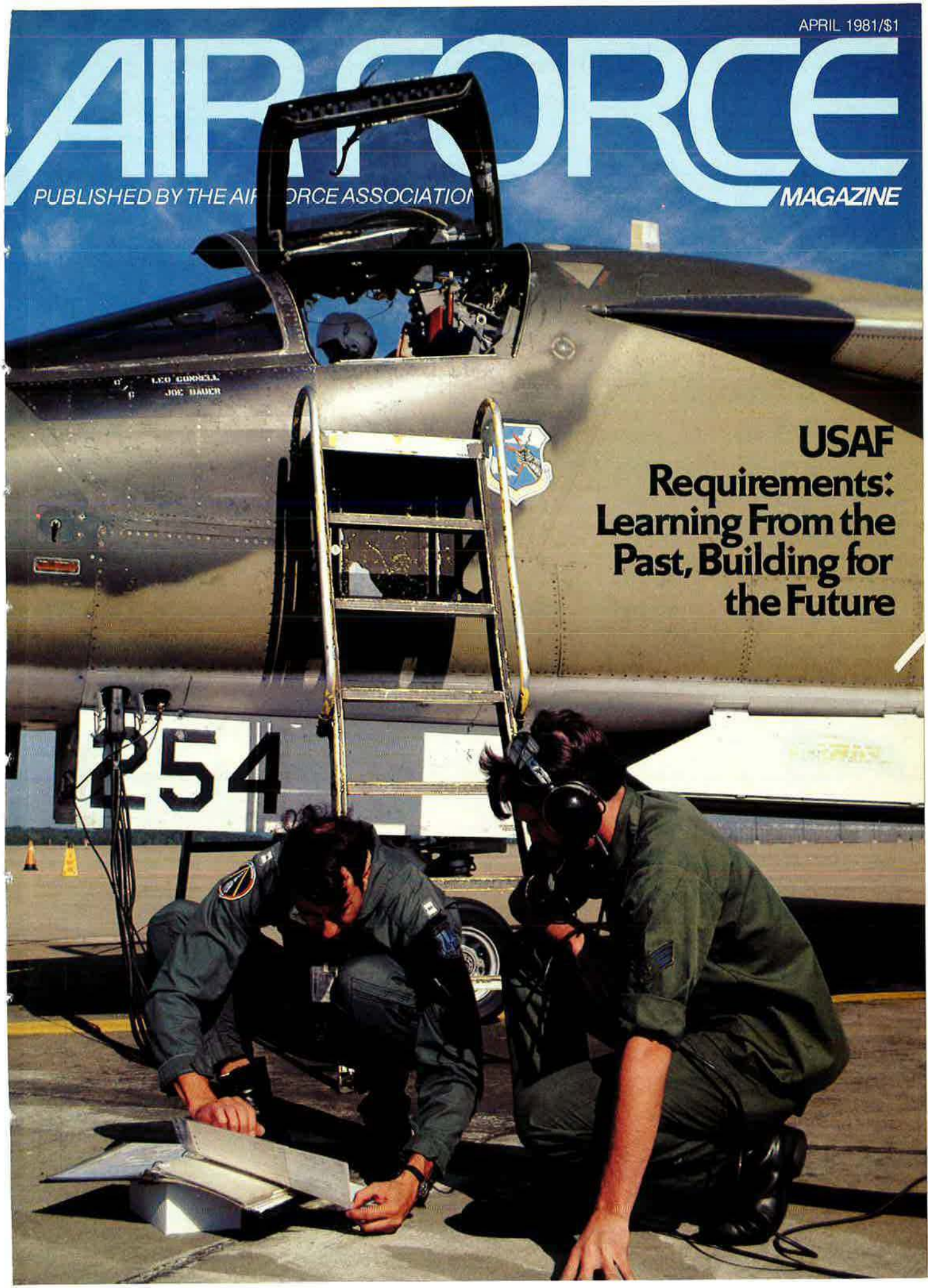
APRIL 1981/$1

AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE



USAF Requirements: Learning From the Past, Building for the Future

Air Force Power

TF34-POWERED A-10 CLOSE AIR SUPPORT AIRCRAFT

CFM56-POWERED KC-135 TANKER AIRCRAFT

CF6-50-POWERED KC-10A ADVANCED TANKER/CARGO AIRCRAFT

GE engines: The superior performance and reliability needed, whatever the mission

General Electric high bypass turbofans are continuing to prove their performance capabilities in key USAF missions.

Twin TF34 engines help provide Fairchild's A-10 with the short-field performance, maneuverability and extended loiter time needed for its close air support mission.

For the McDonnell Douglas KC-10A Advanced Tanker/Cargo Aircraft, three CF6-50 engines help provide excellent mission range and payload capabilities. And for reengined Boeing KC-135 Tankers, four CFM56 engines offer significantly higher aircraft productivity and lower fuel consumption for tomorrow's varied air-fueling missions.

GENERAL ELECTRIC

AIR FORCE
PUBLISHED BY THE AIR FORCE ASSOCIATION MAGAZINE

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This Month

APRIL 1981 • VOLUME 64, NUMBER 4

ABOUT THE COVER

Crouching on the windblown flight line, Capt. Mike Kenny (left) prepares for a training mission in an FB-111A, while crew chief SrA. Kenneth R. Martin assists in the preflight and, in the cockpit, navigator Capt. Bradley Moffett sets up his equipment. The FB-111A training mission takes off on p. 64. (Staff photo by William A. Ford)

Departments

When it comes ECM experience, our ASPJ team.

Sanders Associates Inc. and Northrop Corporation form one of two teams select to compete in the first phase of full-scale engineering development of the Airborne Self-Protection Jammer (ASPJ).

ASPJ is an internal tactical ECM system designed to protect the new generation of U.S. Navy, Air Force, and Army aircraft. This system is essential for mission success and for aircraft and air crew survival in the increasingly dense and sophisticated comb environment of the 1980s and 90s.

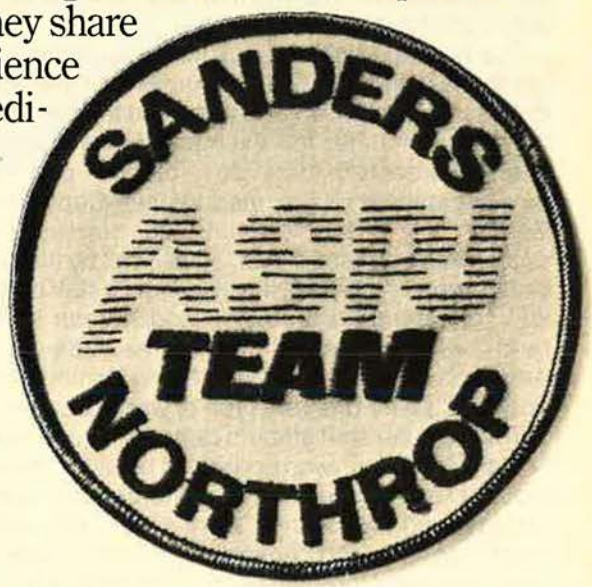
In fulfilling the rigorous requirements for the ASPJ program, team experience is of vital importance. Sanders and Northrop are uniquely qualified with a record of prove performance. Only Sanders and Northrop have supplied internal tactical ECM system in quantity.

to internal tactical score 6,000 for

The two companies have, in fact, designed, produced, and supported in the field ıore than 6,000 internal tactical ECM units for the following front-line aircraft: A-3, .-4, A-6, A-7, EA-6B, F-4, F-14, F-15, F-104, F-111, FB-111, and EF-111.

In addition, Sanders and Northrop have extensive experience with other types f ECM systems. Between them, the team members have developed and produced ıore than 20,000 ECM systems for the U.S. Navy, Air Force, and Army.

And the Sanders/Northrop team offers something more. The two companies ɔlace high value on the importance of teamwork. They share ı mutual commitment to bring together their experience ınd expertise to assure a unified, single-minded dedi- ·ıtion to ASPJ.



AN EDITORIAL

Matching Resources to Requirements

THIS month's theme highlights the past, present, and future of the Air Force requirements process, and its critical role in determining US aerospace power.

If the requirements are identified early, defined right, and integrated into the force on schedule, the Air Force is ready to fight and win. If the requirements are done wrong, the lapse may not become apparent until the fight arrives. That is too late. Therein lies the exquisitely hazardous challenge facing all those persons in the Air Force who must deal with requirements. Being right or wrong in identifying and validating requirements may not be subjected to the test of combat for a decade or more, if at all. And when the judgment comes, it is too late to rewrite the requirements.

Coping with this challenge calls for insightful people with strong constitutions who are willing to fight for progress. Often, however, they run afoul of weaker or more compromising types. Those people are more comfortable with knowns than with unknowns, happier with certainty than uncertainty.

The built-in conflict leads to the syndrome of "fighting the last war," with all the hazards of that approach. Between World Wars I and II, this led the French to build the Maginot Line, for example. Consequently, they slighted armored force development and the combined-arms team advocated by then-Capt. Charles de Gaulle. East of the Maginot Line, however, the concepts were combined into "blitzkrieg" by the Germans. In this country, it meant that the Army's staff college was still concentrating on WW II and Korean War battles (and "lessons learned") as late as 1964–65. But the Army's student officers were being committed to lead troops in a very different type of war in Southeast Asia.

The German staff officers defined requirements pretty well in the interwar period, at least for the war they thought they would fight. But the conflict spread and dragged on. Then they were stuck with the earlier machines. Through conservatism, mismanagement, or madness at the highest levels, their system did not convert changing requirements into fielded hardware in time.

Take the case of the Messerschmitt Bf 109 and Me 262 fighters. The Bf 109 design, begun in 1934, was ready early enough and in sufficient numbers to make the Battle of Britain "a near run thing" in summer 1940. Although its capabilities were steadily improved throughout the war, the Luftwaffe's dependence on the Bf 109 proved fatal when its design limits were reached and the Allies fielded better aircraft. Meanwhile, early in the war, the Messerschmitt team had brought along the Me 262 design to exploit the new jet-engine technology. Three prototypes were ordered by the somewhat lukewarm Air Ministry in July 1940. "Lukewarm," because the blitzkrieg had just swept across France and the Low Countries, and Britain was cornered.

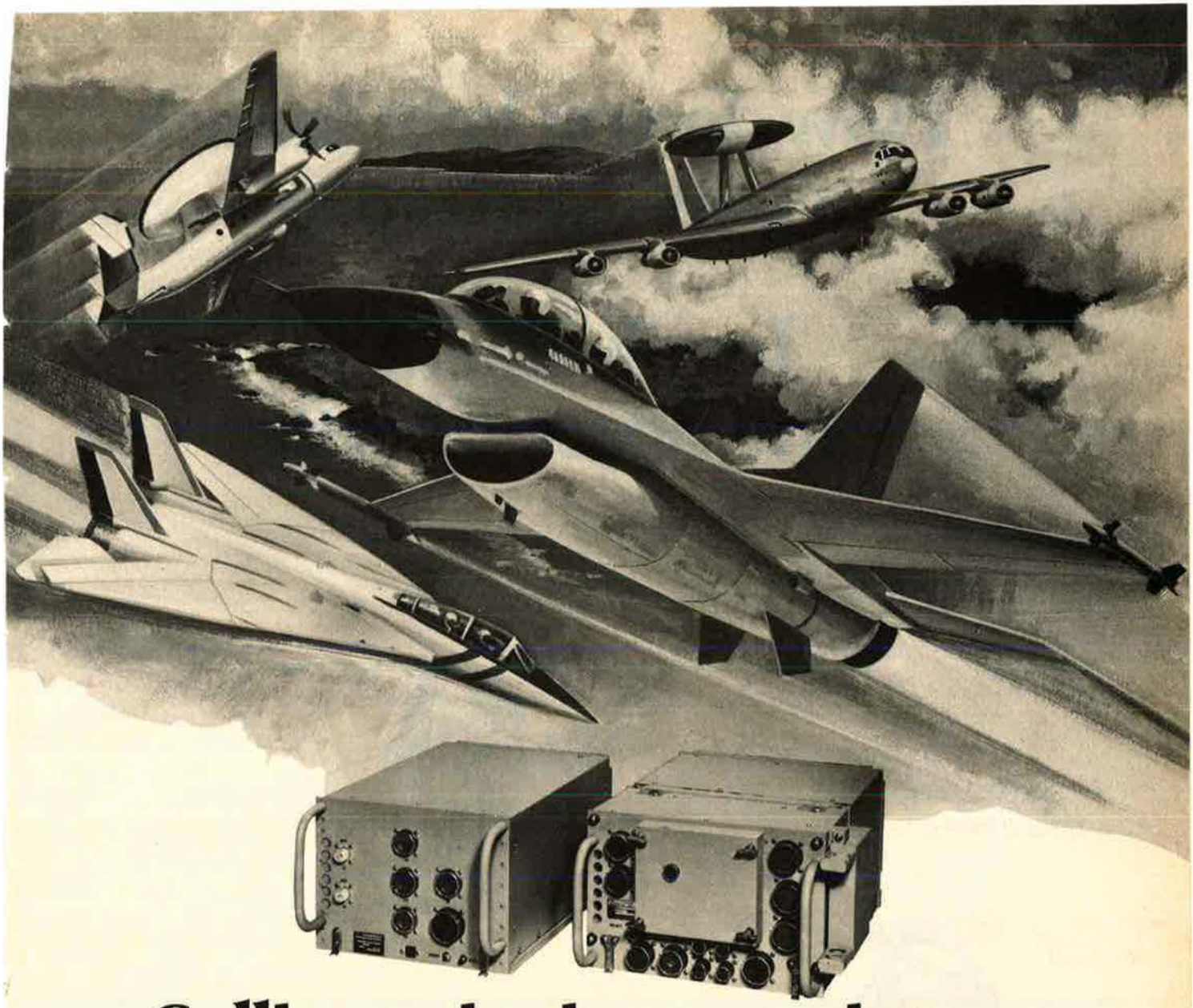
The Me 262 was a great leap forward in tactical aircraft quality. But the German system was tied to quantity production of the Bf 109. Ultimately, only 1,443 Me 262s were produced. Of that number, about 300 saw combat. That was enough to open the book of future air warfare: jet propulsion, sweptback wings, and multicapability (quality) aircraft.

Before and after V-E Day, the Army Air Forces seized opportunities to evacuate and test the Me 262s and other advanced Luftwaffe aircraft. That story is told in "Watson's Whizzers," by Jeff Ethell (p. 54 of this issue). The lessons learned were applied to US tactical aircraft development in time for the F-86 Sabre to impose resounding defeat on the MiG-15 over Korea.

That is the past. Now the US Air Force is faced with present and future missions, and developing requirements to execute them. It should not lock itself into the "quantity" side of tactical airpower (Bf 109) and forgo "quality" (Me 262). See the discussion by Maj. Gen. Robert D. Russ (p. 31) on the topic. The answer is "quality *with* quantity"—capable tactical aircraft of the highest quality, numerous enough to execute the missions, take the losses, but score in so many ways and in such ratios that the enemy loses.

That requires matching limited resources with the requirements. The toughness of character and clarity of vision of USAF leaders, both uniformed and civilian, must be the sharpest possible.

Although the funds are substantial, they are not infinite. And, although the research and development possibilities are promising, R&D should not continue forever for its own sake. At some point, metal must be cut and aircraft put into the squadrons. That means hard decisions. The evidence is clear that USAF leadership is making those decisions. The added essential ingredients are support and implementation; support by the Administration and public (AFA included), and implementation by the Congress. —F. CLIFTON BERRY, JR.



Collins avionics experience. Chain lightning for the JTIDS program.

Chain lightning. It symbolizes the important JTIDS program. And one of its strongest links can be the Singer-Rockwell International team. As recognized leaders in their field, Collins Government Avionics Division and Singer's Kearfott Division can call up an arsenal of experience for the JTIDS Class 2 Terminal Program.

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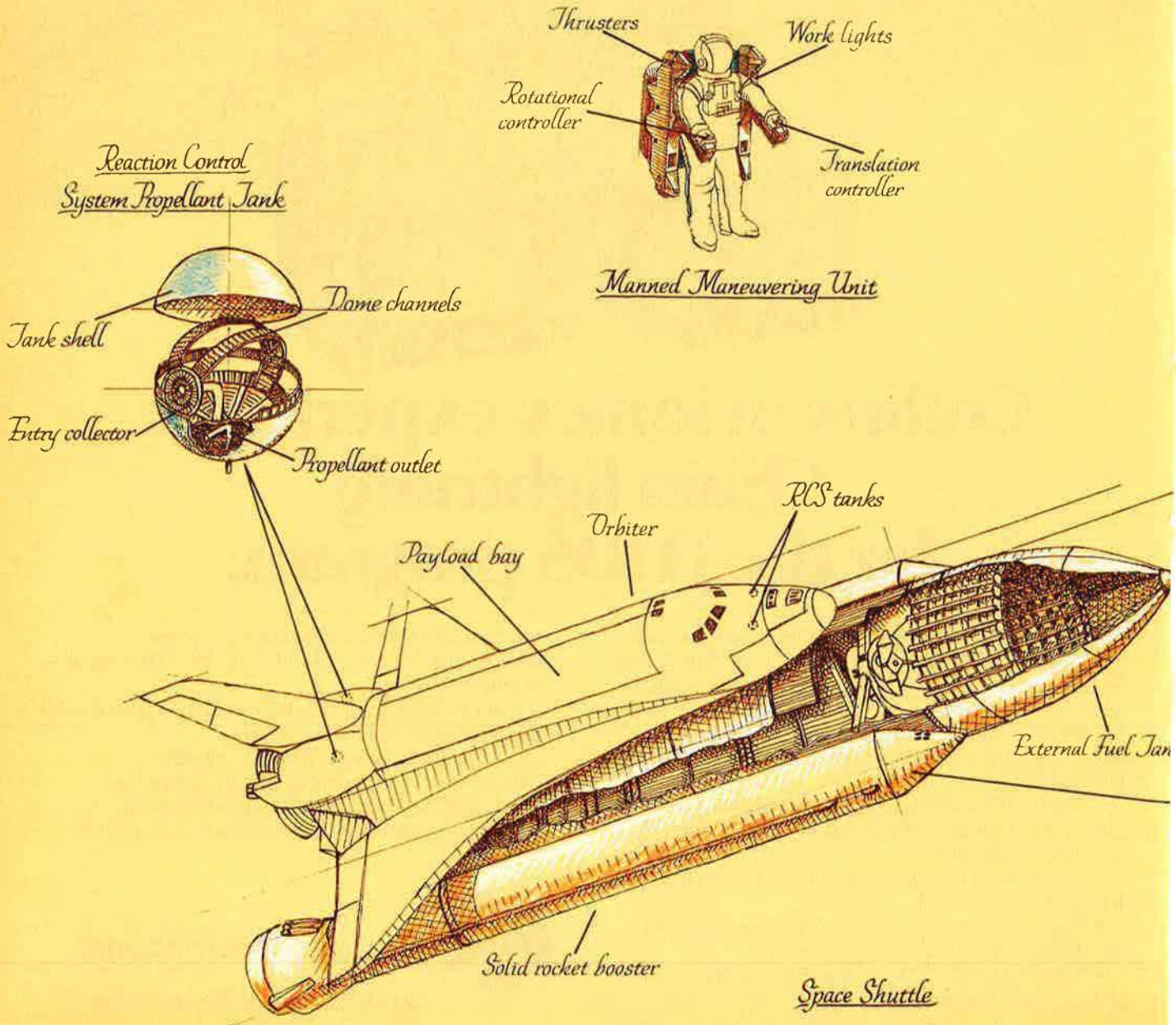
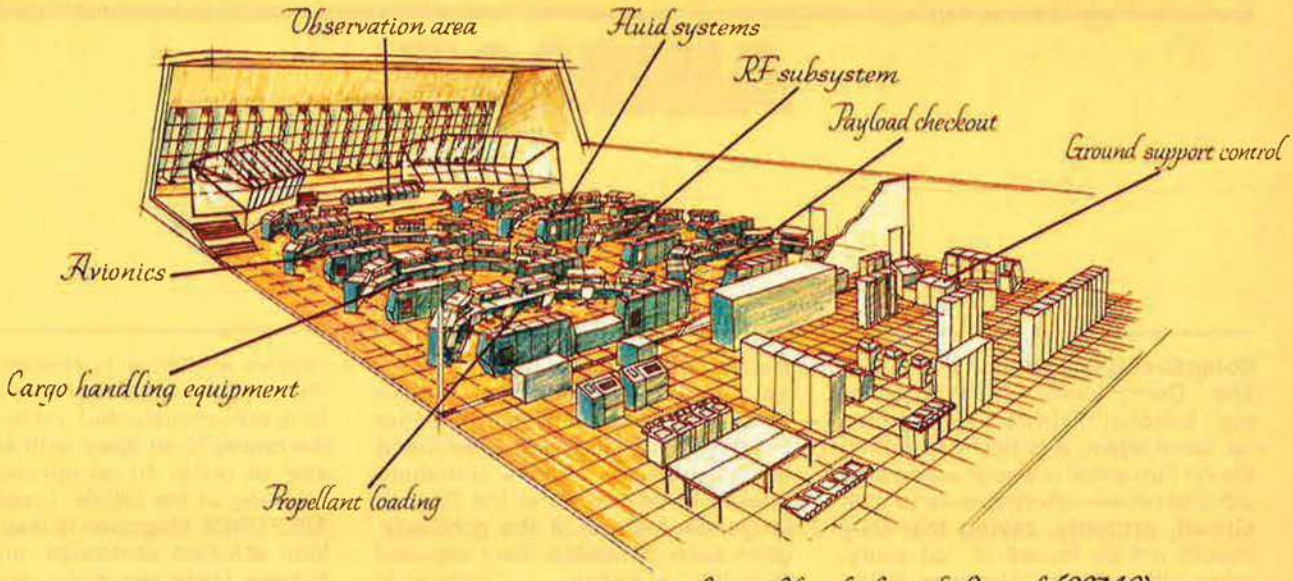
Involvement in the Space Shuttle.





