Through coded communications with MIS-X, the Americans provided valuable intelligence that was otherwise unavailable to Allied forces. Messages for the prisoners at Stalag 17B and other camps were sent through transmissions of the British Broadcasting Company (BBC). Each night, the senior members of the camp would listen to their MIS-X-supplied radios. The prisoners would listen for a distinct sound on the radio, then copy down the message that followed. The cryptology of the messages was simple: the prisoners only had to

OF ALL THE ESCAPES IN WORLD WAR II, THE “GREAT ESCAPE” OF STALAG LUFT III IS BY FAR THE MOST WELL-KNOWN. SEVENTY-SIX OFFICERS ATTEMPTED ESCAPE FROM LUFT III, BUT ONLY THREE SUCCEEDED



Sgt. Frank Oettinger composing the camp paper in the washroom behind the barracks. The Germans knew nothing about the paper. (Kurtenbach family photograph.)

THERE WERE OVER 45,000 PRISONERS FROM OTHER NATIONS IN STALAG 17B. TREATMENT OF THESE OTHER PRISONERS VARIED WIDELY, DEPENDING ON THEIR NATIONALITY

count a set number of words, then copy down a predetermined letter within that word. Messages for Stalag 17B were prefaced with the word “Kurt” (Kurtenbach’s nickname). Shoemaker quotes Kurtenbach as remembering the following about their completion of missions for the War Department: “The vast bulk of signals was intended for ears other than ours. Messages from the War Department were requesting information on where a certain Panzer unit was last seen and what activity was around Peenemünde where the V-2 rockets were launched. Our lads would get out and run loose around Germany sometimes for days at a time and see all kinds of sights before being recaptured and brought back to the camp. We collected a great deal of hard-core intelligence in this manner.”⁵¹

Of course, the Germans did all they could to prevent escape attempts, as well as collect valuable information for their own war effort: the knowledge of over 4,000 American flyers would have proved very useful to the Nazis. On more than one occasion, the Germans put moles in the camp who had studied in the United States before the war. One of these was easily identifiable by his German accent—the American POWs made light of it, nicknaming him “Abby the Mole” and shouting “Hey Abby” any time he came near in order to prevent him from hearing valuable information. The camp commandant eventually reassigned Abby to guard duty.⁵²

Other moles were harder to find. At least one was discovered only after creating an “information maze.” The camp leaders compiled a list of who knew what information pertaining to escape attempts, and gradually revealed the information to one group at a time. While the Germans quickly reacted to some of the attempts, they never discovered others. When the prisoners had narrowed down the identity of the mole—a man named “Pearce”—the camp leaders confronted him. After he admitted to spying on the Americans, one of the prisoners instantly snapped Pearce’s neck out of anger. The prisoners hid the body in one of the

latrines, periodically pushing it down to the bottom of the hole with a wooden plank, before it floated to the surface. William Rasmussen, a member of the “burial committee,” writes that it took “the better part of a month before the body would no longer float. The smell of the latrine, at its [worst] in the summer months, masked the putrid smell of the decomposing body . . . The ex-flyers had won a small battle against the Nazis.”⁵³

The Other Prisoners of Stalag 17B

As previously mentioned, there were over 45,000 prisoners from other nations in Stalag 17B.⁵⁴ Treatment of these other prisoners varied widely, depending on their nationality. As a rule, the French were treated the best, followed by other Europeans, then the Americans. The Nazis typically treated the Italians and Russians as sub-human. A kriegie at Stalag 17B, Steve Carano writes, “The French prisoners were better treated than any others, receiving close to a brotherly affection. From France, they received personal parcels of food, clothing, tobacco, and mail. . . For good behavior they were given furloughs of several weeks to return to France to visit their families. . . The Poles, Serbs, Greeks, and Yugoslavs had similar treatment to the French, which the exception of furloughs, and many strict limitations.”⁵⁵

Life for the Italians and Russians was unbearable. The Italians, who fought against Germany from 1943 to the end of the war, were viewed as traitors to the Germans, given Italy’s previous membership in the Axis powers. Thus, they were treated terribly, despite Italy being a signatory power to the Geneva Convention. Chapin writes, “Most of them were put to work in factories in the cities. When the air raid sirens wailed, the German guards locked the Italians inside the factories before running off to the air raid shelters. The Italians died like rats in a cage.”⁵⁶ Although many of the different nationalities tried to assist each other in whatever ways possible (despite the fences separating parts of the camp), the Italians were ostracized because of their notoriously brutal treatment of Allied POWs in the early years of the war.⁵⁷

The poor treatment of the Russians stemmed primarily from their government’s failure to sign the Geneva Convention.⁵⁸ Carano states, “Several times each week we received word from them, pleading and begging for aid from the Americans which the Germans would not allow, although daily we would dump vast amounts of German soup which our stomachs were not strong enough to consume.”⁵⁹ The Americans and other nationalities in the camp took pity on the Russians, doing whatever possible to alleviate their suffering. In one story, the Americans who first inhabited Stalag 17B brought with them three Russians who took the place of three American prisoners who elected to stay at Stalag 7A, believing escape would be easier once the other American airmen had departed for Stalag 17B.

Once at Stalag 17B, rather than taking the easy

Several of the barracks in Stalag 17B. (Kurtenbach family photograph.)



route of smuggling the three men into the Russian compound (which would have meant a much higher probability of death due to poor treatment), the Americans decided to hide the Russians in their area of the camp. When the Germans walked around the camp or inspected the prisoners, the POWs would hide the Russians in small tunnels under the barracks. Otherwise, Kurtenbach writes, “they were free to walk about the compound, ate shared rations with the other men, usually stayed in one barracks at night where they were known to the occupants, and in general led a life comparable to the average [American] prisoner.”⁶⁰

Liberation

By April 1945, the Russian advance was precariously close to Stalag 17B. On April 6th, the kriegies were instructed to begin preparations for evacuation. Over the next two days, they packed their belongings and prepared for what lay ahead. By then, Russians were already fighting in the streets of Vienna, some 50 miles away. The American POWs delayed the evacuation for as long as possible, but ultimately departed the camp the morning of April 8th in eight groups of 500 prisoners, spaced out at half-mile intervals.^{61 62} Kurtenbach stayed with sixty seriously wounded prisoners who were unable to march.

The Germans chose to march west in an attempt to evade the Russians. At this point, it was clear that the Allies would win the war. The only question was whether the guards of Stalag 17B would meet the end of the war at the hands of the Russians or Americans. The Germans were severely undermanned by this point in the war and would not have been able to put up a fight against any armed force—only a few guards went along with each group of 500 Americans. Hoffman recounts that one of the older guards had trouble carrying all of his gear and his rifle. Taking pity on the man, some of the prisoners took turns carrying his rifle for him—although they quickly gave it back to him if any of the other guards came too close.⁶³ Some of

the prisoners—and guards—were unable to keep up on the march. The ill prisoners began each day at the front of the column and gradually fell back throughout the day. Those who failed to keep up with the main column were taken away, allegedly to hospitals. Many of the prisoners speculated that they were instead shot and left in the ditches.⁶⁴

The prisoners marched for a total of 281 miles before they were liberated in Branau, Germany, by the 13th Armored Division of General Patton’s 3rd Army.⁶⁵ During their years in captivity, they had endured countless brutal acts by some of their Nazi captors. A few of the prisoners took advantage of their newfound freedom by exacting revenge on the more sadistic guards. Numerous Germans were taken into the woods and shot in the first days following the liberation.⁶⁶

Those left at Stalag 17B remained in the camp with dwindling food supplies until VE Day on May 8, 1945. On the day of the camp’s liberation, the remaining prisoners were waiting in the slit trenches around the camp as artillery barrages and air raids began to die down. When they emerged from the trenches, they found that all of the guards had departed. Later that day, the Russians arrived at the camp. Little changed after their arrival, other than that the prisoners were permitted to barter for food in the countryside by day. At night, they were not permitted to leave their barracks. Finally, General Patton learned of their situation and immediately dispatched soldiers to provide them with transportation to the American-held area near Linz.⁶⁷

Conclusion

Stalag 17B was one of dozens of camps scattered throughout Germany and Austria during World War II. The men in the camps endured adversity that was incomprehensible to those in the U.S. Worse yet, loved ones in the U.S., failing to understand the prisoners’ situation, sometimes treated POWs with scorn—one insensitive letter that a POW received from his wife read, “I still love you

THE PRISONERS MARCHED FOR A TOTAL OF 281 MILES BEFORE THEY WERE LIBERATED IN BRANAU, GERMANY, BY THE 13TH ARMORED DIVISION OF GENERAL PATTON’S 3RD ARMY

even if you are a coward and a prisoner."⁶⁸

Some of the lessons from Stalag 17B are not directly applicable to the present-day battlefield. The enemies that capture U.S. service members today are even less likely to follow the rules of the Geneva Convention than were the Nazis. Rather than being held in mass prison camps, today's POWs—if the enemy decides to take them as prisoners—are typically kept in solitary confinement and suffer from war crimes at a much higher frequency than in past conflicts.

If we learn anything from the POWs of World War II, it is of the indomitable nature of the

human spirit, even when almost deprived of hope. Despite everything against them, the prisoners of Stalag 17B organized themselves, retained their military discipline, and fought against the odds—and the German war effort—behind barbed wire. They displayed never-ceasing commitment to each other and their country, doing everything in their power to overcome starvation and the constant fear of death. One of the most surprising aspects of these men, though, was their youth in relation to what they accomplished: the average Stalag 17B prisoner was only 20 years old. ■

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Bomber Wars: Curtis LeMay, R



Robert McNamara and the B-70



Zachary M. Matusheski



(Above) General Curtis E. LeMay, U.S. Air Force Chief of Staff.

(Overleaf) North American XB-70 Valkyrie at the National Museum of the United States Air Force.

**TO UNDER-
STAND
LEMAY,
ONE MUST
GRASP HIS
PASSION FOR
MACHINES**

In a hot Colorado day in June 1964, Gen. Curtis E. LeMay, the outgoing Chief of Staff for the United States Air Force, looked at a collection of soon-to-be graduates of the Air Force Academy. He told the cadets they had three obligations. First, the cadets must continue the fight for “the maintenance of U.S. Strategic Advantage,” or what LeMay called the “cornerstone” of deterrence.¹ Second, he advised students not to let “mutual stalemate” stand in their way because stalemate was false.² Third, U.S. security rested on “the continuous maintenance of superior military capabilities.”³ Although LeMay had lost his fight with Defense Secretary Robert S. McNamara and the Kennedy Administration over the B-70 in 1962, he never stopped believing in the central importance of these forces and of technological superiority. His tenacity came not from service interest, but from how he viewed deterrence.

To understand LeMay, one must grasp his passion for machines, particularly airplanes. LeMay

described as “divine” the first airplane he saw as a child.⁴ He remembered wanting “not only the substance of the mysterious object, not only that part I could have touched with my hands. I wished also in a vague yet unforgettable fashion for the drive and speed and energy of the creature. I also needed to understand and possess the reason and purpose for this instrument—the Why of it as well as the What.”⁵ Young LeMay imagined that if he unlocked the secrets of the plane, he would gain super powers of speed and flight.⁶

As a member of the pre-World War II Army Air Corps, LeMay had expanded its capability by designing a celestial navigation machine. In the mid-1930s, the Army Air Corps could not fly long distances or over water. It used the roads below them for direction. The Army Air Corps decided to experiment with the navigational instruments to gain flight capabilities overseas.⁷ After studying celestial navigation, LeMay helped design what he called the “celestial computer.” The machine solved the celestial triangle, saving its user work with the help of trigonometry and logarithmic tables.⁸ Here, LeMay learned that designing a machine could be helpful in solving a difficult puzzle, a lesson he would later employ in formulating a solution to problems relating to deterrence.

LeMay’s entire career in the Army Air Corps, and later in the Air Force, taught him that technology was in constant motion. He began his career flying in a biplane and ended it by arguing for the B-70, an experimental two-man, six-engine Mach 3 bomber. After reflecting on his early days in the Army Air Corps, the newly minted Chief of the Air Force, LeMay, said before the Michigan Post of the American Ordnance Association:

In less than 60 years every nation on the face of the earth has been stripped of the traditional barriers to aggression. No longer is it necessary for an aggressor to conquer the seas and the land mass to strike directly at his target. Aerospace power can do this today. At this moment. This is one of the lessons we have learned and must not forget. This type of force in the hands of an aggressor is a constant threat to our existence. I feel that we have no recourse in light of our present circumstances but to continue to maintain superior aerospace forces that positively deter aggression. Should deterrence fail, these forces must be so constituted as to insure their survival and in addition they must be able to strike and re-strike with a true war-waging and war-winning capability. To keep this capability, which we have today, we must look at tomorrow and not prepare for yesterday.⁹

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U.S. Secretary of Defense
Robert S. McNamara.

LEMAY'S EXPERIENCE DURING WORLD WAR II SHAPED HIS VIEW OF DETERRENCE

Granted, more advanced planes in larger numbers benefited the Air Force, but beneath that logic, though, lay a lesson that LeMay had learned during his career: Technology was always improving. Because the United States and the Soviet Union were fully armed and competitive with each other, American security plans had to stay ahead of the Soviets in arms development.

LeMay's experience during World War II shaped his view of deterrence. Developments in flight during the war shattered the protective covering of geographic isolation. LeMay's deep involvement in strategic bombing convinced him that the strong application of air power was the key to winning the war. In 1946, LeMay believed that he:

...learned that you can use air power to destroy a nation's industrial potential and a nation's morale, and that if you do, you destroy its will and its ability to fight. You can conquer that nation whether you have conquered its armies in the field or not...in our war against Japan we achieved unconditional surrender of the nation without landing a single soldier of an invading army on its well defended home soil.¹⁰

This statement revealed a degree of service interest; LeMay claimed his service defeated Japan. That noted, he believed that using bombers to run missions like those in Japan won the war.¹¹ His strong

opinion on the matter shaped the early post-World War II Air Force—a branch that could have developed missiles after the war instead of bombers.

LeMay observed that the machines of war worked better with people at the helm. The human element in the application of air power encouraged innovation. LeMay created an open dialogue with the pilots under his command. He invited his men to criticize his leadership during the war, hoping to create an atmosphere of innovation. If he sensed tiredness or frustration, he moved his men around to either different types of planes or non-flying duty.¹² After the war, he was an advocate for his men. In a speech shortly after the war's end, he argued for compassion for the returning veterans. In one speech, he declared that there was nothing wrong with returning veterans "that a while at home will not cure."¹³ He praised the intelligence and competency of the returning veterans. LeMay opened his speech by proclaiming, "I know of no assignment which could give me more pleasure than this one: to tell you business leaders something of the American boy as I saw him in combat. It is an opportunity for which I am extremely grateful."¹⁴ Later, as Air Chief, he would remind audiences that people mattered just as much as weapons themselves. He usually connected this belief with the efficacy of the manned bomber in America's arsenal.

The manned bomber and the Air Force fared well under President Truman. Eisenhower supported a policy of massive nuclear retaliation to maintain international peace, a policy that benefited the Air Force.¹⁵ The situation changed, however, in the Kennedy administration. Kennedy had a broad vision for changing security policy called "flexible response" that would move away from reliance on nuclear weapons and focus on giving the presidency a diversified set of tools with which to respond to a threat. Forced to reorganize the Pentagon to fit this plan, Kennedy hired Robert S. McNamara to do the job.

Like most of his generation, McNamara had served in World War II. He saw no direct combat, however. After college, McNamara got a degree from Harvard Business School where he learned that all business was the same and thus could be managed the same way. All a manager needed was the "facts" of the enterprise.¹⁶ When McNamara first entered the Pentagon, he immediately used the lessons he had learned at Harvard. Instead of sitting down with generals and working with those already in the organization, he invited outsiders to hold managerial positions. He first hired Charles Hitch as a comptroller, doing so because he admired Hitch's *The Economics of Defense in a Nuclear Age*. In that book, Hitch advocated applying "systems analysis" to defense problems, contending that an examination of weapons development, disarmament, deterrence, and intelligence could enhance strategy.¹⁷ Hitch's philosophy was to match strategies to what he and his team thought the enemy's plans were. Following the creed of "systems analysis," Hitch and others believed that war could be managed like a business. As such, this camp rejected LeMay's view



RAND Corporation analyst
Albert Wohlstetter.

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that deterrence required an endless technological arms race.

Many of McNamara's hires also came from the offices of the RAND Corporation. RAND was a pseudo-public entity that was created after World War II to help the future Air Force make informed decisions.¹⁸ However, members of RAND often contradicted Air Force policy, as did Albert Wohlstetter, the most influential of all of the RAND strategists. At that time, the Air Force was most concerned with continental defense (i.e: trying to protect the country now that air power had shattered geographic isolation.). Wohlstetter changed the debate over what the priorities of the Air Force should be. After publishing a study called R-266 "Selection and Use of Strategic Bases," he went on a vigorous speaking tour within the Pentagon, stressing the vulnerability of American bases abroad.¹⁹ His report and talks in the mid-1950s caused worry about the survivability of American strategic bases. Though he never worked for the Kennedy administration in an official capacity, he advised the campaign and knew virtually all of McNamara's RAND hires.²⁰

Survivability and vulnerability were two issues that McNamara used to argue against the reliance on manned bombers and the future development of the B-70. In his initial review of Eisenhower's Defense budget, McNamara told Kennedy that he did not think deterrence relied on "pre-attack comparison of numbers of missiles, or of forces in general except in the most indirect way. We must have survivable retaliatory power."²¹ He then attacked the bomber force. McNamara claimed that the strategic deterrent "is almost totally dependent on our bomber force."²² McNamara alleged that two-thirds of the bomber force was "completely unpro-

tected, except in periods of tension, or after strategic warning has been received."²³ McNamara feared a surprise attack could wipe out the bomber deterrent. McNamara also advised the hardening of missile sites. He suggested that the President consider "acceleration of the POLARIS program and authorization and construction of the industrial base to double the Minuteman production, should this appear necessary."²⁴ McNamara pushed for the acceleration of the missile programs over hardening of bomber sites because he wanted control. With a manned bomber, the ultimate decision rested with the crew of men on board. McNamara wanted authority over the ultimate decision and to minimize outside human actors.

Later, McNamara discussed the potential of the B-70 program. He wrote that "in the future there will be primary dependence on ballistic missiles," implying that the B-70 did not have a place in future strategic deterrent mixes.²⁵ For McNamara, the question of whether or not to develop the B-70 rested on how quickly missiles would develop and when they would become reliable. McNamara also worried about cost effectiveness. While the B-70's speed would make it harder for enemies to attack it, it was not as cheap as a good missile system.²⁶ McNamara believed that some of the funding set aside for the B-70 would be better used for missile development. He ended his discussion of the B-70 by conceding that having the ability to build a Mach 3 plane would give United States forces "prestige."²⁷ The B-70 would show the Western and non-aligned world the power of technological development in the U.S. The creation of a Mach 3 bomber would be a public relations coup, not a serious addition to the strategic arsenal.

Then Air Force Chief of Staff Thomas D. White prevented LeMay and others from protesting the changes. Knowing that the administration was considering changes in the force makeup, White ordered General Thomas Power to put the strategic bombers on a fifteen minute alert to impress the new administration, stating that programs like the B-70 "may well depend on the degree of survivability and control we are able to achieve and demonstrate in the B-52 force."²⁸ White hoped that by showcasing the abilities and strengths of the Air Force's planes, he could demonstrate to the new administration that the Air Force was, above all others, the branch to fund. He also agreed with the incoming administration's decision to change nuclear strategy. White was never comfortable with massive retaliation, but he did not question Eisenhower's massive retaliation policy until Eisenhower's term was nearly over and the election was on.²⁹ When asked about attacking cities solely, White said that the execution of massive retaliation could backfire. As the U.S. attacked cities, the Soviets would be "worn out just beating us to death" because the U.S. selected only civilian targets and not military ones.³⁰ Assaulting forces rather than cities was the strategically smart thing to do.

When White learned that the administration intended to use missiles more than manned



USAF Chief of Staff,
General Thomas D. White.

TWO DAYS AFTER BEING SWORN INTO THE POSITION, [LEMAY] SENT OUT AN OFFICIAL MEMORANDUM TO McNAMARA STATING THAT THERE WERE NO "ACCEPTABLE ALTERNATIVES" TO THE DEVELOPMENT OF THE B-70

bombers, he did not put up much of a fight. He did not vocalize support for civilian Air Secretary Eugene Zuckert's arguments for the B-70. Instead, he told Congress that he was concerned "with the need to maintain a proper mix of manned and unmanned weapon systems in our future aerospace forces."³¹ He admitted, though, that intercontinental ballistic missiles (ICBMs) were "exceptional weapons."³² He reminded Congress that in any future war, "there will be a tremendous premium on systems which can look, and find, and report, and attack, and return, and attack again" as well as carry out reconnaissance.³³ Manned systems had a place in White's imagined future Air Force, but they would be below missiles in importance. Although he strongly disagreed with White's views, LeMay believed that Vice Chiefs of Staff should show no signs of dissent to their military superiors so he stayed quiet.³⁴

On July 1, 1961, LeMay replaced White, who was entering retirement, as Chief of Staff for the Air Force. Two days after being sworn into the position, he sent out an official memorandum to McNamara stating that there were no "acceptable alternatives" to the development of the B-70.³⁵ He also asserted that the manned bomber would be the best strategic deterrent. Around the time that LeMay was coming into office another crisis brewed over Berlin, Germany, a point of contention since the beginning of the Cold War. After World War II, the Allies divided the city and when the lines were drawn between the Soviet and U.S. camps, the blocs wrestled for control of the city. In 1958, Soviet Premier Nikita Khrushchev threatened to sign a separate peace treaty with East Germany, hoping it would stop the exodus of people from East Germany to

West Germany. He gave an ultimatum to this effect, but he did not keep it. In 1961, Khrushchev renewed his call for a four-power agreement that would recognize a divided Germany and leave Berlin as a "free city," which would eventually be incorporated into its Communist surroundings. To achieve this, he threatened again at the June 1961 Vienna Summit to sign a separate peace treaty with East Germany by the end of the year. A separate peace treaty would force the United States to recognize East Germany and, moreover, would put West Berlin at risk.³⁶

This was an advantageous time for LeMay to testify in the Senate Appropriations Subcommittee for the need for manned bombers and the B-70 program. Showing slides of Russian bombers and telling the committee that the country would "need bombers from here on out," he urged them to expedite the development of the B-70.³⁷ He addressed the vulnerability question directly. He noted that the B-70 could survive an enemy attack, because it could be airborne in five minutes and that bombers of the future would be able to rely on a satellite early warning system. Shortly after it heard his testimony, the subcommittee voted to give an extra \$525 million for manned bombers and an extra \$228, 840,000 for the B-70 program.³⁸

After achieving these successes in Washington, LeMay went on a small speaking tour. In a speech to a veterans group, he attacked ICBMs as inflexible strike forces. Manned bombers had the advantage over missiles, he said, because they could be recalled.³⁹ As he put it, the biggest asset of a manned system was having humans on board. Advocating for the manned bomber within the framework of supporting Air Force pilots made good rhetoric, and it connected to his memories of World War II. LeMay understood how powerful and controllable manned weapons could be, and he knew pilots could discern situations that missiles never could.

Five days later, he stressed three points in his speech before the Veterans of Foreign Wars meeting. First, he said that deterrence depended on building, maintaining, and modernizing airplanes which "can disarm an attacker. A lesser force cannot."⁴⁰ Second, he emphasized that "since a prudent man prepares for the worst possible situation, we believe that our forces must be strong, diversified, and flexible."⁴¹ Thirdly, deterrence could only be met with a mix of unmanned and manned systems. He declared that "the most dependable flexibility" lay in "combat ready people."⁴² LeMay envisioned an Air Force that would have a mixed system which included missiles, but prioritized manned bombers. LeMay reiterated this plan in speeches to the 1961 American Legion National Convention and others.

While LeMay campaigned for the B-70 and manned bomber, the Kennedy administration planned on slowing down the development of those same weapons. On July 31, 1961, the military division of the Executive Office of the President's Bureau of Budget suggested canceling Air Force research and development programs and moving to



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halt Air Force plane “procurement”.⁴³ A few months later, McNamara used this tactic on the B-70. On October 7, McNamara privately advocated that the extra money that Congress appropriated for the manned bomber should go unspent. He told the President that these weapons were “soft, concentrated, and vulnerable to ICBM attack.”⁴⁴ Manned bombers were weak because they needed to refuel after a strike. Time would be lost in the refueling process, putting the bombers at a disadvantage if another attack were ordered. McNamara directly confronted LeMay’s argument that bombers were more precise. He told the President that the bombers could not be “used in a selective and controlled way” because they would struggle to penetrate enemy defenses.⁴⁵ McNamara added that all of these weaknesses applied to the B-70, even though it had the ability to fly at three times the speed of sound.⁴⁶

McNamara convinced the President that the B-70 should be shelved. On October 27, McNamara announced that some of the Congressionally budgeted money for manned bombers would go unspent. He froze the \$180 million allocated to the B-70 project.⁴⁷ He explained the logic behind his decision the day after the announcement. In a panel interview with reporters from *Hearst Headline*, McNamara opened by stressing that U.S. “nuclear strength is several times that of the Soviet Union.”⁴⁸ He then stated that the manned bomber’s function was to support missiles until an entire missile force was built that was reliable and precise in delivering nuclear weapons.⁴⁹ When the panel pressed him on the B-70 project, he said that the project remained

in development. The administration authorized the building of three B-70s. McNamara claimed that his refusal to spend the extra money set aside for the bombers was because it was not needed.