Space Shuttle Launch Control (CCMS)

A new era in man's exploration and use of space is beginning.

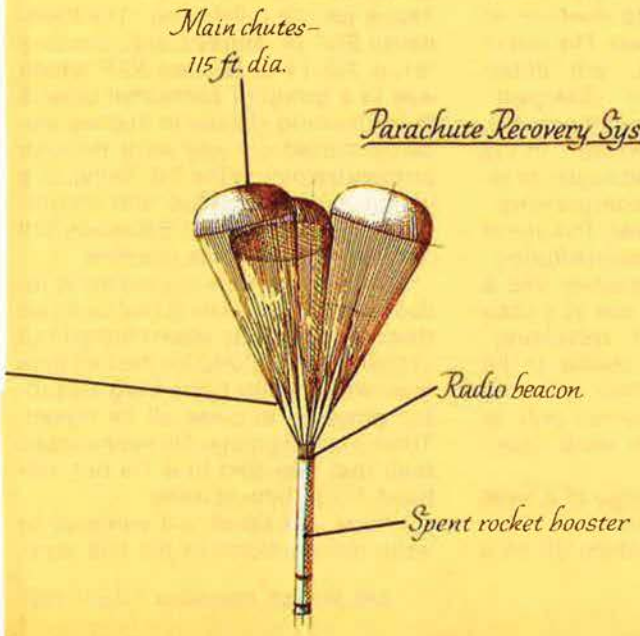
Its cornerstone is the Space Shuttle, an unusual manned vehicle that can fly satellites and scientific equipment into orbit, return to repair and resupply them, and later bring them back to Earth. Its cargo bay can be used as a research laboratory as well as to carry materials to build huge space stations.

Martin Marietta has been involved in Space Shuttle development from its inception, as a partner to both NASA and the Department of Defense. We supply the mammoth, 154-foot external tank to fuel the Shuttle's main engines at launch. In addition, we produce the parachute recovery system for the twin solid-rocket motors, an electronic warning system to alert astronauts of malfunctions, the fuel tanks for the craft's control thrusters, and the pyrotechnic controls to arm and fire the ordnance mechanisms.

For ground operations we produced the computerized checkout, control and monitor system for the launch control centers. And for the Department of Defense we act as the payload integrator, assuring that satellite and cargo designs are Shuttle compatible, as well as performing ground services support for the West Coast launch site.

For orbital operations we have designed a backpack to allow astronauts to maneuver and work outside the Shuttle's main cabin. Looking to the future, we are exploring the concept of a small, remotely controlled spacecraft to deploy, retrieve, survey and repair other spacecraft.

The Space Shuttle is our country's major space vehicle for the decades ahead. Our broad involvement in space and defense programs has given us the knowledge, experience, and the technical resources to help meet the nation's needs in this new era.



Parachute Recovery System

MARTIN MARIETTA

Martin Marietta Aerospace
6801 Rockledge Drive, Bethesda, Maryland 20034

AIRMAIL

Doing Everything Without MX

The "Doing Everything With Nothing" editorial (February '81) pointed up, once again, a critical problem in the Air Force that is also shared by the other services—shortages—and then closed, properly, saying that they should not be forced to "do everything with nothing." However, in between those observations the writer lost touch with reality, or apparently so.

The reality is that the Reagan Administration fully intends to make our country, once again, economically sound. This means the Air Force cannot, and should not, expect to obtain the additional billions of dollars that it would like to acquire at this time for weapon systems of questionable utility and necessity. I specifically identify the MX as such a system, a system whose principal feature is its "mobility" to escape destruction on the ground.

Will someone please explain to me how and why any of our ICBMs would be caught on the ground? And what of the other strategic nuclear systems?

Rather than seeking additional funds, as was suggested by the editorial, the prudent course would be to scrap MX, use available funds to make up shortages, and, as was described in the "In Focus . . ." section on p. 23 of the same issue, take a "Bold Look at National Strategic Options" through SMS-2000.

Our existing short-term national security problem is in the "conventional" area, not strategic.

Col. Peter E. Boyes,
USAF (Ret.)
S. Lake Tahoe, Calif.

Fort Fumble Follies?

Regarding the Air Staff response to Col. Karl S. Park's letter ("UPT for Engineering Students?" February '81): Those staunch warriors of the Pentagon have done credit to the name "Fort Fumble."

Samuel S. Cottrell
President
Applied Analytics, Inc.
Upper Marlboro, Md.

Eschew Obfuscation

As a longtime member of the Air Force Association and an avid reader of AIR FORCE Magazine, I feel that it is past time for articles contained therein to be written in the English language, instead of the gobbledygook such as readers were exposed to in the "In Focus . . . " section in your February issue.

I deal only with the lead article, "A Bold Look at National Strategic Options," on p. 23. Paragraph four begins with the word "quintessentially." My 1980 updated version of Webster's New World Dictionary provides no logical definition of this word as it is used. Paragraph five closes with "in consonance with the postulates." A simple "in accord with demands" says it all without the help of Mr. Webster.

The use of the word "eclectic" in paragraph seven also fails the dictionary test. It seems like the word "logical" would be more appropriate. In paragraph eleven the term "established doctrines" or "conventional ideas" could have been substituted for "orthodoxy," making it easier to understand. The same holds true in paragraph twelve, where the use of "extended" could easily substitute for "protracted."

In paragraph fourteen, several goodies lie in wait. The word "premised" doesn't appear to conform to my dictionary as it is used. The use of "based" for "premised," and "different" or "opposite" for "divergent" vastly improves the thought process. With the word "concomitant" in the same sentence, the mind begins to rebel. The use of "accompanying" would have served as well. The use of "reconstitute" and "reconstituting" in paragraph fifteen sounds like a dried milk product for use in a baby formula. "Rebuild" and "rebuilding" would be the layman's choice. In the final paragraph, the final sentence appears to be constructed only to take advantage of the word "continuum."

The author's knowledge of a wide variety of obscure words is commendable, but to foist them off on a captive audience is reprehensible. The object of articles should be to inform and educate, but not by forcing the reader to sit down with Mr. Webster in order to comprehend the meaning of the article. I realize that AIR FORCE Magazine is read by brilliant scholars worldwide, but I also believe there are more readers of average ability than those of pure brainpower.

In addition, the proliferation of abbreviations in many of the articles will surely lead some of your readers to an early grave. I doubt if many can remember the meaning of PGM, ABRES, DARPA, NSDM, *ad infinitum,* and fewer desire to do so. The continuity of many an article is continually broken as the reader trips over a constant bombardment of MOUs, MICAPs, LRUs, etc. These abbreviations can be appreciated by those familiar with them, but only cause confusion to us readers long gone from where the action is.

You have a great magazine and terrific writers, but please try to remember that the little people could enjoy it more if they could understand and follow it.

Lt. Col. Joseph D. Anderson,
USAF (Ret.)
Vicksburg, Mich.

More Kudos for Jeff Ethell

Thank you for publishing "The Wonderful Six" by Jeffrey Ethell (January '81, p. 72). I was in class 53-F, which was in a group of somewhat unique flying training classes in that we students started out and went through primary training in the T-6. To me, as a young Kansas farm kid with no previous experience, the T-6 was one hell of a big and awesome machine.

Jeff Ethell's article caused me to relive that glorious feeling that came on that marvelous day when I turned out of traffic and realized for the first time that I was actually flying a big, beautiful, powerful airplane all by myself. There may be greater life experiences than that first solo in a T-6 but, offhand, I can think of none.

I hope Jeff Ethell will continue to write more articles in his fine style,

and I look forward to reading them in AIR FORCE Magazine.

Maj. Vernon D. Hesterman, USAF (Ret).
Phoenix, Ariz.

After reading author Jeff Ethell's account of his love affair with "The Wonderful Six," I suffered an attack of nostalgia. Having spent some 3,000 hours in both back and front seats instructing students in the T-6, I can understand his admiration for it. His instructor's earthy advice concerning directional control on the landing roll ("Keep the bastard straight!") is a vital key in mastering the T-6, and tells the whole story in four words.

I disagree with Jeff's statement about moving from the back seat to the front seat as being like moving from the Black Hole to the sunlight—I could always see more from the back seat than any student up front.

Regarding the "Nostalgia Quiz Corner"—any former T-6 jockey should remember the pretakeoff ritual C-I-G-F-T-P-R: controls, instruments, gas, flaps, trim, prop, and runup.

Lt. Col. Curtis N. Farris, USAF (Ret.)
San Antonio, Tex.

• *For an account by Jeff Ethell of the American and allied effort to study and exploit German aviation technology following the end of World War II in Europe, see "Watson's Whizzers," on p. 54 of this issue.*—THE EDITORS

Setting the Record Straight

Regarding the letter "Irrational Money Management" in the "Airmail" section of the February '81 issue:

My purpose in writing the letter was to address a problem area I see in the way the Air Force must obligate and spend its money. There was never any intent to embarrass the people who must work within such a system.

However, subsequent to the publishing of the letter, I learned that the road-paving effort I used as an example did not fall into the category of "spend it all so you can get the same or more next year" projects.

I want to apologize to my station commander and his staff for this error on my part. There is a lesson here that should be emphasized. Emotion is good; it drives individuals to do what must be done even when "the going gets tough." However, in our zeal to take action, we must always be sure of the facts we use to defend a position. No cause is advanced by weak or slanted information.

Maj. Leonard E. Kalinowski, Jr., USAF
Gunter AFS, Ala.

More William Tell Results

All of us in the 524th Bombardment Squadron enjoyed your story "William Tell '80 Results" on p. 29 of your January '81 issue. However, we also noted the absence of some vital information that we would like to provide.

The names of the "Best Bomber Crew" and the first ever to receive the Lt. Gen. Gerald W. Johnson "Best Bomber Crew" award for the 379th Bombardment Wing were as follows:

Pilot, Capt. Robert C. Tom; copilot, 1st Lt. Daniel G. Halpern; radar, Capt. Gregory K. Melton; nav, 1st Lt. Stanley E. Puckett; EWO, Capt. Timothy I. Q. Wong; and gunner, SrA. Robert E. Horton.

In addition, Captain Wong was selected as the "Top Crow," an award given to the best Electronic Warfare Officer in the competition.

Lt. Col. William E. Dunne, USAF
Wurtsmith AFB, Mich.

Our Mistake Entirely

A copy of AIR FORCE Magazine (January '81) has just been delivered. It was of special interest to my wife and me because our son's picture was on the cover, and again in the excellent article, "The Satisfactions of a T-38 Instructor Pilot," by Capt. Slim Connors. Our son is now an IP at Laughlin AFB, Tex., where Captain Connors is also stationed. . . .

It was rather disconcerting to discover that in an otherwise excellent article on pilot training, our son's surname was badly misspelled in the caption "About the Cover" on the contents page.

Prof. Linwood L. Hodgdon
Colorado State University
Fort Collins, Colo.

Where Our True Mideast Interests Lie

Gen. T. R. Milton's recent article, "Where the Cauldron Boiled Over" (AIR FORCE Magazine, January '81), provided us an interesting look into the Middle East jigsaw puzzle and an insightful view of the ongoing intra-Arab struggle. It appears to me two points deserve expanded comment.

In these days of limited resources, as General Milton said, it is absurd to destroy the base at Etzion while seeking a forward base in the Mideast for our forces. It may be politically difficult, but we must recognize that we were able to achieve the "unachievable" with the Camp David Agreements. A US base at Etzion would truly cement the Camp David Agreements and provide us with the most dependable allies in the Mideast.

General Milton comments on Saudi Arabia, ". . . it would seem in our interest to furnish the tanks and the racks [for the F-15]." I am sure I needn't remind General Milton that when Congress approved the sale of the F-15, the executive branch promised that these very items would *not* be sold to Saudi Arabia.

I should like to quote Crown Prince Fahd from a statement given Sunday, January 16, in Mecca to a conference of Islamic leaders: "Peace with the Israeli enemy has become a myth." He went on to call for a "jihad," or holy war, as the only course for resolving the Arab-Israeli conflict.

In this world of more than 150 sovereign nations, there are fewer than twenty-five practicing parliamentary democracies, two of which are the US and Israel. Does General Milton believe we should arm a nation devoted to the destruction of one of our sister democracies? I think not.

Our best and most reliable allies are those with whom we share the same values and interests. No, General Milton, it is not in our interest to provide the tanks and racks that would allow the Saudi F-15s to give meaning to a call for a "jihad" against Israel.

Roberto Garzon
Stamford, Conn.

Thanks for the Memories

It was a joy to read Col. Lester J. Johnsen's "A Rare Time to be Flying" in the January '81 issue. So many of his experiences in pilot training paralleled mine.

I joined the Air Corps as an enlisted man in 1941, and was later assigned duty at Moffett Field. Perhaps I was there at the same time he was taking Basic.

In early 1942 I became an Aviation Cadet, and was sent to Cal-Aero Academy in the Class of 42-I. By then Cal-Aero had both Primary and Basic Training.

While I took Advanced at Luke Field, on graduation we were assigned to Paine Field, Wash. On arrival I was assigned to the 55th Squadron of the 20th Fighter Group, and eventually flew P-47s after going overseas.

Many of the terminologies changed from 1941 to 1942, but thanks, Colonel Johnsen, for a lot of fond memories.

Nick Dormey
Pueblo West, Colo.

Ground Transport Has Its Place Too

Your February issue of AIR FORCE Magazine was a very thorough and

well-done look at logistics and engineering, both key elements in readiness. As Commander of the Military Traffic Management Command, I was especially interested in your article on LOGAIR because that's transportation, and transportation is our business.

While we certainly support Air Force Logistics Command's need for long-term contract airlift as an essential part of its overall transportation matrix, I would suggest caution in characterizing rail and truck service as unresponsive. Each mode has its place in supporting defense needs, and it is the job of the traffic manager using modern concepts and methods to get the most out of each—meeting the shipper's requirements at least cost to the government.

The Air Force recognizes this in its recent adoption of a system of scheduled truck service among air logistics centers. This service promises to provide a fully responsive, economical adjunct to LOGAIR needs.

Using dual-driver, exclusive-use service, trucks can furnish one-day delivery service up to a distance of 800 miles at a cost of less than a third of that of LOGAIR, and also can make door-to-door deliveries. This saves double-handling costs, moves material not transportable by air, and is fully responsive to almost all priority needs.

In a different priority context, rail and truck heavy hauler service provide an absolutely essential element of national defense. Our recently developed Contingency Response (CORE) program has shortened significantly response time for large-scale unit movements involving hundreds of thousands of tons of equipment and supplies which must be moved in support of surface deployments.

Each mode has its uses. It's up to us to make sure we get the most out of our transportation dollars but still support our essential defense needs responsively.

Maj. Gen. John D. Bruen, USA
Commander
Military Traffic Management Command
Washington, D. C.

Meteor First Operational Jet?

Me 262 the first operational jet? ["Airman's Bookshelf," February '81.] I believe the Meteor entered 616 Squadron service on July 12, 1944.

The Me 262 entered squadron service with KG 51 on July 20, 1944, eight days later.

Roy K. Povey
Livonia, N. Y.

AIRMAIL

• *According to Walter J. Boyne, author of* Messerschmitt Me 262: Arrow to the Future *and Assistant Director of Resource Management and Operations at the National Air and Space Museum, two Meteors were delivered on July 12, 1944, but, in the British view, did not become operational until the first sortie on July 27, 1944.*—THE EDITORS

Taking Issue

I take some issue with Maj. Jim Clark's article in the January '81 issue entitled "Tomorrow's Maintenance Training Programs." The Major credits the 3306th Test and Evaluation Squadron at Edwards AFB with pioneering to ensure that program training planning is based on early and exhaustive system analysis and achieving the greatest return for dollars invested. The 3306th was not activated until May 1975.

My group working at what was then called Space Technology Laboratories, now TRW DSSG, prepared a document—6600.33-118—dated November 18, 1960, that was contractually implemented. This achievement was attested to in an article by Lt. Col. Edward G. Sperry, a military counterpart at the time, in the *Defense Industry Bulletin* of June 1969.

The Minuteman program was the first to use a comprehensive systematic approach with system requirements analysis in planning training programs economically, working closely with ATC and AFLC, over fifteen years before. The success of Minuteman validates the approach of the 3306th.

Thomas F. Walton
Hermosa Beach, Calif.

USN Alive and Well in Rota

I would like to express my concern for an article that appeared in the December '80 issue of AIR FORCE Magazine. The article is "The Military Balance 1980/81," as compiled by The International Institute for Strategic Studies.

As Commanding Officer of Naval Station, Rota, Spain, I was disappointed in and unwilling to accept the description of the facility that I command. The article stated that this facility is virtually closed.

The US Naval Station, Rota, steadfastly remains a vital and active US facility in the Mediterranean area. Not only do we provide twenty-four-hour-a-day service to the Sixth Fleet and units operating in the Indian Ocean, but Rota personnel actively support both the Military Airlift Command and Tactical Air Command of the US Air Force.

In 1980 alone, our Air Operations department provided ground handling and servicing for more than 2,000 Air Force Military Airlift Command aircraft of all types. We are also the home port for a Navy Patrol Squadron and a Fleet Reconnaissance Squadron.

I would appreciate it if you would let your readers know that the US Navy is alive and well in Rota, Spain.

Capt. R. Crayton, USN
FPO New York 09540

Copter Kill Claims Exaggerated?

In rebuttal to comments to the effect that Soviet losses of Hind helicopters are unavoidably high even in the stated "permissive environments" of Afghanistan ("In Focus . . . " January '81): It seems old embers are being stirred once more on the merits of the attack helicopter.

The validity of "kill" claims by Afghan rebel groups must stand on its own ground. The only published photographs of downed Soviet helicopters are not Hind attack helicopters and, to my knowledge, there has been only one such photograph released within the last year.

Given the weapon systems being generally employed by Afghan rebel groups, the current antihelicopter war is at the intensity level we experienced in Vietnam in 1965–67, using UH-1 gunship (not Cobra, and certainly not Hind-type) attack helicopters. Our combat loss rate was exceedingly low and demonstrated, if anything, that the then state-of-the-art gun helicopter was not all that susceptible to 7.62-mm-type rounds. I have taken as many as twenty-two hits from 7.62-mm and one 12.7-mm rounds during one engagement and, though noisy and rather frightening, we were flyable and combat ready if need be.

Now to advance the scenario a bit further, let's quickly examine the very mid-intensity situation we encountered during LAMSON 719 during the first two months of 1972. Army Air Cav units were exposed during this time frame to high levels of 12.7-mm, 23-mm, and 57-mm flak, and although the loss rates were accordingly well above the rate for the "in-country" war, the overall loss rate per thousand sorties was one-quarter of one percent, and over sixty percent of

these losses were not attack helicopters, but rather UH-1 "lift" ships.

I would be quite happy, as I am sure a number of NATO ground commanders would also, to find the Hind was indeed quite susceptible to rather primitive ground-fire environments; however, the facts do not demonstrate this, and to presume so as your article implies may in the future prove more than embarrassing.

CW3 R. L. Baird, USAR
Ramona, Calif.

Galland's Last Combat

Could readers help me clarify the April 26, 1945, mission of General Galland, during which his Me 262 was damaged, forcing him to make a no-power, glide landing back at his base at Munchen/Riem? It was his last encounter in the war.

A painting by Frank Wootton, entitled "The Last Combat," shows Marauders of the 397th Bomb Group and fighters of the 10th Fighter-Bomber Squadron, Ninth Air Force, and states that Galland was shot down by James J. Finnegan of the latter. Kenn Rust, in his book on the Ninth Air Force, does not show any Marauder or Me 262 action on the 26th, and indeed states that the 397th BG flew its last mission on April 20.

Other evidence indicates it was the 17th Bomb Group of 1st Tactical Air Force that was hit with Galland's jets on the 26th. The 34th Squadron's history of that group, "The Thunderbird Goes to War," shows the Marauders were on a mission that day, that they were attacked by Me 262s, and that the 34th lost one aircraft.

In the Preliminary Interrogation Report of General Galland, prepared by the Air P/W Interrogation Unit of 1st Tactical Air Force, dated May 14, 1945, the General tells of his unit's attack on a formation of B-26 Marauders flying in two tight Vics of about thirty aircraft each, and states he obtained direct hits on his first target which exploded in mid-air. He also obtained a few cannon hits on his second target, and while banking away to observe the results, he sustained hits in the fuel tanks from that bomber. At the same moment he was jumped from the rear by a US fighter and did not observe if it was a Thunderbolt or a Mustang. His plane was hit several times in the cockpit and in the jet engines, and he sustained splinter injuries to his right leg. With the instrument board shot out, he dove straight down to escape the attacker and headed back for his base.

Galland's unit claimed four aircraft shot down, either four B-26s, or three B-26s and one Mustang, against the loss of one Me 262 shot down, but pilot safe. In parentheses it states: "These claims agree in general with the losses of 42d Bomb Wing of 1st Tactical Air Force. Official records show that three B-26s were shot down, plus one B-26, crashlanded behind our lines due to enemy action."

As an added note, the General, who had test-flown captured Allied aircraft, chose the Mustang as the best American fighter. Of the US bombers, he considered the B-26 as the one he least enjoyed attacking.

Copy of the Interrogation Report was placed in our files by Colonel Woolridge, Commander of the 320th Bomb Group, which was a "sister" unit of the 17th Group in the 1st Tactical Air Force.

Esther M. Oyster
Historian
319th Bomb Group Ass'n
662 Deering Dr.
Akron, Ohio 44313

Abandoned Military Posts

The Council on Abandoned Military Posts is preparing an informal history of the Desert Training Center, which was active during 1942–43. Later known as the California-Arizona Military Maneuver Area, we have yet to determine who trained at Camp Bouse, Ariz. The official history contains very little about the camp.