McNamara’s decision outraged powerful Senators and Representatives. Senator John C. Stennis (D-MS), chairman of the Senate Preparedness Committee, opposed the decision. He called McNamara to determine why he froze the funds. Even after talking to the Defense Secretary, Stennis told reporters that he believed that it would be an “error not to proceed with the manned bomber program.”⁵⁰ Senator Henry Jackson (D-WA), former Chairman of the Democratic National Committee during Kennedy’s election, characterized the decision as risky and pushed for an investigation as to why McNamara had decided not to spend the funds.⁵¹ Neither Kennedy nor McNamara wanted to make enemies of Stennis or Jackson.

McNamara moved quickly to stop generals and admirals from testifying in the interests of their services in front of Congress. In a late November directive, he nullified each service’s privilege of having a liaison to Congress, ordering that all communications between Congress and the Pentagon on budgets go through Norman S. Paul, the Assistant Secretary for Legislative Affairs.⁵² McNamara wanted to close off dissent from the administration’s policies and keep control of Pentagon information in his own hands.

However, this policy had little influence on the situation. Leading Senators remained angry with the Administration’s action after the holiday recess. Senator Richard B. Russell (D-GA) and others on the Senate Armed Services Committee dissented from the McNamara decision to focus on missiles over bombers. Russell said that it was “still too early to abandon manned aircraft in favor of missiles.”⁵³ He added that bombers, not missiles, had been proven to work.⁵⁴

LeMay and his Air Force allies encouraged this way of thinking. In January, Vice Chief of Staff Fredric H. Smith Jr. testified before Russell’s committee. Smith organized his testimony in three parts. First, he emphasized the dangerousness of the Soviet Union, telling the Committee that that nation was then pouring money into efforts to increase and improve its military power. Smith added that, “Scientific efforts of the Soviet Union have been disciplined to create a technological, scientific, industrial, and intellectual base for new weapons and strategic capabilities which challenge the entire Free World.”⁵⁵ To Smith, the arms race was on and the enemy was not looking back.

Smith next stated that the future war would be conventional rather than limited. Manned bombers needed to be developed. “Continuous modernization” was central.⁵⁶ He testified: “Essential to continued strategic superiority is a diversification of the force to include both manned and unmanned vehicles, since no single weapon system can do the entire job.”⁵⁷ Within this diversified system, manned bombers would be prioritized over missiles.⁵⁸

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Smith ended his remarks with a discussion of current U.S. capabilities. The Air Force added air-launched decoy missiles and air-to-surface guided missiles on B-52s to help the planes fly through enemy defenses to give the planes more firepower.⁵⁹ Smith discussed briefly, almost as an afterthought, how missiles were improving. Looking at the large picture, Smith said, "we must continue to take full advantage of the broadening horizons of technology both to meet the threats posed by our adversaries and where possible, present them with technological surprise."⁶⁰ Smith believed technological development could be the key to deterrence through its ability to shock the enemy and penetrate its defenses.

LeMay spoke to the Senate Appropriations Committee a few days after Smith's testimony. He, too, opened his testimony by illustrating the seriousness of the technological challenge that the Soviet Union then posed. Like Smith, LeMay claimed that all of Soviet science was being used to advance its military. He also repeated his Vice Chief's call for a "diversified force" with the manned bomber acting as the main force and missiles in a supportive position. LeMay testified that, "As the enemy reacts to develop defenses, we must maintain the strategic initiative. We must develop new offensive capabilities to stay ahead of the defensive reaction."⁶¹ LeMay believed that, if the U.S. continuously developed offensive weapons, the Soviet Union would be compelled to improve its defenses and could not concentrate on initiating World War III. In that way, a never-ending arms race would keep the peace.

LeMay pointed to the B-70 as an essential new technology. He called the plane "the start of a new generation of flight performance in long-range aircraft."⁶² LeMay said that: "The B-70's indicated performance should affirm my conviction that the essential mission of manned military aircraft depends upon our continuous advancement of their superior performance."⁶³ Here, LeMay admitted that the B-70 was a gamble that would prove that manned bombers still had offensive power. Missiles did not make the bomber obsolete. LeMay did not want to see his old World War II friend, the manned bomber, be discarded. He not only had a service interest in continuing the manned bomber; he had an emotional connection because he had done more flying in manned bombers than in any other type of plane. In essence, the end of the manned bomber would be the end of LeMay's era.

Another man facing the end of his era, joined LeMay in this fight. Carl Vinson had been in Congress since 1914. The Congress of 1914 was a very different legislature from that of 1962. Presidential power had not been so vast in the events leading up to World War I. Congressional power had been more influential. Vinson viewed the rejection of the manned bomber on the part of McNamara as an insult. On February 28, 1961, these two men made an agreement that Vinson would support the Kennedy Administration's budget if McNamara promised to make a pact with the

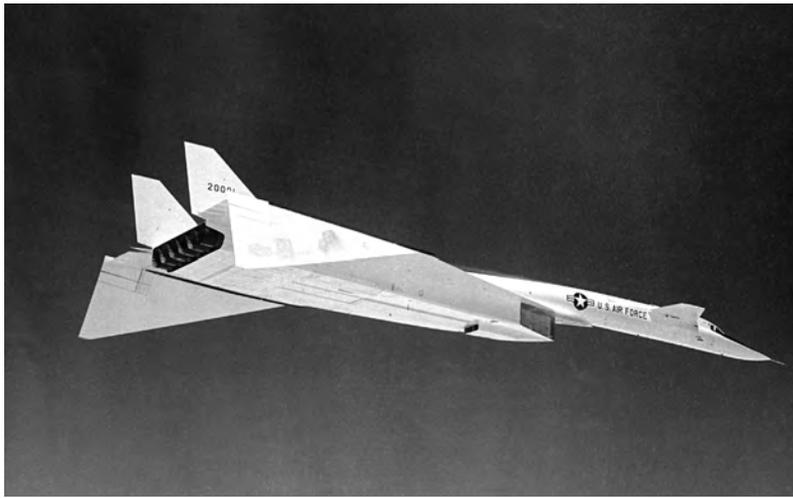
House Committee on Armed Services, under the chairmanship of Vinson. In exchange for Vinson's support, the Department of Defense would make manned bombers the center piece of air defense until 1970.⁶⁴ By cutting funds appropriated to the B-70 program and emphasizing missiles as the primary force, McNamara broke his agreement with Vinson.

Vinson was angry. On March 7, 1962, the House Armed Services Committee released a report directing LeMay to use the \$491 million allocated to build the B-70.⁶⁵ McNamara no longer stood in the way of developing the B-70; LeMay was empowered to spend as he saw fit. Vinson explained why he did this in a press release immediately following the report. He said, "I simply don't like the idea of Congress being thought of as a kindly old uncle who complains but who finally, as everyone expects, gives in and raises his hand in blessing, and then rocks in his chair another year, glancing down the avenue once in a while wondering whether he's done the right thing."⁶⁶ In Vinson's view, Congress should have the right to withhold funds and make sure they were spent a certain way. Vinson did not believe that Congress should just rubber-stamp what the Administration wanted. In order to assert Congressional power, Vinson was willing to push the limits of the separation of powers by empowering LeMay to spend monies appropriated to the Air Force without McNamara's approval.⁶⁷

McNamara could not force Vinson to back down. A Congressman with that much experience, power, and seniority was a force with which to be reckoned. Eventually, Kennedy intervened. According to Kennedy's advisor, Theodore Sorenson, Kennedy invited Vinson for a walk in the White House garden on the day the bill authorizing LeMay to spend the funds was going to be debated. "Uncle Carl," Kennedy said, "this kind of language and my ignoring it will only hurt us and the country. Let me write you a letter that will get us both off this limb."⁶⁸ Vinson backed down in the face of Presidential power. On March 21, 1962, he asked that the House "strike out" the part of the bill that breathed life into the B-70.⁶⁹

In spite of the fact that LeMay lost the budget battles in 1961 and 1962, he never quit advocating for the B-70. LeMay emphasized the importance of the manned bomber, to help push getting the B-70 built. Later, in his 1965 memoir LeMay wrote that he still believed that the B-70 was the next generation of manned bomber.⁷⁰ But the project did not win final approval.

The B-70 fight was a moment in history that speaks to the history of McNamara's tenure, American perceptions of defense technology, and civil-military relations. The conflict between LeMay and McNamara arose from different theories as to which weapons the Defense Department needed. LeMay focused on the manned bomber. His passion for machines, and aircraft in particular, and his understanding of the importance of airmen in war led him to believe that the B-70 should be developed. McNamara used statistics. He did not like the



XB-70 in flight.

McNAMARA NEVER CONSIDERED WHAT LEMAY WAS ADVOCATING. THE SAME CANNOT BE SAID OF LEMAY. HE NEVER CLAIMED MISSILES HAD NO PLACE IN THE AIR FORCE

B-70 because he thought the technology was outmoded. Missiles were the future. He also did not like the manned bomber because it relied on man. With missiles, the person firing the missile has absolute control. McNamara found the number of variables in a manned bomber mission distasteful.

LeMay's and McNamara's battles illustrate another aspect of the McNamara-era Defense Department: the disrespect shown to those with actual military experience. Throughout their debates, McNamara never considered what LeMay was advocating. The same cannot be said of LeMay. He never claimed missiles had no place in the Air Force or that money should not be spent on their development. At certain moments, he admitted that missiles were going to become the preeminent weapon, but he held steadfast to the idea that, during his tenure, manned bombers were going to dominate. This is one of many examples of the poor communication among military leaders and McNamara and his staff. Many of those problems originated in McNamara's actions and the Defense Secretary's

use of his business model.

Technology played a prominent role in the history of American security. In the Cold War era, the concern was about avoiding nuclear war. Military leaders and civilian analysts crafted different models of deterrence based on conceptions of technology and budgetary priorities. In LeMay's mind, deterrence meant a continuing arms race; if the United States lost its superiority in weapons development, it was doomed to be attacked. During the B-70 fight, McNamara turned to the missile because it made things less uncertain in his mind. He never agreed with LeMay's claim that there needed to be a continuing arms race. Throughout his administration, McNamara searched for a way to find the number that would answer the popular question, "How much is enough [to deter nuclear attack]?" He did not want development to go on needlessly and endlessly.

The LeMay-McNamara struggle shows the positive and negative aspects of civil-military relations. On the positive side, McNamara and Kennedy never lost control of the Defense Department. McNamara and Kennedy still made decisions on procurement. Civilian control prevailed. On the negative side, this fight was a factor in the gradual weakening of Congress. The walk that Kennedy took with "Uncle Carl" was not a negotiation. Kennedy was going to do what he wanted to do. Vinson capitulated because he knew that Kennedy would win. Under the U.S. Constitution, Congress is given appropriation power and has a responsibility to work with the other branches to "provide for the common defense." But, in the LeMay-McNamara fight over the B-70, McNamara and Kennedy ignored powerful members of the legislative branch. In the early 1960s, the executive branch carried overwhelming influence on issues of procurement and force design. It was the issues that caused Carl Vinson and others to bow to the President's request. ■

NOTES

1. Gen. Curtis LeMay, "Air Force Academy Graduation Address," June 1964, Box B172, Curtis LeMay Papers, Manuscript Division, *The Library of Congress*, p. 5.
2. *Ibid.*
3. *Ibid.*, p. 6.
4. Curtis LeMay with MacKinlay Kantor, *Mission with LeMay* (Garden City, N.Y.: Doubleday, 1965), p. 14.
5. *Ibid.*, p. 14.
6. *Ibid.*
7. *Ibid.*, p. 96.
8. *Ibid.*, p. 97.
9. Curtis LeMay, "Address Before the Michigan Post of the American Ordnance Association," October 26, 1961, Box B171, Curtis LeMay Papers, *The Library of Congress*, pp. 4-5.
10. Curtis LeMay, "Air Power is Peace Power," August 3, 1946, Radio Address transcript, Box B44, Curtis LeMay Papers, *The Library of Congress*, p. 5.
11. For more evidence of LeMay's personal faith in "strategic bombing" see his preface to *Superfortress: the Story of the B-29 and American Air Power* (New York: McGraw-Hill, 1988), a book he co-authored with Bill

Yenne.

12. Barret Tillman, *LeMay*, (New York: Palgrave-Macmillan, 2007), p. 34.
13. Curtis LeMay, "Address by Major General Curtis LeMay" December 19, 1945, Box B44, Curtis LeMay Papers, *The Library of Congress*, p. 4.
14. *Ibid.*, p. 1.
15. Donald J. Mrozak wrote, "The restrictions in the budgets of both administrations aimed at limiting the other services for the benefit of the Air Force," in "A New Look at 'Balanced Forces': Defense Continuities from Truman to Eisenhower" *Military Affairs*, 38, No. 4 (December 1974): p. 150.
16. Harvard Business School was founded at a time when most business plans focused on their product for planning. HBS taught its students that, through management, the differences between business's products did not matter. Institutional culture was irrelevant. The only thing that mattered was "facts" and managing those "facts." Alfred P. Sloan, one of the designers of the system, wrote, "The great difference in managerial technique between the industry of today as compared with that of

- yesterday is what might be called the necessity of the scientific approach, the elimination of operation by hunches,; this affects tools, men, and methods." Alfred P. Sloan Jr. with Boyden Sparks, *Adventures of a White Collar Man*, (New York: Doubleday, Doran, and Company, 1941), pp. 140-41. See also Deborah Shapley, *Promise and Power: The Life and Times of Robert S. McNamara* (Boston: Little, Brown, and Company, 1993), pp. 21-25.
17. Bruce Kuklick, *Blind Oracles: Intellectuals and War from Kennan to Kissinger*, (Princeton: Princeton University Press, 2006), p. 35.
18. "Pseudo-public" is the way that Fred Kaplan and others describe RAND.
19. Fred Kaplan, *The Wizards of Armageddon* (Stanford: Stanford University Press, 1991), pp. 85-110.
20. *Ibid.*, pp. 249-50. Wohlstetter's popularity was helped by the collaborative atmosphere at RAND. One Harvard professor recalled that the organization was "more than a collection of people; it is a social organism characterized by intellect, imagination, and good humor." *The Rand Corporation: The First Fifteen Years* (Santa Monica, Calif.: RAND, 1963), p. 2.
21. Robert S. McNamara, "Review of FY 1961 and FY 1962 Military Programs and Budgets: Tab II Memorandum 'Review of FY 1961 and FY 1962 Military Programs and Budgets,'" Box 77, President's Office Files, *John F. Kennedy Presidential Library*, p. 2.
22. *Ibid.*, p. 7.
23. *Ibid.*
24. *Ibid.*, p. 9.
25. Robert S. McNamara, "Review of FY 1961 and FY 1962 Military Programs and Budgets: Research and Development Proposals," p. 8.
26. *Ibid.*
27. *Ibid.*, p.10.
28. Gen. Thomas White to Gen. Thomas Power "Thomas White Calls for Reappraisal of Military Strategy," Feb. 1, 1961, *Digital National Security Archives Online*, NH00910, p. 4.
29. When Air University developed "Project Control," White was one of its few Air Force supporters. "Project Control" would have taken cities off of the target lists. It was eventually shelved due to the Air Force's distaste for it. Lt. Col. David J. Dean, "Project Control: Creative Strategic Thinking at Air University," Air University Review 35 No. 5 (July-August 1984) <http://www.airpower.maxwell.af.mil/airchronicles/aureview/1984/jul-aug/dean.html>
30. General Thomas White, "Danger Years for U.S. Just Ahead," *U.S. News and World Report*, July 18, 1960, p. 79.
31. Air Force News Service, Release No. 2392, April 14, 1961, Godfrey T. McHugh Papers, *The John F. Kennedy Presidential Library*, p. 3.
32. *Ibid.*, p. 4.
33. *Ibid.*
34. Curtis LeMay with MacKinlay Kantor, *Mission with LeMay*, pp. 508-09.
35. Curtis LeMay to Robert S. McNamara, "FY 1963 Budget—Central War Offensive Forces Package," July 3, 1961, *Digital National Security Archives Online* NH00429, p. 6.
36. Lawrence Freedman, *Kennedy's Wars: Berlin, Cuba, Laos and Vietnam*, (New York: Oxford University Press, 2002), pp. 58-79.
37. William Moore, "LeMay Urges Boost in Bomber Spending," *Chicago Daily Tribune*, July 19, 1961.
38. Joseph R.L. Sterne "Senate Tops Kennedy B-52 Request," *Baltimore Sun* August 4, 1961, Box 77, President's Office Files, *John F. Kennedy Presidential Library*.
39. Curtis LeMay, "Speech to the 66th Annual Convention of Jewish War Veterans," August 19, 1961, in Box B171, Curtis LeMay Papers, *Library of Congress*, p. 4.
40. Curtis LeMay, "Address before the 62nd Annual Convention of Veterans of Foreign Wars," August 24, 1961, Box B171, Curtis LeMay Papers, *The Library of Congress*, p. 5.
41. *Ibid.*
42. *Ibid.*, pp. 5-6.
43. Military Division to Director of the Executive office of the President Bureau of the Budget, "Effect on expenditures of 3rd Budget Amendment for Department of Defense," July 31, 1961, in National Security Files Box 275 in *The John F. Kennedy Presidential Library*, p. 1.
44. Robert S. McNamara to John F. Kennedy, Box 279, National Security Files, *The John F. Kennedy Presidential Library*, p. 1.
45. *Ibid.*
46. *Ibid.*, p. 2.
47. Philip Dodd, "780 Millions Turned Down By McNamara," *Chicago Daily Tribune*, October 28, 1961.
48. "Secretary of Defense Robert S. McNamara Interview with the Hearst Headline Panel, as it appeared in the New York Journal American, New York, New York" October 29, 1961, in *Statements of the Secretary of Defense: 1961: Volume III*, p. 1445. This source is a collection of bound press releases and speeches by Robert S. McNamara at the John F. Kennedy Presidential Library.
49. *Ibid.*, p. 1446.
50. "Stennis Opposes Decision," *New York Times*, October 27, 1961.
51. "Jackson Decries Cutback in B-52s," *New York Times*, November 1, 1961.
52. Jack Raymond, "McNamara Curbs Service's Pleas to Congressmen," *The New York Times* November 26, 1961.
53. "Senators Resist End of Bombers," *The New York Times*, January 23, 1962.
54. *Ibid.*
55. "Statement by General Fredric H. Smith Jr., Vice Chief of Staff, United States Air Force, Before the Committee on Armed Services, U.S. Senate," January 24, 1962, draft found in Box B172, Curtis LeMay Papers, *The Library of Congress*, p. 2.
56. *Ibid.*, p. 8.
57. *Ibid.*, pp. 7-8.
58. *Ibid.*, p.10.
59. *Ibid.*, p. 11.
60. *Ibid.*, p. 12.
61. Curtis LeMay, "Presentation to the Committee on Appropriations, United States Senate," Box B172, the Curtis LeMay Papers, *The Library of Congress*, p. 7.
62. *Ibid.*, p. 10.
63. *Ibid.*
64. Robert S. McNamara, "Memorandum for the President: Meeting with Chairman Vinson on FY 1962 Defense Program," April 28, 1961, found in President's Office Files Box 77, *The John F. Kennedy Presidential Library*, p. 2.
65. Carl Vinson, *Report to accompany H.R.9751 on Authorizing Appropriations for Aircraft, Missiles, and Naval Vessels*, March 7, 1962, House of Representatives Confidential Committee Print, Box 33, President's Office Files, *The John F. Kennedy Presidential Library*, p. 1.
66. Carl Vinson, "Press Release on H.R. 9751: To authorize appropriations during fiscal year 1963 for aircraft, missiles, and naval vessels for the Armed Forces, and for other purposes." March 7, 1962, Box 33, President's Office Files, *The John F. Kennedy Presidential Library*, pp. 2-3.
67. Besides his views on Congress, Vinson believed that bombers were in the future make-up of the Air Force and that the Soviet Union was gaining on the United States in design and quality. *Ibid.*, p. 1.
68. Theodore Sorenson, *Kennedy*, (New York: Harper and Row, 1965), p. 348.
69. Carl Vinson, "Statement by Carl Vinson (D-G.A.), Chairman, House Committee on Armed Services" March 21, 1962, Box 33, President's Office Files, *The John F. Kennedy Presidential Library*, p. 1.
70. Curtis LeMay with MacKinlay Kantor, *Mission with LeMay*, pp. 477, 496.

The Wingman-Philosopher of MiG Alley: John Boyd and the OODA Loop





Scott E. McIntosh

(Overleaf) An F-86 of the 51st Fighter-Interceptor Wing sits on the pierced-steel planking.

[THE OODA LOOP]... FOUND ADVOCATES NOT ONLY IN THE U.S. MILITARY, BUT ALSO IN THE REALMS OF BUSINESS AND SPORTS— ANYWHERE A COMPETITOR SEEKS AN EDGE

In “John Boyd and John Warden: Airpower’s Quest for Strategic Paralysis,” Maj. Gen. David S. Fadok describes John Boyd’s theory of conflict as “an eclectic and esoteric discourse on how to survive and win in a competitive world.”¹ The author, however, makes it clear that this discourse did not spring fully-formed from Boyd’s forehead; a number of years, experiences, and influences steered Boyd toward this philosophy. Boyd broke from the physical and spatial parameters that limited predecessors and instead emphasized the temporal and psychological. Surprise, in effect, is the prime goal, and to achieve this Boyd advocated operations at a faster tempo than that of one’s adversary. His “Boyd Cycle” or “OODA² Loop” especially has migrated from a tactical construct toward wider application; it has found advocates not only in the U.S. military, but also in the realms of business and sports—anywhere a competitor seeks an edge. Boyd’s OODA loop is still pertinent; dissecting its historical influences, however, may be just as useful when formulating an approach toward U.S. security.