We would also like to know who trained at Ajo, Dateland, and Blyth Army Air Fields. Rumor has it Blyth was B-24 combat crew training. We would also like to know more about Site 7 near Parker, Ariz.

Please contact:

Col. John Kennedy, USAR (Ret.)
705 E. Tuckey Lane
Phoenix, Ariz. 85014

CAP Submarine Patrols

I need information relative to the Civil Air Patrol Submarine Coastal Patrol activities off the Virginia Capes during the early days of World War II. I am interested in hearing from persons attached to Base No. 4 at Parksley, Va., or others who may have information on these activities.

I urgently need this information to assist in compiling the history of the Virginia Wing of the Civil Air Patrol.

Maj. Allan H. Pryor, CAP
P. O. Box 237
Sandston, Va. 23150

P-61 Black Widow

I am researching the Northrop P-61 Black Widow in preparation for a book I intend to write on this exciting and unusual aircraft.

I would like to ask readers for any information or photographs concerning the aircraft or people who flew them. Any items will be handled carefully and returned promptly.

TSgt. Tom Tyndall, USAF
42 Castle Dr.
Atwater, Calif. 95301

The Big Blow of 1933

Anyone who witnessed or has heard reliable stories about the devastating hurricane that hit Langley Field, Va., on August 23, 1933, please write with details.

Information will be used in a book about Langley I have been developing since early 1979. Photos of that event would be very helpful, and will be returned promptly.

Col. C. L. Weidinger, USAF
6437 Eastleigh Ct.
Springfield, Va. 22152

Army and Air Force Exchange Service

The Army and Air Force Exchange Service (AAFES) is in the process of expanding its historical program, and would appreciate receiving old photographs, correspondence, narratives, maps, badges, and other material of historical value to the exchange.

Contributors are asked to identify all submissions with names, date, and location. Items used in displays or publications will be credited to the persons who furnished them. Items submitted will be returned if requested.

Send all contributions to:

Army and Air Force Exchange Service
Attn: CP-I
P. O. Box 222305
Dallas, Tex. 75222

Flying Training Program

I am working on a research project on the Air Force Flying Training Program. Due to the change from FTAF to ATC, training command historical records are incomplete during the 1956–59 era. In particular, I am trying to collect information on Classes 57-RJ, 57-RN, and 57-RX. The twenty members of each of these classes began training at Spence AB and graduated at Laredo AFB on July 16, 1957.

I would appreciate information on how many members of each class actually graduated, along with any information on their later career activities. Class rosters and a copy of the graduation program would be especially helpful. Letters from the students and instructors would be appreciated.

Also, if anyone knows the whereabouts of a copy of the final report on

AIRMAIL

Project Palm, initiated at James Connally AFB and conducted at Bainbridge AB, I would appreciate hearing about it.

R. P. Bateman
2800 Indian Ripple Rd.
Dayton, Ohio 45440

Arnold Air Society Det. 785
The Brigadier General Everett R. Cook Squadron of Arnold Air Society needs names and addresses and commissioning dates of our alumni. Please send this information to:

1st Lt. Wayland B. Owens, AAS
Brigadier General Everett R. Cook Squadron
Arnold Air Society, Det. 785
Memphis State University
Memphis, Tenn. 38152

AFROTC Det. 925
AFROTC Det. 925 at the University of Wisconsin, Madison, will celebrate its thirty-fifth anniversary in September 1981. We intend to produce a unit history that would include the names, assignment histories, and significant achievements of past commissionees. We would particularly welcome any old photographs and stories of what our detachment was like in the past.

All past graduates of our program are also invited to attend our annual Air Force Ball and Dining-Out to be held on May 2, 1981. Please contact:

AFROTC Det. 925
1402 University Ave.
Madison, Wis. 53706
Phone: (608) 262-3440

451st Bomb Group, 15th AF
One of World War II's most active veterans groups is continuing its search for those members that served in its ranks.

The organization would appreciate hearing from ground and flying personnel that may have served in the 724th, 725th, 726th, 727th Squadrons, and Group Headquarters, during 1943–45.

The Group will be conducting its second national reunion in the summer of 1982 (site unknown at this time), and would appreciate hearing from those that are not, as yet, on the new Group roster.

Robert Karstensen
President
451st Bomb Group, Ltd.
1032 S. State St.
Marengo, Ill. 60152

AFROTC Det. 630
Kent State University AFROTC Det. 630 is celebrating its thirtieth anniversary this year. We would like to hear from graduates and former staff members. Please send current assignment information, year of graduation, and a brief summary of your Air Force career to date.

Each person responding will receive a newsletter containing information on the detachment. Please contact:

Cadet Public Affairs Officer
AFROTC Det. 630
Kent State University
Kent, Ohio 44242

381st Bomb Group
I would like to hear from anyone who was a member of my squadron, the 535th Bomb Squadron of the 381st Bomb Group, Eighth Air Force. I was a ball turret gunner on the B-17 *Superstitious Aloysius.*

Also, I would like to hear from anyone who knew one of my best buddies, William "Blackie" Blackman from Louisiana, who was shot down while I was in the hospital, and, additionally, from anyone that went through the Las Vegas Army Aerial Gunnery School. I am looking for anyone who knew Jesse D. Clark, of Dallas, Tex., another good buddy of mine.

Thanks for any assistance readers may be able to render.

Johnny T. Mills
23842 Welby Way
Canoga Park, Calif. 91307
Phone: (213) 883-9933

94th Troop Carrier Wing
I am interested in hearing from anyone who was assigned to this unit, which was stationed at Hanscom AFB, Mass.

I am especially interested in the history of this base, which is an unusual one. It was an Air Force operational field until 1973, when all flying operations were relocated to other bases.

I am interested in anyone who was with the 94th TCW and can tell me what it was like being based at Hanscom in the '60s.

I would be most grateful to anyone who can send me their accounts of Hanscom.

Andy Briscoe
41 Great Meadows Rd.
Concord, Mass. 01742

474th Fighter Group
I am compiling a history of the wartime airfield at Warmwell in Dorset, England. It was used by the USAAF in 1944 as Station 454, and the unit operating there was the 474th Fighter Group.

I would be most grateful for any information on the subject, especially that concerning personnel, missions flown, aircraft used, personal memories, or anecdotes.

Ivan Mason
8, Inglesham Way
Poole, Dorset BH 15 4PB
England

Hq. MATS, EASTAF
Desire to organize a reunion of former members of this organization stationed at McGuire AFB, N. J., during the period 1952–55.

Jean L. Muccie
1901 Atlantic
N. Wildwood-by-Sea, N. J. 08260

SAC Models
I am making a plea to all those who can supply me with any unbuilt models of aircraft and missiles of the Strategic Air Command in 1/72 scale.

I am in the process of building a complete display of SAC's aircraft. The main problem I am having is finding models of the SR-71, U-2, B-58, B-50, and all of the ICBMs.

I would be most appreciative of any efforts to contact me regarding such items. Also, any photos, duty stories, and other related articles (as I am also writing a synopsis to go with the display) will be gratefully accepted and acknowledged.

Stewart D. Oliver
3404 Roxford Dr.
Champaign, Ill. 61820
Phone: (217) 359-3618

Olga Greenlaw
Interested amateur historian would like information regarding Olga S. Greenlaw, AVG member and author of *The Lady and the Tigers,* published in 1943. Any information will be gratefully appreciated.

Walter H. Kimotek
17 W 708 Butterfield Rd.
Oak Brook Terrace, Ill. 60181

Collectors' Corner
As a Dutch aviation enthusiast, photographer, and collector, I am looking for color slides, negatives, and photographs of military aircraft.

My special interests are Air National Guard and Army National Guard. In addition to photos, I am interested in USAF, ANG, and AFRES unit histories and insignia.

I try to get as much information as possible about each unit. Sometimes it is very difficult to get this information, since many units have been

Who provides a key link in the success of the B-52's mission?

SINGER

The largest single award ever made to a company in the simulation business went to Singer's Link Division for B-52 weapons systems trainers. These trainers will simulate the entire mission profile, including daytime and night flying, aerial refueling, threats and countermeasures—even damages incurred.

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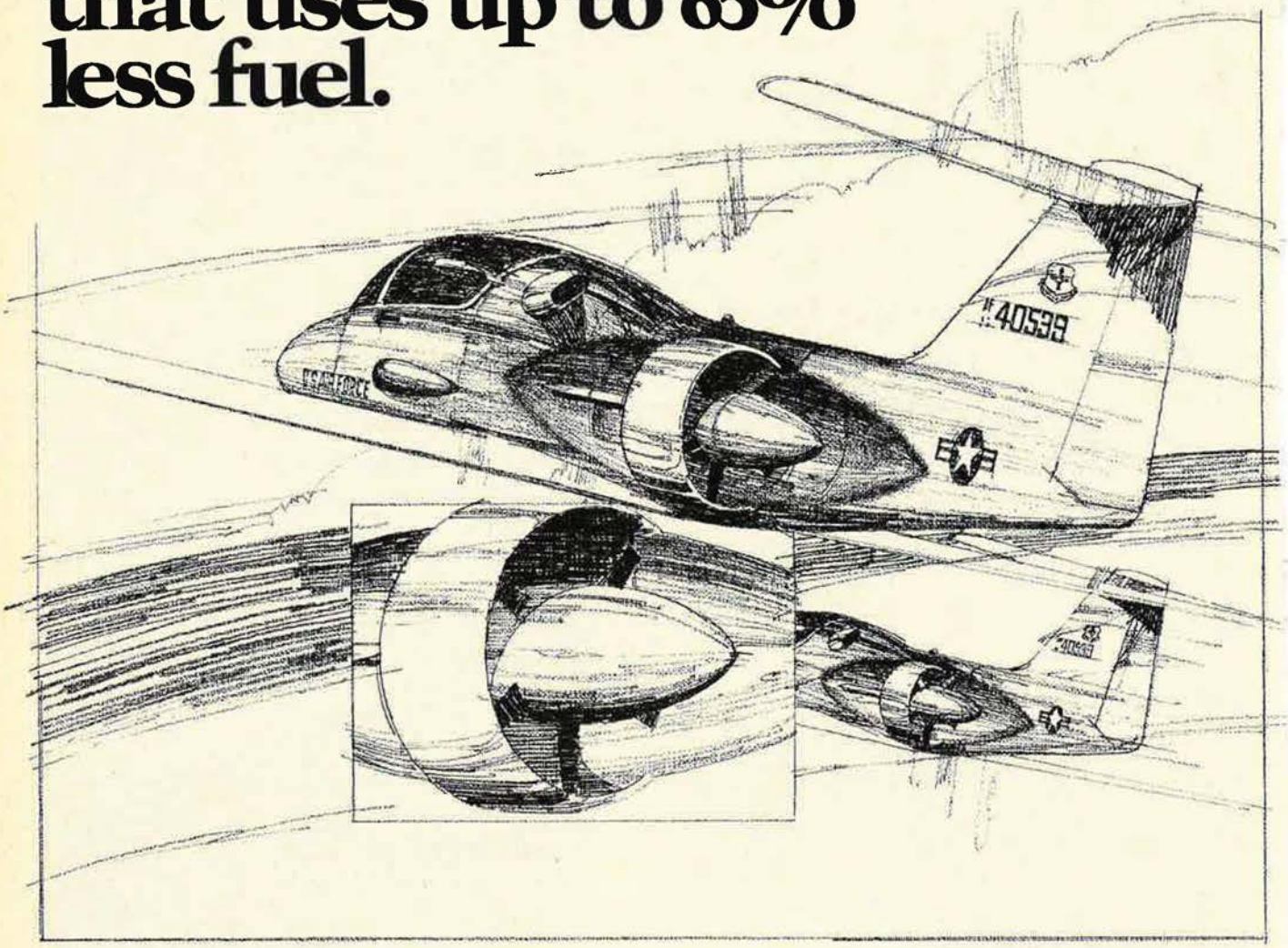

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Vought performance.

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Our diversity may surprise you.

deactivated, and others still exist but their history fact sheets are very brief.

On my last trip through the United States, I met someone who showed me two books containing most of the information I am looking for. They are *United States Air Force Units 1946–63,* Vols. 1 and 2. I know that these books are now out of print, but perhaps there is someone who has these books and would be willing to sell them.

Can anyone help me obtain these books or more information about these units (especially ANG units and deactivated USAF units)?

Any help will be welcome and all letters will be answered.

G. Henk J. Scharringa
Steenen Camer 34
3721 NC Bilthoven
The Netherlands

I am collecting photos, three inches by five inches or five inches by seven inches, black and white or color, of the following aircraft:

C-45 or T-11; C-47; C-54; C-74; C-124; C-135; AT-6; B-25; B-26; B-29; B-47; B-50; F-80 or T-33; F-84F; F-84G; KC-97; and KC-135.

Any photo or help would be appreciated.

Maj. Richard R. Gundry, USAF (Ret.)
Box 486
Yellville, Ark. 72687

I would like to exchange information and/or photos with any former servicemen who were attached to the 313th Bomb Wing, Thirteenth Air Force at Clark Field in the Philippines during the years 1945–50. I am particularly interested in the activities of the 72d Air Service Group.

All information and photos will be returned.

Harry Stokes
2300 Dove St.
Rolling Meadows, Ill. 60008

Dedicated collector would like to borrow, trade, or purchase photographs, slides, or negatives taken by private individuals of the McDonnell F-101 Voodoo in USAF service during 1957–65. I am especially interested in F-101A and F-101C aircraft of the 27th Fighter-Bomber Wing at Bergstrom AFB, Tex., 1957–59, and F-101A and F-101C aircraft of the 81st Tactical Fighter Wing at RAF Bentwaters and RAF Woodbridge in England, 1959–65. Also require early RF-101 material.

Please contact:

SrA. Gary D. Powell, USAF
PSC Box 2265
APO New York 09194

AIRMAIL

VFW Post Commander is interested in acquiring US Air Force, Air Force Reserve, or Air National Guard squadron or base, active or inactive jacket patches for a display.

Any help on this matter from anyone would be greatly appreciated.

I. R. Wilson
P. O. Box 221
Marathon, Fla. 33050

Looking For. . .

During 1940–41 I flew out of Hickam Field, Hawaii, in the old B-18s. I was a radio operator in the 4th Reconnaissance Squadron, 11th Bomb Group.

I was just wondering if any of my old buddies made it through the war. They transferred me to Schofield Barracks after December 7.

Bill Summers
P. O. Box 576
Pinon, Ariz. 86510

I am hoping that readers may have information regarding the first refueling of aircraft in flight from either land or water.

A British author, Mr. Brian Gardner, is researching refueling and seeks information on either military or civilian refueling.

Any help will be appreciated.

Forest M. Johnston
1120 Ranleigh Way
Piedmont, Calif. 94610

UNIT REUNIONS

AFROTC Det. 380, Michigan State University
Det. 380 will celebrate its thirty-fifth anniversary in late May. **Contact:** Cadet Capt. Marie Rigotti, AFROTC Det. 380, Michigan State University, East Lansing, Mich. 48824.

Brookley AFB
Fourth Brookley AFB reunion, May 16, 1981, Mobile, Ala. **Contact:** Frank M. Lugo, 5 S. Springbank Rd., Mobile, Ala. 36608. Phone: (205) 344-9234.

Flying Cadet Class
The Flying Cadet Class of July 1931 will celebrate its fiftieth anniversary, May 11–13, 1981, The Broadmoor, Colorado Springs, Colo. **Contact:** Fred R. Freyer, 4203 Tenth St., St. Simons Island, Ga. 31522. Phone: (912) 638-2276.

Iceland Veterans
Iceland vets (all branches) June 28–July 2, 1981, Kutshers Country Club, Monticello, N. Y. **Contact:** Dave Zinkoff, 2101 Walnut St., Apt. 1109, Philadelphia, Pa. 19103. Phone: (215) 568-1234.

International Order of Aviation Characters
The annual business meeting and aerospace symposium for the International Order of Characters (IOC) will be held April 24–25, 1981, at Woodway Country Club, Darien, Conn. **Contact:** James E. Crane, 965 Hope St., Stamford, Conn. 06907. Phone: (203) 322-2323.

SPAR
1981 Science, Philosophy, and Religion (SPAR) symposium, April 29–May 1, 1981, Air Force Weapons Laboratory, Albuquerque, N. M. **Contact:** SPAR Inc., P. O. Box 18067, Albuquerque, N. M. 87185.

4th Strategic Support Sqdn. (SAC)
A reunion for all former Strategic Support Squadron personnel, June 20–21, 1981, KIVA Inn, Abilene, Tex. **Contact:** Robert L. "Lucky" Luedke, 2100 Twentieth St., Denver, Colo. 80202. Phone: (303) 573-6127.

11th/482d Service Sqdns., 8th Service Group
A reunion for the 11th and 482d Service Squadrons, and the 8th Service Group (WW II), June 5–7, 1981, Lancaster, Pa. **Contact:** John J. "Jack" Heckler, 76 E. Harbor Dr., Teaticket, Mass. 02536. Phone: (617) 540-1303.

29th Air Service Group, 13th AF
Thirty-fourth reunion for the 29th Air Service Group, July 13–17, 1981, Charlotte, N. C. **Contact:** Frank Pace, 315 W. Fifteenth St., Dover, Ohio 44622.

80th Fighter Sqdn., 8th FG
"Headhunters," reunion June 11–14, 1981, Coco Beach, Fla. **Contact:** Yale L. Saffro, 7841 Kildare Ave., Skokie, Ill. 60076. (Please include a stamped, self-addressed envelope.) Phone: (312) 673-9040.

307th Air Refueling Sqdn.
June 26–28, 1981, Four Seasons Motor Inn, Colorado Springs, Colo. Please send self-addressed envelope to: Norb Hansen, 4390 Fenton St., #202, Denver, Colo. 80212. Phone: (303) 420-4001.

390th Bomb Group, 8th AF
A reunion and dedication of the Framlingham Control Tower will be held May 8–17, 1981, Framlingham AB, England. **Contact:** Roger Howell, 245-B Boxwood Rd., Annapolis, Md. 21403. Phone: (301) 268-9220.

456th Bomb Group, 15th AF
June 18–21, 1981, St. Louis, Mo. **Contact:** James F. Watkins, 11415 Minor Dr., Kansas City, Mo. 64114. Phone: (816) 942-5594.

IN FOCUS...

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

Washington, D. C., March 5

Boosts in USAF's Force Projection

Current Air Force plans for improving SAC's Strategic Projection Force (SPF), over the near term include modification of the B-52H's avionics system—known as Project Gallant Cobra—to bring bomb delivery CEPs down to the 140-foot range. Over the long term, USAF plans to upgrade SPF by adding—beginning in 1987—the Long-Range Combat Aircraft (LRCA), which Congress refers to as the multirole bomber.

Key gains that LRCA provides over the B-52Hs assigned to SPF include greater range and payload combined with less dependence on tankers; greater survivability because of reduced radar and infrared signatures as well as possibly self-contained lethal defense system; and the ability to operate autonomously in a dynamic, target-rich environment.

The latter trait is to be derived from the use of improved sensors and standoff weapons that make it possible to locate, identify, and destroy fixed, mobile or imprecisely located targets over distances of about 100 miles.

The multiservice Pave Mover/Assault Breaker program, which exploits sophisticated standoff technologies, is applicable to LRCA. The notion is to launch various types of standoff weapons and dispensers and to guide them inertially to a "capture basket" where they would receive final command guidance information before releasing specialized submunitions. Included here would be guided or unguided armor-piercing, fragmentary, incendiary, or antiship submunitions.

Standoff weapons under consideration for adaptation to the SPF mission include the T-16 surface-to-air Patriot missile, the T-22 variant of the US Army's Lance missile, and the Navy's integral rocket-ramjet-propelled supersonic tactical missile. Candidate submunitions include the extended range antiarmor munition (ERAM), the Gator aerial mine, and the combined effects bomblet (CEB).

LRCA also could be equipped with the Medium-Range Attack Standoff Missile (MRASM), a shortened version of the General Dynamics entry into the air-launched cruise missile competition. MRASM is guided by TERCOM (terrain contour matching), has a terminal seeker, and carries large payloads over considerable distances. Launched from LRCA, this missile can attack high value targets with great precision. Primary use of a LRCA/MRASM combination would be to destroy bridges or tunnels on vital rail lines and roads to create chokepoints or to close airfield runways to halt or impede close air support/battlefield interdiction operations by the enemy.

The Strategic Bomber Schism

SAC's Commander in Chief, Gen. Richard H. Ellis, recently told this column it is essential that the US develop and deploy both interim strategic and advanced technology ("Stealth") manned penetrators. In the view of the Strategic Air Command, he explained, these weapons should be designed exclusively for the strategic nuclear, or SIOP (Single Integrated Operational Plan) mission, and not be burdened by features oriented toward multirole capabilities such as conventional force projection or maritime missions.

Further, he said, because the Stealth bomber is more important over the long run than the interim design, the latter should be chosen and configured not to impede expeditious development of the former in either a political or economic sense. Also, the choice of an interim bomber should be made primarily on the strength of availability.

Because of the worsening strategic imbalance, a new interim penetrating bomber is needed as quickly as possible. Applying the twin criteria of early availability and of protecting the Stealth bomber program to the two candidates for the interim system—a stretched FB-111 design known as the FB-111B/C and a B-1 type aircraft—SAC's Commander in Chief stressed that by "1984 we could have twenty-five modified FB-111s on the ramp, which means almost two squadrons, as compared to one B-1."

According to SAC's estimates, the first B-1 squadron would not achieve operational status until 1985, one year later than the FB-111. Cost is equally important, according to General Ellis, and favors the FB-111B/C by a ratio of 2.5 to one. According to AFSC's Aeronautical Systems Division, he said, 150 FB-111B/C aircraft would cost "a little more than $7 billion, while 100 B-1s would come to more than $18 billion." He acknowledged that the FB-111B/C is not an acceptable air-launched cruise missile (ALCM) carrier, but suggested that it could be transferred to the tactical forces upon completion of its stopgap role in the strategic arena. Other senior Air Force leaders expressed doubt that the tactical forces would "accept" a SAC hand-me-down that seemingly no longer is capable of performing the strategic mission but is deemed "good enough" for the tactical mission.