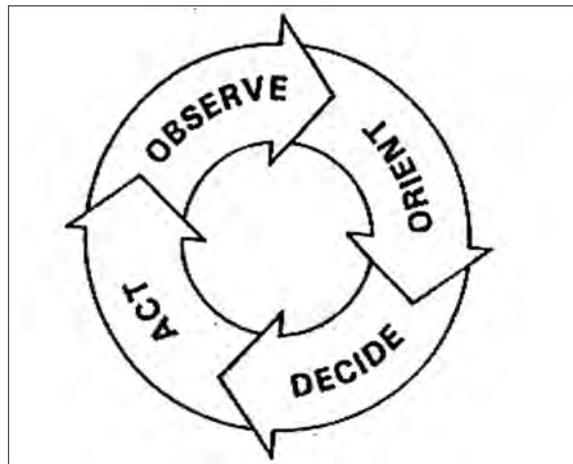
If Flying an Airplane is Complex, Fighting One is Even Harder

In Robert Coram’s biography of Boyd, he describes a briefing Boyd delivered in 1976 where he stated that

Generating a rapidly changing environment—that is, engaging in activity that is so quick it is disorienting and appears uncertain or ambiguous to the enemy—inhibits the adversary’s ability to adapt and causes confusion and disorder that, in turn, causes an adversary to overreact or underreact... [T]he message is that whoever can handle the quickest rate of change is the one who survives.³

According to Grant T. Hammond’s John Boyd biography:

It was at Nellis [AFB, Nevada,] that he first achieved fame within the Air Force. He was simply the best instructor at the Fighter Weapons School, and every-



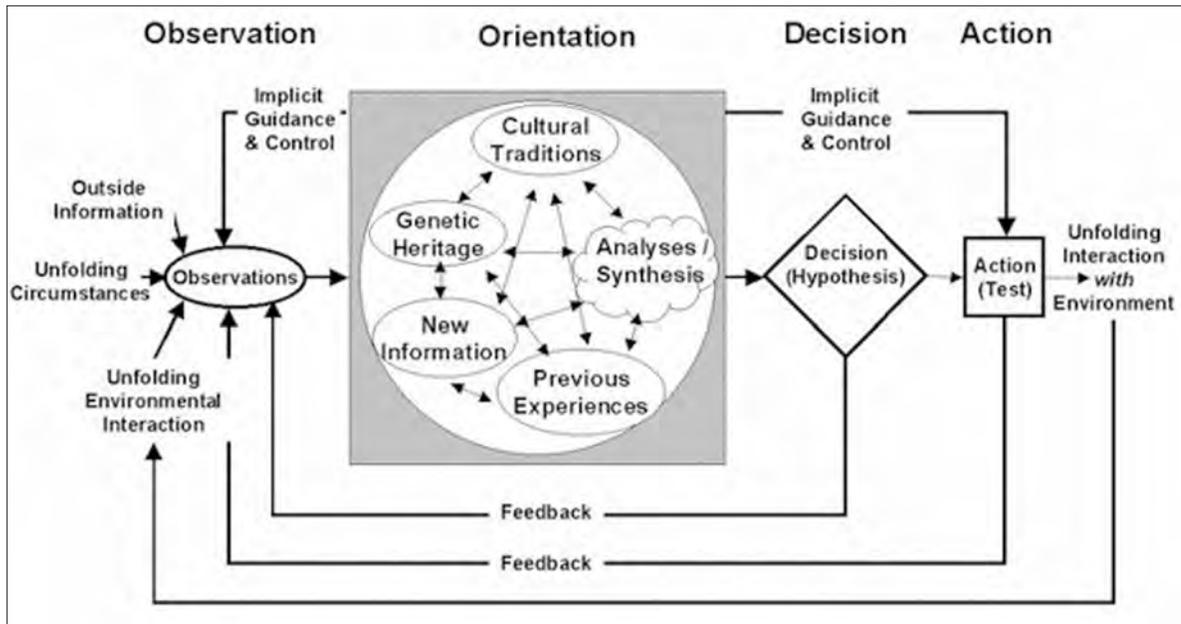
one knew it. The secret of air-to-air combat was to get inside the other guy’s OODA loop. Get your opponent in a position where he was already reacting one or more moves behind what you were able to do; fling him out in front of you by quickly changing speed, altitude, or direction. Then nail him. The key was the speed with which you could change and adapt to the changes.⁴

Indeed, if one imagines himself in the cockpit, it is easier to grasp Boyd’s conclusions, though he applied them to all facets of military operations. The pilot must constantly scan his instruments to monitor aircraft “speed, altitude, or direction,” as well as fuel and performance. He must compensate for any change in the machine’s intended pitch, roll, and yaw. He must note and correct any deviation from accepted limits in engine temperature and pressures. He may converse with other entities in the air or on the ground as he looks down at a kneeboard chart to estimate his aircraft’s location. He must assess and act upon any odd vibration in the airframe or sluggish response to his actions. He is therefore in constant motion, striving to preserve situational awareness via sensory inputs from his eyes, ears, and hands. The possibility of other aircraft inadvertently colliding with—or maneuvering to attack—his own aircraft geometrically augments

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(Left) The OODA Loop in its simple form.

(Right) The same loop in flowchart format.



[THE] PILOT—ALREADY IMMERSSED IN AN INTENSE COCKPIT WORKLOAD—MUST BE FIRST TO OBSERVE THE ADVERSARY, ORIENT HIS OWN AIRCRAFT TO THE POSITION OF GREATEST ADVANTAGE, DECIDE TO ENGAGE, AND ACT TO DO SO. THIS OBSERVE-ORIENT-DECIDE-ACT CHECKLIST IS KNOWN AS THE COMBATANT'S OODA LOOP

this need for situational awareness. There is therefore a lot going on in the cockpit—even in a modern GPS, fly-by-wire, Heads-Up-Display enabled jet fighter (the modern SAM/AAA threat is no petty distraction, either), where technology has shifted the mantra from “aviate, navigate, communicate” to “aviate, assimilate, disseminate”.

According to Boyd, when the enemy appears, this pilot—already immersed in an intense cockpit workload—must be first to observe the adversary, orient his own aircraft to the position of greatest advantage, decide to engage, and act to do so. This Observe-Orient-Decide-Act checklist is known as the combatant’s OODA loop. He with the faster OODA tempo and more accurate assessment is forecast to win in any engagement. Fadok describes the unfortunate adversary:

*Mismatches between the real world and our mental images of that world generate inaccurate responses. These, in turn, produce confusion and disorientation, which then diminish both the accuracy and the speed of subsequent decision making. Left uncorrected, disorientation steadily expands one’s OODA loop until it eventually becomes a death trap.*⁵

In this example, the victor takes advantage of his OODA loop’s tighter radius. He is turning inside the enemy’s loop and maintaining (maybe even improving) his position there with the intent of passing the enemy aircraft through his gunsight.

Mastering the Fundamentals and Taking the Initiative

Boyd, as a military pilot, understood the process of learning responses by rote.⁶ From his first day of training, this pilot memorizes checklists until his actions are automatic. He must repond immediately, fluidly, and accurately when an instructor yells “Bailout!” or “Hot start!” or “Engine fire!” Paradoxically, having mastered the fundamentals of

procedure, the hypothetical pilot is later taught the doctrine of “Centralized Control/Decentralized Execution.” U.S. military training regimens have evolved from what the nineteenth century Prussian thinkers called “*Auftragstaktik*,” where the leaders of the smallest combat units, having received a general mission (*Auftrag*) from a commander “in a short, concise order”⁷ are trained to lean forward and show initiative—to be proactive, aggressive, and fluid in execution. The American fighter pilot’s stress on initiative is at the forefront of this doctrine and has been so since at least the Second World War. Through this juxtaposition of checklist memorization and “leaning forward in the straps,” the fighter pilot is trained to “minimize his own friction through initiative and harmony of response... to ‘tighten’ his own loop...to speed up his own decision-action time...”⁸ Such emphasized decentralization in actions and rapidity in responses will, according to Boyd, concurrently decelerate and expand the enemy’s loop. The perceived menace and unpredictability in a faster and more accurate OODA loop will confuse and disorganize enemy forces. “Ultimately, it produces panic and fear that manifest themselves in a simultaneous paralysis of ability to cope and of willingness to resist.”⁹ As previously noted, this OODA loop concept—knowingly or otherwise—has been embraced by U.S. military leadership and is now well-known in its doctrinal and training institutions.

MiG Alley

One can surmise that John Boyd started theorizing about conflict when he hunted Communist jets over Korea’s “MiG Alley” in 1953. When the MiG-15 debuted on November 1, 1950, it overwhelmed every United Nations airframe in the Far East. The tried and true F-51 Mustang (the ground attack variant of the World War II P-51) could only repeatedly turn inside and drop to low altitude as the pilot pushed up the throttle, crossed his fingers,



This MiG-15 was flown by a North Korean defector.

**WARY F-86
PILOTS
ADAPTED BY
ENTERING
PATROL
AREAS
ABOVE .85
MACH... THIS
PRACTICE
PROVIDED
TWENTY
MINUTES ON
STATION**

and headed for his home airfield.¹⁰ The MiG could accelerate far beyond the American F-80 fighter jet's airspeed in level flight and could easily outclimb it. The Navy's showcase jet, the new F9F, was similarly outclassed in the climb, dive, and turn. The unique and novel MiG-15 held a mystique and an aura of awe for the pilots it assailed:

*The MiG's swept-back wings were products of design data captured from the Germans, and the original model MiG was powered by a Russian copy of the British Rolls-Royce Nene engine. Low wing loading and a 5,000-pound thrust engine resulted in a plane with a spectacular maneuverability and a level speed of about 660 miles per hour. Probably in production as early as December 1947 the MiG's [sic] were reportedly pouring off Russian assembly lines at a rate of 200 per month by the end of 1950.*¹¹

Its heavy armament—one 37-mm and two 23-mm guns—held quite a punch as well.

The United States, however, had sent its own engineers into the captured German aircraft factories in 1945, and used the knowledge gained there to produce an answer to the MiG-15. An aircraft that had originated as a straight-wing jet on the drawing boards at North American Aviation Company, this prototype had undergone a radical transformation after V-E Day:

*At North American's request a captured Messerschmitt swept-wing assembly was brought to the company for study. This wing had leading-edge slats which extended and retracted automatically in response to aerodynamical forces, permitting low speeds for landing and unprecedented high speeds for flight. North American added the fully-swept design version of the [German] Me 262 wing to its F-86 Sabre, and the result was spectacular, even with the modest 5,200 pounds of thrust provided by the J47-GE-13 jet engine.*¹²

The swept-wing design, enabled by this feat of German jet engineering, was the most radical of tried and true features in the F-86 Sabre. Six M3 .50-caliber machine guns in the nose, complimented by the now-standard K-18 gyroscopic computing

gunsight and electric range-control system, enabled effective engagement for targets both airborne and earthbound. Even with two 120-gallon wing-mounted external tanks, however, this airframe's combat range was only 490 nautical miles.¹³

This short range demanded that F-86 pilots follow an established set of tactics when patrolling along the Yalu. To ensure optimum coverage on combat air patrols, these men (more than a few of which had become aces during the Second World War) took off in four-ship formations at five-minute intervals. The formation they used was basically the "finger four" *Schwarm* ("flight") that Luftwaffe pilots developed over Spain in 1937:

*[Its] four aircraft resembled that of the fingertips of an outstretched hand... [The] Rotte, or element of two aircraft... became the basic fighting unit. The job of the Rottenfuhrer, or element leader, was to attack; the job of the Rottenflieger, or wingman, was to protect and follow his leader... The aircraft could thus break together, to attack, or toward one another, for mutual defense... [The Squadron Commander would stagger the flights] in altitude, which both improved the ability of the formation's pilots to sight the enemy and made the formation itself less conspicuous in the glare of the sun. The formation leader was able to control his widely spaced unit by means of radio.*¹⁴

Sabre flights, in similar staggered four-ship formations, would enter the patrol zone below the contrail level at between 27,000 and 30,000 feet altitude, thus reducing the possibility of being spotted first. A pilot could thus look upward to locate enemy aircraft by vapor trails while leaving none of his own. Using these tactics, the first F-86 missions took off from Kimpo on December 17 and the 336th Squadron's commander, Lt. Col. Bruce H. Hinton, scored the first Sabre air-to-air MiG-15 kill.¹⁵

It was not long, however, before Communist pilots overcame their initial shock and developed counter-tactics to the F-86, which USAF pilots, like Boyd, had to counter. As with the OODA loop, "once the process begins, it must not slow. It must continue and it must accelerate,"¹⁶ and a cycle of competing innovation commenced over the Yalu. Because of the aforementioned combat range problem, Sabre pilots attempted to conserve fuel by cruising at slower speeds into the patrol area, then accelerated when sighting hostile aircraft. In response, MiG pilots timed attacks to coincide with the end of the Sabres' patrols, when fuel was shortest and long aerial engagements were thus precluded. MiG pilots poured on the thrust when diving to engage, and their adversaries had little time or fuel to respond effectively.

Wary F-86 pilots adapted by entering patrol areas above .85 mach,¹⁷ a speed well within the airframe's normal operating limits. This practice provided twenty minutes on station, ten of it laid aside to stay and fight if MiGs attacked during the Sabres' egress. These tactics changed little in the next three years.



F-86 fly over Korea in 1952.

THE JET AGE HAD BROUGHT FASTER CLOSURE SPEEDS... THE OODA LOOP... ACCELERATED AND TIGHTENED DUE TO THE DIMINISHED GAP BETWEEN SIGHTING AN ENEMY AIRCRAFT AND ENGAGING IT

The “jet stream,” whereby Sabre flights arrived in patrol areas at five-minute intervals, provided a minimum of four separate high-speed forces within easy supporting distance in time and space. The first Sabre flight to spot MiG’s [sic] called out their location, altitude, and heading, and when a fight developed all Sabre flights converged on the point of contact.¹⁸

Sabre pilots increased cruising speeds and improved on the *Luftwaffe*’s proven four-ship formation with the “fluid-four”:

The two element leaders carried the firepower, while the wingmen covered the rear—a significant thrust along the Yalu where the enemy could almost always get the first “bounce”... These tactics ably exploited the outstanding characteristics of the Sabres.¹⁹

Closure speed between combatants was now often over 1,000 miles per hour and demanded rapid, high-G-force maneuvers as adversaries competed for advantage. The basic goal of jet combat in MiG Alley was largely unchanged from the Second World War’s:

...to hold a commanding position on an opponent long enough to shoot him down. That usually meant getting on his tail and closing the range to a thousand feet or less. And, as in World War II, the task of each individual pilot was the same: to stay with his wingman or leader so as not to get caught by surprise.²⁰

Hence, while the jet age had brought faster closure speeds—and concurrent necessity for augmented awareness plus constricted response time—the mechanics of dogfighting had not changed much. The OODA loop, however, had accelerated and tightened due to the diminished gap between sighting an enemy aircraft and engaging it.

While the machines were similarly matched over MiG Alley, there were differences in performance. Pilots on both sides of the conflict worked to take advantage of their airframes’ relative strengths. The MiG’s aforementioned mixed-caliber armament held a low cyclic rate of fire; the larger

rounds meant that the MiG-15 could hold quantitatively less ammunition than its adversary, but the fact that a single 37mm round could knock a wing off a targeted airplane inspired U.S. pilots to ask for larger guns on the F-86. In speed, the two aircraft were comparable, but while the MiG could perform better in the climb the F-86 was superior in level flight at low altitudes. This difference in performance²¹ influenced a later American countertactic. A pattern emerged where four-MiG flights, confronted by Sabres, would split into pairs—one would climb while the second pair would dive to escape:

Sabre flights were [therefore] increased to six aircraft, so that four F-86’s could follow the climbing MIG element and two could chase the diving MIG element. Elements of two Sabres would continue to pursue as the MIG elements broke down into singles, as they almost always did.²²

The diving element could take advantage of the fact that, below 25,000 feet, the F-86 was the more maneuverable aircraft. The physical strain of flying such a top-of-the-line combat aircraft was reduced as the Sabre’s controls were designed to transmit less vibration to a pilot’s hands. The Sabre was also heavier than the MiG-15, which brought greater momentum in the dive and offset the aforementioned relative weakness in a climb.²³

This MiG Alley tactic also constituted the latest development in dogfighting. Like playing “Chicken,” since dogfighting’s inception, each side engaged the other’s formation and sought to break that formation while preserving its own. As Thomas C. Hone points out in his work on the contest for air superiority over Korea, in 1916—near the time of this inception—mathematician and engineer F.W. Lanchester described the fighting differential between two military forces x and y as the ratio x^2/y^2 , where x and y are the relative strengths of the two forces engaged.²⁴ Using this model, if two Sabres could stick together and chase down one MiG, they were not twice as powerful in the attack, but *four times* so.²⁵ Conversely, when confronted by superior numbers of Communist aircraft, the cohesive “*Rottenfuhrer und Rottenflieger*” team played to American qualitative strengths. As Hone describes it, “...technology and experience gave the Sabre flights an advantage: the best basic formation was the element of leader and wingman, and the USAF pilots—most of whom had combat experience in World War II—were simply better at flying it.”²⁶ Adaptive U.S. technology only augmented this gap as the war progressed. In 1951 the MiG’s nearly constant evasive tactic was to break contact and streak for sanctuary beyond the Yalu, which worked well against the A-model Sabres. When the U.S. Air Force introduced the F-86F to Korea in July 1952,²⁷ however, the upgraded engine and aerodynamic performance significantly reduced the MiG’s chances for successful escape.

It is, of course, often said that the variable was superior U.S. technology, but Boyd’s argument was

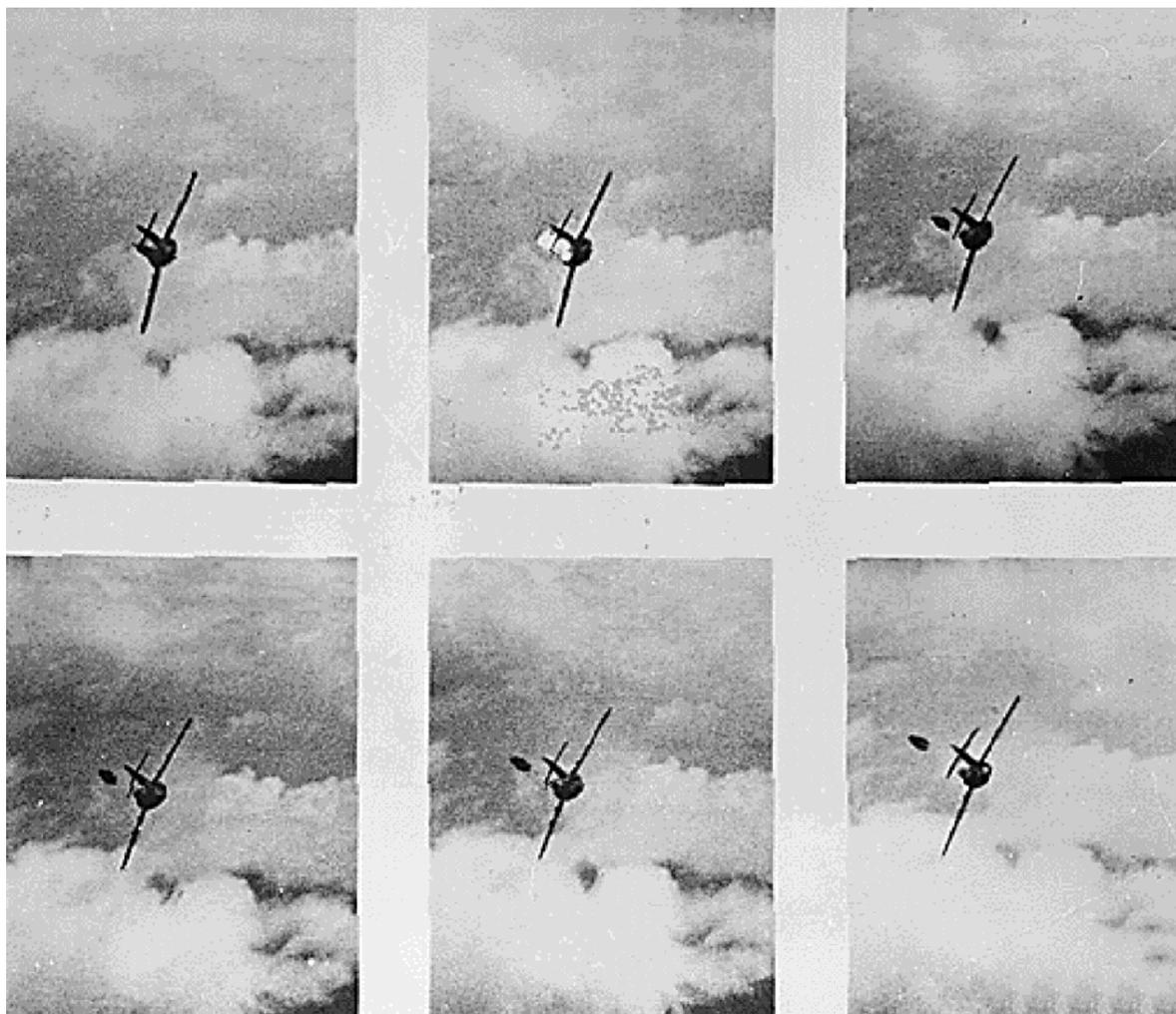
John Boyd in 1952, after winning his wings as an Air Force pilot. After basic flying instruction in Mississippi, he trained in jets at Williams AFB, then combat training in the F-86 at Nellis AFB, before being sent to Korea. (Boyd Family Photo)



more holistic. He acknowledged, for instance, that in energy-maneuverability, the MiG-15 was more than a match for the F-86; he also liked to mention the examples of the Wehrmacht's 1940 campaign against France and Israel's raid on Entebbe—cases where technology level was close to even on the playing field but “the ability to transition from one maneuver to another was a crucial factor in the victory.”²⁸ Later in his career, queried about the role of technology, Boyd responded, according to those present, in this manner: “Machines don't fight wars. Terrain doesn't fight wars. Humans fight wars. You must get into the minds of humans. That's where the battles are won.”²⁹

The professionalism and discipline ingrained in the humans at U.S. fighter squadrons in Korea certainly contributed to their success. Ground Control Intercept (GCI) radars emitting from Manchuria aided MiG formations in finding UN aircraft. This was especially important when USAF B-29s began bombing North Korean airfields and communication networks to further augment air superiority via a coordinated offensive counterair campaign. Operational planners at the fighter squadrons responded by varying both locations and arrival times for Sabre patrol sorties. Strict radio communication discipline ensured that Communist GCI technicians' efforts remained reactive in nature,

Gun camera footage of the end of a MiG-15 as the pilot ejects.



WHERE TECHNOLOGY LEVEL WAS CLOSE TO EVEN...“THE ABILITY TO TRANSITION FROM ONE MANEUVER TO ANOTHER WAS A CRUCIAL FACTOR IN THE VICTORY”

John Boyd climbs into the cockpit of his fighter.



A ground attack version of the swept-wing F-86 sits on the PSP apron.



and this expanded the GCI-to-MiG-dispatch (OODA) loop accordingly. The fact that Sabre pilots never turned away from attacking MiGs—regardless of fuel, ammunition, or numerical inferiority—further disrupted the adversary's initiative. On the

ground, USAF aircrews reviewed gun camera footage alongside their intelligence officers, who recorded developments in Communist tactics, typed them up, and distributed them to other Sabre units.³⁰ In this fashion, “best practices” were assessed, recorded, and disseminated amongst this small, tightly-knit community. A combat pilot's OODA loop constricted accordingly when he recognized, countered, and adapted to such recorded and briefed tactics.

Analysis and Synthesis

Colonel Boyd's experience in Korea certainly influenced his subsequent philosophies. His 1987 compilation entitled “A Discourse on Winning and Losing” describes a cognitive process of analysis and synthesis akin to the aforementioned mission completion, conversation, collation, and communication process inherent in combat debriefing. In effect, Boyd advocated dissecting each engagement, finding interconnections amongst components, and synthesizing these components into an assessment of what has occurred. Success in modern military action, according to Boyd's own analysis and synthesis, comes to the warfighter who attains initiative, harmony, variety, and rapidity in his actions.³¹ Boyd credited Clausewitz for identifying the heavy influence of friction in warfare but reached even further back into classic military philosophy to evolve his own thoughts on it. Clausewitz emphasized bringing one's adversary to the massive, decisive Napoleonic battle at the expense of “strategy, deception, and guerrilla-like tactics.”³² Boyd favored instead an approach that, rather than emphasizing one's own friction in battle, maximized the enemy's and warmed particularly to Sun Tzu's thoughts on “such themes as deception, speed, fluidity of action, surprise, and shaping the adversary's perception of the world.”³³

One can argue that Boyd analyzed his personal history and synthesized his experiences into a new and coherent philosophy for strategy. Grant Hammond certainly did:

*That to Boyd is the sum total of life. All organisms seek to survive and prosper. They do so by enhancing their freedom of independent action or establishing symbiotic relationships through timely adaptation to a constantly changing environment. Those who adapt will survive; those who do not, die. Those who do survive do so by being good at doing OODA loops. Though abstract, this was an important concept to a fighter pilot who had only seconds to make the right decision or perish.*³⁴

The proven fighter formation tactics employed by the German *Legion Kondor* pilots over Spain, later morphed into U.S. Air Force practice; the fundamentals-by-rote regimen he learned in pilot training; the differences in performance between airframes over MiG Alley and the subsequent adaptation of tactics to these differences; as well as his readings on classic military theorists—it is likely

A modern photo of the two Korean War foes, the Mig-15 (left) and the F-86.



BOYD NEVER GOT TO FLY LEAD...THE STANDARD ...WAS 30 MISSIONS UNDER YOUR BELT BEFORE YOU COULD FLY LEAD INSTEAD OF WINGMAN. BOYD HAD ONLY 22 MISSIONS WHEN THE WAR ENDED. NOT MUCH, BUT HE MADE THE MOST OF IT

that Boyd knitted his thoughts on conflict together from these influences. One can imagine him simulating dogfighting aircraft with his hands—as he surely did in officer’s clubs at diverse airfields like Suwon and Nellis—when describing the OODA loop with its tighter turn radius and constant need for both cockpit-style situational awareness and initiative in the engagement.

Conclusion

Via daily competition between the aforementioned airframes over MiG Alley during the Korean War, U.S. strengths in technological innovation and agile analysis enabled an ever-accelerating evolution of tactics, techniques, and procedures that ultimately facilitated an increase in the F-86 to MiG-15 kill ratio from 4.9:1 to 20:1 by January 1953.³⁵

It is occasionally pointed out that Boyd himself shot down no enemy jets over MiG Alley, but in the author’s opinion this is irrelevant. Arriving close to the end of the Korean War, the winter of 1952-53, Boyd spent his combat sorties as a wingman.

Boyd never got to fly lead, because the standard operating procedure was 30 missions under your belt before you could fly lead instead of wingman.

*Boyd had only 22 missions when the war ended. Not much, but he made the most of it and developed important tactical insights from his limited experience.*³⁶

What is relevant is the fact that Boyd himself experienced, monitored, and contemplated this unique era of air combat. Perhaps he also believed there was something he needed to prove since he received no kills there. His “pushing the envelope” style, one which ensured he would defy convention for the rest of his days, is mentioned often in the available works on Boyd, as is the opinion that only a personality like his could have influenced military thinking as it has into the 21st century.

Nearly 15 years after his death, America’s national security challenges are admittedly both more complex and broader in scale than a recurring aerial competition over the Yalu. President Obama’s 2010 National Security Strategy states in its conclusion that “One of the reasons that this nation succeeded in the second half of the twentieth century was its capacity to pursue policies and build institutions that endured across multiple Administrations, while also preserving the flexibility to endure setbacks and to make necessary adjustments”³⁷ (emphasis added).

Grant Hammond credits time and movement,

or speed and maneuver, as the two concepts underlying Boyd's analysis and synthesis of warfare. "If one moves and constantly presents an opponent with a changing situation and does so quickly, one has a tremendous advantage. If one cannot do this, according to Boyd, the chances for success in almost any kind of combat are seriously degraded."³⁸ The contemporary challenges and necessary adjustments to U.S. national security accordingly demand this type of analysis and synthesis. Consider, for example the evolving threat of cyber warfare, where, as Gregory J. Rattray writes:

*New military capabilities and business enterprises require a conscious balancing of opportunity and risk; this demands a discipline of analysis that has not yet developed. The United States must learn how to protect its cyberspace presence in a cost-effective fashion. This may involve the development of large offensive forces that "roam the net" protecting commerce; the orchestration of international accords and norms might be able to limit disruptive activity by states against other states and punish nonstate actors; perhaps a new "cyber Manhattan project" can establish more secure technological foundations for cyberspace.*³⁹

This is a realm of conflict where one sometimes has no idea he has undergone an attack. If he manages to identify his attacker, what then? How do the laws of warfare apply to retaliatory action? It's not a big leap from building offensive net-roamers to conceiving an OODA loop for them.

The fight against improvised explosive devices (IEDs) is less abstract. This may be modern warfare's most stark example of competing OODA loops and the circuit of tactic-counter-tactic-counter-tactic development and ongoing attempts to wrest initiative from an adversary. The Joint Improvised Explosion Device Defeat Organization routinely employs OODA loops to take on IED logistics, workshops, and installation in Iraq.

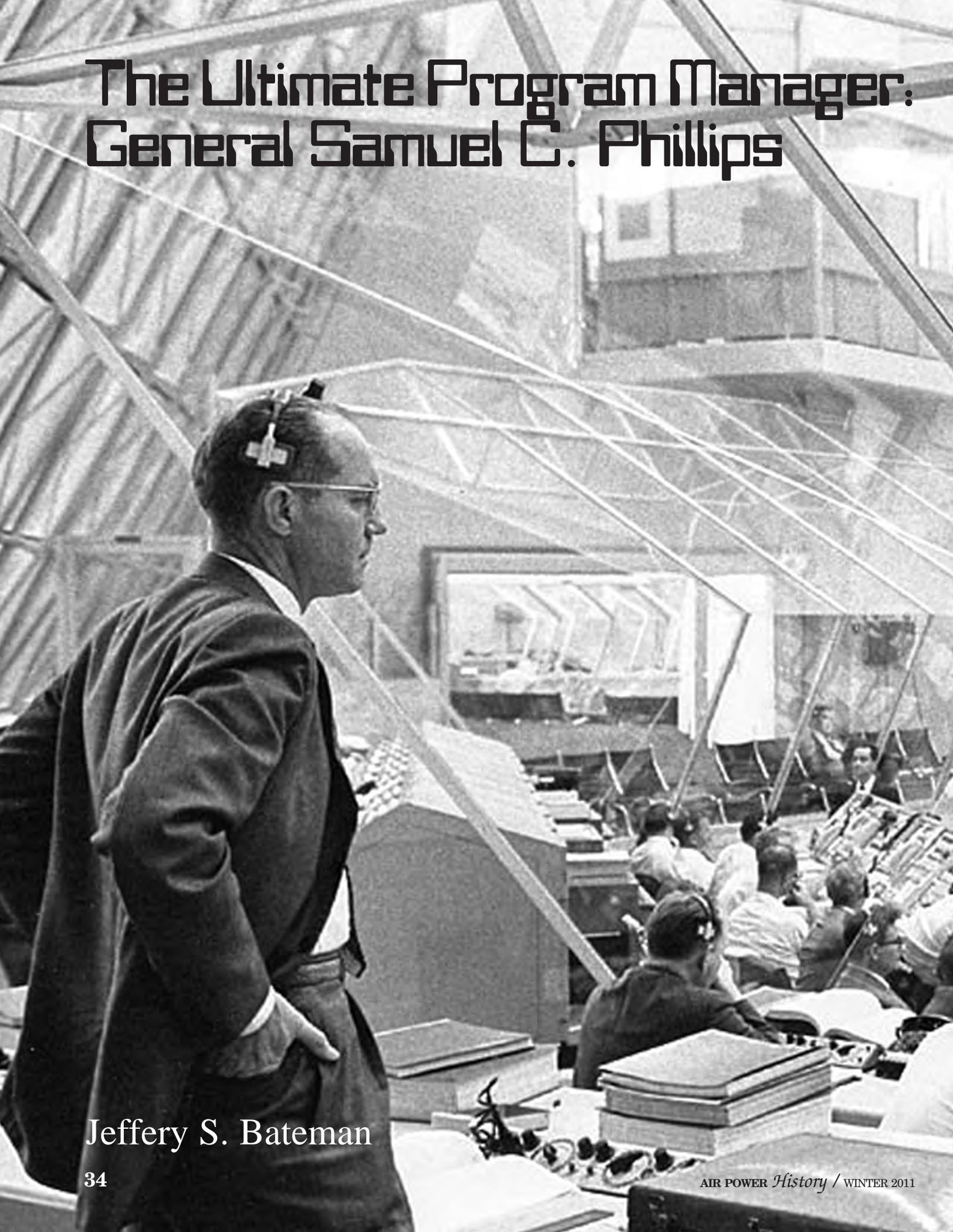
Boyd's theory and subsequent advocacy of tightening the cycle at the expense of an adversary's in any endeavor thus retains its relevance. To master the challenges ahead, the United States of America will need to lean forward in the straps and to continue constructing its own OODA loops, building upon (its own and others') hard-won experience (as John Boyd did)—but also to employ its technological and analytical strengths to quickly adapt to events ahead. ■

NOTES

1. Fadok, David S., "John Boyd and John Warden: Airpower's Quest for Strategic Paralysis," in *The Paths of Heaven: The Evolution of Airpower Theory* (Maxwell Air Force Base, Alabama: Air University Press, 1997), p. 328.
2. OODA is the acronym for "Observe Orient Decide Act".
3. Robert Coram. *Boyd: The Fighter Pilot Who Changed the Art of War* (New York: Back Bay Books, 2002), p. 328.
4. Grant T. Hammond, *The Mind of War: John Boyd and American Security* (Washington, D.C.: Smithsonian Institution Press, 2001), p. 7.
5. Fadok, p. 367.
6. Hammond, on pp. 26-27, also emphasizes the "routine practice and repetition that was required to become really good at something and to overcome the boredom by focusing on minute improvements" that Boyd embraced as a competitive swimmer at the University of Iowa.
7. Robert M. Citino, *Blitzkrieg to Desert Storm: The Evolution of Operational Warfare* (Lawrence, KS: University Press of Kansas, 2004), pp. 8-9.
8. Fadok, p. 367.
9. *Ibid.*, pp. 367-8.
10. Robert Frank Futrell, *The United States Air Force in Korea 1950-1953* (Washington, DC: Office of Air Force History, 1983), p. 244.
11. *Ibid.*
12. *Ibid.*, p. 250.
13. *Ibid.*
14. Donald L. Caldwell, *JG 26: Top Guns of the Luftwaffe* (New York: Ballantine Books, 1991), p. 5.
15. Futrell, p. 251.
16. Coram, p. 338.
17. Futrell, p. 251.
18. *Ibid.*, p. 252.
19. *Ibid.*
20. Hone, Thomas C., "Korea," in *Case Studies in the Achievement of Air Superiority* (Washington, D.C.: Center for Air Force History, 1994), pp. 470-71.
21. *Ibid.*, p. 469.

22. Futrell, pp. 301-02.
23. Hone, p. 471.
24. While the author could find no evidence that Boyd ever employed Lanchester's model, Hammond's biography especially describes Boyd's intuitive grasp of real-world concepts and subsequent mathematical testing and refinement of these concepts. The "Thermodynamics, Pizza, and Beer" (Hammond, 53-55) section, where Boyd formulated his energy maneuverability theory at an off-campus pizza parlor while studying electrical engineering at Georgia Tech, is exemplary. Boyd may have never scrawled Lanchester's equation on a napkin, but Hone's article uses it to reveal why an accomplished wingman like Boyd would stick tightly to his element leader in air combat.
25. Hone, p. 471.
26. *Ibid.*
27. *Ibid.*, p. 489.
28. Coram, p. 328.
29. *Ibid.*, p. 341. This emphasis on the human variable over technological is further exemplified in the fact that in January 1953, the kill ratios became even more favorable to UN pilots. The December 1952, withdrawal of Soviet fliers from North Korean jet cockpits was almost certainly a factor.
30. Hone, p. 473.
31. Coram, p. 336.
32. *Ibid.*, p. 332.
33. *Ibid.*, p. 331.
34. Hammond, p. 15.
35. *Ibid.*, p. 36.
36. *Ibid.*, p. 38.
37. White House, *National Security Strategy of the United States of America* (Washington, D.C.: White House, 2010), p. 51.
38. Hammond, p. 151.
39. Rattray, Gregory J., "An Environmental Approach to Understanding Cyberpower," in *Cyberpower and National Security*, (Washington, DC: National Defense University Press/Potomac Books, Inc., 2009), p. 265.

The Ultimate Program Manager: General Samuel C. Phillips



Jeffery S. Bateman



(Overleaf) General Phillips looks out over the Apollo 8 control room. (All photos courtesy of the photo collection, Air Force Research Laboratory, Phillips Research Site History Office, Kirtland AFB, New Mexico.)

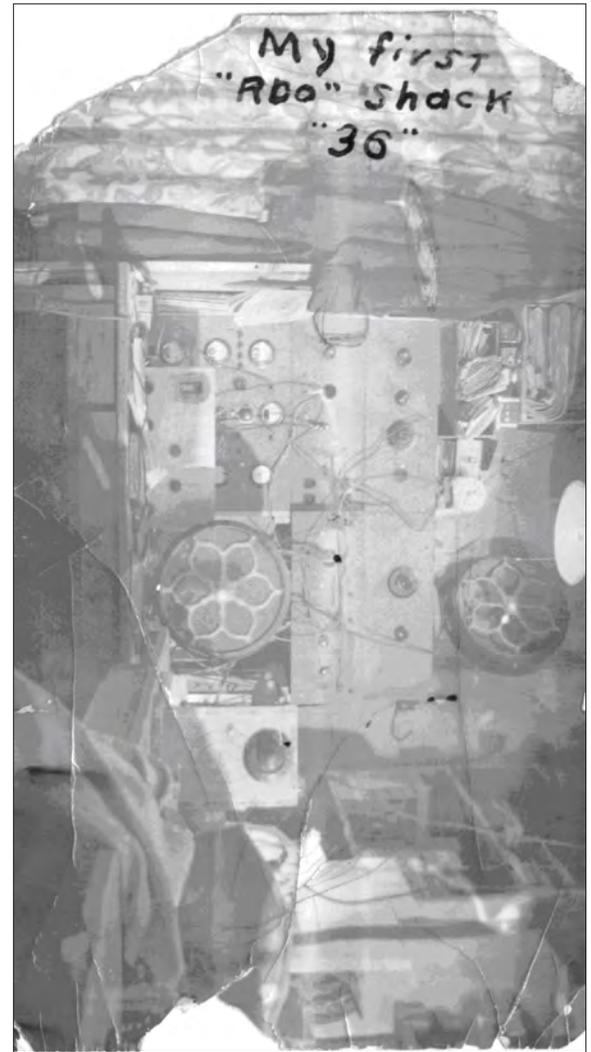
5,4,3,2,1, everyone likes a good countdown! For those of us old enough to have experienced the grainy television images associated with the Apollo program, few countdowns surpassed the excitement and anticipation associated with three men strapped at the apex of a massive rocket, set, we hoped, to launch them on new adventures in outer space. Few, however, felt the excitement and tension as often as Air Force Gen. Samuel C. Phillips, Program Manager for the Minuteman Missile Program, and later Program Director for NASA's Apollo Program through the Moon landing. Preparing for countdowns dominated his career for over a decade.

Like the thirteen men preceding him as recipients of the Smithsonian's Langley Gold Medal for aeronautics and its application to aviation (including the Wright Brothers, Robert H. Goddard, Charles A. Lindbergh, and Wernher von Braun), Phillips deserves to be remembered for his singular achievements in leading more critical national-level research and development programs than perhaps any other American. Quiet, and always the "calm hand at the wheel," Phillips never achieved, nor sought, the "rock star" status associated with luminaries such as Lindbergh or von Braun. However, as he said himself, "Results are what count," and few can compare with Sam Phillips.¹

Samuel C. Phillips was born on February 19, 1921, in Springerville, Arizona. His father, an electrician, worked on power systems, which caused the family to move frequently. Raised in Cheyenne, Wyoming, Phillips developed an early interest in electronics, especially in radio systems.

He studied Electrical Engineering at the University of Wyoming, while participating in the Reserve Officers' Training Corps (ROTC) and the Civilian Pilot Training Program. Upon graduation, he received a commission as a regular officer in the U.S. Army (a rare distinction reserved for top ROTC graduates) and he was subsequently assigned to the Infantry. Already a licensed pilot, Phillips had hoped for an assignment to the Army Air Forces, but duly reported as ordered to Ft. Benning, Georgia, for infantry training. While waiting for his operational infantry assignment, Phillips boldly sent a telegram directly to the Chief of the Army Air Corps, suggesting that they "better get him quick" if they wanted him. They did, and the Army reassigned Phillips to the Air Corps.²

Phillips flew distinguished combat tours in P-38s and P-51s for the Eighth Air Force, earning two Distinguished Flying Crosses and eight Air



Medals. Following a tour with the occupation forces in Germany, Phillips returned to Langley AFB, Virginia, followed by graduate school at the University of Michigan in Electrical Engineering. Phillips then began a series of research and development jobs, culminating in his assignment as program manager for the B-52 bomber. He returned to the operational Air Force as Director of Logistics for the Strategic Air Command's (SAC) 7th Air Division in the United Kingdom (UK), where one of his major duties was to negotiate the installation and support of the Thor missile system. Phillips impressed Gen. Bernard Schriever's deputy, Brig. Gen. Charles H. Terhune Jr., with his work on Thor, and Schriever brought him into their organization as the program manager of the Minuteman program in 1959, where

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Jeffery S. Bateman, Colonel, USAF (Retired), is an Air Force historian at the Air Force Research Laboratory's Phillips Research Site, Kirtland AFB, New Mexico. A thirty-two-year Air Force veteran, and career Security Forces Officer, his fifteen assignments included a tour as a member of the initial cadre at the Air Mobility Warfare Center; command of three squadrons; the 100th Mission Support Group; and a tour as the Air Officer Commanding, Cadet Squadron 13, United States Air Force Academy. A graduate of the University of Washington, Colonel Bateman holds Masters Degrees in History and Criminal Justice. He is also a graduate of the U.S. Army War College. His work on inter-war military training at land-grant colleges was published in the Utah Historical Quarterly, and he contributed a collection of oral histories to the Library of Congress Veteran's History Project.



(Left) Phillips built this radio system in his parents' basement. He carried the photo in his wallet all his life.

(Above) Sam Phillips in his P-51 Mustang at RAF Honington, nicknamed "Dana" for his daughter.

he served until "borrowed" by NASA in early 1964 to take over as the Apollo Program Director. Phillips, then forty-three years old, guided Apollo through the lunar landing in 1969. General Phillips commanded the Space and Missile Systems Organization (SAMSO) from 1969-1972, the National Security Agency, 1972-1973, and finally, Air Force Systems Command from 1973 to 1975. Post-retirement, General Phillips worked at senior positions with the TRW Corporation, and twice headed efforts to help NASA assess its management practices in the wake of the 1986 *Challenger* Space Shuttle Disaster. General Phillips died on January 31, 1990. He is interred at the U.S. Air Force Academy.³

A classic "workaholic," Phillips had a work ethic second-to-none. During his Minuteman and Apollo years, 70-80 hour workweeks were common,

Brigadier General Phillips briefs Colorado Governor John Love on the Minuteman Missile.



with frequent weekend travel, often including coast-to-coast "red eye" flights. A sample of his diary from January 1968, right at the heart of the Apollo program, is instructive. Phillips made fourteen phone calls; sent out three taskings; agreed to speak at a luncheon; responded to an invitation to a congressional dinner; agreed to a media interview and flew to Cape Canaveral that evening—all on a day he was home sick! According to Col. Gilbert D. Rye (USAF, Ret.), Phillips's Executive Officer at the Space and Missile Systems Organization, Phillips did not slow down one bit once he left Apollo, filling up every minute during his long days, then taking briefcases home at night, working through papers "like a machine." Colonel Rye tells a great story about Phillips calling him one Saturday morning to play tennis, perhaps an out-of-character nod to his wife Betty Ann's insistence he exercise. Rye was astounded when Phillips called him, surprised by his normally all-work boss. The general did not play well, and Rye never played tennis with him again.⁴

When in Charge, Take Charge!

Sam Phillips was not a particularly dynamic speaker, nor a "rah-rah" cheerleader-type personality. Nonetheless, there was no doubt who was in charge of a program when Phillips had the stick. During his B-52 years, he shared program management with his Air Material Command counterpart, Col. Edmund O'Connor. Phillips, assigned to Air Research and Development Command, was responsible for aircraft development, and at some ill-defined point where the program moved from development to production, O'Connor, as the procurement officer, would theoretically take over. While he did not like the arrangement, Phillips worked well with O'Connor. However, he became extremely frustrated when he discovered that lower-level contracting officers could override certain of his decisions as program manager. Phillips told his boss, then-Maj. Gen. Thomas Patrick Gerrity, that he *had* to have the power to issue contracting direction as part of his authority as program manager. Phillips believed this so strongly he got himself certified as a procurement officer and hung the warrant over his desk. This determination to seize the authority he needed to get the job done became a technique he would repeat.⁵

Phillips's belief in assuming the authority necessary to accomplish his responsibilities clearly manifested itself in the Minuteman program. He froze the Minuteman design in June 1960, in favor of production (and above all meeting the initial operating capability schedule) despite the fact that the missile was over 1,000 miles short of its specified range at that point in development. He knew it would take six to twelve months to reach the designated range, and he was running out of time. Phillips traded off range for schedule by placing the first Minuteman missiles at Malmstrom AFB, Montana, in 1962, calculating that the northern latitude and higher elevation would compensate for



Time-elapse photo of Minuteman launch.

HE WAS WILLING TO MAKE THE TOUGH CALLS, NOT JUST TO KEEP ON SCHEDULE, BUT ALSO TO ADROITLY BALANCE COST, SCHEDULE, AND IN THIS CASE, PERFORMANCE

the range limitation given the relatively shorter distance the missiles would have to travel to target the Soviet Union. His team calculated they could achieve the required range by the time Wing 2 (Malmstrom was Wing 1) went into production. A huge decision, but one that Phillips believed was within his authority.⁶

Similarly, Phillips made the decision to install field maintenance joints in Minuteman, so that SAC maintenance personnel could remove and service the re-entry vehicles and guidance systems in the field. The original “wooden missile” design was based on the idea that field personnel could not perform maintenance on these systems, a concept Phillips’s own SAC experience told him would never work. He was willing to make the tough calls, not just to keep on schedule, but also to adroitly balance cost, schedule, and in this case, performance.⁷

NASA, by 1963, was an organization with formidable technological talent, however, it was clear to Administrator James E. Webb that his organization lacked the large program management experience for an effort on the scale of Apollo. Webb turned to industry and the military for help, bringing in the capable Dr. George Mueller from Space Technology Laboratory (STL, later TRW) as Associate Administrator for Manned Space Flight. Mueller (pronounced Miller) knew Phillips, as STL had been the Science and Engineering Technical Direction (SETD) contractor for Minuteman. While they had not worked directly together, Mueller knew he wanted Phillips on his team. Phillips had hoped to return to SAC for another operational tour and he was reluctant to join NASA. Nonetheless, he stepped right in and took charge. Though initially assigned as Deputy Apollo Program Director under the dual-hatted Mueller, he acted from day one as Program Director, a title he formally received nine months later. Phillips brought a range of highly-developed program management disciplines with him from the B-52 and Minuteman programs, including centralized change control with associated cost estimating; associate contractor relation-

ships built on mutual trust and frank communication; and a systems engineering approach that produced a “full visibility” set of baseline criteria and the first Apollo Development Plan within his first year running the program.⁸

His take-charge attitude overcame a great deal of resistance—both to the perceived micromanagement of previously independent NASA centers, and to the idea of relinquishing much of the technological development efforts to associate contractors. Phillips just never gave up. His “sheer competence” won over the centers, and their leaders Wernher von Braun, Bob Gilruth, and Kurt Debus, all of whom eventually cooperated with this outsider. Phillips transformed NASA from a capable technological organization with limited ability to adhere to schedule and cost discipline into an organization capable of landing on the Moon on time and at reasonable cost. In 1963, Dr. Mueller’s staff predicted Apollo had a one-in-ten shot at landing on the moon by 1970. Sam Phillips was the main reason Mueller was happy his staff was proven wrong in July of 1969.⁹

...Apollo may be the only achievement by which our age is remembered a thousand years from now...

Arthur C. Clarke

The “Bold Approach”

Sam Phillips was no gambler, in the sense that a gambler assumes an element of chance in making a decision in hopes of some sort of gain (a roll of the dice). He did, however, repeatedly make decisions of enormous consequence to his programs (and his career) based on a careful scientific analysis of the risks involved compared to the potential gain achievable. Many of these decisions proved to be real game-changers.

In late 1961, just twelve months before the first Minuteman was to become operational, the Kennedy Administration asked Dr. James C. Fletcher to review Minuteman’s flexibility in light of



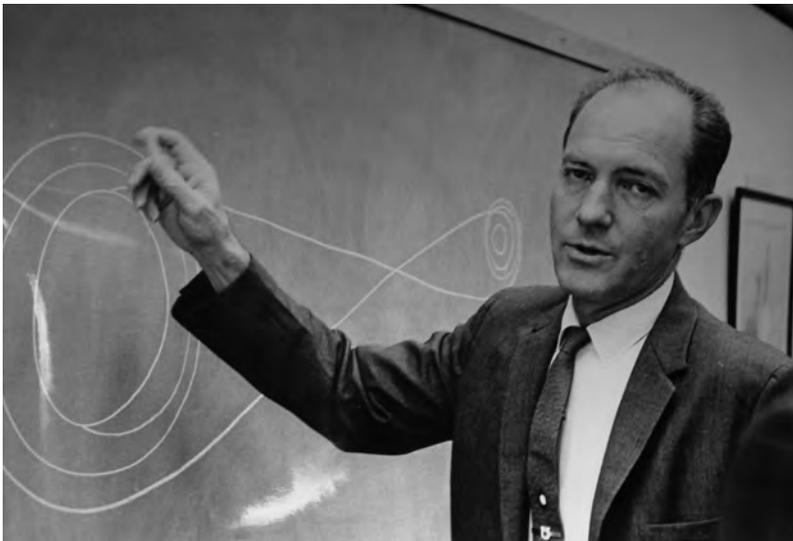
General Bernard A. Schriever (USAF, Ret.) greets Lt. Gen. Phillips as he assumed command of the Space and Missile Systems Organization in 1969. Schriever created a favorable acquisition environment for Minuteman, in which Phillips thrived. They were an unbeatable team, the superb entrepreneur and the ultimate program manager.

the coming shift in national policy from massive retaliation to one of flexible response. Phillips saw “the handwriting on the wall” for Minuteman and quickly convened his engineers to see what could be done with Minuteman to increase its flexibility before the IOC date—understanding he was balancing a critical program delivery schedule with its very survival under a new administration.¹⁰

Phillips and his team determined they could in fact make the changes (known as Block Change One), including, among other things, the ability to launch individual missiles, and to remotely select targets. Neither capability was part of the original design, and both required major rework of the launch and guidance control systems with just twelve months before the system was scheduled for fielding!¹¹

Phillips, more cognizant of schedule than perhaps anyone on his team, took the risk to modify Minuteman to field a product more in line with emerging national strategy. This was no “roll of the dice.” Change control, one of Phillips’s most cher-

Phillips demonstrates the circumlunar orbit he advocated for the Apollo 8 mission.



ished management disciplines, enabled his engineers to know *exactly* where the various systems within Minuteman were at any given point in time. They could take the risk because they knew precisely where they were starting. The Minuteman team made the changes, produced the system on schedule, and perhaps saved it from potential elimination in the process.¹²

The far more complex Apollo program provided ample opportunities for Sam Phillips to take carefully calculated risks in the constant ballet of achieving balance between scheduling objectives and performance, and increasingly, controlling cost. In addition to the incredible complexity of the Apollo research and development process, the element of flight safety for the astronauts added another critical layer of difficulty in making risk-based decisions. Nonetheless, Phillips continued to make critical decisions on a daily basis, perhaps none greater than the decision to pursue a circumlunar orbit for *Apollo 8*.