Influential congressional experts, as well as OSD and Air Force leaders, take issue with some figures underlying SAC's B-1 vs. FB-111B/C comparison. Their contention is that it takes between 200 and 300 FB-111B/Cs—the figure varies depending on specific missions—to match the capabilities of 100 B-1 derivative aircraft. Also, they believe that it will cost a minimum of $3 billion to replace TAC's F-111Ds that would have to be converted to the FB-111B/C configuration; that the FB-111B/Cs would need a modest avionics upgrade that will cause it to reach IOC at about the same time the B-1 derivative would; and that the B-1 cost figures probably will be lower than the $18 billion cited by SAC.

Lastly, these sources point out, Congress instructed the Department of Defense and the Air Force to build a "multirole bomber," not a system solely oriented toward the strategic nuclear mission. The Defense Department is to submit its recommendations for a multirole bomber or bombers this spring, although it is likely

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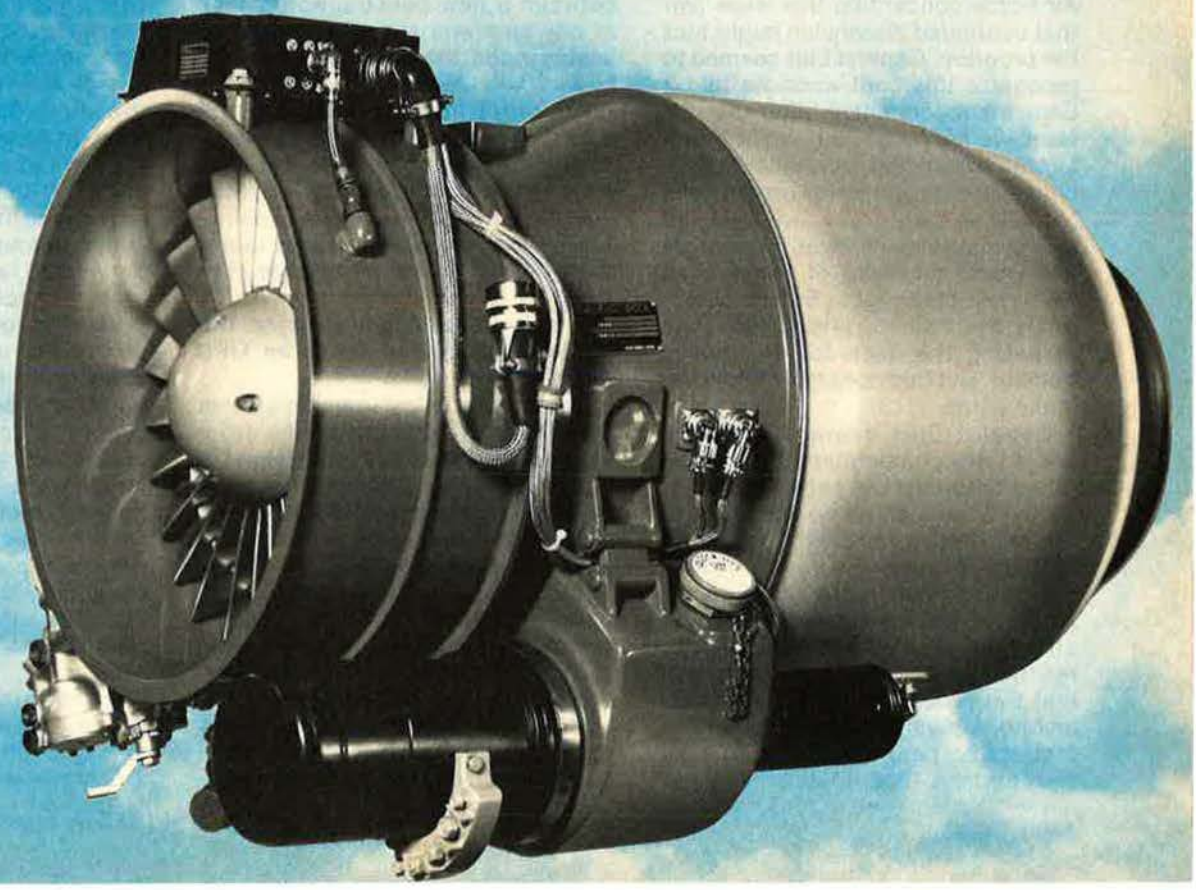


that the original deadline for this report will be moved back from March to June of this year. There is strong evidence that Congress would oppose a design that is not optimized for both the conventional and strategic nuclear missions, and in the case of the latter, lacks the mandated traits of a cruise missile carrier.

Although the B-1 could serve as a competent ALCM carrier once Stealth designs replace it as a penetrator, General Ellis thought it unwise to spend that much additionally for a capability that is being furnished adequately by B-52 aircraft. Because SAC has been and continues to "take good care" of its B-52s in the form of regular extensive overhauls and modification, these aircraft will be able to serve as standoff ALCM launchers "at least well into the 1990s or [even] into the next century," General Ellis said.

These considerations caused the head of SAC to assert that "if I were king, I would build the FB-111 and an advanced technology bomber," rather than the B-1/Stealth combination preferred by the Department of the Air Force and pertinent DoD elements. He conceded that there is strong support in both Congress and the Air Force for the B-1 and virtually none for the FB-111B/C and added, "I don't want to separate myself from the rest of the 'blue-suiters,' but they don't have the responsibility that I have" in the operational sector.

Congressional experts who know of the different preferences within the Air Force concerning this issue fear that continued dissension might hurt the program. General Ellis seemed to recognize this peril when he told a Senate subcommittee "that the real issue we are faced with is not which aircraft is selected, but rather that all concerned recognize the urgent need to make an early production decision on the interim penetrator." The problem would go away, of course, if it were possible to field a Stealth bomber by the mid- to late-1980s, thus obviating the need for an interim bomber. But this does not seem to be in the cards.

General Ellis expects that "we could have an operational prototype [Stealth bomber] as early as 1985 or 1986 . . . and an all-up squadron of fifteen aircraft in 1990," assuming that the program is funded in an optimal manner. Some other senior Air Force leaders are less sanguine and fear that IOC might not be reached before the mid-1990s and that the probability that the Stealth technology will work as advertised in a strategic penetrator may be only sixty percent. (Stealth technology research applicable to various combat aircraft is being carried out by both the Air Force and the US Navy.)

General Ellis told Congress that if "we act now to take advantage of [the range of technologies known collectively as Stealth], bombers will be able to penetrate even the most sophisticated radar defenses." Over the next few years significant gains can be made in "propulsion; reduced aircraft weight; nonreflective composites; dramatically lower radar and infrared signatures; [and] improved countermeasures and refined avionics," he reported.

While it is possible to retrofit some of the Stealth technologies to existing aircraft, full realization of their benefits is possible only in the case of designs that are new from the ground up, according to General Ellis.

In SAC's view, Stealth bombers must be able to penetrate hostile airspace "on the deck" as well as at high altitude, General Ellis told this writer. If SAC were forced to chose between an interim and a Stealth bomber, the decision would go in favor of the latter, he said.

On the other hand, General Ellis acknowledged that if the choice were between a new penetrating bomber of any kind and MX in a survivable basing mode, the ICBM would get the nod as "the highest priority issue."

Although not opposed to some modification of the MX's currently proposed basing mode—such as elimination of the SALT II-oriented viewing ports of the shelters and linking all shelters within valleys rather than in straightline complexes confined to twenty-three units—SAC's Commander in Chief stressed the unique attributes of MX in an MPS basing mode.

These include fast reaction against hard targets, independence from warning, its location in sovereign US territory, high alert rates on the order of ninety-eight percent, low operating costs, better and more reliable command and control than any other strategic system, and the ability to expand or contract the size of the system in response to either increasing threats or arms-control considerations.

Mounting concern about drawn-out litigation by environmentalists and others in order to block construction of MX shelters led General Ellis to suggest that it is well within the powers of Congress to solve such potential problems. As was done in the case of building the Alaska pipeline, Congress, by fiat, can dispense with the environmental laws and regulations that otherwise might ensnare construction of MX in time-consuming and costly court battles. If it indeed is the will of the Congress that MX be built, he asserted, Congress can and should ensure that it be done without undue delays.

Tardy Approach to High Energy Laser Weapon Development?

The US Senate's Committee on Commerce, Science, and Transportation, in a special report on "Laser Research and Applications," found disturbing deficiencies in the Defense Department's high-energy laser program and warned that the nation's investment in laser weapons—totaling to date about $1.4 billion—was inadequate. Current DoD strategy for the development of high-energy lasers, according to the committee, "is one of moderately paced technology development and excludes weapon system development. This strategy is based, in part, on a conclusion that it is premature for high-energy laser weapon development programs.

"There is a feeling that the Soviets are moving prematurely into such weapons development. However, little evidence was found to support such an important conclusion. According to the testimony, the Soviets are outspending the United States by three to five times in the field of high-energy lasers and may have begun the development of operational weapon systems."

On the strength of lengthy hearings involving hosts of government and aerospace industry scientists, the committee suggested that current experimental laser devices and associated technology appear to be approaching levels of maturity to support some potential near-term applications, "such as antisensor systems" and seem to be "scalable to support other potential applications such as antisatellite and low-altitude air defense for ships and ground-based targets. Much additional research and experimentation must be done to support the most difficult applications, such as defense against tactical, submarine-launched, and intercontinental-range ballistic missiles."

Pointing out that the DoD high-energy laser budget is diffused among DARPA, the Air Force, Navy, and Army—each of which is pursuing

technology objectives of peculiar interest to its concerns—"there is a compelling need to revise the [Pentagon's] high-energy laser research and development planning and funding to achieve a balance between technology development and weapon system development. Achievement of this objective could be enhanced by the Secretary of Defense designating an office . . . to manage and direct the overall DoD high-energy laser program."

Claiming that invention of the laser device ranks among the most important discoveries of this century, "potentially rivaling in the twenty-first century the significance of the atom bomb and discovery of integrated circuits," the committee predicted that by using lasers to defend against offensive nuclear weapons the superpowers might move into a "postnuclear era." The concomitant would be a "dramatic shift in strategic nuclear posture," the Senate committee's report said.

The committee report predicted the feasibility of a high-energy laser weapon that in a high-density threat environment methodically moves from target to target "giving all azimuth coverage; focuses the beam on the most threatening target; holds the beam on the selected aimpoint despite the target's distance, speed, and maneuver; burns through the target skin and ignites the fuel or destroys the warhead or other vital component. Then, with instructions from its sophisticated fire-control system, the weapon switches the beam to the next target providing the greatest threat and so continues through tens or hundreds of successful engagements before the fuel is expended."

The committee reported one witness "described a system concept for destroying hostile satellites, aircraft, and submarine and intercontinental-range ballistic missiles and expressed the view that such a system could be developed and deployed in three to five years at a cost of $10 billion." Pointing out that this notion represented the most optimistic assessment concerning the state of laser weapons technology, the committee found that other experts, even though sanguine about the long-range potential of laser weapons, "were less optimistic about the ability to develop and deploy such systems within this decade."

A major point of contention among US laser weapon experts, the committee reported, is over the potential consequences of certain "breakthrough" technologies: "New technologies, such as the free electron laser, appear to offer great potential to avoid many of the difficulties and pitfalls that have slowed the progress of lasers toward operational systems."

The committee concluded that "current DoD budget allocations for high-energy laser programs are not sufficient to achieve operational directed energy weapons at the earliest time. But, it is possible to significantly accelerate the achievement of directed energy weapon systems. There also is a need to develop new and promising laser devices such as the free electron laser."

But last month, following crucial tests of the Air Force's Airborne Laser Laboratory (ALL)—a modified NC-135 using a carbon-dioxide continuous wave laser device—former Air Force Secretary Dr. Hans Mark stressed that "we are quite a ways away from having the capability to put lasers in space." He added that "before you can put a laser in space you are going to have to learn how to put it on an airplane, and make it work on an airplane, and make it do useful things on an airplane." That, he explained, is the purpose of the ALL program, which has been under way since 1970. (Within the next few months, ALL is to demonstrate the feasibility of shooting down tactical missiles in flight.)

Probably the first application of this technology, Dr. Mark suggested following successful shakedown tests of both the laser and the optical alignment system at Kirtland AFB, N. M., will be on the strategic bomber force. Laser weapons only work well above 30,000 feet or so because higher up the rarefied atmosphere causes far less attenuation of the beam than at lower altitudes, according to Dr. Mark. Further, because of the power requirement of the laser weapon —roughly equal to the output of a large jet engine—only large aircraft appear capable of accommodating systems of this type. Hence, strategic bombers penetrating hostile airspace at high altitude appear to be good candidates for using laser defenses against surface-to-air or air-to-air missiles, he said. The operational availability of such a weapon, short of a crash program, might be between ten and twenty years away, he speculated.

At the same time. Dr. Mark was sanguine that, over time, space-based laser weapons could be developed and deployed. Over the long term, "I think we are going to put lasers in space and shoot down intercontinental missiles." This forecast, he warned, however, should not be construed as an alibi for *not* building MX. Because laser systems that can disable ballistic missiles won't be available for many years to come, he said, MX "will not be outdated technologically," even though it may turn out to be "the last major new missile system we have to build if we are successful" in the development of laser ABM weapons.

Ballistic missile defense involving laser weapons, he said, is dependent on the Space Shuttle with the result that space-based laser weapons programs and the Shuttle program "will converge . . . at some point."

So far as the Soviet Union is concerned, Dr. Mark said, "we know [they] are doing a lot of work on lasers [but to my knowledge] they do not have a laser like [ALL] on an airplane. We are way ahead of them on this."

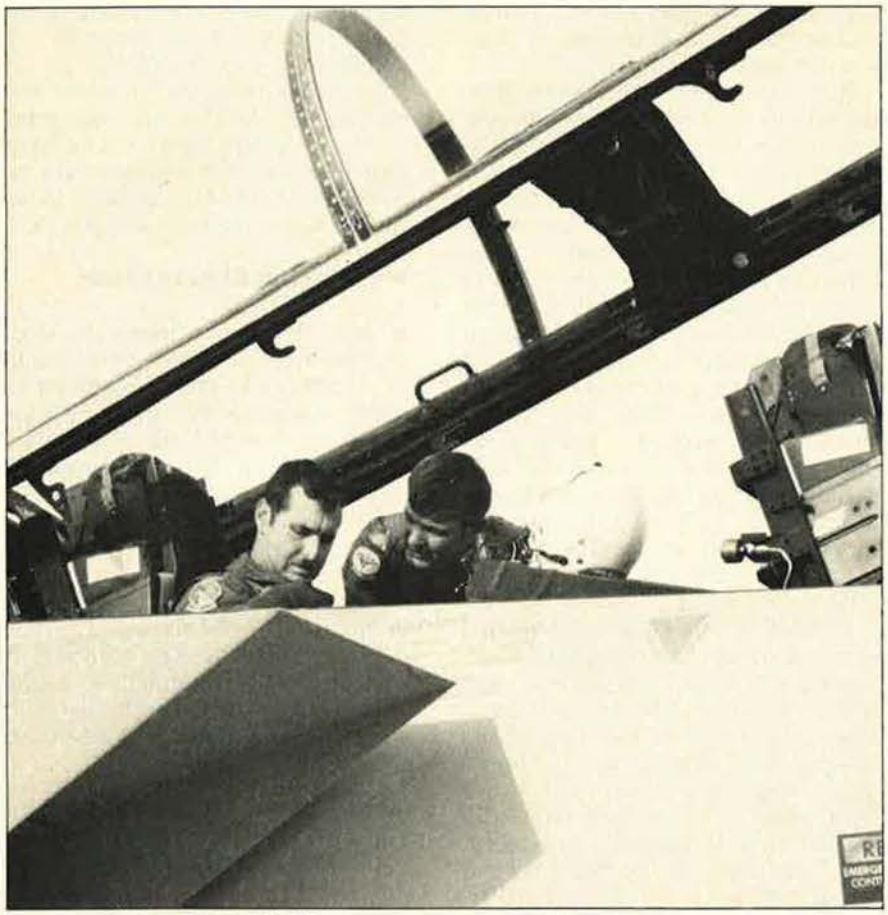
Washington Observations

★ Adm. William J. Crewe, Jr., Commander in Chief, Allied Forces Southern Europe, told this column that the death of Marshal Tito last year, as yet, has neither weakened Yugoslavia's determination to steer a political course independent from Moscow nor emboldened the Soviet Union toward moves to threaten Belgrade's independence. At the same time, he expressed concern over the growing threat to the Sixth Fleet by Soviet submarines and Backfire bombers as well as over harassment by Libyan MiG-23s, some of which are—or were—being operated by North Korean and Syrian pilots.

★ SAC Chief General Ellis recently told a group of Pentagon correspondents that permissive attitudes concerning the behavior of military personnel should be rectified because "we don't want a drunk or pothead . . . running around [SAC's nuclear weapons] storage or alert areas." He urged the Administration—preferably the Secretary of Defense—to issue a "statement of policy" asserting that the use of illegal drugs by military personnel will not be tolerated. Such a proclamation would help reverse what he termed the "permissiveness in our recruitment policy." There have been "drug busts" involving "security policemen and supervisors in maintenance within the disciplines having to do with our alert force and security of nuclear weapons," he said. Also, in a few instances, bomber crews were found to be involved in drug use. There are, however, no known instances of drug use by personnel of this type while actually on duty, he pointed out. ■

AEROSPACE WORLD
News, Views & Comments

By William P. Schlitz, SENIOR EDITOR



Lt. Lewis Claborn, 964th AWACS weapons director, buckles in for a flight aboard an F-15 while he is coached in the aircraft's intricacies by Maj. Bill Meeboer. F-15 pilots and AWACS specialists are trading know-how to enhance E-3A crew capability in assisting tactical air operations (See below.)

Washington, D. C., March 4

★ Four F-15s from the 49th Tactical Fighter Wing, Holloman AFB, N. M., recently deployed to Tinker AFB, Okla., under a new TAC program aimed at enhancing E-3A crew capability in assisting tactical air operations.

The program is to provide face-to-face contact between E-3A crews assigned to the 552d Airborne Warning and Control Wing at Tinker and aircrews from throughout TAC, including ANG and AFRES fighter units.

According to Lt. Col. Wayne Bechler, an F-15 pilot recently assigned to the 552d: "This program provides both the E-3A and tactical fighter crews with a better understanding of each other's capabilities, tactics, and operational requirements. Maj. Bill Meeboer, also an F-15 pilot, and I are assigned to the 552d to conduct a training program for E-3A crews that will give them a better understanding of the type of information a fighter pilot requires to enhance his survivability and effectiveness. In addition, we plan to brief both active and Reserve tactical fighter units on the specific capabilities of the E-3A," the eighteen-year veteran fighter pilot said.

During the joint training sessions, crews of the two types of aircraft will fly with each other ("B" version F-15s—two-seaters) and then discuss tactics and develop ways to best use the advanced capabilities of both aircraft.

★ At Scott AFB, Ill., in early March was conducted the first of what the top communicators of the three services pledge will be "periodic" joint meetings each year.

Object of the get-togethers of the Commanders of the Air Force Communications Command, the Army Communications Command, and the Naval Telecommunications Command is to "discuss issues of mutual interest, develop unified positions, and, when appropriate, decide on a course of action to be jointly pursued," spokesmen said.

A joint secretariat representing the three services has been established at Scott, where AFCC is headquartered, "to support the meetings, maintain records, monitor study groups working on individual problems, and implement the commanders' decisions," officials said. Air Force and Army secretariat delegates will be permanently on hand, while Navy representatives will commute from Telecommunications Command headquarters in Washington, D. C.

The agenda at the first meeting included seeking ways to eliminate duplication of effort, looking at communications problems in Southwest Asia, and reviewing technical control upgrade actions.

Besides the obvious benefits of such cooperative exercises, "substantial savings in time and money" should result, officials declared.

Maj. Gen. Robert T. Herres commands AFCC; his Army and Navy counterparts are Maj. Gen. Gerd S. Grombacher and Rear Adm. Ralph M. Ghormley.

★ Following the recent completion of a flight-test qualification and certification program, the F-16/79 intermediate export fighter is being readied for evaluation flights by pilots

of several potential customer air forces.

US Air Force pilots Lt. Col. Joseph Dryden and Capt. Greg Lewis flew simulated combat missions in the prototype aircraft at Edwards AFB, Calif., in early January. They engaged in mock combat with other high-performance aircraft and dropped 500-pound bombs while flying at various speeds.

The F-16/79 was developed by General Dynamics under a company-funded program to fulfill the government requirement for an export fighter with cost and performance characteristics that lie between the current US export fighter, the F-5E, and the standard F-16 Fighting Falcon, presently operational with USAF and five allied air forces in Europe and the Mideast.

According to officials, the F-16/79 will offer substantially greater speed, range, avionics, and maneuver capabilities than the F-5E.

It is estimated that about twenty-five countries will have a requirement for new intermediate fighters during the next fifteen years, General Dynamics officials contend.

The F-16/79 is currently a finalist in new fighter aircraft competitions in Austria and Taiwan.

★ A new aircraft designed to carry nearly two tons of instruments to an altitude of thirteen miles is scheduled for delivery to NASA's Ames Research Center, Moffet Field, Calif., in April.

The F-16/79 intermediate export fighter recently completed a flight-test qualification program and is being readied for evaluation flights by several potential customer air forces. (See adjacent item.)

The NASA ER-2 (for Earth Resources) is to augment research programs being undertaken by two Lockheed U-2 planes now at Ames. The ER-2 is similar to the U-2R and the new TR-1 now being produced for USAF.

The one-place, single-engine jet has been designed by Lockheed-California Co. to cruise above 70,000 feet (21,000 m) at a speed of 476 mph (770 km/hr) and has a range beyond 3,000 miles (4,829 km).

Payload compartments in the ER-2's nose, behind the pilot, and in wing pods will carry a variety of cameras, an imaging radar, and other sensors for scientific measurements in the stratosphere and for earth resources studies, NASA officials said.

★ AFSC's Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio, recently began operating a unique new facility known as the Mobility Development Laboratory.

Among other things, the new lab is visualized as being used by engineers to develop air-cushion takeoff platform devices that would attach to the undercarriage of aircraft. Slightly in the science-fiction realm, the devices would loft aircraft on takeoff over such obstacles as bomb craters on battle-damaged runways and once the aircraft were airborne would be jettisoned for reuse.

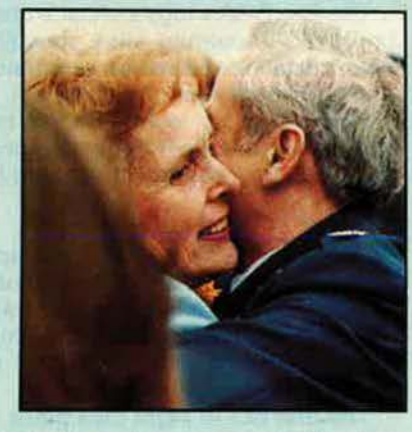
The engineers will also be looking into ground-effects takeoff and landing systems for landing large aircraft with gross weights exceeding 1,000,000 pounds.

Equipping the new lab is a forty-four-foot whirling arm that moves around a circular track at up to fifty mph. Test models will be attached to the tip of the arm. Another major test device is a Plexiglas platform twenty-four feet in diameter perforated with 150 tiny instrumented holes that permit engineers to record precise pressures generated by air cushions as they move across or are dropped onto the platform.

★ Aerospace technology is being applied in the early detection of potential heart attacks and strokes.

Georgia Tech engineers are developing a nonsurgical technique for diagnosing atherosclerosis, a gradual narrowing of the arteries that is a leading cause of heart attacks and strokes.

From The Corrections Desk, March 1981 Section



The caption for this photo in the March issue (p. 37) was wrong. The photo was part of a two-page feature about how the Air Force looked after its own during the long hostage crisis. The accompanying photos were exclusive to AIR FORCE Magazine, and supported the main point: the Air Force cares for its own people and takes care of them in crisis. But we at the magazine managed a misidentification in the photo caption, saying "Col. Thomas E. Schaefer embraces his wife during their arrival at Andrews."

In fact, Colonel Schaefer and Mrs. Barbara Allen, wife of Air Force Chief of Staff Gen. Lew Allen, Jr., are embracing.

For our mistake, there is, of course, no excuse, extenuation, or mitigation. Mrs. Allen and Mrs. Schaefer are both owed apologies from us, which are freely and humbly given. Both gracious ladies exemplify the Air Force's hidden asset and source of its enduring strength: the families of its people. They have enough burdens to carry without AIR FORCE Magazine's adding to them by this sort of misidentification.

We are grateful to both ladies and their husbands for the forbearance and equanimity with which they took this gaffe.

—F. CLIFTON BERRY, JR.

The Atlanta institution's Bio-fluid Dynamics Lab is exploring the connection between atherosclerosis and abnormal blood flow through arteries. While doctors already use special equipment to listen to blood flow in diagnosing diseases, Tech engineers hope to develop a better method for early detection.

"We're involved in this work because the same natural laws governing blood apply to air flows in aeronautical science," explained program director Dr. Don Giddens.

Earlier diagnosis is important because the disease shows few symptoms until well advanced. Medical researchers once thought that effects of the disease were irreversible but recent experiments on lab animals indicate some improvement in human victims may be possible.

AEROSPACE WORLD

Work with Piedmont Hospital neurosurgeon Dr. Robert Mabon has led to a prototype instrument known as the Pulsed Doppler Ultrasound Flow Meter, a device that makes readings by sound.

Blood flow studies show promise for other kinds of medical care, such as making kidney dialysis more effective.

★ Following a fourteen-flight test program conducted by Lockheed-Georgia Co. at its Marietta facility, the first operational re-winged C-5A has been returned to the Military Airlift Command.

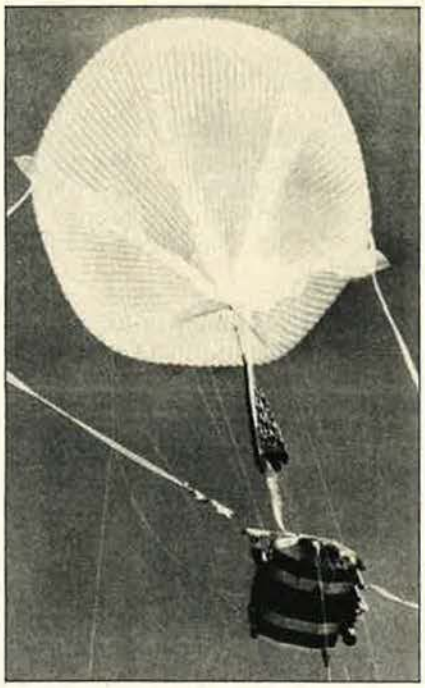
The aircraft is now being flown from Dover AFB, Del., in what is expected to amount to some 1,400 hours of worldwide missions during an operational test and evaluation (OTE) program to check out systems function, reliability, and maintainability, officials said.

The new C-5A wings are made of an improved aluminum alloy specially heat-treated for corrosion resistance and high toughness.

New wings are to be fitted to the rest of the C-5A fleet beginning next year, with the program concluded by 1987.

★ Under a $284 million contract, USAF will buy six more McDonnell Douglas KC-10 tanker/cargo aircraft, bringing the number ordered thus far to twelve of a planned total of thirty-two.

The first KC-10 flight took place in July 1980 and the plane has been undergoing tests at the manufacturer's facilities at Yuma, Ariz., refueling a variety of aircraft including fighters, bombers, and transports. The first operational KC-10s are to serve with SAC's Eighth Air Force at Barksdale AFB, La.



American balloonists Maxie Anderson and Don Ida got off to a good start from a launch pad at Luxor, Egypt, in early February in their globe-circling venture but came down near Murchpur, India, because of "operational problems." Anderson, a seasoned balloonist, will undoubtedly try again. (Wide World Photos)

Commands Celebrate Thirty-fifth Anniversaries

March marked the thirty-fifth anniversaries of two major Air Force commands, SAC and TAC. Both began operations in 1946.

Because of demobilization, at the end of its first year SAC numbered 37,092 people and 270 planes. The latter included 148 B-29s, the mainstay of the force at the time. Today, SAC employs some 117,300 people at twenty-eight SAC bases and at twenty-five other bases where SAC forces are located. The command has more than 1,000 ICBMs and about 400 bombers and 650 tankers, including AFRES planes.

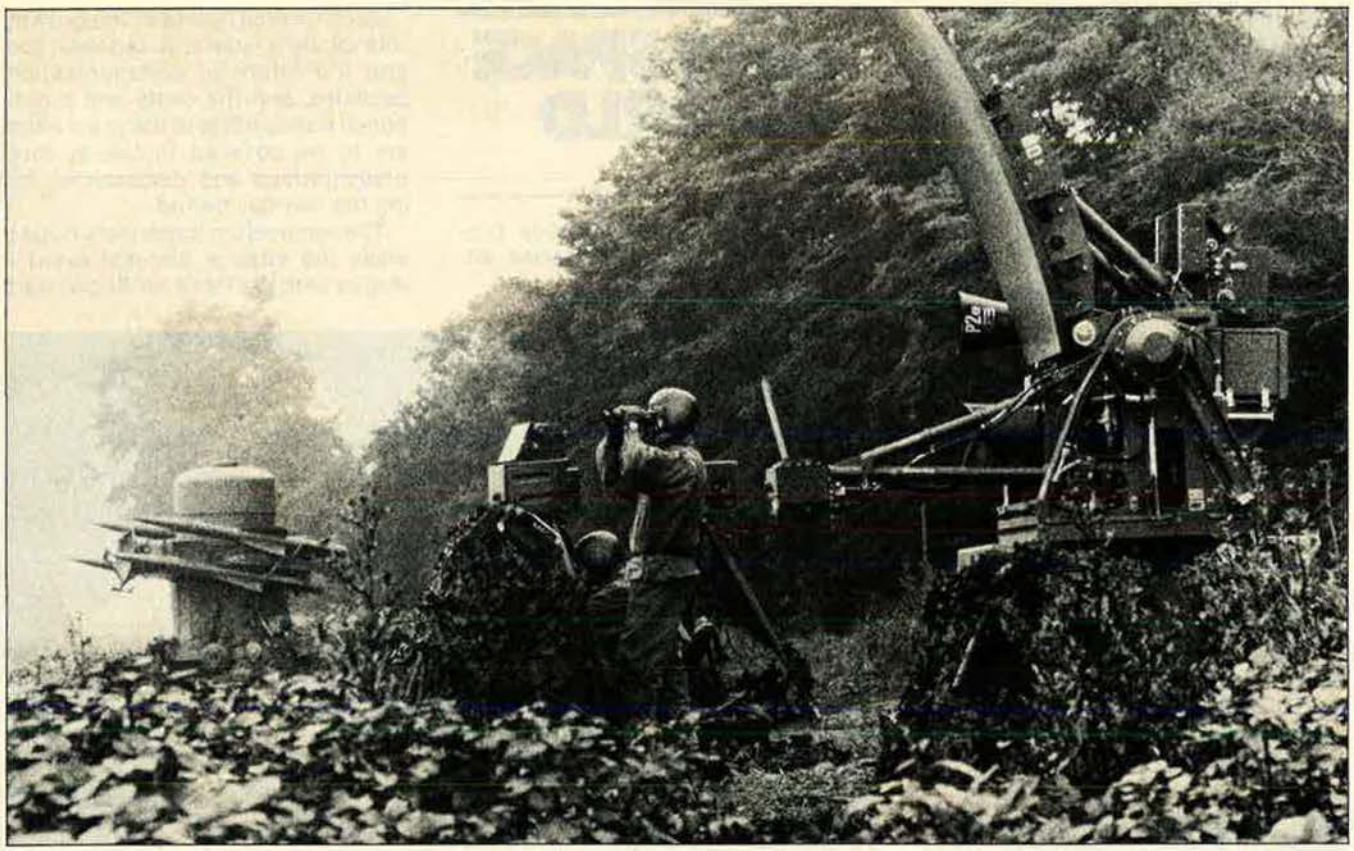
TAC's mission, initially, was to supply tactical air support to the ground forces. In 1948, the command could boast only a planning section of 158 people, but the mission, over the years, has included fighter, bomber, airlift, missile, and radar operations. Today, TAC's air-superiority forces have more than 106,000 people operating from thirty-three bases and units in the US, Iceland, and Panama. Living up to its motto that "Readiness Is Our Profession," the command works closely with US and allied tactical air forces in Europe and the Pacific, supports naval as well as ground forces, and is ready to deploy almost anywhere with just a few hours notice. TAC also provides air defense for the continental US, a mission assigned in 1979.

While SAC was preparing to celebrate thirty-five years of service, one important element of the command, the Airborne Command Post, saw its twentieth birthday in February. EC-135 aircraft from Offutt AFB, Neb., currently rotating three a day, have been in the air every hour of every day for the last twenty years. Since 1961, these aircraft have flown more than 20,000 missions as airborne command posts and have accumulated more than 171,200 accident-free hours, a flawless record. Aside from the fortitude of the crews, great credit for this mark is given to maintenance people, who must ready the aircraft for their missions; and base personnel, who keep the runways open and usable regardless of the Nebraska weather.

SAC has added significantly to its ABNCP capabilities with its new E-4 aircraft.

—T. L. S.

SAC's first E-4B Advanced Airborne Command Post climbs skyward on a test flight. A second is currently being outfitted.



The UK's Marconi Blindfire radar system provides all-weather, round-the-clock capability for the British Aerospace-developed Rapier low-level air-defense missile system, left. Here, the radar and missile systems are deployed in a typical operational setup. Rapier has been selected for air defense of US air bases on British soil.

★ Two researchers at NASA's Langley Research Center, Hampton, Va., have demonstrated the world's first gas laser powered directly by sunlight.

Ja H. Lee and Willard R. Weaver directed light from a solar simulator onto a quartz tube containing a gaseous iodide. The light stimulated the iodide to cause lasing and the emission of a five-watt burst of concentrated light waves.

"The directly sun-powered laser would eliminate the need in current laser systems for intermediate energy conversion to produce lasing," a spokesman said, thus reducing potential systems' size, weight, complexity, and cost.

The space agency's interest in lasers includes such applications as sensing of the earth and its environment, optical data processing and transfer, and power transmission for space operations.

★ The nation's first "wind farm" will be in operation in midyear with the completed assembly of a third NASA-sponsored advanced wind turbine system.

The cluster of machines at Goldendale, Wash., is expected to produce a total of 7,500 kw at a cost "very close" to that of power generated through the use of fossil fuels, officials said. Power fed into the Bonneville electricity grid will be enough to supply up to 3,000 average homes.

Designated Mod-2, the turbines are the largest and most powerful ever built and were designed with a system life of thirty years. They were built by the Boeing Engineering & Construction Co., Seattle, Wash.

The Mod-2s are 200 feet (sixty-one m) high and their steel rotors measure 300 feet (ninety-one m) from tip to tip.

NASA engineers predict that wind farms of from twenty-five to 100 tur-

Radar systems built by Germany's AEG-Telefunken, claimed to be the most modern in the world, are on order to replace twenty-year-old types at Hannover, Frankfurt, and Munich. SRE-M5 sets are also in the works for Austria, Belgium, and the UK.

Formation flying for these F-86s of the Japanese Air Self-Defense Force's aerial demonstration team has ended after twenty-three years. They'll be replaced by Mitsubishi T-2s, Japan's first supersonic aircraft. (Wide World Photos)

bines may be producing truly significant amounts of cost-effective electricity by the end of the century.

★ Leaders in aerospace technology from the major European countries, the US, Canada, USSR, Japan, and China are to gather at Le Bourget Airport near Paris on June 2–3 to take part in the first International Aerospace Symposium. The event is being conducted in conjunction with the Paris Air Show, which opens at the airport on June 4.

Subjects for discussion at the symposium will include interplanetary exploration, worldwide fuel problems in civil aviation, and aerospace developments in China.

The meeting, sponsored jointly by the US Departments of Commerce and Defense and NASA, will be held in the US Pavilion at the airport.

"To ensure its technical excellence, the symposium is being organized by the American Institute of Aeronautics and Astronautics, the largest and most prestigious professional society of aerospace engineers," officials said.

Such diverse issues as the growing role of helicopters, a ten-year look into the future of communications satellites, and the costs and regulation of airline travel in the years ahead are to be covered in twenty-three presentations and discussions during the two-day period.

The symposium's sponsors hope to make the affair a biennial event in league with the Paris Air Show, tradi-

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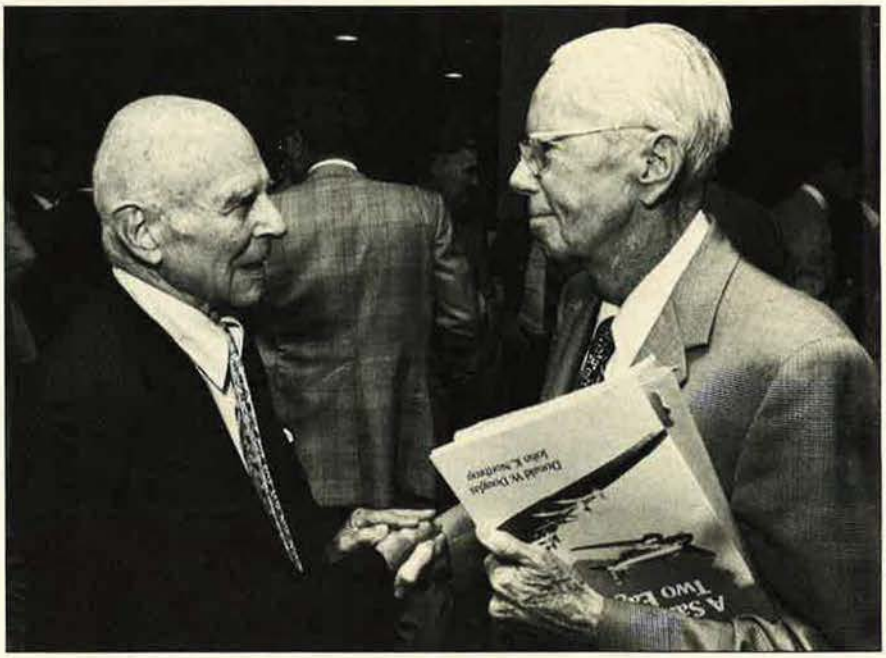

A pair of eagles: Jack Northrop, right, with Jimmy Doolittle. Aircraft designer and aviation pioneer Northrop died in February. (See News Note.)

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tionally where the latest developments in aviation and space technology are unveiled and "where both East and West come together to show the world their latest technological triumphs," officials said.

In another Air Show-related event, London's *Financial Times* is sponsoring on June 3 a conference of top commercial carrier leaders and others. The subject: "Financing World Air Transport Expansion."

★ Two new combat radar systems that make possible rapid counteraction against enemy fire have been accepted by US Army under its Firefinder Operations project.

The AN/TPQ-37 was declared operational at Fort Hood, Tex., and the first production unit of the AN/TPQ-36 was delivered to Fort Sill, Okla.

Both systems were developed and are being produced by Hughes Aircraft Co.'s Ground Systems Group, Fullerton, Calif., to provide fast, accurate, and automatic plotting of all types of incoming fire. The computer-operated systems can also track friendly fire for adjustment and registration.

The AN/TPQ-36 is a small, highly mobile unit mounted on a trailer for front-line use, while the -37 is mobile but larger for use to the rear of the battle area. Both systems have undergone extensive testing, officials said.

The Army has contracted for thirty-two -37s and 106 -36s with an option for eighty-two additional units.

★ **NEWS NOTES**—Belgium's **famed 349 Squadron,** based at Beauvechain AB, nineteen miles (thirty km) east of Brussels, has become the first operational NATO unit to be equipped with the **new F-16 multirole fighter.** The squadron will assume an air defense role. Formed in 1943, the 349 flew with the RAF and on June 10, 1944, became the first Allied squadron to fly sorties from French soil, following the landing at Normandy on June 6.

Under a USAF contract, the University of California at Riverside will conduct a **two-year study of effects of jettisoned jet fuel on the atmosphere.** An environmental chamber simulating altitudes will determine the photochemical transformations of JP-4 and JP-8 military fuels.

The Mideast Sultanate of **Oman has become the fifty-first country to buy Lockheed's C-130.** The "H" version will be used for military logistics support and country building.

CAP had another busy year in 1980. Among other things, the Air Force auxiliary **saved fifty-two lives** on its own and was credited with an additional sixty-three assists.

DoD has established a **Defense Small Business Advanced Technology Program** to capitalize on the creative potential of such firms and promote "innovative solutions to scientific and technological problems" in about twenty R&D areas.

Died: Aviation pioneer **John K. Northrop,** of pneumonia in February in Glendale, Calif. He was eighty-six. A prolific and internationally respected designer of aircraft, Mr. Northrop helped found the company that bears his name as well as another aerospace industry giant, Lockheed Corp. His career paralleled the evolution of US aviation, and his design genius helped guide it into the jet age. ■

A Prisoner Release of Twenty Years Ago

With the release of the hostages by Iran, Air Force Col. John R. McKone harked back twenty years to his own release by the Russians after seven months in Moscow's notorious Lubyanka Prison.

Colonel McKone, currently 3902d Air Base Wing Commander, Offutt AFB, Neb., and Col. Freeman Bruce Olmstead, now air attaché in Denmark, were the two surviving members of a six-man crew aboard an RB-47 reconnaissance aircraft shot down by a Soviet fighter over the international waters of the Barents Sea on July 1, 1960. During their ordeal in Lubyanka, the two were kept in solitary confinement and interrogated intensely.

On January 25, 1961, several days after the inauguration of President John F. Kennedy, the Soviets released them.

"Our release was very sudden," Colonel McKone recalls. "The Russians had given us no hope of ever getting out." On their release, the two officers were driven to the American Embassy and turned over to Ambassador Llewelyn Thompson. Later that morning, they flew by KLM jetliner to Amsterdam, where an Air Force C-121 took them to the US air base at Goose Bay, Labrador. From there, it was on to Washington, D. C., where they were met by President Kennedy and their wives.

Colonel McKone credits President Kennedy in following President Eisenhower's strong stand in conducting no business with the Soviets until the two officers were freed. "We were not exchanged for people or money as far as I know," he said. Also, world opinion had turned against the Soviets.

Accepting a JFK invitation to visit, "When we arrived at the White House in a staff car, the President of the United States came down the steps and opened the car door for me and my wife. That's one of the biggest honors I have ever received," said Colonel McKone.

A far more difficult time for McKone and Olmstead was their subsequent meeting with the widows of the other RB-47 crew members. "One of the first things we felt we had to do was to meet with those ladies to tell them the facts as we knew them about their husbands."

Upon arrival for a visit in 1961, the McKones are greeted at the White House steps by President John F. Kennedy.

CAPITOL HILL

By Kathleen G. McAuliffe, AFA DIRECTOR OF LEGISLATIVE RESEARCH

Washington, D. C., Feb. 25

Navy Chiefs on Sea-based MX

While the Reagan Administration is considering all MX basing mode options, including surface ships, top Navy officials seemed to lay to rest the idea of a sea-based MX.

Sen. Dan Quayle, a new member of the Armed Services Committee, queried Navy Secretary John Lehman and Chief of Naval Operations Adm. Thomas Hayward on the MX and a series of tests known as Hydra, which probed the idea of launching ballistic missiles from the sea surface.