When Phillips first broached the idea, NASA Administrator Webb wondered aloud if Phillips had lost his mind. Phillips recalled, “If a man could breathe fire through your head by a telephone my head would have been burned out.”¹³ Thus, Sam Phillips, formally interviewed at least four times for his life story by historians concurrent with his NASA experience and retrospectively, recounts the one and only time he records being chewed-out by a superior. This from a man who survived frequent encounters with Gen. Curtis E. LeMay across two weapons systems—the B-52 and Minuteman—on which the customer, LeMay, and program manager, Phillips, did not always agree. The Webb fire-breathing conversation was incident to Phillips’s attempt to convince him that changing the mission profile of *Apollo 8* from an Earth orbit mission to a circumlunar orbit was a good idea. Webb initially thought Phillips was putting the entire Apollo program in jeopardy. At first brush, Webb had a point. At the time Phillips made his pitch, *Apollo 7*, the first manned mission with the Saturn V rocket, had not even launched. *Apollo 6*, an unmanned mission, had been nominally successful with important “anomalies.” These included the failures of three rockets on the Saturn V and “pogo” (like the stick) stage oscillation with the potential to damage a spacecraft or its components. As well, the Lunar Module (LM) intended for the *Apollo 8* mission was seriously behind schedule, threatening delay of that mission and that of the lunar landing mission by the end of 1969.¹⁴

Webb did not give Phillips enough credit for thinking strategically about the program. Phillips, though he would refer to himself as a program manager even as a four-star, was very much aware of what was at stake politically, and he had carefully considered the risks. The idea championed by Phillips was that of George M. Low, the Apollo Spacecraft Program Manager. Low’s idea was to turn the LM delay liability into an asset by flying a dummy LM on *Apollo 8*, then flying the mission around the Moon rather than the Earth to accom-

PHILLIPS... APOLLO'S "ROCK OF GIBRALTAR," NEVER LOST HIS COOL. EVER THE STOIC, HE RARELY DISPLAYED EMOTION IN PUBLIC AND IS UNIVERSALLY DESCRIBED AS CALM AND COLLECTED



Phillips several of the objectives originally planned for later missions—hence helping NASA catch-up instead of adding further delay. Phillips's risk analysis assumed the correction of the *Apollo 6* anomalies as confirmed on a successful *Apollo 7* mission. Of course, he could do so because of the standard he had set for understanding anomalies—the mission would not fly until NASA engineers thoroughly understood them. Phillips did not *hope* the rockets would work, or that a stage would not “pogo,” he was nearly certain. This did not mean that Phillips thought his team could eliminate all the risks inherent in space flight, nor that the first-ever orbit of the moon was without unknown elements, but his thoughtful analysis based on solid facts and reasoning carried the day. Phillips and NASA Deputy Administrator Thomas O. Paine convinced Webb to approve the *Apollo 8* circumlunar effort pending the successful completion of the *Apollo 7* mission.¹⁵

Because Phillips led the Apollo program through *Apollo 11*, one might naturally assume it was the lunar landing mission that gave him the most emotional satisfaction. But while the photo taken at Houston's Mission Control Center after the *Apollo 11* launch shows a rare broad smile from the otherwise rather serious and taciturn Phillips, he actually considered *Apollo 8* his most personally satisfying mission, probably because his advocacy and leadership gave the mission a “go,” and enabled NASA to stay on track for a lunar landing by the end of the decade.¹⁶

The Straight Shooter

Phillips, affectionately referred to by his NASA teammates as Apollo's “Rock of Gibraltar,” never lost

his cool. Ever the stoic, he rarely displayed emotion in public and is universally described as calm and collected. Along with his enormous value as the ultimate program manager, Sam Phillips was an officer his bosses could count on to “tell it like it is,” a trait that earned him the absolute trust of boss after boss.¹⁷

Contractors, thousands of them, constituted a vital part of the Apollo program, and Sam Phillips firmly believed in treating them as cooperative partners in the enterprise. But when they failed to perform—watch out! North American Aviation (NAA) built several Apollo components, among them the Saturn-II rocket stage. This program was beset with scheduling, cost, and performance problems, failing in every key area Phillips believed essential to an effectively managed program. Moreover, NAA's failures “snowballed” across Apollo, ultimately causing delays of the Apollo missions. By late 1965, Sam Phillips had enough. He assembled a team of nearly 100 NASA experts and descended upon NAA for a management review of their Saturn-II program.¹⁸

NASA sent the team's report to NAA President J. L. Atwood, along with cover letters from Phillips and Mueller, both of whom knew Atwood as a colleague for years, beginning their letters with “Dear Lee.” That personal touch, however, was the only warm note in the report, eventually known as the “Phillips Report.” Phillips regarded frank communication with contractors as essential, and this report reflected that belief fully. The report criticized every element of NAA Saturn-II management, including program planning and control, pricing, engineering, manufacturing, and reliability. Phillips and his team turned NAA inside out, suggesting major management and personnel changes, with Phillips emphasizing that “I could not find substantial basis for confidence in future performance.”¹⁹

Unfortunately, the Phillips Report came to the attention of then Senator Walter F. Mondale following the 1967 fire in *Apollo 1*, and he used it as a tool to hammer James Webb in Senate hearings investigating the fire. This appalled Phillips, since he never intended for the document to become public. It did not really matter that the cause of the fire was unrelated to the problems Phillips highlighted at NAA, he was concerned that communications of this sort, if they were to be effective, had to stay confidential between company representatives and the government. Despite the leak, however, the Phillips Report, and other contract management reviews conducted or ordered by Phillips, resulted in changes in program managers as well as substantive improvements in performance.²⁰

Even though Phillips returned to the Air Force in 1969, his reputation as a program manager (and as a straight shooter) remained. In 1986, following the Space Shuttle *Challenger* disaster, new NASA Administrator Dr. James C. Fletcher, once Phillips's Minuteman nemesis, asked Phillips to lead a team to look at NASA's organization, particularly in regards to organization for multi-center space flight programs, as Apollo had been. So, seventeen years



Sam Phillips and family at his promotion to Brigadier General in 1960. At 39, he was the youngest general officer in the U.S. armed forces. From left to right is his wife Betty Ann (known as B.A.), and daughters Dana, Janie, and Kathleen.

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after leaving, Phillips returned to NASA. He found that, in many ways, the program management discipline he instilled in Apollo had eroded in the shuttle and space station programs. Even his treasured “singleness of responsibility,” with authority vested in one strong program director, was gone, replaced by what he called, “an organization of competing baronies,” with no one in charge of particular programs. He saved his strongest comments for the space station program, which he deemed, “a mess.”²¹

The erosion of management discipline likely occurred bit by bit over time. For example, Lt. Gen. James A. Abrahamson (USAF Ret.), former astronaut, Space Shuttle Program Director, and Director, Strategic Defense Initiative, credits Phillips with instilling the safety culture he inherited when he took over the early shuttle program at NASA, which he subsequently guided through ten successful missions. Abrahamson, who also served as Phillips’s Inspector General at Air Force Systems Command, remembers getting advice from Phillips as he prepared to move to NASA. While it is clear that certain elements of Phillips’s structure remained, by 1986, the major programs were in jeopardy.²²

Fletcher adopted many of the concrete recommendations Phillips provided, to the extent that Phillips recognized positive changes when Fletcher asked him to return in 1988 for a management review of the NASA Headquarters itself. With his usual candor, Phillips also pointed out the many ways NASA still needed to improve, particularly in program management and systems engineering, the key skill sets Phillips brought to NASA originally, “...before they existed anywhere else.”²³

Phillips on Leadership

Notwithstanding his many accomplishments, Sam Phillips maintained a low profile consistent with his quiet nature. He gave his share of speeches, but never with pleasure. He read the manuscript and sat back down, perhaps leading off with a canned joke inserted into his speech by his execu-

tive officer. If he gave grand lectures or even informal talks on the nuances of leadership, they were not recorded. Yet there is much to discern in Phillips’s leadership style from his actions—how he treated people and how he led.

Phillips worked hard, and he gravitated towards subordinates who did the same. Colonel Rye (a captain when he worked for Phillips) says that Phillips trusted him far above his pay grade, and pointed out techniques for getting things done as well as the importance of building relationships between people. By his example, Phillips showed Rye how to slice through problems—how to drill down to the key issues.²⁴

Reinforcing his strong belief in the role of program manager, Phillips, as SAMSO Commander, supported his program managers unfailingly. Though the quality of their program review briefings (and their programs) could vary widely, Colonel Rye never saw Phillips chastise a program manager publicly. He might sit through a lengthy briefing by a poorly prepared manager, say little, then spend the rest of the day, privately, counseling him.²⁵

This reflects the importance of what Phillips called “eyeball-to-eyeball,” management. Leadership, for him, was something most effectively done one on one, face-to-face. It was a style that reflected his reserved personality, and it was extraordinarily effective.²⁶

Though never publicly demonstrative, Phillips cared deeply about his troops, and he went to great pains to help with their developmental needs and promotions. The remarkable level of success enjoyed by Phillips’s former subordinates may be attributable in part to the fact that many of them were handpicked to work for him in the first place, but by any measure, working for Phillips was good for one’s career. Among former Phillips subordinates are at least eight general officers, including among them Gen. Lew Allen, former Air Force Chief of Staff, Lt. Gen. Abrahamson, as previously mentioned, and Lt. Gen. James R. Clapper, the Director of National Intelligence. His impact on these officers and many others may be his most important legacy as an Air Force senior officer.

...we, of the Apollo Program Staff, will remember well some things which have not been said to the world. Not said because only those standing before you now are among the privileged few who know Sam Phillips, the man; how he has contributed to the growth of each of us by giving unstintingly of the appreciative word, the pat on the back, the calm, gentle, yet firm and unconfused direction. You give your all and by doing so have brought out the best in all of us. This is what we will remember: You have led a superhuman effort without losing your humanity. You have done a most difficult job with humility, with style and with grace. We, your staff, can only revel in our association with you, and say, GREAT JOB GENERAL SAM!²⁷

Conclusion

In 1985, historian Richard H. Kohn conducted

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an interview aimed at capturing an oral history of Air Force research and development efforts. General Phillips participated, along with Generals Schriever, Robert T. Marsh, James H. Doolittle, and Dr. Ivan Getting. These men represented key players in Air Force research and development from the interwar years through the modern jet era.²⁸

Clearly, these men recognized how the times they lived in shaped their experiences, and how they in turn shaped the times they lived in. For their part, Schriever and Phillips recognized that the national priority of Minuteman enabled, "...a unique and revolutionary streamlined management approach." Phillips certainly understood he was the beneficiary of this fact, and of course Schriever's singular efforts to "set him up for success." As well, Phillips knew that the national priority of the Apollo Program gave him enormous, though not unlimited, resources.²⁹

All the men interviewed bemoaned acquisition processes that became increasingly complex and bureaucratic, suggesting that only another crisis would break the logjam they saw in weapons sys-

tem development as of 1985. Even in these periods of crises, however, money and emphasis are not enough. Minuteman would have probably been developed and fielded without Sam Phillips, but certainly not by 1962, and, if it was pushed back another year, would it have been cancelled as part of McNamara's flexibility review in favor of Poseidon or some other, more flexible, program? Phillips was the indispensable man in that program—the risk taker, the man who believed invention could be scheduled to meet a demanding national priority...and he did it!³⁰

Small wonder George Mueller picked Phillips for Apollo. Mueller knew *what* to do, but relied on Phillips's groundbreaking managerial skill and leadership ability to make it happen. NASA would have eventually made it to the Moon, but not before 1970, not by the date set to honor the goal articulated by an assassinated President and expected by the American people. They needed someone with the "right stuff," someone for whom "results are what count." That was General Samuel C. Phillips. ■

The Apollo leadership team. From left Dr. George Mueller, Lt. Gen. Samuel Phillips, Dr. Kurt Debus, Dr. Robert Gilruth, and Dr. Wernher von Braun.



NOTES

1. Gen. Bernard A. Schriever, Memorial Tribute to Sam Phillips, 1990, Phillips Collection, Air Force Research Laboratory Phillips Research Site History Office, Kirtland AFB, NM. Phillips hung a sign over his desk with the

inscription "Results are what count" during his tour as the Minuteman Program Manager, 1959-1963. Phillips replaced Col. Ed Hall as Program Manager. Hall biographies generally describe his tour ending on the "eve" of the

first Minuteman launch, but in fact, Phillips took over sixteen months prior to the first launch.

2. Gen. Samuel C. Phillips biography file, Air Force Research Laboratory Phillips Research Site History Office, Kirtland AFB, NM. Phillips sent the telegram in 1942, asking for transfer to the Army Air Forces. He remembered sending it to the "Chief of the Air Corps," but he may have sent it to the Chief, Army Air Forces, depending on what date in 1942 he sent it.

3. *Ibid*; Samuel C Phillips, interviews (transcript) by Martin Collins, National Air and Space Museum, February 23, 1988, June 29, 1988, and September 28, 1989.

4. Col. Gilbert D. Rye, (USAF Retired), interview by author, April 4, 2011. Col. Rye was General Phillips' Executive Officer at the Space and Missile Systems Organization; Diary of Samuel C. Phillips, January 17, 1968, Box 42, Samuel C. Phillips Papers, Manuscript Division, Library of Congress, Washington D.C. Rye also cites the fact that Phillips completely renovated his Washington D.C. home, largely with his own hands, while he was assigned to NASA, as testament to his restless personality.

5. Phillips, interviews by Collins, February 23, 1988, June 29, 1988, and September 28, 1989; Rye, interview by author, April 4, 2011. Phillips and O'Connor became career-long colleagues. O'Connor worked with Phillips on Apollo and later served as his deputy at Air Force Systems Command. He retired as a Lt. Gen. in 1975, a month after Phillips.

6. Phillips, interviews by Collins, February 23, 1988, June 29, 1988, and September 28, 1989; Roy Neal, *Ace in the Hole: The Story of the Minuteman Missile* (Garden City, N.Y.: Doubleday, 1962), p. 154.

7. See note above. At this stage in Minuteman development, SAC Commander General Curtis E. LeMay was still deeply opposed to the missile program, so Phillips had little initial support or input from SAC. Phillips did not get as many operational tours as he would have liked, but he believed in the value of R&D officers with operational experience. His own experience was key in the decision to add field maintenance joints to Minuteman.

8. Phillips, interviews by Collins, February 23, 1988, June 29, 1988, and September 28, 1989; Stephen B. Johnson, *The Secret of Apollo: Systems Management in the American and European Space Programs*, (Baltimore: The Johns-Hopkins University Press, 2002); Courtney G. Books, et al., *Chariots for Apollo: A History of Manned Lunar Spacecraft* (Washington D.C., NASA, 1979). Mueller was initially the Associate Administrator for Manned Flight and the Apollo Program Director before relinquishing the program director position to Phillips. Phillips brought fifty-five USAF officers with him to work in all parts of the Apollo program, eventually USAF support peaked at 400 officers. The three NASA centers were Marshall in Alabama, Kennedy in Florida, and the Manned Spacecraft Center (later Johnson Space Center) in Texas.

9. Johnson, *The Secret of Apollo*, pp. 130-131, 135. Consider NASA before Phillips: Mercury and Gemini were successful programs in terms of missions, but both late and massively over budget. Mercury, forecast at just under \$20 million, cost more than \$143 million. Gemini, planned at \$531 million, cost \$1.3 billion. Apollo, a far larger project, never exceeded its approximately \$3 billion annual budget by more than 1% in the years Phillips was program director; Books, et al., *Chariots for Apollo: A History of Manned Lunar Spacecraft*, pp. 129-30.

10. Samuel C. Phillips, "Rocketry in the 1950s: Transcript of AIAA Panel Discussion by Leading Participants," NASA Historical Report No. 36, October 28, 1971; Samuel C. Phillips, "Launch on December 63rd," *AIAA Journal*, October 1972. Dr. James C. Fletcher would later serve two terms as NASA Administrator, including the period fol-

lowing the Challenger Disaster in 1986. He brought teams led by Phillips in to evaluate NASA management in 1986 and again in 1988.

11. See note above.

12. See note above.

13. Samuel C. Phillips, interview by Robert Sherrod, NASA Headquarters, July 2, 1971.

14. Andrew Chaikin, *A Man on the Moon*, (NY: Penguin, 1994), pp. 56-59; Samuel C. Phillips, et al, *Apollo Expeditions to the Moon: The Shakedown Cruises*, (Washington D.C.: NASA, 1975); Phillips, interviews by Collins, February 23, 1988, June 29, 1988, and September 28, 1989. Phillips recounted his LeMay story in the Collins interview. He wrestled with LeMay over the side-by-side cockpit (vs. tandem) and over replacing the bombing system in the B-52. LeMay got his way in both cases, but Phillips learned an invaluable lesson. LeMay began his lecture with "Listen young man..." and told his staff to record everyone in the room during the bombing system briefing, so LeMay would know, for once, who to blame when it did not work. Phillips took this lesson to heart, referring to it as "singleness of responsibility," a belief he shared with LeMay and practiced the rest of his career.

15. See note above; Phillips, interview by Sherrod, July 2, 1971.

16. Phillips, interview by Sherrod, July 2, 1971; Samuel C. Phillips, interviews by Thomas W. Ray & Loyd Swenson, NASA Headquarters, July 22, 1970, and September 25, 1970. Phillips referred to the *Apollo 8* mission as "C-Prime", following a somewhat complex alphabetical mission designation mostly used internally at NASA. Similarly, spacecraft and spacecraft components had numerical designations reflecting the extent to which they could be interchanged before flying on an "Apollo" mission. The LM originally intended for *Apollo 8* is an example of this, since a dummy LM was substituted for it.

17. Phillips, interviews by Ray and Swenson, July 22, 1970 and September 25, 1970; Rye, interview by author, April 4, 2011.

18. Samuel C. Phillips, "The Phillips Report," NASA, <http://history.nasa.gov/Apollo204/phillips2.html>.

19. *Ibid*.

20. Books, et al., *Chariots for Apollo*, pp. 194-200; Johnson, *The Secret of Apollo*, pp. 143-45; Phillips, interview by Sherrod, July 2, 1971. Sherrod reported in his interview notes that Phillips "grimaced" when he asked him about whether he expected to be associated with the "Phillips Report" as it evolved from a private communication to a political tool.

21. Samuel C. Phillips, interview by Howard E. McCurdy, NASA Culture Study, June 19, 1988; Samuel C. Phillips, "Summary Report of the NASA Management Study Group: Recommendations to the Administrator National Aeronautics and Space Administration," December 30, 1986.

22. Lt. Gen. James A. Abrahamson, interview by author, March 30, 2011.

23. Abrahamson, interview by author, March 30, 2011; Samuel C. Phillips, "Effectiveness of NASA Headquarters: A Report for the National Aeronautics and Space Administration," February 1988.

24. Rye, interview by author, April 4, 2011.

25. *Ibid*.

26. Samuel C. Phillips, "Management Scheme for Apollo," *The Management of Aerospace Programs*, 1967: pp. 193-214.

27. Apollo Program staff to General Phillips, July 28, 1969, Phillips Collection, Air Force Research Laboratory Phillips Research Site History Office, Kirtland AFB, N.M.

28. Jacob Neufeld, ed., *Research and Development in the United States Air Force: An interview with General Bernard A. Schriever, General Samuel C. Phillips, General Robert T. Marsh, Lt General James H. Doolittle, Dr. Ivan Gettling*, interview by Richard H. Kohn (Center for Air Force History: Washington, D.C., 1993).

Forgotten Wars: Freedom and Revolution in Southeast Asia. By Christopher Bayly and Tim Harper. Cambridge, Mass.: Belknap Press, 2006. Maps. Photographs. Notes. Bibliography. Index. Pp. xxx, 674. \$35.00. ISBN: 978-0-674-02153-2

The dropping of the American atomic bombs on Japan in August 1945, had signaled the birth of a new era. For a moment, the British Empire held sway in Southeast Asia and dominated the great crescent of land that stretched from India, through Burma, and into Singapore and in which were both French Indo-China and Dutch Indonesia. Yet, within a few years, that domination had crumbled; and a variety of nations were struggling for independence.

This book tells the story of the birth pains of a new Asian world, mostly between 1945 and 1949, and goes into the emergence of China as a communist monolith to the north.

Each of the ten chapters covers a violent and decisive event of this period in vivid detail and well describes the personalities involved. There is a list of some key characters and additional information about them, and some others, in the text. There are thirty-four photographs as a “rogue’s gallery,” but they don’t tell the entire story. The five maps help a bit, but could have been amplified. As happens all too often, the authors commit the cardinal sin of not showing all of the places mentioned in the narrative.

The work is a sequel to the authors’ earlier *Forgotten Armies*, a book that readers who are really interested in this topic and this area of the world might want to read in conjunction with this latest volume. That raises a point about the possible readership of this book. These are “forgotten” wars for a reason: they form part of the legacy of the founding of the nations involved but don’t have the same rationale or impact beyond. Most readers are more concerned with the outcome of such revolutions than with the confusing and complex details of how they were achieved.

I enjoyed this history, but have to confess that I read it all the way through only because I was looking for information related to other subjects.

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



Warriors and Wizards: The Development and Defeat of Radio-Controlled Glide Bombs of the Third Reich. By Martin J. Bollinger. Annapolis,

Md.: Naval Institute Press, 2010. Map. Photographs Tables. Notes. Appendix. Bibliography. Index. Pp xviii, 269. \$39.95 ISBN: 978-1-59114-067-2

In researching and writing this work, the author has applied his interest in naval and maritime history to a topic that remains as relevant to today’s warfare as it did to those involved in Europe’s World War II maritime war—the practical application of standoff weapons and the methods to defeat them. Nazi Germany introduced and successfully used standoff weapons—two versions of glide bombs directed by an airborne controller—from August 1943 to August 1944. The threat was considered so great that the loss of Allied vessels, particularly those supporting the operations at Anzio between Rome and Naples, was, for some time, reported to the public as caused by mines or conventional air-dropped torpedoes.

While for the most part treating the topic in chronological fashion, Bollinger examines the roles of four distinct groups: the German scientists who devised the guidance system, the Allied scientists who sought to counter this new technology by electronic means, the *Luftwaffe* crews who attempted to deliver the weapons, and the seamen who had to deal with the consequences. Drawing on records and reminiscences from North America and Europe, Bollinger carefully attempts to identify as many glide-bomb attacks as possible. At the same time, however, he accounts for the influence of all concerned. Once having introduced the weapons, how would the Germans refine their use? How did the skippers of vessels under attack respond? What did the Allies make of their newly installed electronic gear?

The highly trained *Luftwaffe* crews experienced their greatest rate of success in the earliest months of the campaign, partly because the early targets were less well defended and partly because neither active nor passive countermeasures had been employed.

As is increasingly the case, historians examining World War II continue to recognize the importance of Britain’s code-breaking efforts. Timely dispatch of warnings enabled land-based fighters in the Mediterranean Theater (where the glide bombs were most widely used) to inflict devastating losses on the specially equipped Dornier Do 217 and Heinkel He 177 bombers. English-based radar controllers directed intercepts over Normandy. The coordinated Allied counter-air campaign, also relying on accurate intelligence, occasionally attempted to destroy these specialized aircraft on the ground at their operational bases. While aircraft

could be replaced, increasingly desperate Germany was unable to maintain experienced crews either because of inadequate training or through their loss in combat or accidents.

Without question, this is an exceptional work. It transcends many aspects of warfare. Without bogging down in electrical engineering, it deals succinctly with technical issues and draws some interesting conclusions regarding use of jamming equipment. The role of intelligence, whether technical or operational, receives its due. Then there are the air operations. While standoff weapons allowed German aircraft to remain outside the range of shipboard anti-aircraft guns, the need to guide the weapons from slow-moving aircraft without being able to take evasive action resulted in onerous air-to-air losses. The Germans expected the use of glide bombs to halt invasions. The Allies suffered losses to transports and warships; but, in a war of attrition, they ultimately overcame these setbacks.

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



Red Eagles: America’s Secret MiGs in the United States Air Force Secret Cold War Training Program. By Steve Davies. Oxford, UK: Osprey Publishing, 2008. Photographs. Notes. Appendices. Glossary. Index. Pp. 352. \$25.95 ISBN: 978-1-84603-378-0

This story of the 4477th Test and Evaluation Squadron (4477th TES) “Red Eagles” explores the avenue to more realistic air-to-air training born from the Air Forces’ pathetic performance in the skies over North Vietnam. The frustration of air combat in that war was reflected by one Fighter Weapons School instructor who said, “I’d hate to see an epitaph on a fighter pilot’s tombstone that says, ‘I told you I needed training.’” How do you best train for the most dangerous game in the world?

The answer was simple: train by fighting the “real thing.” MiG–17, –21, and –23 examples obtained from Indonesia, Egypt, Israel, and elsewhere in the 1970s were brought together at Groom Lake, Nevada (Area 51), for exploitation in 1960s programs such as Have Doughnut, Have Drill, and Have Pad. These “black” programs were flown largely by Air Force Systems Command test pilots whose results eventually found their way into classified tactics manuals. But exposing tactical fighter crewmembers to MiGs would reduce or eliminate the “buck fever”

that could paralyze them on their first combat encounters. Constant Peg began at Nellis AFB, Nevada, in April 1977, but moved to a remote airbase at Tonopah, Nevada. 4477th pilots initially came from Aggressor programs formed in the 1970s to reform Tactical Air Command's air-to-air training, make it realistic, and introduce dissimilar adversaries in T-38s and later F-5s.

The unit's first MiGs were in dangerous disrepair and had to be rebuilt. The Red Eagles brought together a unique maintenance team of innovative scroungers who could get aircraft into the air and keep them there. One Red Eagle commander explained, "We had a maintenance function that could reverse engineer parts that would have been the envy of any TAC fighter wing in the world. There were some short cuts that could be taken: you could use the nose wheel tire from a T-38 on the MiG-21, and hydraulic pumps off the F-100 would fit them". The maintenance functions employed just fewer than 100 hand-picked maintainers.

Maintenance personnel operated out of Tonopah during the week and returned to Nellis on weekends. Pilots "commuted" daily from Las Vegas, flying either a T-38 or an MU-2 light transport aircraft. To maintain their cover as Aggressors, most 4477th pilots also maintained F-5 currency. Therefore, Red Eagles were multiplexed in several aircraft: T-38s, F-5s, the MU-2, and one of the MiG-types. This did not create a problem, because the pilots were considered some of the best and most qualified; but it did make for very long workdays.

On November 1, 1980 the squadron received its first MiG-23 Flogger from Egypt. The Red Eagles would eventually have nine; but these aircraft were judged unsafe, unreliable, and inferior air-to-air fighters. It was a status symbol to fly, but "the best thing we could have done was buy as many as we could afford and give them to our enemies so they could kill themselves flying it. The MiG-23 was the best trick the Soviets ever played on themselves," observed some U.S. Flogger pilots. The MiG-17s were grounded indefinitely in 1982 because of chronic engine flame-outs and the fact that they no longer represented the viable threat facing TAC aircrews.

Aircrew exposures to the MiGs increased with support to Red Flag exercises in the 1980s, where participating units worked with the 4477th as part of their two-week deployment. Red Flag participants were multi-service, so Navy and Marine pilots joined their Air Force counterparts at Tonopah. However, after eleven years of operations, the 4477th shut down

in 1988 as the Aggressor force downsized and restructured to deal more effectively with modern threats. Its MiGs no longer represented the threats facing our fighter forces. The Red Eagles track record was impressive: from April 1977 to March 1988, the sixty-nine American MiG pilots flew 15,264 sorties and exposed nearly 6,000 aircrews to their first case of "buck fever" in a peaceful environment.

Uncovering the story of the Air Force's secret MiGs was a challenge, because much of the information was destroyed inside a Pentagon safe on 9/11. Constant Peg and the 4477th TES were declassified in 2006. Steve Davies, a military and commercial aviation photojournalist, interviewed more than thirty squadron members to provide a fascinating glimpse into a "black" program that provided "stuff of dreams" training and enabled American fighter pilots to go into their first combat having already met their adversary.

Dr. Gary Lester, Air Force Operational Test and Evaluation Center (AFOTEC) Deputy Historian, worked in the Directorate of Test, 57th Fighter Weapons Wing, in the 1980s



Ambassadors from Earth: Pioneering Explorations with Unmanned Spacecraft. By Jay Gallentine. Lincoln and London: University of Nebraska Press, 2009. Illustrations. Photographs. Bibliography. Index. Pp. xviii, 501. \$34.95 ISBN: 0-8032-2220-5

The "Outward Odyssey—A People's History of Spaceflight Series," edited by Colin Burgess and published by the University of Nebraska Press, began with *Into that Silent Sea* in 2007. It grew rapidly with distribution of *Into the Shadow of the Moon, To a Distant Day, and Homesteading Space*. The fifth volume in the series is *Ambassadors from Earth* by Jay Gallentine, a film and video engineer with a lifelong interest in space exploration. Like its companion volumes, *Ambassadors from Earth* aims to tell a portion of the space exploration story in a publicly engaging way, one replete with human passion and devoid of baffling technical terminology.

Gallentine focuses primarily on early U.S. and Soviet programs—Luna, Pioneer, Ranger, Surveyor, Venera, Mariner, and Voyager—to send robotic spacecraft beyond Earth orbit during the two decades after the launch of *Sputnik 1* in October 1957. He struggles, however, to extricate these stories from both a web of captivat-

ing details about the origins—Sputnik, Explorer, and Vanguard—of unpiloted spaceflight in Earth orbit and hypnotic tales of cosmonauts and astronauts competing to reach the Moon. Furthermore, he purposefully entangles the saga of early robotic spacecraft in a distracting, episodic account of brilliant mathematician Michael Minovitch's efforts to receive credit as "inventor" of the gravity-assist method to speed spacecraft deeper into space. As a consequence, readers of *Ambassadors from Earth* are treated to anecdotes within, behind, and on top of anecdotes.

A commendable variety of sources supplied Gallentine with information and insights. Beyond consulting appropriate books and articles, he interviewed or corresponded with more than 30 relevant individuals and examined transcripts from at least a half dozen other interviews conducted by historians from the Smithsonian Institution's National Air and Space Museum. Primary materials—reports, memoranda, letters, conference papers, press releases, and notebooks—came to his attention in private collections and at such institutional archives as the California Institute of Technology, Jet Propulsion Laboratory (JPL), NASA, UCLA, and University of Iowa. Unfortunately, the absence of annotations in the narrative renders it impossible, except in a few instances, to discern from whence the author derived unfamiliar facts or obscure interpretive points of view.

While the absence of footnotes or endnotes might not bother the average reader, it prevents a professional assessment of the author's historical accuracy. The question of accuracy looms larger when Gallentine commits a first-class faux pas by referring to Titan IV launch vehicles in the context of the 1970s Mariner program. Furthermore, his unrelenting disparagement of the Jet Propulsion Laboratory's early approach to Ranger spacecraft design and program management throws into question his objectivity as a researcher.

Stylistic frivolity in word choices and phrasing raises concern about the seriousness with which Gallentine approached his subject. The narrative abounds with glib, too-cute language: "America probably would've launched a urinal cake into orbit that day as long as it fit the nose cone"; or "A full reel of stuff measured a foot across and weighed thirty-five pounds, easily capable of fracturing the metatarsals on any butterfingered assistant." Such witty similes and metaphors might be tantalizingly delightful in a Tom Robbins' novel but seem displaced in a history—even a popular history for the masses.

Despite the aforementioned characteristics, *Ambassadors from Earth* exhibits sufficiently redeeming qualities to earn my recommendation. Gallentine introduces many lesser-known participants in early U.S. and Soviet robotic space exploration. Some of his anecdotes, like how the Australians pilfered data from *Mariner 4* to construct images of Mars before JPL, are simply precious. Finally, he has an admirable ability to simplify for lay readers how something like a radioisotope thermoelectric generator (RTG) works, and he sets the stage for a history of more recent interplanetary missions.

Dr. Rick W. Sturdevant, Deputy Director of History, HQ Air Force Space Command



Great War Commands: Historical Perspectives on Canadian Army Leadership. Andrew B. Godefroy, ed. Ontario: Canadian Defence Academy Press, 2010. Maps. Diagrams. Photographs. Notes. Index. Pp. xv, 247. Free at http://regimentalrogue.com/library/great_war_commands_godefroy.htm. ISBN:978-1-10015601

World War I combat is frequently characterized as a brutal and mindless slugfest, where hundreds of thousands died needlessly, due to leaders' stupidity and inability to adapt tactics to modern weapons of war. Common images show heroic soldiers being ordered to their deaths as generals sat in comfortable chateaus miles behind the lines, willfully ignorant of the horrors of trench warfare because they never visited the front lines. Military strategists Basil Liddell-Hart and J.F.C. Fuller and poets Siegfried Sassoon and Wilfred Owen, all veterans who deplored the waste this type of combat represented, popularized this perspective. There is truth to this perspective; but the authors in this study argue it was not the norm, at least not in the Canadian Expeditionary Force (CEF). They argue the CEF fostered a culture of innovation and imagination that was instrumental in making the Canadian Corps one of the premier allied fighting forces on the Western Front.

Renowned World War I historian Hew Strachan says the Great War represented a coming of age for the British Dominions of Canada, Australia and New Zealand. Each country fielded significant combat forces that fought as integral units for the first time. The Australians and New Zealanders are best remembered for their efforts at Gallipoli against Turkey and the Canadians for their suc-

cessful assault on Vimy Ridge.

A cadre of leaders from these countries rose to high command in a way likely closed to them in the British Army. The authors note that recent scholarship has covered many elements of Canada's military contributions to the Allied victory; but, unlike those of other countries, Canada's military leaders haven't received much attention. They present case studies of nine leaders who played pivotal roles. Some chapters evaluate the subject through the lens of the tactics of a particular battle and others through a broader study of the leader's contributions in organization or leadership in combat. All the contributors seek to identify strengths and weaknesses and focus on the key things their subjects were known for, whether good or bad. They hope to better understand their Great War leader's success and provide lessons to modern leaders.

Unlike many such compilations, the quality of the writing is consistent across the board. The authors stay focused on their subjects and answer the questions they pose. They cover a spectrum of leaders and command issues and provide a broad perspective of these men and their contributions. The evaluations are uniformly positive and the language is so frequently laudatory, it often appears like an apologia for Canadian leadership.

There are two other major issues with this book. Politics were a major factor in the Canadian Army in World War I, but the authors provide no background to help the reader understand the personalities and issues nor how these impacted troop efforts at the front. A chapter framing this interplay would help explain a great deal. I frequently resorted to internet searches as I read to find out enough to help me better understand things. Maps, Maps, Maps! Where are the maps? The authors frequently discuss very specific details of battles without a single map to help the reader picture events. Two very general maps aren't detailed enough to support the text in any meaningful way. How anyone can publish military history discussing tactics and the importance of battlefield movement without maps is beyond me.

While these detract from an otherwise well done work, they should not prevent anyone interested in the subject from purchasing this book. It is a good discussion of a little-covered aspect of Great War leadership. Godefroy achieved his purpose in "broadening the current understanding of how the CEF was led and why it performed as it did."

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



General William E. DePuy: Preparing the Army for Modern War. By Henry G. Gole. Lexington: University Press of Kentucky, 2008. Maps. Photographs. Note. Bibliography. Index. Pp.xviii, 364. \$40.00 ISBN: 978-0-8131-2500-8

This is the biography of an important soldier who is little known to the general public, but who made a big impression on his peers during a critical time in the Army's history. He was at the center of major change and was responsible for much of it. He was a man of unusual intelligence, lucid expression, and intense focus. He happened to be in the middle of the Revolution in Military Affairs. DePuy was also that rare combination of being both a doer and a thinker, able to deal with complex concepts and lead superbly in action. He was not without detractors as being ruthless in relieving those he considered incompetent. While he inspired admiration from most, there were those who resented, and even feared, him for his intensity. There are those who include him with Marshall and McNair as one of the three great trainers of the U.S. Army in the twentieth century.

The "Old Army" is the one just before: the one we look back at with nostalgia; the one in which our fathers soldiered. DePuy started in the tail-end of one such. He enlisted in the National Guard in 1937, and was in the ROTC from 1937 to 1941. The Old Army of World War I was already changing. The infantry squad was now twelve men rather than eight. The M-1 Garand was replacing the 1903 Springfield rifle. Wrap-around puttees gave way to leggings. Other developments, such as the triangular division, were not as apparent to the men in the ranks. It was a new Army in which DePuy served in World War II, from shavetail to lieutenant colonel, in an AUS division commanding a battalion and earning the Distinguished Service Cross, three silver stars, bronze star with V, two purple hearts, and a Regular-Army commission.

He eventually went on to four-star Commanding General of the Army Training and Doctrine Command from 1973-77, where he made his greatest contribution in preparing the Army for modern war, visualizing that as a massive clash at the Fulda Gap. In between he missed a conventional role in Korea because of a still-classified detail to the CIA; but he had three key assignments during Vietnam, going from brigadier to lieutenant general, including a year in command of the Big Red One, the 1st Infantry Division, where he killed more than his share of North Vietnamese but also stepped on some "friendly" toes.

The bibliography is impressive in using sources not often tapped. The photographs are well selected to help tell the story. The maps are mostly about the 90th Division in World War II and, thus, are more appropriate for a history of that outfit. Inevitably, there are a few errors on such things as appropriate grade for individuals at a particular time.

I highly recommend this book for any senior and serious scholar of the U.S. Army since World War II. It may be of less interest to the general reader.

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



A Hard Way to Make a War: The Italian Campaign in the Second World War. By Ian Gooderson. London: Conway, 2008. Maps. Tables. Photographs. Notes. Appendices. Glossary. Bibliography. Index. Pp. 352. £20.00 ISBN: 978-1-84486-059-3

In his acknowledgements, Gooderson states the obvious: that this ground has been well trodden before and that he made use of many sources, mostly secondary. This is borne out by the references in the notes and in the extensive bibliography. He suggests that he used earlier interpretations to form his own. These tend to be from the British point of view, which is understandable since he is a Senior Lecturer at the Joint Services Command and Staff College, Defence Academy of the UK. For the American reader this can be refreshing, as it gives a different perspective. Having served in the Mediterranean Theater for fourteen months, I've read extensively about operations in that theater but found some new information and ideas here. The best for me is the space given to the planning for each campaign. This is too often minimized in favor of the more exciting battles that follow, although it is equally important.

Resources to pursue an Italian Campaign were limited by Marshall's insistence on a build-up for Overlord. Economy of force in the Med should achieve the limited objectives there. Based on ULTRA intelligence, it was initially hoped the Germans would withdraw to Northern Italy. This dream was soon dashed, and the Allies became reluctantly reconciled to a slugging match the length of the peninsula. Only here were the Western Powers engaging Hitler's ground forces and providing a sort of second front to keep Stalin half-way happy, while maybe helping the future Overlord by keeping some potential defenders away

from France. The Allies were thus committed to a continuous offensive, in tough terrain and weather, and with restricted assets, against a skilled and dedicated foe.

There was a dissonance between the U.S. and the UK about the importance of the Med. Though America had bought "Europe First," that didn't mean everywhere on that content; and there was a strong feeling among the public and most leaders that Japan must be stopped and then defeated and that China must be maintained in the War. These feelings weren't shared by Churchill's government. There was suspicion about the Prime Minister's obsession with an adventure in the Balkans. The image of Perfidious Albion had deep roots in the former colonies. That image was shared by those Italians who felt betrayed because their entire country wasn't occupied and then defended against the Reich. They were disappointed (but blamed the U.S. this time) when the Tedeschi weren't chased up to the Alps after the capture of Rome because the three best American infantry divisions and the entire French Expeditionary Force were pulled out for Anvil/Dragoon. Many of the British regretted this too. From Churchill on down there was a lamentable lack of logistical appreciation of the ports in Southern France, not just to remedy the failure to seize Antwerp and other ports to the north, but to return the First French Army to *la Patrie*. The bulk of the book is devoted to events before this. The eleven months after are summarized in 15 pages.

The author employs a useful device in expounding the "voice of experience," telling lessons learned at key points in the story. The pictures are above-average in the action shots shown (though there are also a few of the obligatory ones of the Brass), but the six maps seem a bare minimum for the ground and action covered. While the book doesn't give too much about what was happening on the other side of the lines, overall it adds some things to the story of that secondary war.

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



Sharks of the Air: The Story of Willy Messerschmitt and the Development of History's First Operational Jet Fighter. By James Neal Harvey. Philadelphia: Casemate, 2011. Photographs. Notes. Bibliography. Index. Pp. v, 402. \$32.95. ISBN: 978-1-935149-46-0

Willy Messerschmitt was the creative genius behind some of Nazi Germany's

most successful aircraft, including the Bf 109 and the subject of this book, the Me 262, the world's first operational jet fighter. A lifelong aviator, Harvey has written several novels; this is his first foray into nonfiction history. On the whole, it is engaging and well written and provides a fascinating glimpse into Messerschmitt's life and work and the development of this impressive aircraft.

The book combines elements of biography and military and technical history and begins with Messerschmitt's life, showing how he became one of Germany's premier designers. Harvey frequently shifts the narrative between Messerschmitt's work and specifics of Me 262 development and a broader view of world events that impacted Germany and her military. This helps keep the aircraft's development in perspective with wartime events and keeps the story from becoming too technical. However, Harvey does provide abundant information on technical aspects of the aircraft's development; his research shows best here.

Bureaucracy, politics, design issues, and material shortages all affected development and eventual fielding of what could have been the most effective aircraft developed by either side. Harvey uses primary sources extensively, including interviews with Messerschmitt family members and employees as well as pilots and crew, to build a well-rounded picture of the troubled development program. These first-hand sources are the book's greatest strength, as the designer, builders and pilots assess in their own words their efforts and products. Thus, Harvey gives a very human face to what could have been a dry account.

As good as this book is, there are some issues. Factual inaccuracies detract from an otherwise compelling story. Most actually have nothing to do with the main story, but are part of the broader narrative about the wider war. While not affecting the main story, they are frequent enough to be distracting. Some additional information is only peripherally connected to the story and in one case (the shoot down of Admiral Yamamoto) there was no apparent connection to the subject at all. Another issue is the organization of the notes. They don't reference specific passages, but are arranged by chapter leaving the reader to infer which citation goes with the information they are curious about. Several times it was apparent there was no source cited at all. This is a serious shortcoming in any historical work.

Harvey never addresses the morality of Messerschmitt's work that so materially helped Hitler and the Nazis in their efforts at conquest. He comments several

times on Messerschmitt's concern for his workers and refusal to use slave labor; but, in the current era of greater accountability, this omission bears noting. A full biography of Messerschmitt would need such commentary, but here it would detract from the focus on Me 262 development. This book is not the final word on Willy Messerschmitt, his contribution to the *Luftwaffe* in World War II, or even the Me 262; but it is an excellent overview and a good read. I thoroughly enjoyed it and, despite its flaws, recommend it to anyone interested in this unique aircraft.

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



Night Fighters: *Luftwaffe* and RAF Air Combat over Europe 1939-1945. By Colin D. Heaton and Anne-Marie Lewis. Annapolis, Md.: Naval Institute Press, 2008. Photographs. Appendices. Index. Bibliography. Pp. xiv, 188. \$27.95 ISBN: 1-59114-360-4

In the blackened skies over Europe, the British Royal Air Force and German *Luftwaffe* waged nightly battles of survival. Using extensive interviews and research, the authors discuss this nocturnal portion of World War II. Laid out somewhat chronologically, with ventures into specific areas such as technology and tactics, the book begins by describing the initial air war that would lead the RAF to carry on its air war under the protective cover of night. This is definitely not a "there I was" type of book nor was it intended to be such. Rather, it focuses on an analytical approach of understanding the nocturnal air war.

After suffering extremely high losses during a severely flawed attack on Wilhelmshaven in December 1939, RAF Bomber Command switched to a night bombing campaign. Early results of the new tactic campaign were less than desired (primarily as a result of the difficulties locating targets at night). RAF losses were still significant. This would result Arthur "Bomber" Harris being given command of Bomber Command. Heaton and Lewis provide solid insight into the British political issues of acceptable losses and public support. Prime Minister Churchill's involvement in these issues is thoroughly discussed.

Recognizing the difficulty in effectively targeting industrial sites, Harris modified RAF targeting tactics to focus on "dehousing" the German industrial population to "cripple German industry by proxy."

Additional tactics modifications included compressing the bomber stream to minimize its overall exposure to *Luftwaffe* night fighters and using pathfinders to visually highlight the target to increase bomber accuracy.

Bomber Command's switch to a night focus resulted in a *Luftwaffe* counter. The book outlines the *Luftwaffe* focus at great length, detailing the organizational structure, assets used, and personalities involved. The *Luftwaffe*'s efforts can best be described as innovative and effective but ultimately hampered by a chronic battle for assets and the flawed leadership of Goering and Hitler. First, the *Luftwaffe* implemented a radar and flak ring around Germany, followed by multi engine radar-guided night fighters. Later they would adapt a "Wilde Sau" approach with had German cities brightly illuminated so traditional day fighters (Bf 109 and FW 190) could see and engage British bombers against the lit-up sky.

The difficulties in locating targets (RAF) and aircraft shortcomings (*Luftwaffe* and RAF) resulted in a technological war between the two sides as each worked to gain the high ground. Today we continue to reap the benefits of many of the advances discussed such as radar (ground-to-air, air-to-air), electronic warfare (jamming and chaff), and radio navigation.

Highlighting the severe impact of the high loss rate and extreme risks involved in the air war, the authors continually return to the RAF policy of branding anyone who wouldn't or couldn't continue because of fatigue or psychological stresses as "Lacking of Moral Fiber" (LMF) and permanently putting them in a negative light. While current knowledge of the stresses of war easily highlights the exceptionally flawed nature of this branding, the repeated coverage of the issue reaches the point of being a detriment to the book. A similar impact (or lack thereof on the *Luftwaffe* night fighter force is not sufficiently addressed, nor are any impacts of *Luftwaffe* night fighter losses addressed.

The book is definitely *Luftwaffe*-centric. This is evident in both the text and appendices. Even chapters meant to focus on RAF efforts return to discussions about the *Luftwaffe*. However, as a study of the *Luftwaffe*'s night defense of Germany and the night fighter force structure, the book is an exceptional source of information.

For readers looking to learn more about the *Luftwaffe* night fighters and defense of Germany, this is a solid book. However, the RAF isn't given the same level of coverage (e.g., *Luftwaffe* photos outnumber RAF photos approximately 2 to 1). Ultimately the critical views of

Harris' de-housing campaign and the RAF's LMF policy overshadow all other analytical discussions of the RAF. RAF night fighter efforts receive minimal coverage. Ultimately, the courage of the men involved on both sides is evident throughout the book. This, alone, makes the book worth reading despite its other flaws.

Lt. Col. Daniel J. Simonsen, USAF, Commander AFROTC Detachment 305, Louisiana Tech University, Ruston, La.



Coffin Corner: The True Story of Kenneth Horrigan, World War II POW in Stalag 17B. By Kenneth Horrigan. Durham, Ct.: Eloquent Books, 2010. Illustrations. Photographs. Notes. Appendices. Pp. ix, 96. \$26.50 ISBN: 978-1-60911-011-6

During my decades as a docent at the National Air and Space Museum's facilities, I have often implored World War II veterans to put their stories down on paper. That way, after they pass on, the kids, grandkids, or great grandkids who find the old shoebox full of yellowing photos in the attic and have no idea who any of the people, places, or equipment in those photos are, don't just give toss them into the trash. There was meaning associated with that relative's life and, particularly, youth.

Ken Horrigan has done just that with his small book—and it is a small, easily read book. Only 32 of its 141 pages are Horrigan's narrative of his USAAF time, incarceration in a Stalag, and return to civilian life. There is also a one-page introduction by his daughter—the one who convinced him to write his story—and three pages of dedication to the four Horrigan brothers who served in the war written by their sister.

The story is similar to that of many young American men. Horrigan was inducted into the Army Air Forces in February 1943 and trained as a radio operator and mechanic and then as an aerial gunner. In September 1943, he was assigned to Martin B-26 Marauders in the 587th Bomb Squadron, 394th Bomb Group near Kalamazoo, Michigan. The group departed the next February for service with the Ninth Air Force in England. On his eleventh combat mission over northern France, April 22, 1944, Horrigan's plane was shot down by anti-aircraft fire. Landing near German troops, he was immediately captured. By the end of the month, he was a POW in Stalag 17B in Austria. The camp was liberated by troops

of the U.S. Third Army on May 3, 1945, and Horrigan was back in the States in June.

What is really unique about the book is the organization. I noted that his narrative is rather short. That's because the rest of the book is comprised of what I call appendices. They consist mostly of photocopies of letters Horrigan sent to his folks during training, in his operational unit, from the prison camp, and after his liberation. Some newspaper clippings are also included. The book doesn't need a lot of narrative, because Horrigan's story is told through his letters (thankfully, he had good penmanship, and the copies are good, so they are easily read). All in all, it's an interesting way to see this period in his life directly through his eyes at the time.