Admiral Hayward told the committee that the Navy looked at the idea several times in the last few years, but that it remains an unattractive alternative as there are command and control problems with "ballistic missiles bobbing around in the middle of the ocean . . . and we haven't come close to the accuracy that you'd need. . . ."

Secretary Lehman said that carrying the MX on surface ships would place MX in the same vulnerable condition facing Minuteman. "They [the ICBMs] are targetable and preemptable until they are actually put in the water," the Secretary stated. He further said that merely barraging the area in which the ships are located would do severe damage to continental shelf submarines, surface ships, or even SSBNs. " . . . [T]his prelaunch survivability, which is the whole issue, is not really resolved by a Hydra-type solution," according to Secretary Lehman.

Bomber Priority

Gen. Richard Ellis, Commander in Chief of the Strategic Air Command, strongly recommended to the members of the Senate Armed Services Committee a two-bomber program in order to meet our long-term requirements—1990 and beyond—as well as the near-term threat.

Congress is scheduled to receive evaluations on interim bomber options from DoD this spring, and the SAC Commander urged an early production go-ahead.

General Ellis did say, however, that " . . . if one of the bomber programs must yield to fiscal limitations and only a single bomber can be pursued, it should be the new technology bomber."

Stealth Report

A House Investigations subcommittee concluded that release of information last year on "Stealth" technology was purely politically motivated to make the Carter Administration "look good in an election year, and not, as claimed, for purposes of damage limitation." It said also that the release of the Stealth technology research did serious damage to our national security by providing the Soviets with long lead time to duplicate US efforts and to develop countermeasures.

The panel recommended a total revamping of procedures for protecting classified information. The new policy should provide that no one official, not even the Secretary of Defense, be allowed sole authority to declassify secret defense programs until a special panel, to include all top DoD intelligence officials and the Joint Chiefs of Staff, reviews the program and recommends declassification.

Price Heads R&D Panel

Rep. Melvin Price (D-Ill.), Chairman of the full House Armed Services Committee, elected to chair the R&D subcommittee. This gives a potential boost to USAF airlift needs, especially the CX. Last year, the R&D panel under the leadership of former Rep. Richard Ichord (D-Mo.) zeroed the Administration request to begin research and development on the new outsize cargo transporter, the Air Force's top priority in the mobility area.

Chairman Price stated recently that "the lack of strategic airlift . . . limits the potential use of our forces to protect our national interest in various parts of the world. It is my intention that my subcommittee will look carefully at airlift this year . . . at both short-term improvements we can make and the long-term requirements for new airlift development."

CRAF Retrofitting

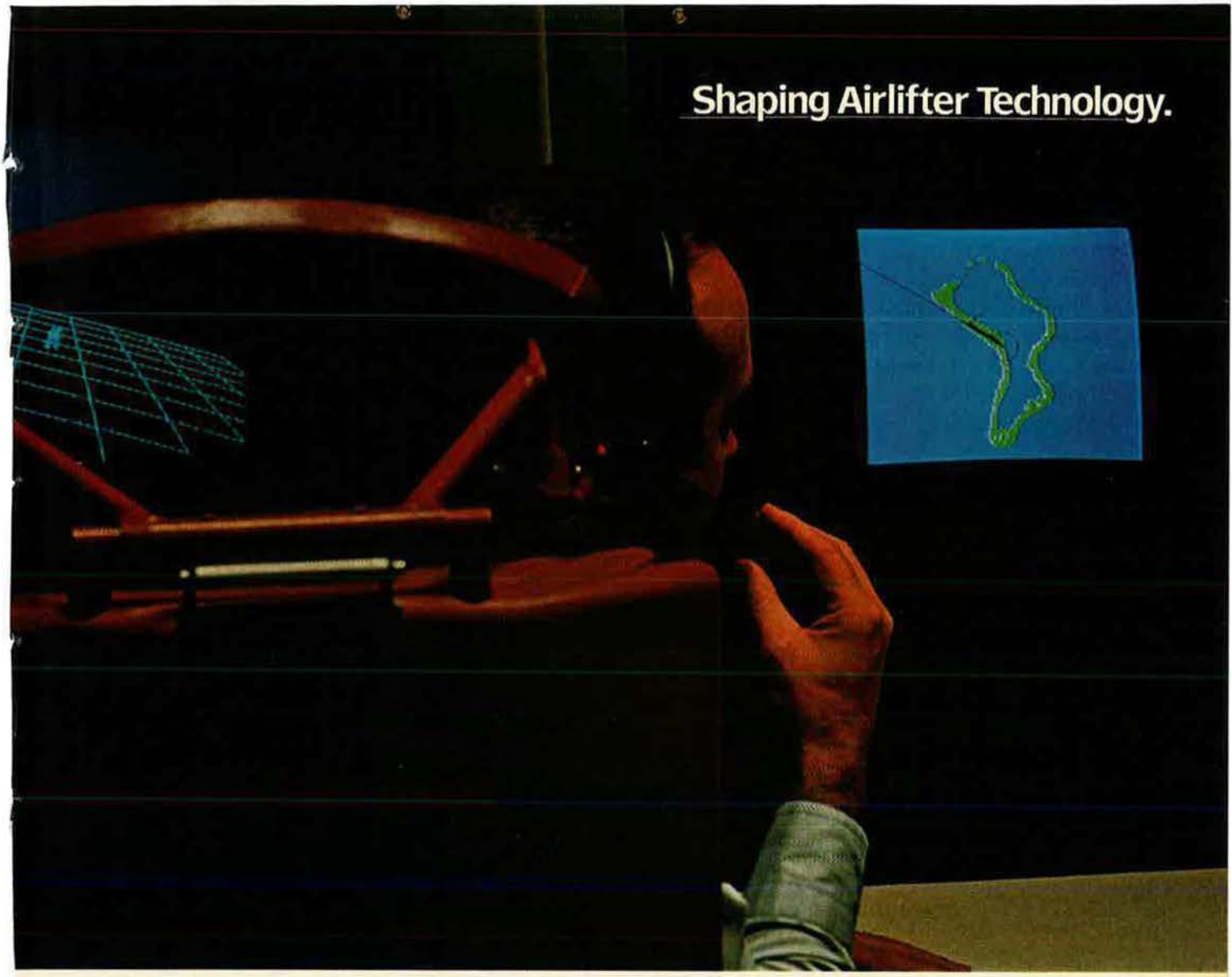
The Air Force's Civil Reserve Air Fleet (CRAF) enhancement program will be modified to focus on retrofitting existing commercial wide-body aircraft while retaining the current policy of modifying only new production aircraft. Prospects for success of CRAF enhancement are poor under the present policy because the airlines are not buying the previously projected high numbers of wide-body aircraft.

The Air Force notified key congressional committees that Requests for Proposals (RFPs) will be issued to the airline industry to determine the number of aircraft they will commit for CRAF enhancement and the expected price tag. Currently, there is substantial industry support for the program. If the costs are favorable, the Air Force intends to use funds—appropriated in FY '80 and FY '81 but as yet unspent—to open retrofit lines and begin the CRAF modifications at the earliest possible date.

Allen on Priorities

Gen. Lew Allen, Jr., USAF Chief of Staff, told Congress that Soviet improvements, qualitative and quantitative, make it necessary to fund a tactical force modernization program averaging at least 300 high-quality aircraft each year.

This year, however, the Air Force was forced to reduce future capability to meet near-term capability by adding to readiness accounts. The FY '82 fiscal restraints of the Carter Administration not only severely cut back USAF tactical aircraft procurement to a figure of 126 but ironically also forced a 54,000-hour cut in flying hours for the Air Force—the most basic of readiness issues. The Air Force Chief pointed out the need to return to twenty hours of flying time per month for each pilot and said he proposed this to the new Administration as the budget amendment was being completed. ■



"Pilot to cockpit display. Show me the way to Diego Garcia."

The pilot's words simply dramatize an inevitable advance in future airlifters. He will talk with cockpit computers instead of operating a complicated array of knobs, switches and keyboards.

Actually, in the navigational example above, the pilot will be more terse. He would first say "Map." That would tell the cockpit display computer, which is programmed to recognize his voice, what kind of instruction is coming. Then the pilot would say "Diego Garcia," and that little Indian Ocean atoll would flash onto the CRT screen in front of the pilot. Scientists and programmers call those instructions and questions to the computer syntactical searching.

This example of advanced airlifter research comes from the electronics laboratories of Lockheed-Georgia, and it is based on imaginative computer techniques. But throughout all of the laboratories, development centers and assembly lines at Lockheed a quiet computer-based revolution is underway. It affects every aspect of airlifters from their design, through use of computer-aided graphics, to their manufacture, using a host of computer-based tools. And finally, Lockheed-Georgia is applying unique computer technology to assure the highest quality in parts and assemblies.

The result: better airlifters from cockpit to tail. This quiet revolution is what you would expect from the scientists, engineers and programmers at Lockheed-Georgia, the people who have more experience, by far, in the specialized world of airlifters than anyone. After all, airlifters are their world. When it comes to airlifters, the people at Lockheed know how.

Lockheed-Georgia

The machine is the Air Force's new, supersonic, tactical jamming aircraft, the EF-111. And inside its lean frame is the ALQ-99E Jamming Subsystem, an electronic powerhouse that will help the EF-111 perform virtually any ECM mission.

The ALQ-99E—fully integrated into the EF-111 aircraft soon to be delivered to the Air Force—uses key equipment from Raytheon. This includes one RF calibrator and multiple transmitters and exciters per aircraft. Within each exciter, interchangeable and programmed technique cards, in combination with software, enable the EF-111 to react to diverse and rapidly changing threat conditions. In addition, the equipment's frequency coverage, reliability, and effective use of available jamming power give the aircraft its ECM punch.

This all adds up to the kind of flexible capability the EF-111 needs to increase the effectiveness of any strike force—whether in its role as standoff jammer, in penetrating the world's densest electronic defenses, or in providing close air support. Small wonder that such versatility makes the EF-111 a critical element in the U.S. Tactical Air Forces.

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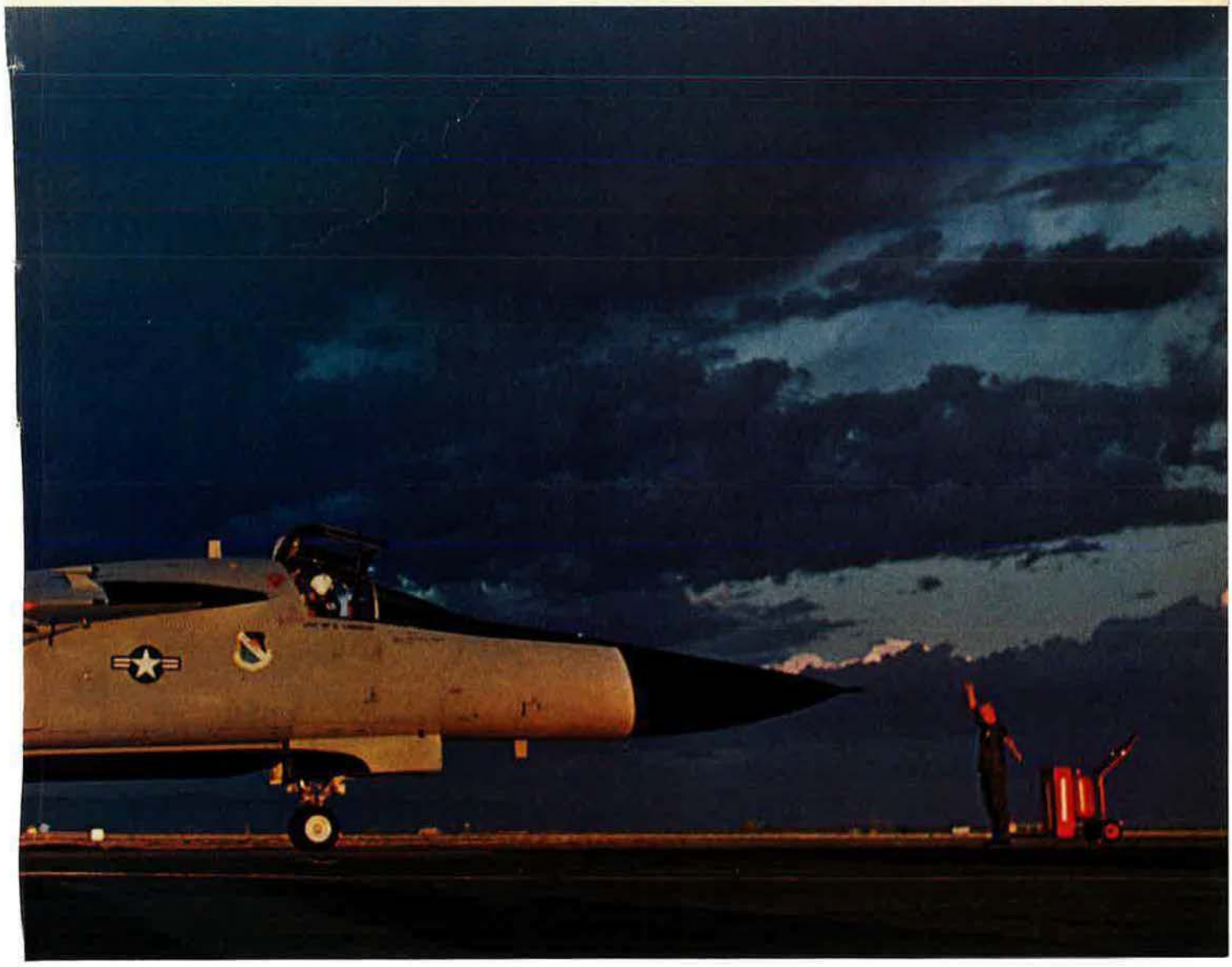

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The debate over "quality" vs. "quantity" in tactical fighter development has overshadowed the true need of the US Air Force in the decades ahead: quality *with* quantity. This is the real challenge of current and future . . .

Tactical Fighter Development

We Have Debated Long Enough

BY MAJ. GEN. ROBERT D. RUSS, USAF

"QUALITY in our tactical fighter force is of greater importance than quantity. Of course, we would like both, but if we must choose, our choice is quality."

Gen. William Momyer, then Commander of Tactical Air Command, made that observation more than ten years ago. When recently asked about his views now, he soundly responded, " . . . the same!"

Certainly the argument over whether numbers or capability is more important—or what is commonly referred to as "quality vs. quantity"—has been controversial.

During the past several years, extensive analyses, trade-off studies, and force-mix evaluations have been conducted by a variety of groups to help in deciding how many and what kinds of aircraft, avionics systems, and weapons are required to modernize the tactical fighter force. Not surprisingly, when diverse groups and agencies analyze the same problem, different perspectives, interests, and goals emerge.

The quality school desires to capitalize on the vast US industrial base and to modernize our tactical fighter force by pursuing continued and sustained sophistication of our systems. These advocates point out that over the years our technological superiority has allowed us to design, develop, and deploy highly capable aircraft, avionics systems, and weapons that are recognized as superior to those of our adversaries. This school believes that we should continue to rely on technology and capitalize on technological opportunities. They stress that this approach has served us well in the past, not only in terms of military capabilities and hardware, but in civilian applications as well. They point to the advances made in hand calculators, digital watches, and computer chip technology as evidence.

The differing school—quantity—contends that technologically advanced systems are too expensive and cannot be procured in sufficient numbers to meet the threat. This group doubts whether such complex systems could be flown and maintained at high enough readiness rates to support wartime requirements. As a result, this school advocates a modernization strategy of larger numbers of aircraft at the expense of capable avionics and weapons. They firmly believe that only less capable systems can provide high sortie rates because simplicity makes them inherently more reliable, maintainable, and, in the long run, more available.

"Quality vs. Quantity," "Complex vs. Simple," "Expensive vs. Cheap"—all of these shorthand terms have been used to characterize this debate. But, as is often the case when using shorthand to describe complex issues, the terms can be inadequate, incomplete, and possibly inaccurate.

The overriding issues are: What types of systems, in what quantities, with what capabilities, and in what time frame will give our tactical fighter force the best chance to successfully execute the missions and tasks directed by the National Command Authorities? To answer these issues one needs to understand what our fighter force is required to do, against what threat, and at what level of intensity.

Worldwide Mission Requirements

Tactical fighter forces are tasked to conduct operations worldwide. These operations include both conventional and nuclear employment in NATO Europe or Korea, augmentation of those forces assigned to defending the North American continent against bomber attack, and a myriad of air operations in other areas of the world where our national interests might be threatened. These areas include locations where some US forces, bases, and logistical support might exist, to areas where little or no en-route or in-place capability may be available.

These considerations are not new demands on our tactical fighter forces, because they have long been required to deploy worldwide. But the Soviet invasion of Afghanistan and other events in Southwest Asia have more clearly revealed the challenges and difficulties associated with planning for tactical operations in these areas. These challenges include getting forces into these

The North American F-86 Sabre (above, en route to "MiG Alley" in Korea) racked up a fifteen-to-one kill ratio over Russian-built MiG-15s in September 1952. The Lockheed P-38 Lightning (right) was designed in 1937 and first flew in 1939. Both were quality designs, available when needed, and adaptable to multiple missions during service life.

areas quickly and basing, employing, supporting, and sustaining them if they become engaged in combat.

The expected threat in these worldwide locations is large, diverse, sophisticated, and gaining in capability daily. During the decade of the Seventies, for example, the Soviets have been aggressively developing and producing large numbers of tactical aircraft with improved systems. Today, they produce a new tactical aircraft every six or seven hours, or about 1,300 a year. Many of these are highly sophisticated, like the MiG-23 Flogger and MiG-25 Foxbat.

If we were to produce aircraft at the same rate, we could reequip our entire active tactical fighter force every eighteen months. Last year alone, the Soviets outspent us by $50 billion in defense-related efforts—an amount larger than the total Air Force budget. Obviously, these large and sustained efforts have allowed them to maintain their large numerical superiority over our forces. But equally troubling is that large expenditures on research and development efforts during this same period have placed them in a position to overcome the qualitative advantage previously enjoyed by our forces.

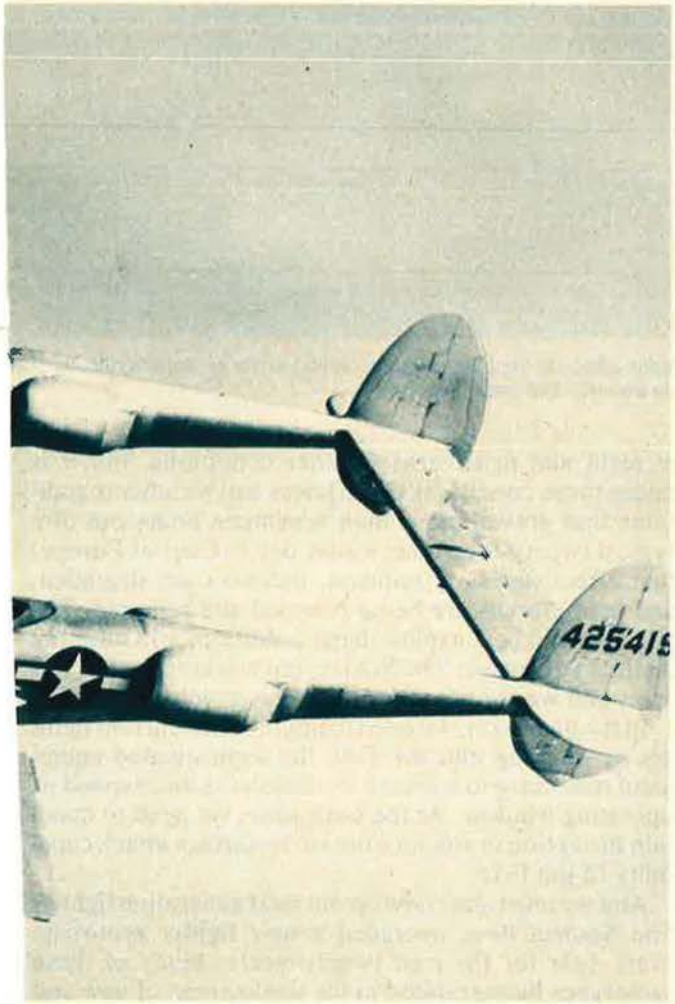
In sharp contrast to the past, Soviet fighters today are characterized by extended range, improved maneuverability, and sophisticated avionics and weapons. For the air-to-air arena, advanced air-superiority fighters are being developed with expanded operational envelopes

and improved air-to-air radar and missile capabilities. These developments are expected to lead to the deployment of a new long-range aircraft with a look-down/shoot-down capability in this decade.

For the air-to-surface arena, the Soviets are pursuing offensive systems to support their modern, highly mechanized, and mobile ground forces in carrying out Soviet doctrine—a doctrine that demands that forces be able to operate twenty-four hours a day, in all types of environmental and geographical conditions. They are equipping their direct air support aircraft with laser rangefinders and compatible missiles and bombs to support a rapidly advancing ground force. The Soviets are also building and deploying large numbers of Hind (Mi-24) and Hip (Mi-8) helicopters, not only to provide support for ground troops but to make available more fixed-wing aircraft for interdiction missions against NATO bases, nuclear storage areas, and C^3 facilities. Other improvements are being made in surface-to-air defense systems and electronic warfare capabilities, which all contribute to the Soviet drive to gain at least qualitative equivalence with us.

Tactical Fighter Requirements

To counter this sophisticated threat we need tactical forces that can meet the conditions of battle at the tempo required and then be able to sustain that tempo. The keys to sustainment are sufficient trained personnel, spare parts, and equipment to ensure we can fix aircraft when they break. The F-15, for example, is a quality system with highly capable avionics and weapons and has been a frequent target for those opposed to sophistication. But rhetoric aside, the facts show that the F-15 has demonstrated repeatedly in operational exercises, surges, and deployments that when proper support is available, high sortie rates can be generated to support both peacetime readiness requirements and wartime rates.



The 1957-vintage North American F-107 was flown by the National Advisory Committee for Aeronautics (NASA's predecessor) for supersonic testing and compilation of research data used in later USAF aircraft designs.