The only nit I can pick with the book is the back book jacket. To read that, one would think this is an exposé dealing with horrors of the Veteran's Administration (VA). Horrigan does spend two pages on his unhappy experience with the VA right after the war, but this is a very small portion of the story, and the jacket is very misleading.

In short, this is a great little book for the author's family in particular and, in general, anyone wanting a quick, interesting read about one of the many thousands of young men who went off to war with the USAAF.

Col. Scott A. Willey, USAF (Ret.), Book Review Editor



Immelmann: The Eagle of Lille. By Franz Immelmann. Philadelphia and Newberry, UK: Casemate, 2009. Photographs. Notes. Appendices. Glossary. Pp. 205. \$29.95. ISBN: 978-1-932033-98-4

Max Immelmann was the prototypical fighter pilot. He wasn't the first airman to down an enemy aircraft in combat, but his name is still synonymous with air fighting—even for those unfamiliar with the man himself. He was, in fact, the first pilot to shoot down an aircraft using the famous Fokker Eindekker. This airplane sported the world's first synchronizer gear allowing a machine gun to fire forward thru its own propeller arc. This innovation gave Eindekker pilots a significant advantage in air combat by allowing them to aim their entire aircraft rather than maneuvering to position an observer to fire. Immelmann and his fellow pilots were responsible for the Fokker Scourge of early-to-mid 1915 which effectively banished Allied planes from the skies over

German lines. He is credited with developing the famous climbing reversal maneuver known as the Immelmann (interestingly enough he never describes performing this maneuver in his letters.) Besides his individual accomplishments he helped develop the fighter-squadron concept as well as formation tactics his friend Oswald Boelcke would later perfect. His prowess so impressed his British opponents that they nicknamed him the "Eagle of Lille." Aside from the maneuver bearing his name, Immelmann's contributions to air warfare are often lost in the greater fame of later pilots like Richtofen and Rickenbacker. One of the first true fighter pilots, he blazed a trail for his successors. His death at age twenty-five, victim of an aircraft structural failure after his synchronizer gear failed and he shot off his own propeller, was mourned by all Germany.

Franz Immelmann, Max's brother and another World War I fighter pilot, wrote the book both as homage to his brother and as an exhortation to a new generation of German youth to look to aviation again. He wrote the book in the early 1930s (incidentally just after Hitler unveiled the new *Luftwaffe* to the world) after discovering a cache of Max's wartime letters to their mother detailing his flying activities. Franz wrote only what narrative he felt necessary to describe Max's early life and later to fill in gaps left by his brother's letters. Therefore, the majority of the book is an invaluable firsthand look at early air weapons and tactics. An added charm is that Max's personality, serious focus on his responsibilities, humility, and often childlike delight in the awards and recognition piled at his feet are brought out. As a young lieutenant he received more high-level decorations than most field marshals could boast in a career.

The book is an excellent read. My only real complaint is the lack of supporting information on German aviation operations in the early war years. This would have lengthened the book; but for today's readers, the information would be particularly useful. However, Franz didn't write this book for the 21st century reader, so the omission is understandable. Minor editorial issues (e.g., photographs repeated with inaccurate captions) don't detract from the book's readability. The only other critique for modern editors is a lack of notes explaining items in some letters. Immelmann frequently refers to personal issues or comments on home-front news such as wartime socialist politician Karl Liebknecht's activities which show a different side of Immelmann the man. There is a decidedly nationalistic tone in Franz's writing, but this is a minor issue. All

things considered, this is a valuable book and well worth the time and price.

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



The Forgotten Squadron: The 449th Fighter Squadron in World War II. By Daniel Jackson. Atglen, Penn.: Schiffer, 2010. Maps. Tables. Diagrams. Illustrations. Photographs. Notes. Appendices. Bibliography. Index. Pp. 160. \$59.99 ISBN: 978-0-7643-3537-2

This book is noteworthy not only for its subject and narrative quality, but also for other aspects including photo quality and depth of scholarship. Most surprising is that Lieutenant Jackson conceived and finished this research project while still a college student. The excited response of veterans and families to his requests for information and the lack of official documentation on the 449th's activities convinced him this was a story that needed to be shared. The result is first class and would do any historian proud.

I didn't know P-38s served in the China-Burma-India Theater. The 449th was the virtual unknown of Chennault's not-well-known Fourteenth Air Force whose contributions have faded like the mists of the mountainous land they defended. It was the only P-38 unit stationed in China and dealt with the same maintenance, support, and supply problems that plagued every other unit there. Jackson does an excellent job discussing the unit's struggles from all perspectives and helps the reader appreciate fighting in such unforgiving circumstances.

The account of the squadron from inception to deactivation is excellent. Jackson provides enough background of world and theater events to frame the squadron's activities and help the reader understand the unit's efforts and contributions. He interviewed or corresponded with twenty-nine unit veterans, one Chinese civilian, and a Japanese researcher in developing his narrative. Numerous memoirs and reminiscences, published and unpublished, helped him recreate a robust picture of events. He even traveled to China to see some of the locations he writes about. His success is evident in the frequent firsthand accounts of events as varied as the accidental shooting of a pilot by an armaments officer demonstrating rifle maintenance; the shootdown and rescue by Chinese partisans of Rex Barber, one of the men who shot down Admiral Yamamoto;

and the story of the only enlisted man killed in theater, stabbed by a Japanese agent in a Chinese market. Throughout, the book stays focused on the subject and includes the memories and perspectives of many enlisted members, a feature frequently missing from these works. The book fills in a missing piece of the Greatest Generation's story.

This high-quality unit history is laid out as a coffee-table book; the multitude of pictures lends itself to this format. Many military histories suffer from a lack of adequate maps, but this one has plenty of useful maps. The appendices are particularly useful and include a place name listing; comparisons of Allied and Japanese fighter aircraft; a unit timeline; a record of all originally assigned aircraft and their fate; and listings of personnel killed in service, aerial victories claimed by the squadron, and kill totals for all squadron pilots.

There are a few shortcomings, however. Jackson minored in Chinese and knows the language better than most. He uses the Pinyin rather than the out-of-date but more commonly known Wade Giles renderings of Chinese place names—distracting for several locations, as the Wade Giles and Pinyin terms are not at all alike. There are a few editing errors, but the only other real complaint is the high price. Only the real student of the theater, veterans, or family members will probably ever buy it. This is a shame because the 449th veterans deserve to have their story more widely known and Jackson's talent deserves a wider audience. Schiffer and Jackson really put together a real gem in this book.

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



Command of Honor: General Lucian Truscott's Path to Victory in World War II. By H. Paul Jeffers. New York: Penguin, 2009. Photographs. Bibliography. Index. Pp. viii, 326. \$16.00 paperback. ISBN: 978-0-451-22684-6

I have to confess to a bias in favor of the subject of this book. I served under, or nearby, General Truscott from North Africa to the Rhine and acquired a strong respect for him. Since then, I've read a good share of the works about those times, including his *Command Missions*. The first part of this latest account is a biography of Truscott and gives a good picture of not only the general, but also the Regular Army of that era. The story then moves to the early part of World War II when Truscott was involved in the organization

of the Army Rangers. He then became the first American general to see action in Europe. When the war ended, he was the only Army general to have commanded a regiment, division, corps, and army in that war.

The coverage Jeffers provides of Truscott's campaigns from Morocco to the Po River is excellent. Naturally, it is centered on his contributions, which gives a different approach from other histories. Jeffers is a journalist and writes in a non-academic style. Not much has been written about our occupation of Germany and the war-crimes trials that followed the end of the conflict. As it had been in 1918-1919, the U.S. Third Army was again the army of occupation. Lucian Truscott became the Third's commanding general after Patton's fall from grace and stayed in that position until his own failing health necessitated replacement by Keyes in April 1946. Little has been written about Truscott's post-retirement activities, but significantly he was Intelligence Advisor to President Eisenhower during most of that administration.

The only major deficiency of this book is the absence of maps. Maps are indispensable in a work of this nature; I cannot understand why none was included. I also noted several dozen errors that should have been caught by closer editing by someone with a knowledge of this period of U.S. military history.

In the end, however, these are relatively minor caveats, and I highly recommend *Command of Honor* to anyone with an interest in the U.S. Army's combat role in World War II. It fills an important gap.

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



India's Armed Forces: Fifty Years of War and Peace. By Ashok Krishna, AVSM. New Delhi, India, and Hartford, Wisc.: Lancer Publishers, 1998. Maps. Illustrations. Index. Pp. ix, 181. \$20.00 ISBN 1-897829-47-7

Major General Krishna's book attempts to offer a brief history of India's military forces following partition in 1947. Paradoxically, this both works and doesn't work well. His arrangement works in the sense that the reader receives an insider's point of view on Indian military history. It doesn't work from the perspective that the history is biased in some parts. However, again paradoxically, this doesn't constitute a problem if the reader understands that the book has been written from a certain

point of view and inherently contains biases. Moreover, if the reader is particularly trying to explore how an Indian military officer writing on the topic of Indian military history views that history, the book is perfect.

One of the most interesting aspects of this book lies in the glances that one gets at the viewpoints of a career general officer from the Indian Army. While some of the general's comments are what one might expect as the "party line" with regards to conflicts between India and Pakistan and India and China, some comments about relations with other states, such as the United States, do not appear quite as orthodox. In some ways, this can lead to further questions about the differences in thought between different sectors in Indian society.

The main way in which the bias of the author becomes a problem lies in the usefulness of the book as an authoritative account on the Indian Armed Forces. Because Krishna relies so much on secondary sources and first person accounts, one has to wonder at the objectivity of those sources as well—especially because most of those sources are insiders as well. Barring the reader's own independent verification, it is impossible to substantiate the more boisterous claims of Indian prowess.

While some of the English used in the book seems a little "off" at times, possibly based on the general's language skills, it doesn't make the book unreadable. In some ways it simply serves as a reminder that the author of the book may be writing from a mental map unfamiliar to the reader.

Overall, this short book is a decent primer on the history of the Indian Armed Forces, as long as one keeps in mind the insider perspective prevalent throughout the work. Additionally, based on the sources, it can best be described as a survey, rather than any kind of original research or theoretical work. For those looking for a more balanced view of military history vis-à-vis South Asia, they are better advised to look somewhere else.

Mr. David J. Schepp, Seventh Air Force Historian, Osan Air Base, Republic of Korea



Inferno: The Fiery Destruction of Hamburg 1943. By Keith Lowe. New York: Scribner, 2007. Maps. Photographs. Notes. Appendices. Bibliography. Index. Pp. xv, 431. \$30.00 ISBN: 978-0-7432-6900-1

Keith Lowe, a sometime novelist, is a

history editor for a major London publisher. *Inferno* illustrates those qualities in this painstaking study of *Operation Gomorrah*, the combined Anglo-American firestorm devastatingly unleashed in consecutive raids in late July and early August 1943.

Hamburg was long a port with strong ties to both Britain and the United States. It was not a rabid Nazi city, nor was it a great industrial center, though it had its share of war industry. What made it an attractive target of total war was its identifiable location on the river Elbe and its flammability. Though its inhabitants and government had stripped it of much of its woodwork, its very construction made it highly vulnerable to incendiaries. Moreover, for night bombers, the physical features meant that radar could identify the aiming points.

To arguments that the firing of Hamburg was terror bombing, Prime Minister Churchill had responded that for the summer of 1940 the *Luftwaffe* had saturate-bombed—in Hitler’s word, “*Coventrien*”—British cities, or at least attempted to do so. Ironically it was beam navigation that had pinpointed these targets. In the case of Hamburg, it was not just “beams” (H2S radar) that guided the Pathfinders, but also the PM’s sanctioning of the use of “window” to “snow” the German defenses that played a vital part in the success. But as Lowe shows, the *Luftwaffe* reacted quickly and adaptively.

RAF and USAAF casualties were light until the ill-fated fourth raid on the night of 2 August. The meteorological forecast was dicey, and the PRU Mosquito came back with far too optimistic a report—upon which the strike was launched. The thunderstorm had not cleared. Crews were flying beyond their training. Thunderstorms vitiated “window” and scattered the RAF’s bombers so that they were alone and unprotected, especially on the trip home. And the *Luftwaffe* night fighters, freed from their “boxes” to operate as “*Wilde Sau*” (wild boars) enjoyed a field day of surprise and success.

Lowe’s patient research in the British, German, and American archives enables him to be both precise and picturesque. He has the novelist’s grasp of suspenseful action, both in the air and on the ground. Moreover, he is not content to close his story as the flak stopped, but to carry it on and evaluate it through the postwar famine. That was one of the worries. The Allies removed all the Nazis, but they had run the system of supply and success throughout those hard times. In the vacuum caused by their departure there was chaos. To use Martin Caidin’s 1960

title, *The Night Hamburg Died* lasted far longer than twelve hours.

Professor Robin Higham, Emeritus,
Kansas State University



Truth, Lies, and O-Rings: Inside the Space Shuttle Challenger Disaster.

By Allan J. McDonald with James R. Hansen. Gainesville: University Press of Florida, 2009. Notes. Index. Pp. xix, 626. \$39.95 ISBN 10: 0-8130-3326-8

This multi-layered book illuminates how government, industry, and academe create, manage, and operate technocratic projects. It is not a military history piece, although *Air Power History* readers will find vignettes of Air Force General Don Kutyna’s role in the *Challenger* post-mortem fascinating. Nor is it a narrative on the grandeur of human spaceflight praiseful of the NASA, contractor Morton Thiokol, or technocracy. It is the memoir of a leading member of the NASA-Thiokol team that ultimately launched *Challenger* that fateful day and who was instrumental in pinpointing the disaster’s causes and then safely designing, building, and flying much-improved solid rocket boosters (SRBs) that helped return the system to flight.

It is a critical memoir but fair. Author, engineer, and executive Allan McDonald was Thiokol’s director of the Solid Rocket Motor project. He opposed the launch, along with other engineers, and paid a high personal and professional price. While the book is his product, he was assisted by respected aerospace historian James R. Hansen, who wrote 2005’s acclaimed *First Man: The Life of Neil Armstrong*.

Readers may digest the product on many levels. It is not a generalized chronological tale of what happened during the *Challenger* explosion and deaths of seven astronauts. Those seeking such an understanding should first skim Hansen’s bibliographic essay for a more popular audience introduction. Rather, the authors demonstrate the detailed functioning of government, industry, and academe in an aerospace case study in which McDonald was a first-person participant. As such, he analyzes primary sources retained for over two decades detailing engineering, leadership, and management personalities and decisions involved in the Shuttle program. He is not so much telling the tale of *Challenger* as much as illuminating relationships in an important segment of the aerospace com-

munity, demonstrating that success in such work demands heterogeneity in engineering, management, operations, and sundry bureaucratic skills.

Details matter in rocketry. As a history-of-technology piece, McDonald significantly provides a plethora of explanation covering the design, function, and limitations of the joint-sealing O-rings. He repeats his descriptions sufficiently for readers to retain them without loss of freshness, for the details are important. Retaining sight of the Shuttle’s unbending temperature limitations, O-ring sealing characteristics, and operational and test data allows the reader to comprehend the roles of human personality, organizational limitations, institutional culture, and, one may add, faulty operational doctrine, in launching the vehicle McDonald methodically discusses competing explanations and disposes of them, never losing sight of how final arbiters ignored important data to “go for launch.” He explains *Challenger* was the first time he had to justify to NASA *not* to launch a rocket vice convince them why it was safe to do so.

The bulk of the narrative and analysis covers the work of the post-accident presidentially appointed investigative agent, the Rogers Commission. Herein scholars will see the challenges accident investigation bodies face, including honest confusion, faulty memory, deplorable lies and cover-ups by NASA and industry leaders, and sustained demonstration of pure integrity and bureaucratic courage by engineers, managers, astronauts, and Commission members. The success of any technocratic endeavor depends upon the depth of the questions asked and the courage of the answers; the Rodgers Commission and those within government, industry, and academe who redesigned the SRBs asked and answered well. McDonald’s description of the return-to-flight process is equally insightful, as is information on the 2003 *Columbia* tragedy.

This is a serious historical work. McDonald retains his passion for what happened during and after the accident, but he does not allow his judgment to cloud. Hansen’s historiographical essay rightly stresses the importance of McDonald’s contribution as the only serious work produced by one of the *Challenger* launch, post-accident, and return-to-flight principals. Aerospace historians will find the book insightful for illuminating how and why the accident occurred; the interactions of government, industry, and academe; and the continued relevance of human agency within technocratic projects. Military historians and strategists will find themselves drawn to

the role of attempting to create an “operational” system out of a complex assemblage lacking a clear mission. Scholars interested in bureaucratic behavior will find grist for their mills. *Truth, Lies, and O-Rings* is a critical history on a weighty topic with lessons that may be generalized to many such endeavors.

Dr. Steven A. Pomeroy, Assistant Professor of Military and Strategic Studies, USAF Academy



Known and Unknown: A Memoir. By Donald Rumsfeld. New York: Sentinel, 2011. Photographs. Illustrations. Maps. Notes. Index. Pp. 815. \$36.00 ISBN 978-1-59523-067-6

Secretary of Defense (SecDef) Rumsfeld left the Bush Administration in 2006 and practically disappeared from sight until the publication of this memoir, a substantial and clearly written work that in all likelihood will be viewed, above all else, as an apologia. Beyond that, it is a personal account of his incredible track record in government and in the private sector.

His government service spanned four decades and encompassed shaping events in American domestic and foreign policy. He was a four-term congressman; senior advisor to several US presidents; ambassador to NATO; twice SecDef; special ambassador to the Middle East in the aftermath of the Beirut bombing; presidential chief of staff; ambassador on the Laws of the Sea Treaty; and chairman of the Cost of Living Council, Commission to Assess U.S. National Security Space Management and Organization, and the Ballistic Missile Threat Commission. He was a respected and feared Republican power broker and was considered several times as a vice presidential candidate. Outside of government, he was a successful CEO and chairman of several corporations.

Rumsfeld portrays himself as a hard-driven, highly focused, and intelligent leader, with a politically and fiscally conservative vision for government and national security. If his vignettes are accurate, he was also a fair-minded and thoughtful task master. He cites his decision, as SecDef, to continue USAF General Brown as JCS Chairman after some of his comments displeased President Ford. One immediately thinks of the opposite outcome when SecDef Cheney fired Air Force Chief of Staff General Dugan for his comments. Rumsfeld also discusses his successful struggle with opposing Army brass to have the M-1 tank selected for produc-

tion. He was a proponent of the B-1 bomber and the ballistic-missile-defense system (for which he was a key player in having the Anti-Ballistic Missile Treaty repealed), an outspoken opponent of détente, and tireless in his effort to reform the Pentagon’s way of doing business.

His six years as SecDef under President George W. Bush are of particular interest and consume two thirds of the book examining his involvement in military transformation, 9/11, Hurricane Katrina, the Afghanistan and Iraq wars, and the global war on terrorism (GWOT). Rumsfeld argues that the National Security Council (NSC) and National Security Advisor (NSA) were not nearly as effective as was needed, especially in the aftermath of 9/11. He places the blame squarely on NSA Condoleezza Rice who failed to facilitate a clear flow of viewpoints and supporting arguments between NSC members and the President. In his view, she marginalized differences of opinion, giving a misleading impression there was consensus on different issues. One unfortunate consequence was that the war in Iraq both exacerbated flaws in the system and suffered from an inharmonious war cabinet. Rice also created confusion in the management of the Iraq occupation by circumventing Rumsfeld’s linkage to Paul Bremer, the unpredictable head of the Coalition Provisional Authority.

Rumsfeld’s account of decision making is a litany of repeated frustration. Failures within the intelligence agencies and an often dysfunctional NSC undermined him. He highlights clashes with the State Department, especially Deputy Secretary Armitage, over media leaks that impinged on Rumsfeld’s credibility and effectiveness. It appears he also wasn’t enchanted with either Secretary of State Colin Powell or Paul Bremer. He takes issue with the belated argument, in the embarrassing aftermath of locating no weapons of mass destruction, that bringing democracy to Iraq was a key reason for the invasion. It was both disingenuous and potentially alarming to non-democratic partners in the Middle East.

Rumsfeld describes his roles in the evolving GWOT, the move to war in Afghanistan and Iraq, and his outrage when the Abu Ghraib abuses came to light. He also describes his disappointment with critics, especially in the media, who, from his perspective, misrepresented or distorted his position and that of the President on a number of national security issues.

This is a must-read memoir, rich in details, that should lead to a better understanding of how the United States ended up in two of the longest running conflicts

in its history. Rumsfeld has now presented his side of the story in a number of events that led to serious criticism of his leadership, judgment, and decision making. A reader may draw a different set of conclusions on his role in the events described in this memoir; but Rumsfeld’s view is, all the same, compelling.

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



Hero of the Air: Glenn Curtiss and the Birth of Naval Aviation. By William F. Trimble. Annapolis, Md.: Naval Institute Press, 2010. Photographs. Notes. Bibliography. Index. Pp. xvi, 270. \$37.95 ISBN: 978-1-59114-879-1

This is a timely book, as 2011 marks the 100th anniversary of Naval Aviation. Trimble deals with his subject in an objective manner, avoiding the trap of many writers about the era who show barely concealed bias toward either Glenn Curtiss or the Wright Brothers, even though their legendary feud ended nearly a century ago. With his “just the facts, Ma’am” approach, Trimble is able to provide a clear, cogent telling of the remarkable story of how air power came to the U.S. Navy, and Curtiss’ powerful influence on its development.

The book traces Curtiss’ early life, running a bicycle shop to help feed his family after his father’s death, and becoming a bicycle-racing champion. Turning his attention to motorcycles, he again became a champion rider. In 1907, he became known as “The Fastest Man on Earth” for roaring through a measured mile at 136.3 mph. But his real interest was in engines, and it was this interest that caused him to back into the then fast-developing world of aviation.

One strength of the book is that, while the focus is on Naval Aviation, Trimble has admirably placed those developments in the context of the general advance in aviation. Curtiss developed many engines, each more reliable and more powerful than its predecessors. Using these, he won many awards and prizes, such as several Scientific American prizes, the Gordon Bennett Trophy, and the Collier Trophy (twice).

Those years saw many villains, as well as many heroes. Among the heroes are Eugene Ely, a Curtiss test pilot, who made the first-ever takeoff from, and landing on, an anchored Navy ship in 1910. And, without the vision and wisdom of Captain Washington Irving Chambers,

Naval Aviation would have not come about for some years after 1911. These were also the prime years of the litigious dispute between the Wright Brothers and Curtiss, which had a profound impact on the development of aviation in the U.S.

Curtiss delivered the first Navy aircraft, the A-1 Triad (able to operate from the water, land, and in the air) in the summer of 1911 at his hometown of Hammondsport NY, teaching, among others, Naval Aviator #1, Theodore "Spuds" Ellyson, to fly. Other great successes were development of the first flying boat, the famed OX-5 90-hp V-8, and the immortal JN-4 Jenny and its floatplane version, the N-9H. The book notes that as aeronautical engineering became a recognized science, the uncanny "seat-of-the-pants" engineering prowess of Curtiss that served him so well for several decades was being overcome by a more scientific approach as aircraft continued to evolve and expand the known limits of aviation.

Trimble winds up his story with the realization of one of Curtiss' dreams—seeing one of his aircraft fly the Atlantic Ocean. The massive, four-engine NC flying boats (Navy Curtiss) were developed for anti-submarine patrols. In May 1919, three of these craft set out to fly from Trepassey Bay, Newfoundland, to the Azores. Only the NC-4, commanded by LCDR Albert Read, made the crossing as planned. The Smithsonian-owned aircraft is displayed at the National Naval Aviation Museum in Pensacola FL.

William Trimble has done a great service to those interested in the early days of aviation, and especially the development of Naval Aviation. What Glenn Curtiss would think of supersonic F/A 18 Hornets taking off from the deck of a nuclear-powered carrier far at sea can only be imagined.

Capt. Maury Cagle, USNR (Ret.), Docent, NASM's Udvar-Hazy Center



Patton: The Pursuit of Destiny. By Agostino von Hassell and Ed Breslin. Nashville, Tenn.: Thomas Nelson, 2010. Photographs. Bibliography. Pp. xxv, 195. \$19.99. ISBN: 978-1-59555-056-9

This book is part of a series entitled, *The Generals*, that is apparently intended for a popular audience, possibly at the high-school level. There is no question that

Patton is a figure who deserves continuing attention. Of the twelve U.S. generals who commanded field armies in World War II, he was the most flamboyant and best publicized. Whether he was the best leader is still a matter of debate. Field Manual FM 6-22, *Army Leadership*, lists twelve attributes and eight competencies of leadership. Patton scores high on these, but resilience and tenacity are tops. Without question, Patton's fame was enhanced, and interest in him revived, by the production in 1970 of the film in his name, featuring George C. Scott, which gives a sensationalized portrayal.

Von Hassell attempts to give the story of the man, acknowledging the flaws but emphasizing the undoubted talents. Unfortunately, he fails to convey Patton's feelings about a possible display of his own cowardice—that it would be destructive to his self-image. Fear is a natural instinct, necessary for survival. I can testify that it is also natural for a leader to be uncertain how he will react when first under fire.

One of the noted aspects of Patton's persona was his frequent use of profanity. Von Hassell unfortunately does not grasp the difference between obscenity and profanity and when Anglo-Saxon terms for bodily functions are more appropriate than euphemisms.

It has now been forty years since the film was released, so I wonder how much current awareness there is of the general. My son teaches a college history course where many of the students are in Army ROTC. Only one-third of these students had heard of Patton, and a mere 20 percent had seen the movie.

The book has a very modest bibliography but no notes or index. What is inexcusable in a work that covers a number of battles is the complete lack of maps. While the photographs are helpful, there are far too many factual mistakes and dubious and unverified conclusions for this to be considered reliable history. Though some parts are interesting, I do not recommend this to anyone interested in a biographical study of one of the most interesting characters of the Second World War.

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



Between Threat and War: U.S. Discrete Military Operations in the Post-Cold War Period. By Micah Zenko.

Stanford, Calif.: Stanford University Press, 2010. Maps. Illustrations. Notes. Appendices. Index. Pp.xii, 228. \$14.00 paperback ISBN: 978-0-8047-7191-7

Despite the War Powers Resolution of 1973, the U.S. under the so-called Presidential authorization, has continued to engage in various levels of military operation without Congressional approval. When there are foreign threats that can't be resolved by economic or political measures, the country's leaders resort to military force. This book uses the term "discrete military operation" (DMO). The word "discrete" could be confused with "discreet," but is clearly used here in the sense of being distinct, separate, or apart.

Zenko has identified thirty-six DMOs between 1991 and 2009, and fourteen cases of non-use. Though he names only three of the latter, there were probably many more times when a military option was considered at the highest levels. Some were not adopted because a decision was reached of non-feasibility due to such things as the loss of surprise—often because of media leaks. All these overlap with another bucket of worms, covert operations by the CIA, which may never be reported.

The main part of the book is four case studies of DMOs that explore selected incidents in depth. The final chapter has conclusions and policy recommendations. More important than the success or failure of specific operations is the discussion of how alternatives such as these can be used in the implementation of foreign policy. It's reassuring that this part of the spectrum of choice is used.

There are supposedly forty-eight different war plans on the shelf for possible contingencies. Some readers may recall the Color Plans of an earlier era. At one time, the War College was rumored to have made a plan for Patagonia. Unfortunately, none was prepared for Grenada.

Micah Zenko is a fellow in the Center for Preventive Action at the prestigious Council on Foreign Relations. He provides no bibliography, but the voluminous notes give a good idea of the sources and the extensive research done. The facts assembled here are in a different format and context that heretofore seen and are worth reading by anyone concerned with policy selection.

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



Books Received

Carlson, Elliot. *Joe Rochefort's War: The Odyssey of the Codebreaker Who Outwitted Yamamoto at Midway*. Annapolis, Md.: Naval Institute Press, 2011. Maps. Notes. Illustrations. Photographs. Appendices. Bibliography. Index. Pp. xiv. 572 \$36.95 ISBN: 978-1-61251-060-6

Davies, R.E.G. *Airlines of the Jet Age: A History*. Washington, D.C.: Smithsonian Institution Scholarly Press, 2011. Maps. Notes. Appendices. Photographs. Illustrations. Bibliography. Index. Pp. xvi, 461. \$99.95 ISBN: 978-0-9788460-8-4

Ford, Douglas. *The Elusive Enemy: U.S. Naval Intelligence and the Imperial Japanese Fleet*. Annapolis, Md.: Naval Institute Press, 2011. Maps. Notes. Bibliography. Index. Pp. xiv. 297. \$29.95 ISBN: 978-1-59114-280-5

Gordon, John. *Fighting for MacArthur: The Navy and Marine Corps' Desperate Defense of the Philippines*. Annapolis, Md.: Naval Institute Press, 2011. Maps. Notes. Illustrations. Photographs. Bibliography. Index. Pp. xiii. 370 \$32.95 ISBN: 978-1-61251-057-6

Hoe, Alan. *The Quiet Professional: Major Richard J. Meadows of the U.S. Army Special Forces*.

Lexington: The University Press of Kentucky, 2011. Notes. Appendix. Photograph. Index. Pp. xvi, 253. \$29.95 ISBN: 978-0-8131-3399-7

Jones, Priscilla D. *The First 109 Minutes: 9/11 and the U.S. Air Force*. Washington, D.C.: Air Force History and Museums Program, 2011. Photographs. Notes. Diagrams. Tables. Pp. 87. Paperback U.S. GPO 2011-365-240/93301

Kaplan, Edward A., Ed. *High Flight: History of the U.S. Air Force Academy*. Chicago: Imprint Publications, 2011. Notes. Index. Pp. xii, 312. \$29.95 Paperback ISBN: 978-1879176-46-1778

Okerstrom, Dennis R. *The Final Mission of Bottoms Up: A World War II Pilot's Story*. Columbia and London: University of Missouri Press, 2011. Notes. Photographs. Bibliography. Index. Pp. x, 254. \$29.95 ISBN: 978-0-8262-1948-0

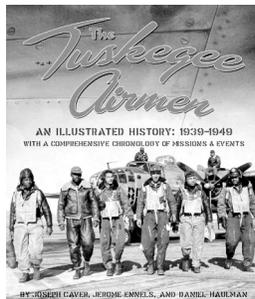
Smith, Richard K. and R. Cargill Hall. *Five Down, No Glory: Frank G. Tinker, Mercenary Ace in the Spanish Civil War*. Annapolis, Md.: Naval Institute Press, 2011. Maps. Notes. Illustrations. Photographs. Appendices. Index. Pp. xiii, 377. \$36.95 ISBN: 978-1-61251-054-5

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

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(Required by 39 USC 3685)

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From the President

Dear Member,

By the time you read this, our third biennial symposium will have concluded at Andrews AFB's new Conference Center in the Jacob Smart Building. This year's theme was "Air Power and Global Operations: 9/11 and Beyond," and featured panels of historians, analysts and leaders who directed air operations during this period. The symposium will have been capped by our annual awards presentation, which included the fifth Gen. Carl "Tooe" Spaatz Award presentation to Lt Gen James R. Clapper Jr., Director of National Intelligence, and also our fifth Maj. Gen. I.B. Holley Award presentation to Mr. Joe Caver of the Air Force Historical Research Agency. Your Foundation is very proud to host these symposia and recognize these worthy individuals for their lifetime service in the making and the documentation of Air Force history.



Let me take this proud occasion to repeat the Foundation's Mission Statement:

The Air Force Historical Foundation is dedicated to promoting the preservation and appreciation of the history and heritage of the United States Air Force and its predecessors. The Foundation seeks to inform and inspire the men and women who are, or have been, affiliated with the Air Force and the general public, particularly those with an interest in national security, about the dynamic heritage of air and space power and its relevance to contemporary and future issues.

We believe that, over our nearly sixty years of existence, the Foundation has remained steadfast in accomplishing this mission, and we have largely succeeded. The question is, going forward, how can we continue to pursue and—hopefully—achieve our goals? Money is tight: membership is declining; corporate and governmental support dwindles, as the Defense budget is cut, and hard cover books are replaced with electronic reading devices. Our business model that has sustained us through the years perhaps needs some readjustment.

At this critical crossroad, your Foundation needs you more than ever. As we look toward our fast approaching Sixtieth Anniversary in 2014, we not only need your financial support, but your ideas regarding how we remain viable and relevant to our mission and membership. We will soon post a survey section on the Foundation web page. Please visit it soon and help keep the lines of communications open.

A handwritten signature in black ink that reads "Dale W. Meyerrose". The signature is written in a cursive style and is underlined with a long, horizontal stroke.

Dale W. Meyerrose, Maj Gen, USAF (Ret)
President and Chairman of the Board

2011 Foundation Symposium



(Left, left to right) Keynote Speaker Hon. Thomas J. Ridge, Maj. Gen. Dale W. Meyerrose, Air Force Historical Foundation President, Dr. Priscilla Dale Jones, Panel Chair and Organizer, and Foundation Executive Director Jim Vertenten.

(Below) Keynote Speaker Hon. Thomas J. Ridge addresses the audience

(Below left) Foundation Executive Director Jim Vertenten welcomes the attendees.



(Above) Panel on **9/11 and Operation Noble Eagle**. (Left to right) Col. Miles L. Kara, Sr, USA, (Ret.), John J. Farmer, Jr., Dean, Rutgers-Newark School of Law, Maj. Gen. Larry K. Arnold, USAF, (Ret.) and panel chair Dr. Priscilla Dale Jones, Air Force Historical Studies Office.

(Above) Maj. Gen. Dale W. Meyerrose, Air Force Historical Foundation President, introduces Keynote Speaker Hon. Thomas J. Ridge.



Dr. John Q. Smith, Air Force Historical Studies Office, introduces **The Global War on Terror and Operation Enduring Freedom** panel.



(Above) **The Global War on Terror and Operation Enduring Freedom.** (Left to right) Dr. Christopher N. Koontz, Air Force Historical Studies Office, Dr. Rebecca L. Grant, Director, Gen. Billy Mitchell Institute for Airpower Studies, and Lt. Gen. Robert J. Elder, USAF, (Ret.)



(Left) Dick Anderegg chaired a panel on **New Operational Paradigms and Innovations**, whose members were (left to right) Randy Bergeron, AFSOC, Dr. Daniel L. Haulman, AFHRA, and Lt. Gen. Christopher A. Kelly, USAF, (Ret.)

(Below) Maj. Gen. Curtis Bedke USAF, (Ret.) presented the Keynote address on Day Two of the symposium.

(Below) **Operation Iraqi Freedom and Operation New Dawn.** (Left to right) Dr. Benjamin S. Lambeth, Center for Strategic and Budgetary Assessments, Lt. Gen. Walter E. Buchanan, III, USAF, (Ret.) and Chair, David A. Byrd, Air Force Historical Studies Office. The panel included (below right) George W. Cully, former Director Air University History Office. Dr. Lambeth also won the Best Article Award for 2010.





(Above left) Lt. Gen. Christopher D. Miller, USAF, DCS/Strategic Plans & Programs, (left) and Foundation President Maj. Gen. Dale W. Meyerrose, USAF (Ret.) flank Gen. Carl A. "Tooney" Spaatz Award winner, Lt. Gen. James R. Clapper, Jr., USAF (Ret.). General Clapper is Director of National Intelligence.

(Above right) Foundation Administrator Angela Bear (right) registers symposium attendees.

(Right) Foundation President Meyerrose and Dick Anderegg (right) surround Maj. Gen. I. B. Holley Award winner Joseph D. Caver, AFHRA.

(Below) Dr. Robert S. Ehlers, Jr., won the Foundation's Best Book Award.

(Below right) Air Force History and Museums Program Director Dick Anderegg (left) hands out special History coins to the two individuals primarily responsible for the symposium's success, Foundation Executive Director Jim Vertenten (center) and Dr. Priscilla Dale Jones, Air Force Historical Studies Office.



Thank You, Reviewers

It's customary to list those individuals who have helped to produce this journal. Atop the list, of course, Brig. Gen. Alfred A. Hurley, our publisher, provides wise guidance regarding all aspects of *Air Power History*. Assistant Editor Dr. Richard Wolf performs layout, design, and typesetting. Col. Scott Willey, the book review editor, makes his demanding job look easy – it's not. Bob Dorr, our technical editor, possesses an enormous data base on airplanes; it's in his head. John Kreis chairs the annual best article and best book committees. After others have proof read the manuscripts, Eileen and Richard De Vito re-read every line of type and till manage to discover and eliminate errors. Executive Director Jim Vertenten and Office Manager Angela Bear handle myriad administrative chores, including the very important Foundation's home page. I am delighted to thank the reviewers of articles and book reviews. If you are aware of anyone I may have missed, please let me know.

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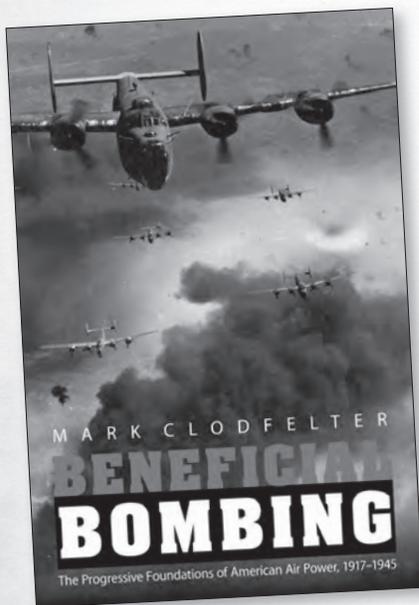
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“A thoughtful and well written account of a central thread in the thinking of American airpower advocates and the way its implementation in two world wars took place at the time, was seen afterwards, and has come to be enormously influential in the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

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



Beneficial Bombing

The Progressive Foundations of American Air Power, 1917–1945

MARK CLODFELTER

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

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News

History Department displays Unique Aviation Artifact

At the conclusion of the movie, *Raiders of the Lost Ark*, a government employee pushes an unlabeled crate that is assumed to contain the Ark of the Covenant into a vast storage facility containing thousands of identical boxes. For many years a similar, if much smaller, repository existed in the basement of Harmon Hall. Scores of irreplaceable aviation artifacts were stored there, collecting dust and exciting little interest. Among them was a 1/48th scale B-25 model fashioned of wood. Retrieved from the basement and adopted by the Department of History, the model was displayed prominently for many months until its age and condition mandated minor repairs.

During this restoration a small rolled-up piece of North American Company notepaper was discovered hidden in the fuselage. The note had the simple, penciled

inscription "Elton Whitfill, 1944." Subsequent investigation revealed that the often-overlooked model was actually one of only seven very special presentation examples made during World War II. One apparently went to General Jimmy Doolittle, who flew the B-25 bomber on his famous Tokyo raid. The governors of Kansas and Missouri each received one. Another went to General Dwight Eisenhower. It's likely a sixth went to General Carl Spaatz and eventually found its way to the Air Force Academy. The final model was reserved for the President of the North American Company, the actual bomber's manufacturer.

It turns out that Elton Whitfill crafted and built the seven models. Born in 1913, Whitfill joined the North American Aviation Corporation in 1941 as a pattern-maker and eventually rose to become general foreman of his shop. As a pattern-maker he was responsible for the creation of wooden molds for the B-25 bomber, an essential process linked to the production of metal die-casts. Before the molds could be used for manufacturing, various exact scale mock-ups are necessary in order to give designing engineers a tangible cre-

ation for further tests and modifications.

After World War II, Elton Whitfill built master plans for the Lockheed P-80 Shooting Star, one of the Air Force's first jet aircraft. His long and successful career spanned scores of years and he participated in the production of state-of-the-art propeller aircraft, jet aircraft, and spacecraft. He passed away in 2008.

Much of the background on the model and Elton Whitfill's life comes as a result of a visit by Whitfill's daughter, Joyce, and son-in-law Lt Col James D. Caven, USAF (retired). Contacted as a result of the department's discovery, they were gratified to learn that his handiwork will continue to inform and inspire future generations of cadets. It's not clear where all seven models currently reside. But it's noteworthy that one is on display at the Eisenhower Museum in Abilene, Kansas and another merits a place at the National Air and Space Museum in Washington, DC. And, most certainly, the Academy's Department of History is proud to display its own!

Submitted by 2d Lt. Alexander M. Milhous, USAF, USAFA/DFH.

AFSA

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As one of the nation's most trusted non-profit organizations, the Air Force Sergeants Association (AFSA) promotes and protects the benefits and rights of **Total Air Force** (Air Force Active Duty, Air National Guard, Air Force Reserve Command) enlisted members and their families.

In Memoriam

Reginald C. Augustine, 1913-2011

Reginald C. Augustine was born in Decatur, Illinois on October 12, 1935; he died on June 30, 2011, at Sibley Memorial Hospital in Washington, D.C. Involved in intelligence during World War I, Augustine took part in a mission to capture some leading German scientists, including Otto Hahn, the discoverer of the nuclear fission principle. Code named Alsos, the operation came under the direction of Lt. Gen. Leslie R. Groves, head of the American effort—the Manhattan Project—to build an atom bomb. While searching for the Germans near Toulouse, France, Augustine turned on the Geiger counter that he had brought along. After searching the area meticulously, the Alsos team discovered some thirty-one tons of nuclear materials. These were shipped to General Groves for use in the “Little Boy” dropped on Hiroshima. Augustine also brought back a galaxy of German star scientists, including Hahn, Nobelist Max von Laue, Karl Wirtz, Erich Bagge, and Carl von Weizsacker. For this extraordinary service, Augustine was awarded the Order of the British Empire by King George VI. He is survived by his wife, Juno Yolanda DeCastro; two daughters, Dolores Augustine and Nancy Oppenheim, and two grandchildren.

Brig. Gen. Simeon Kobrinetz, USAF (Ret.)

The first rabbi to attain general officer rank, Simeon Kobrinetz, died on September 6, 2011, at Silver Spring, Maryland. He was eighty three. Fittingly, the rabbi was buried September 9, on Chaplain’s Hill at Arlington National Cemetery. Rabbi Kobrinetz led the campaign to establish Chaplain’s Hill as a memorial to fallen Jewish chaplains. The memorial is currently touring East Coast synagogues, military installations, and civil institutions. It is scheduled for dedication t Arlington on October 24.

Born in Brooklyn, New York, he was graduated from Columbia University; studied at Yeshiva University; and earned a Ph.D. from the Jewish Technological Seminary. In 1970, after serving as Hillel Director at the University of Florida and the University of Miami, he served as national chaplain of the Department of Veterans’ Affairs, including rising to president from 1976-1978. At the time of his death, Kobrinetz was also president of the Jewish War Veterans.

Rabbi Kobrinetz is survived by his wife of fifty-two years, Beverly; three children, Nina Multak; David Kobrinetz, and Alisa Chernack; sister, Rita Bassett; and six grandchildren.

Benjamin Goldman, 1922-2011

Benjamin Goldman passed away on March 22, 2011, at home at the age of 89. Mr. Goldman had a long career in public service. He enlisted in the Army Air Corps shortly after Pearl Harbor and became a waist gunner on a B-17. In June 1944, while returning from his second bombing mission over Berlin, he was shot down and taken prisoner by German armed forces and held at Stalag Luft 4 until liberated by Soviet troops in 1945. He bemusedly recalled the Nazi interrogators misperceiving the significance of his last name, saying “Goldman? Your German ancestors would be very disappointed.” Upon his return from the war, he completed graduate studies in history and became a military historian, working for more than forty years at Langley Air Force Base. He retired as head of the Office of History for Tactical Air Command. Subsequent to his retirement, he and his wife were active volunteers at the Virginia Living Museum. He also volunteered at the Veterans Administration Hospital in Hampton. He was active in the Torch Club, Rodef Sholom Congregation, and the American Ex-Prisoners of War Organization. He was preceded in death by Jane, his wife of sixty-four years, in 2007. He is survived by his daughter, Lyndall Miller of Philadelphia; his son, Roger S. Goldman of Park City, Utah; and four grandchildren.

Funeral services were held on March 24. In lieu of flowers, please send donations to the Virginia Living Museum or to Buildable Hours, Inc. (www.buildablehours.com).

Guidelines for Contributors

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

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

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

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

Manuscripts and editorial correspondence should be sent to Jacob Neufeld, Editor, c/o *Air Power History*, 11908 Gainsborough Rd., Potomac, MD 20854, e-mail: editor@afhistoricalfoundation.org.

2012

Stalag Luft III April 17-21, 2012
Dayton, Ohio. Contact:
Marilyn Walton
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New Albany OH 43054
(614) 855-4161
waltonk9@gmail.com

351st Bombardment Group June 14-17, 2012, Erlanger, Kentucky. Contact:
Deborah Eason
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Milledgeville GA 31061
(478) 453-7388
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B-52 Association Dayton/Fairborn, Ohio. August 9-12, 2012. Contact:
Wayne Pittman
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50th Supply Squadron (Hahn AB, Germany) October 1-6, 2012, Dayton Ohio. Contact:
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355th Fighter Group Association Fairborn, Ohio, October 4-8, 2012. Contact:
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The Association of Air Force Missileers Great Falls, Montana, October 10-14, 2012. Contact:
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www.afmissileers.org
aaf@afmissileers.org

463rd Bomb Group Historical Society October 11-14, 2012, Dayton /Fairborn Ohio. Contact:
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Art Mendelsohn Jr
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www.463rd.org

2013

The B-52 Defensive Fire Control System Association June 13-16, 2013 Fairborn Ohio. Contact:
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510th Fighter Sq. September 4-8, 2013
Mason, Ohio. Contact:
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379th Bomb Group Association September 5-8, 2013, Dayton/Fairborn Ohio. Contact:
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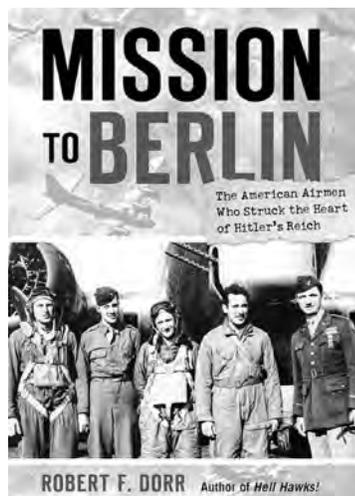
MacDill Flyers October 4-6, 2013, Fairborn Ohio. Contact:
Gene Stevens
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(937) 429-1552
genestevens@sbcglobal.net

Ranch Hands Vietnam Association October 10-13, 2013, Fairborn Ohio. Contact:
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List provided by:

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Recently Released



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

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

Bob Dorr is technical editor and co-creator of this journal and was recently

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

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

by Robert F. Dorr



The mystery aircraft in our Fall Issue was the U.S. Air Force's Douglas YC-15 Advanced Medium STOL Transport (AMST) of the mid-1970s. STOL was the abbreviation for short takeoff and landing. When used for an airlifter like this one, the term referred to the ability to deliver supplies to ground combat troops using crude runways close to the front lines.

Dating to 1968, the AMST program initially had the goal of producing a replacement for the C-130 Hercules tactical transport. After proposals from three other aircraft makers were weeded out, the YC-15 became one of two aircraft developed and tested during the AMST program. The other was the Boeing YC-14.

The YC-15 made its first flight on August 26, 1975 (almost a year ahead of the YC-14 on August 9, 1976).

The YC-15 had four engines, while the Boeing version had two. They were 15,500-pound thrust Pratt & Whitney JT8D-209 turbofans. The YC-15 used large double-slotted flaps that extended over 75 percent of the wingspan to enhance STOL capa-

bilities. To save costs, it used a modified DC-8 nose-wheel unit and the DC-10 cockpit as adapted for a two-person crew, with two lower windows for visibility during short-field landings.

Never given a popular name ("Loadmaster" was considered), the YC-15 accommodated 90 percent of all Army combat vehicles, including a 62,000-pound extended-barrel, 8-inch (203 mm) self-propelled howitzer. Vehicles were loaded through rear fuselage doors with built-in ramps. The YC-15 introduced a number of innovative features, such as externally blown flaps, which used double-slotted flaps to direct part of the jet exhaust downwards, while the rest of the exhaust passed through and downward over the flaps, introducing the Coanda effect. It was also the first military aircraft with a supercritical airfoil.

The YC-15 had a gross weight of 219,180 pounds. The two examples built had different wingspans of 110 feet and 132 feet.

Although both aircraft met performance goals, after a review of strategic and fiscal issues, the Air Force decided to not to place a production order for either the YC-14 or YC-15. The service canceled the AMST program in 1979.

In 1996, after being in storage for a decade and a half, the YC-15 returned to flight status on bailment to Douglas to carry out research under the new C-X program, which led to today's C-17 Globemaster III airlifter. Because they came from the same design team to meet similar specifications, the YC-15 and C-17 are similar in appearance.

Our "History Mystery" winner out of 27 entries is Thomas F. Hitchcock of Washington, Utah. He is a longtime supporter of the Air Force Historical Foundation and frequent entrant to this contest. If we kept better records, we would also know whether he is a past winner. His prize is a copy of the book "Mission to Berlin," a history of B-17 Flying Fortress crews in one of the great air battles of World War II.

A couple of readers still say this contest is too difficult, so we're going to ease off the pressure in this issue. Identify the aircraft in our new "History Mystery" and write a sentence about it.

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

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

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

And let's get serious about those historical treasures in your attic or basement. Some readers say they just don't remember where their color

slides are. That's not a good way to assure the preservation of history. Dig out your slide or snapshot of a rare aircraft and lend it to Air Power History for this contest.



This Issue's Mystery Plane



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