The F-15's reliability and maintainability speak well for sophisticated, quality systems. In the area of reliability, the F-15 avionics mean-time-between-failure is almost 100 percent better than the F-4E's. As for maintainability, only about one-fifth of the maintenance downtime is due to sophisticated systems, while the remaining four-fifths is for systems and subsystems considered common to all aircraft. This type of experience clearly tells us that we can develop, and in fact have in the field, quality systems that are sophisticated but also reliable and maintainable.

Modernizing the Force

We know what kinds of forces and systems are required if we are to successfully confront a numerically superior, highly capable adversary on a sophisticated battlefield—we know that requires quality systems. And if some people want to equate quality with sophistication, that's fine, because sophistication is a relative term. In this case, relative to the enemy we face and the mission to be accomplished. During the Korean War, some people considered the F-86 too sophisticated when compared with some of the aircraft it was to replace. But it certainly was not too sophisticated when compared with the MiG-15 that it had to find, engage, and defeat over the Korean peninsula. The same parallel can be drawn with the F-15. Compared with the F-4 it may be more sophisticated, but not when viewed against the MiG-23 Flogger or MiG-25 Foxbat that it must outfly and outfight.

What we should do is put a moratorium on the debating and, instead, direct our attention to accelerating the development and procurement of quality aircraft, avionics, and weapon systems.

Our forces need quality systems to be able to conduct air operations anywhere and anytime—operations that include providing close air support for our outnumbered

The enhanced air-to-ground F-15 adds the dimension of night and all-weather attack to the Eagle while retaining all its air-superiority capabilities. Above, dropping Mk 84 2,000-pound bombs at 30° dive angle and fifty-foot impact interval.

ground forces in Western Europe, conducting interdiction missions deep into enemy territory, or gaining and maintaining air superiority over the battlefield.

Only by developing and fielding quality systems will our forces be able to operate across the spectrum of geographical and environmental conditions that exist worldwide—systems with capabilities that allow them to exploit the unique opportunities for success that exist at night and in adverse weather conditions. For it is under these conditions of darkness and weather (conditions that prevail more than seventeen hours out of a typical twenty-four-hour winter day in Central Europe) that effectiveness is reduced, defenses are degraded, and many forces are being rearmed and repaired. The side that can best exploit these conditions will have the distinct advantage. The Soviets are working hard in this area, and we cannot allow them this sanctuary.

In the near term, we need to upgrade our current fighters by building into the F-16 the sophisticated equipment necessary to increase its usefulness and expand its operating window. At the same time, we need to maintain the option to enhance the air-to-surface attack capability of the F-15.

And we must start now on our next generation fighter. The Soviets have averaged a new fighter prototype every year for the past twenty years. Many of these prototypes have resulted in the deployment of new and

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Maj. Gen. Robert D. Russ is Director of Operational Requirements in the Office of the Deputy Chief of Staff, Research, Development, and Acquisition, Hq. USAF. He was commissioned through the AFROTC program at Washington State University and, after pilot training, flew F-84F, F-100, F-101, and F-4C fighters in air defense, attack, and reconnaissance roles. He commanded the 4th Tactical Fighter Wing at Seymour Johnson AFB, N. C., then served at Hq., Tactical Air Command before assuming his present position in November 1979. He is a command pilot with more than 4,000 flying hours.

The F-16XL design concept incorporates an advanced delta wing with the basic F-16 Fighting Falcon fuselage. The artist's concept shows the XL in both air-to-air and air-to-ground configurations. It could be ready for test in 1982.

improved capabilities. In contrast, the US Air Force has not flown a new fighter design since the YF-16 and YF-17 in 1974. We should start to prototype and demonstrate advancing technologies, not just because the Soviets do but because it allows us to maintain the technological development necessary to respond quickly to a change in threat or mission requirements. It can also shorten the time necessary to get new systems into production. The F-16XL is an example of what could be tested next year.

The point is, if we are to retain our qualitative edge, we need to do what we do best—and that's developing and fielding technologically advanced systems.

However, we have limited resources to devote to these tasks. During the past decade, fundamental changes have taken place in the American and world economies that have eroded the purchasing power of our defense dollars. We have seen rising inflation and labor rates, shortages of skilled laborers, increasing dependency on foreign fuels and raw materials, lengthening acquisition cycles, and growing competition for the world's markets and supplies. It is within this context that we must decide how best to build a quality force in sufficient numbers to successfully accomplish our required missions.

Captured Messerschmitt Bf 109 in USAAF markings. A "quality" aircraft in 1935, more than 33,000 Bf 109s flew in Luftwaffe units from 1937 to 1945. Its quantity production hampered introduction of such new aircraft as the Me 262 jet.

As a point of departure, we have long maintained that additional resources were needed for national defense. The American people have confirmed their support for a strong defense and are prepared to support it with increased funding. The exact amount of this additional funding has not been determined. But what is significant is that the discussion is now focused on how much more is needed, rather than whether there will be more. Naturally, these additional resources will not all go for tactical forces. But once we determine that amount for tactical force modernization, the analyses, studies, and force mix evaluations can then go forward with alternatives to provide our needed quality fighter force.

In the final analysis, the "Q vs. Q" argument is similar to the gun argument. One can study pistol designs and do cost benefit analysis of short vs. long barrels, small vs. large caliber, or single vs. multiple shot. But all of this analysis is rendered irrelevant if the enemy is shooting at you with a Gatling gun. The point is: You need weapon systems that can compete against the threat and compete in the environment in which the enemy chooses to fight.

Those who argue against quality systems are prone to rely too heavily on economic analysis. The economic aspects must be considered, but the most important consideration has to be what is required to be successful in combat. ■

The Carter Administration left a legacy in the field of strategic policy that warrants continued attention and action at the highest national level. Putting this policy to work may prove crucial for survival in . . .

THE DANGEROUS DECADE

BY EDGAR ULSAMER, SENIOR EDITOR (POLICY & TECHNOLOGY)

BRITISH Prime Minister Margaret Thatcher's foreboding designation of the 1980s as the "dangerous decade" has become a standard ingredient of current Pentagon testimony on Capitol Hill. Both the Department of the Air Force and the Joint Chiefs of Staff themed their posture statements to the dark shadows that Soviet military threats and general global instabilities cast over the scarcely begun decade.

A wealth of facts portends danger for the decade ahead. The Military Posture Statement by the Joint Chiefs of Staff sees the world of the 1980s dominated by proliferation of nuclear weapons and the number of countries possessing them. The warhead count of intercontinental weapons—up by 200 percent from ten years ago—not only is growing, but, "most significantly, the range, accuracy, targeting flexibility, and payload of intercontinental nuclear weapon systems have been markedly improved," according to the Joint Chiefs of Staff. At the same time, their report points out, the virtual monopoly over nuclear weapons by the US and the USSR has vanished. Instead, by the end of the decade the Joint Chiefs fear that a dozen or more nations will have acquired "some military nuclear capability."

The Military Posture Statement sees another gloomy omen in the proliferation in other weapons of mass destruction and willingness on the part of the Soviet Union and its allies to use them. The evidence is significant, according to the Joint Chiefs, that the Soviets and their allies have used toxic chemical weapons in Southeast Asia and Afghanistan and that even small powers like Vietnam and Pakistan appear to have chemical warfare capabilities. Further, even though the US reduced the transfer of arms to Third World countries, the Soviets, their allies, and others are increasing the export of advanced conventional weapon systems. Ethiopia alone, the Posture Statement asserts, has received $2 billion worth of Soviet military assistance over the past four years. Libya, Syria, Iraq, and India are other countries that have received large quantities of Soviet weapons, especially modern tanks and aircraft.

Lastly, other developing countries—Argentina, Brazil, Egypt, Israel, and North Korea among them—have progressed from the status of importers of arms to manufacturers and suppliers of sophisticated arms for the Third World. The net effect, the Joint Chiefs point out, "has been that developing nations have become armed to the point that they are capable of waging a war of great destructiveness, swiftness, and reach. As a consequence, intraregional conflicts in areas like Southwest Asia, Southeast Asia, Latin America, and Africa more than ever before threaten widespread death and devastation and portend harm to US interests."

The keystone of US concerns, of course, is that the growth in Soviet military power has nurtured a corresponding propensity on Moscow's part to interfere directly, or indirectly through surrogates, in the affairs of other nations. By reducing the ability of the US and its allies to cope with Soviet and Soviet-supported initiatives, the FY '82 Posture Statement asserts, "the Soviet Union has laid the foundation for an assertive foreign policy. A growing capability to project military power beyond the periphery of the USSR is a reflection of this Soviet drive to exert influence worldwide."

These trends of the "dangerous decade" dictate that the US broaden its strategic focus beyond nuclear deterrence and a limited range of theater and regional contingencies. The Chairman of the Joint Chiefs of Staff, Gen. David C. Jones, defined this global strategy as "a framework for appropriate levels of response to infringement on our vital national interest. . . . We must have the capability to act when, where, and how it serves our interests, not simply react to crisis at the point of attack."

Broadened Strategic Focus

The strategy that General Jones recommended to Congress hinges on "applying our strengths against the weaknesses of the adversary, not just necessarily at the point of attack (which may be the enemy's strength), but across a wide array of painful vulnerabilities. The Soviets must be continually faced with the certain prospect that a military move against US or allied interests risks a conflict that could be wider in geography, scope, or violence than they are prepared to deal with. In particular, they must be convinced that an infringement on our vital interests in Southwest Asia would trigger a confrontation with the United States that would not be confined to that region."

Implementation of such a strategy, General Jones suggested, will involve an array of steps beyond current programs that seek to boost mobility and force projection. Included here are some stockpiling of military hardware for rapid transfer to friendly nations in distress without forcing the services to draw down their combat stocks. Also essential is closer cooperation with allies in formulating national policies that broadly affect other nations. There should be, in General Jones's words, "recognition that within the context of collec-

tive security, 'national interest' must frequently be defined with reference to 'coalition interest.' "

Equally essential is better integration of this nation's economic, technological, diplomatic, and military policies to ensure a cohesive and consistent whole "greater than the sum of its parts," including more flexibility in aiding friends and allies. The latter entails, in the view of the Joint Chiefs, "a more forthcoming US stance in direct economic assistance, concessionary military assistance, and sales of military hardware."

A noteworthy recommendation by the Joint Chiefs—and one that appears to be part of the broadened strategic focus sought by the new Posture Statement—is to expand cautiously security relationships with the People's Republic of China because that country "makes contributions generally consistent with US interests in East Asia and elsewhere by containing significant Soviet forces along the Sino-Soviet border." In a similar vein, the FY '82 Defense Report stresses "gradual expansion of military-to-military contact" between the PRC and this country.

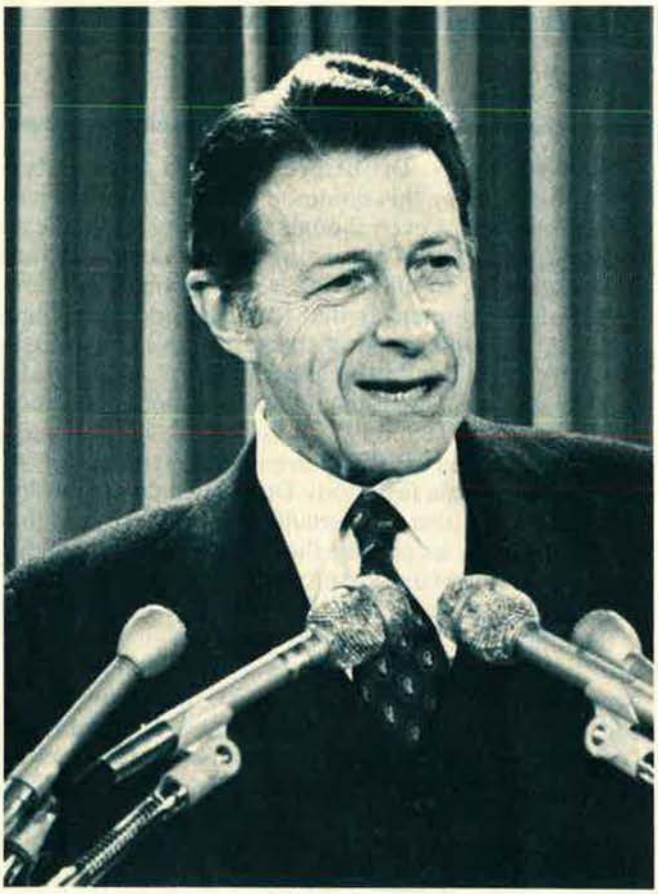
At the same time, however, the Military Posture Statement points at the staggering challenge of modernizing the PRC's military capabilities—and thereby making Beijing an effective military counterweight to Moscow. China's People's Liberation Army reflects a generation of isolation from the modern world and four decades of Maoist ideology, with the result that the Chinese forces "are limited by a technological and industrial base that produced weapon systems at least a generation behind those of the West and the Soviet bloc. China must leap decades of technology," according to the Joint Chiefs of Staff.

It is doubly significant that in spite of the deficient state of the PRC's armed forces, the Soviet Union feels compelled to assign more than forty-two divisions to the Far East, and that there are indications that this force—especially the units located in Mongolia—will be increased over the next few years.

Redressing Strategic Imbalances

The need to broaden the nation's strategic focus in no way diminishes the importance of shoring up the effectiveness and credibility of US strategic nuclear forces. Defense Secretary Caspar W. Weinberger told the Senate Armed Services Committee that two of the highest priorities in rearming America are "to redress the imbalances that have developed between our strategic nuclear forces and those of the Soviets" and ensuring that these forces are modernized and ready for instant use.

There is a widespread tendency in Washington at present to deride summarily the track record of the Carter Administration in the field of national security. Without arguing the justification for this attitude in general, a central policy nurtured and carried forward by the previous administration deserves to be acknowledged and, within the limits of the actions taken, applauded. That policy is the Carter Administration's "countervailing strategy." Although most of the capabilities needed to translate this policy into hardware realities are years



Secretary Weinberger considers it vital "to redress the imbalances that have developed between our strategic nuclear forces and those of the Soviets. . . ."

General Jones believes that "we must have the capability to act when, where, and how it serves our interests, not simply react to crisis at the point of attack."

away, codification of the goals of the revised doctrine at the White House level is significant and useful.

In his exhaustive farewell report to Congress, former Defense Secretary Harold Brown ranked the affirmation of the countervailing strategy in the form of a Presidential Directive (PD-59) as one of the "significant" achievements of his stewardship over the Defense Department.

Two basic considerations caused the countervailing strategy to evolve in its present form, he told Congress.

The first is that, because it is a strategy of deterrence, the countervailing strategy is designed with the Soviets in mind. That means that the US strategic deterrent must be able to cope with Soviet, and not just US, doctrine and "thresholds." Equally important, Moscow must be made to understand that US retaliation to nuclear attack will be swift, certain, and entail—from the Soviet perspective—intolerable consequences.

The Carter Administration's final version of the countervailing strategy represents a positive and overdue departure from the "mirror-imaging" of US strategic thinking—meaning ascribing to Moscow motives, moralities, and inhibitions identical to those of the US—precisely because of a hardheaded and perceptive definition of what constitutes "intolerable consequences" to the Politburo and of its risk assessments so far as nuclear war is concerned.

Several key factors are being weighed by the countervailing strategy in this context: "First, Soviet military doctrine appears to contemplate the possibility of a relatively prolonged nuclear war. Second, there is evidence that they regard military forces as the obvious first targets in a nuclear exchange, not general industrial and economic capacity. Third, the Soviet leadership clearly places a high value on preservation of the regime and on the survival and continued effectiveness of the instruments of state power and control—a value at least as high as that they place on any losses to the general population, short of those involved in a general nuclear war. Fourth, in some contexts, certain elements of Soviet leadership seem to consider Soviet victory in a nuclear war to be at least a theoretical possibility."

The second basic point made by the countervailing strategy and PD-59 is that because "the world is constantly changing, our strategy evolves slowly, almost continually . . . to adapt to changes in US technology and military capabilities, as well as Soviet technology, military capabilities, and strategic doctrine." Capstone of the countervailing strategy, according to Dr. Brown, is the recognition that the unquestioned Soviet attainment of strategic parity has put "the final nail in the coffin of what we long knew was dead—the notion that we could adequately deter the Soviets solely by massive retaliation against their cities."

Continuum of Options

The new strategy as promulgated by PD-59—and augmented by other, related Presidential Directives—"tells the world that no potential adversary of the United States could ever conclude that the fruits of his aggression would be worth his own costs. This is true whatever the level of conflict contemplated. To the Soviet Union, our strategy makes clear that no course of aggression by them that led to the use of nuclear weapons, on any scale of attack and at any stage of conflict, could lead to victory, however they may define victory," Dr. Brown reported to Congress.

Five basic elements of PD-59's force-employment policy funnel and combine into the countervailing strategy, according to Dr. Brown. For one, there must be a "continuum of options, ranging from use of small numbers of strategic and/or theater nuclear weapons aimed at narrowly defined targets, to employment of large portions of our nuclear forces against a broad spectrum of targets," he told Congress.

The Carter Administration's final version of the countervailing strategy represents a positive and overdue departure from the "mirror-imaging" of US strategic thinking—meaning ascribing to Moscow motives, moralities, and inhibitions identical to those of the US . . .

Quite admirably, Dr. Brown conceded that the flexibility provided by this continuum of options enhances escalation control even though he remains a skeptic so far as the prospects of preventing limited nuclear strikes from escalating to all-out nuclear exchanges are concerned. His argument is that "we must do everything possible, that opting out of this effort and consciously resigning ourselves to the inevitability of such escalation is a serious abdication of the awesome responsibilities that nuclear weapons, and the unbelievable damage their uncontrolled use would create, thrust upon us." At this juncture in his testimony Dr. Brown cited new statistics on the doomsday qualities of nuclear war that some might see as pulling the rug out from under the escalation control argument while others might view it as cementing the case for it.

Beginning with the proposition that an all-out nuclear war between the United States and the Soviet Union would involve the use of about 16,000 nuclear warheads and bombs that the two countries possess, the former Defense Secretary attempted to define the resultant indescribable horror by outlining the destructive force of a typical nuclear munition—a one-megaton warhead. Detonated on a major American city, such a warhead would produce these effects:

- All reinforced concrete structures within a radius of 0.8 miles would be completely destroyed, as would all small woodframe and brick residences within three

miles, and all lightly constructed commercial buildings and typical residences within 4.4 miles;

- Virtually everyone within a radius of 1.7 miles would be killed instantly, as would more than half of those within 2.7 miles—totaling about a quarter of a million immediate fatalities.

Moving from this highly unlikely one warhead/one city scenario to so-called "limited" strikes—such as a Soviet attack on the US ICBM force—Dr. Brown reported an astronomic rise in the fatality rate, ranging (depending on wind, weather, height of burst, and other specific conditions) "anywhere from 2,000,000 to 22,000,000 fatalities within thirty days."

For massive nuclear exchanges involving military and economic targets in the US and the USSR, he said, fatality estimates range from a low of 20,000,000 to 55,000,000 up to a high of 155,000,000 to 164,000,000 in the United States, and from a low of 23,000,000 to 34,000,000 up to a high of 64,000,000 to 100,000,000 in the Soviet Union.

Disregarding the question of practical feasibility of applying the brakes once a nuclear exchange has started, the value of escalation control to the "politics" of deterrence is probably undeniable. Hence Dr. Brown's contention that "the controlled use of nuclear weapons, along with other appropriate military and political actions, should enable us to provide leverage for a negotiated termination of the fighting." The level of leverage that can be applied under such circumstances probably will be proportionate to the US ability to convince Moscow that further escalation will not only be futile but counterproductive.

Under the peculiar logic of nuclear war, a compelling case thus can be made for structuring initial nuclear strikes so as to leave the enemy with sufficient highly valued military, economic, and political resources still surviving but still clearly at risk so that the enemy has a strong incentive to seek an end to the conflict, according to Dr. Brown.

Survivability, Sustainability, Flexibility

Escalation control obviously is dependent on the survivability and endurance of one's nuclear forces and the supporting command control communications and intelligence (C^3I) capabilities. To say that the US posture in this regard is deficient probably understates the case. Yet survivability and endurance are fundamental to the ability to tailor the employment of nuclear forces to the gamut of changeable and perhaps unanticipated situations and to adjust them for the appropriate responses under all conditions. Lastly, without adequate survivability and endurance, it would be impossible to keep substantial offensive strategic forces in reserve.

In acknowledging the essentiality of the twin nuclear war-fighting traits—survivability and sustainability—Dr. Brown's Defense Report effectively scuttles this country's unilateral reliance on "launch on warning" as a long-term solution to ICBM vulnerability. The "use or lose" concept of silo-based ICBMs advocated by many adherents of a minimum deterrence philosophy could lead to unwarranted escalation of strategic conflict, according to Dr. Brown. Worse yet, reliance on a "launch on warning" posture—or "launch on angst," as it has been dubbed by congressional wags because of the present C^3I system's proclivity for false alarms—could unleash nuclear war by accident at what strategic analysts morbidly refer to as the "city-busting" level.

Dr. Brown's prescription for solving the survivability and endurance problem is to build the survivably based MX weapon system, ensure the continued survivability of the ballistic missile submarine fleet, and improve strategic C^3I capabilities.

The third component of the countervailing strategy is a flexible targeting capability, predicated on the ability to destroy major elements of four general categories of Soviet targets.

The first step here must be to prevent a potential aggressor from gaining a significant strategic advantage after an initial exchange, meaning that ideally his residual strategic forces should be weaker relative to those of the United States than they were before he attacked. The US ability to deny the Soviets a fundamental and favorable shift in the residual strategic balance, however, will remain elusive until MX and advanced attack assessment systems capable of reporting which individual Soviet ICBM launchers have been fired, and which have not, come into the inventory toward the end of the "dangerous decade."

The other category of "counterforce" targets encompasses the full range of Soviet and, as appropriate, non-Soviet Warsaw Pact military power of both the conventional and nuclear type. As former Defense Secretary Brown put it, "Because the Soviets may define victory in part in terms of the overall postwar military balance, we will give special attention in implementing the countervailing strategy to more effective and more flexible targeting of the full range of military capability, so as to strengthen deterrence."

Counterforce Targeting and Strategic Reserves

The third set of targets involves "organs of Soviet political and military leadership and control." Unambiguous US ability to destroy the upper echelons of the Soviet leadership clearly represents deterrence where it counts most. The US, nevertheless, must recognize "the role that a surviving supreme command could and would play in the termination of hostilities, and [therefore must allow for] scenarios in which destruction of [the Soviet command authorities] would be inadvisable and contrary to our best interest. Perhaps the obvious is worth emphasizing: possession of a capability is not tantamount to exercising it," according to Dr. Brown.

The countervailing strategy's emphasis of counterforce targeting does not mean deemphasis of the ultimate deterrent effect attained by being able to threaten the full Soviet target structure, including the industrial and economic base. Stressing the importance of retaining the assured destruction of the Russian homeland as "an ever-present factor in the Soviet calculus regarding nuclear war," Dr. Brown—presumably speaking not only for his own but preceding and succeeding US administrations as well—pointed out that "as a matter of policy, we do not target civilian population *per se*." He added, however, that heavy civilian fatalities and other casualties are inevitable in case of an attack on the Soviet industrial and economic bases, which are collocated with the Soviet urban population.

The final element of the countervailing strategy, as spelled out by Dr. Brown, centers on the designation and employment of "adequate, survivable, and enduring reserve forces and the supporting C^3I system both during and after a protracted conflict. At a minimum, we will preserve such a dedicated force of strategic weapon systems."

The overriding virtue of the countervailing strategy, as summarized by the former Defense Secretary, is its intrinsic mandate that the overall capabilities of the US strategic nuclear forces must never be allowed to become inferior—"in appearance or in fact"—to those of the Soviet Union. Secondarily, this strategy presupposes equivalence not only at the top rung of the nuclear escalation ladder but at all steps below, and thus reduces the chance of miscalculations concerning what either the US or the Soviet Union might consider safe nuclear thresholds.

Survivability and Endurance Upgrades

The Carter Administration's legacy in terms of programs that, over time, could provide the capabilities needed to transform the countervailing strategy from a theory into practice is sparse yet promising. The FY '82–86 program submitted by the outgoing Administration provides for marked improvements of the nation's missile attack warning and assessment system through the deployment of five mobile (truck-mounted) ground terminals of the early warning satellite systems and of improved satellites that will be able to relay warning messages from the mobile ground terminals to airborne command posts over communications links with increased antijam protection.

The strategic C^3I improvement program also envisions acquisition of six E-4B aircraft to support both continuous airborne alert for the Strategic Air Command's airborne command post and ground alert for the National Emergency Airborne Command Post (NEACP) of the National Command Authorities and the Joint Chiefs of Staff. The result will be comprehensive communications improvements involving the ICBM force, airborne strategic bombers, and the Navy's TACAMO aircraft, which relay execution messages concerning SLBM launches to submerged submarines.

Further, the Airborne Launch Control System (Phase III) provides nine EC-135 airborne launch control aircraft with the means to monitor the status of 200 Minuteman ICBMs and to retarget them, thus giving the National Command Authorities the flexibility to employ surviving ICBMs even if an enemy attack disrupts or destroys their fixed ground-based launch control centers. Delivery of the first modified EC-135 capable of remote retargeting and direct alert status reporting from the missile silos is scheduled for early 1984.

Clearly the key element required for attainment of a countervailing posture is a survivably based MX capable of carrying out counterforce missions. But prospects for this vital system are murky since the Reagan Administration—seemingly concerned about potential filibustering by environmentalists—is considering restudying the weapon's basing mode.

At a press conference in February, Secretary Weinberger asserted that the "immense opportunity" on the part of environmentalists to slow down or even stop the project is a "matter of great concern, because I do think we need to deploy this missile, and I think we need it soon."

Expressing the view that any reasonably competent attorney could "snarl up" construction of the system's 4,600 shelters on a piecemeal basis, the Defense Secretary said that he is looking at the possibility of alternate basing modes, including sea-basing. He cited specifically the possibility of basing MX on "old surface vessels that would require very little [development] time and very little cost and which we have" in abundance.

Some congressional and other technical experts look askance at this scheme, known as "Project Hydra," for a number of reasons. For one, these missile-carrying ships represent extremely "soft" targets—overpressures as low as five pounds per square inch would probably put them out of commission—and ICBMs based in such a manner are deficient in accuracy as well as command and control, compared to land-based systems.

Additionally, it can be argued that Hydra combines the worst of the sea-based and land-based ballistic missile schemes. It lacks the relative survivability of the SLBM force, but shares its vulnerability to attrition by stealth. At the same time, Hydra is devoid of the hardening of the land-based ICBM force, and it can be attacked without the unambiguity—and thus certainty of response—of a weapon system located in the US heartland.

Finally, and possibly its most pronounced deficiency, is Hydra's vulnerability to seizure by terrorists. It would be impossible to exaggerate the catastrophic consequences of terrorists or other outlaw forces seizing a US surface ship carrying many ICBMs with each of them containing ten high-yield warheads.

Without arguing basing mode details, the Military Posture Statement terms the growing vulnerability of the land-based ICBM force—"the key contributor to our time-urgent hard-target kill capability"—the central challenge to national security at this time. The reason, the statement points out, is that without a high degree of survivability, "the deterrence and crisis stability of our strategic force mix could be seriously compromised."

Some of the reasons why the strategic sector—and within its bounds the ICBM force—represents the top-priority defense challenge for the US in this dangerous decade was spelled out by the Air Force's posture statement to the Ninety-seventh Congress: "In 1980 alone, the Russians outspent us by nearly a three-to-one margin to upgrade and improve their strategic forces. And there are no indications that this feverish pace will abate in the coming years. . . . While the Soviet Union is improving all aspects of its military capabilities, one of the most alarming trends has been the modernization of its land-based ICBM forces.

"Over the past decade, our estimates indicate the Soviet effort in ICBMs has exceeded that of the US by a factor of four to one. As a result, the Soviet Union now possesses a clear and growing advantage in its ability to destroy hard targets, thereby posing a particularly serious threat to the land-based ICBM force and its associated command control and communications network."

The Department of the Air Force caps these findings by asserting that "we believe the early deployment of the MX missile in a multiple protective shelter mode is

the most effective way to increase the survivability and retaliatory capability of the ICBM force. Deployment of the air-launched cruise missile (ALCM) and the bomber modernization programs, . . . together with the development of a new long-range combat aircraft, are likewise essential strategic enhancements."

Prospects for a New Strategic Bomber

Prospects for a new multirole strategic bomber, or even one confined solely to the nuclear mission, appear bright at this time. As Secretary Weinberger told Congress, "Based upon the evidence that I have to date, the Administration would be inclined to pursue development of a strategic bomber after a thorough but rapid engineering development effort." Further, Congress has instructed the Secretary of Defense to report this spring on his plans for bringing a multirole bomber into the operational inventory by 1986.

The first step . . . must be to prevent a potential aggressor from gaining a significant strategic advantage after an initial exchange, meaning that ideally his residual strategic forces should be weaker relative to those of the United States than they were before he attacked.

Department of the Air Force testimony lists several candidate designs: "Near-term candidates include B-1 variants, a stretched version of the FB-111, and a new design based on currently available technology," the latter seemingly meaning low observable or "Stealth" aircraft.

In the case of the B-1 and FB-111 candidates, the Air Force believes initial operational capability involving fifteen aircraft is possible by the mid-1980s. USAF estimates that "a B-1 variant would be able to meet an initial operational capability approximately fifty-six to sixty months from go-ahead, with final aircraft delivery by calendar year 1989 based on a buy of 180 aircraft. The FB-111B/C is estimated to meet an initial operational capability about forty-four to fifty-four months from go-ahead, with final aircraft delivery by calendar year 1987, based on a buy of 150 aircraft. The pursuit of the FB-111B/C option would, of course, also require the replacement of the F-111D [aircraft] taken from the Tactical Air Command by procurement of a suitable replacement." The Air Force testimony cautioned that although the FB-111B/C could be put into service earlier, "the B-1 variant would have considerably greater range and weapons load."

At this writing, the inclination both in Congress and the Executive Branch is to pursue the multirole bomber in two ways, meaning acquisition of a B-1 variant in limited quantities and as rapidly as possible, concurrent with expeditious development of an advanced technology system. The latter—in the form of several test articles—might be available for realistic testing in a simulated combat environment early in the second half of this decade.

Two principal considerations make a dual-track development approach to the bomber program attractive. There are those like former Defense Secretary Brown who hold that reliable penetration of the prospective Soviet air defenses in the 1990s is likely to require a "Stealth" design. If that, indeed, were so, B-1 type aircraft in the inventory at that time would be used to launch air-launched cruise missiles from standoff positions and to serve in sea-control and conventional force projection missions. Conversely, there are some experts who question whether "Stealth" bombers can be designed to perform the force projection missions that require long ranges and heavy payloads, especially if it should turn out that these advanced technology designs must include low-level penetration capabilities. Presumably cost factors will play a major role in the decision on whether one or two types of new strategic bombers should be built.

One of the most noteworthy issues raised by the FY '82 Air Force Posture Statement is an expression of keen interest in ballistic missile defense systems. Major advances in sensor and electronic technology make it possible in the coming decade to build an "affordable" antiballistic missile (ABM) system, the Air Force reported to Congress, adding that "we envision a sufficiently accurate system that would not require a nuclear warhead to destroy incoming reentry vehicles. Precious nuclear materials needed for offensive weapons would not have to be diverted for use by such an ABM system."

Acknowledging that deployment of such a system would require revision of the ABM treaty—a part of SALT I—currently in force, the Air Force nevertheless suggested that recent technical developments "may alter the situation sufficiently for it to be advantageous to examine extension of the treaty. It is quite possible that, in an era of essential equivalence of strategic nuclear systems, the stability of the strategic balance may be enhanced rather than degraded if both sides have all or at least a portion of their land-based strategic forces protected by nonnuclear, point defense antiballistic missiles." The advantage of linking MX with ABM to counter Soviet growth in warhead numbers by the end of the century is obvious.

Current testimony on the "dangerous decade" was summarized succinctly by General Jones when he suggested that the great question "will be whether the world's democracies will do what is necessary to assure their survival."

They probably will, but there also is the question of how much longer they can wait before time runs out. ■

THROUGH the medium of its "Aggressor" squadrons, Tactical Air Command air combat training approaches the real thing. Since combat data support TAC's thesis that most losses occur during a pilot's first eight to ten combat missions, TAC tries to find a way for the pilot to get that experience against enemy tactics *before* he goes to war.

Aerial combat encounters in Southeast Asia underscored dramatically the need for realistic aerial combat training against both dissimilar tactics and dissimilar aircraft. Although pilots from the same units have always practiced aerial combat with one another, there were no permanent aggressor squadrons in existence.

To meet the need, the 64th Fighter Weapons Squadron of the 57th Tactical Training Wing was formed at Nellis AFB in Nevada. The first deployment was in the summer of 1973, with the squadron required to unpack and fly ten missions under conditions of near real-war environment. The success of the 64th's aggressor training led to the formation of the 65th Fighter Weapons Squadron.

Overseas bases maintain two additional aggressor squadrons. Pacific Air Forces (PACAF) aircrews are served by the 26th Tactical Fighter Training Aggressor Squadron based at Clark Field in the Philippines. United States Air Forces in Europe (USAFE) aircrews receive training from the 527th Tactical Fighter Training Aggressor Squadron based at

THE AGGRESSORS

TAC's 64th and 65th Fighter Weapons Squadrons of the 57th Tactical Training Wing at Nellis AFB, Nev. simulate MiG-21s to provide realistic dissimilar air combat training for USAF pilots by using Warsaw Pact air-to-air combat tactics.

PHOTO ESSAY BY WILLIAM A. FORD, ART DIRECTOR
Text by Anne-Marie Gabor

TAP (LEFT): An "aggressor" prepares to taxi out for a sortie. ABOVE: The F-5E, which closely resembles the MiG-21 in size and performance. BELOW: The myriad colors of the Squadron resemble various Soviet camouflage paint schemes.

Alconbury RAF Station in England. The 64th and 65th Fighter Weapons Squadrons provide the trained aggressor aircrews for Clark and Alconbury.

Training begins with an aggressor unit presenting a situation briefing to the opposing units to explain the rules of the engagement. A day of classroom instruction follows, which covers Warsaw Pact air-to-air tactics.

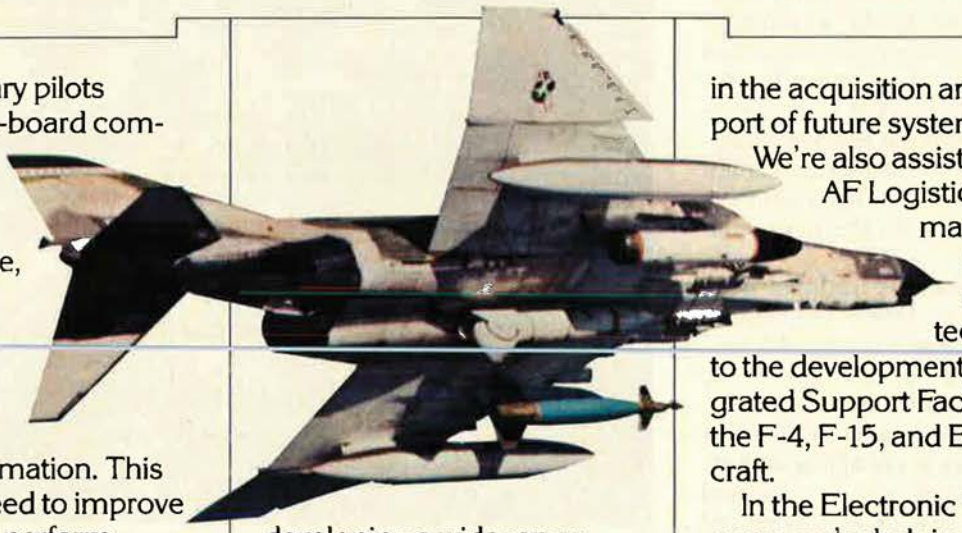
During the actual simulated combat, six aircraft are usually involved, supported by two ground controllers and an eighteen-man maintenance team. The highly maneuverable F-5E "Tiger II," which closely resembles the Warsaw Pact MiG-21 in size and performance, is flown. Warsaw Pact dogfight tactics, which — unlike US tactics — are dependent on the radar intercept ground controllers, are used. The minimum altitude restriction is 5,000 feet above ground level, although in actual combat pilots would likely go much lower.

Aggressor pilots make comments on each aerial engagement into small tape recorders. During the extensive debriefings that follow, the tapes are used in conjunction with the aggressors' gun camera film to recreate the aerial combat situations.

The lessons learned during the debriefings are the key to the success of the aggressor training. It is an opportunity for the training aircrews to review their mistakes to ensure they are not repeated when there is more at stake than wounded pride. ■

During a deployment to Langley AFB, Va., an F-5E taxis out for a simulated air combat mission over the Atlantic.

Digital Technology for Avionics of the 80's



Today's military pilots need their on-board computers more than ever to help them navigate, automate weapons delivery, and access real-time mission information. This means the need to improve reliability and performance margins in avionics systems has increased. So has the need to reduce spiralling life-cycle costs.

That's why TRW has been working with the Department of Defense and NASA to apply digital technology to avionics—developing a wide range of advanced systems for air and space applications. Take DAIS, for example, the Air Force's Digital Avionics Information System. Since 1975, TRW has supported DAIS with advanced simulation technology, analytical and test software, and avionics integration and analysis. Programs like DAIS, investigating standard architectures and interfaces promise to reduce life-cycle costs in the acquisition and support of future systems.

We're also assisting the AF Logistics Command in applying digital technology to the development of Integrated Support Facilities for the F-4, F-15, and E-3A aircraft.

In the Electronic Warfare arena, we're helping to develop an in-theater reprogramming capability to ensure that critical mission data is always accurate and up-to-date.

We're also at work in space, developing advanced flight software for IUS, HEAO, and the TDRS system.

If you'd like to learn more about digital avionics technology at TRW, contact: Richard Maher, 1 Space Park, Redondo Beach, Ca., 90278. Phone (213) 536-3238.

DIGITAL AVIONICS TECHNOLOGY from

A COMPANY CALLED TRW

DEFENSE AND SPACE SYSTEMS GROUP

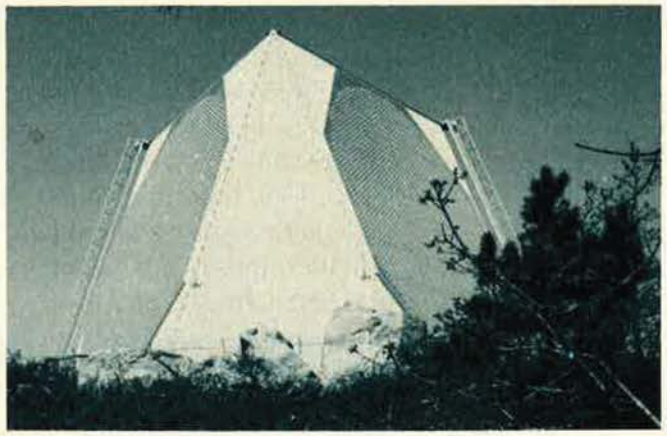
As missions change and technology evolves, USAF commands must define and justify their requirements for systems to meet the needs. The process is called . . .

Defining USAF Requirements

A STAFF REPORT

TO BE filled properly, Air Force needs must be adequately identified and stated. USAF's systematic expression of operational needs is known as the "requirements process." It is designed to acquire supplies and equipment needed to support the USAF mission that cannot be satisfied by existing resources already assigned to the field commanders.

USAF defines operational need in several ways. One is recognition of a deficiency in existing abilities, and increasing vulnerability to the Soviet threat falls into this category. Obsolescence is another. A third way is by recognizing an enemy weakness that can be exploited by acquiring new or modifying old systems. Another is discovering a more cost-effective way of performing the same mission. The Companion Trainer Aircraft (CTA), for instance, will give SAC B-52 crews proficiency training in an aircraft that costs less to operate than the B-52. It also saves further wear and tear on the old bomber. Technological advances that can reduce costs or improve mission effectiveness are yet another way of showing operational need. USAF cites as an example the laser and its contribution to high-speed, jam-resistant, point-to-point communications.



Two new PAVE PAWS sites will improve and extend early-warning coverage of offshore areas (left); modifications to Army UH-60 Blackhawk helicopter (above) will meet rescue and other critical needs.

Validating operational needs is the domain of the USAF Directorate of Operational Requirements. The office relies heavily on ideas submitted by the major commands around the world. Using a format called the Statement of Operational Need (SON), each idea comes into the directorate. It then goes to all major commands, the Air Staff, and to the other services for assessment. All responses are expected back in ninety days. The SON then moves into the Pentagon's coordination and approval process. Every statement of operational need must survive this close scrutiny and validation before it can move any further towards acceptance by USAF.

Once validated, work now begins, in conjunction with Air Force Systems Command, to develop a program plan. That is, to determine initial funding requirements and start the budget process to get the money, and to issue the implementing program management directive. Acquiring the item can involve totally new development from prototype to production. Or, the need may be satisfied by additional off-the-shelf procurement of an existing piece of equipment or weapon system, or modification of one. A program may also represent some combination of the above. Looking at the Companion Trainer Aircraft again, USAF says it may lease or buy an existing commercial aircraft, or it may require modification to an existing aircraft that may be leased or purchased.

A further refinement to the process, involving the Office of the Secretary of Defense, occurs with "major needs." These are further translated into Mission Element Need Statements (MENS) and submitted to the Secretary of Defense for approval. An item takes on "ma-

jor" need proportions based on the urgency USAF gives it, also if it costs more than $100 million for Research and Development or $500 million to procure, if it is a joint acquisition among DoD and other nations or involves two or more US services, and, finally, if its acquisition dictates certain manpower and logistics requirements.

This process by which Air Force states its needs resolves requirement issues before attempting any acquisition. It is designed to prevent duplication of effort either within the Air Force or by other services. Statements of need are ready for funding and their priority established for each program year. Low-risk, uncomplicated needs receive faster staffing, and all requirements are tied to a systematic program before entering the assessment and validation phases. ■

After requirements are defined and validated, priorities must be established within mission areas. A formidable challenge is . . .

Setting Requirements Priorities

All formal Air Force requirements that have been validated, or in the case of major programs requiring approval by the Secretary of Defense as Mission Element Need Statements (MENS), are placed into priority by mission area.

The mission area structure is established by the Under Secretary of Defense for Research and Engineering (USDR&E). The structure provides a breakdown of missions, and lumps them into categories that support various types and levels of warfare. This enables the Secretary of Defense and each of the services to evaluate requirements in a common way. It enables them to determine which requirements focus on the most critical deficiencies in a mission area, and at the same time is a practical way to assess the contribution of each validated requirement to the overall mission area effort.

Three typical and important mission areas are:

- Strategic Offense—those capabilities required to deliver weapons in support of national objectives against enemy resources critical to his survival;
- Tactical Warfare—the capabilities required to deter or counter aggression at level of conflict below central nuclear conflict;
- Mobility—encompasses force projection, resupply, and support of deployed forces.

PRIORITY AIR FORCE REQUIREMENTS

The Air Staff provided AIR FORCE Magazine with a selection of some of its current high-priority requirements that have been through the validation or MENS process. They are shown here by title and then a very brief description of the requirement. A word of caution is in order: These selections are not in any particular priority order (except for MX), and their presentation should not be interpreted as setting priorities. Rather, this is a mix of overall top Air Force priority needs. For AFA members, these are programs you will hear and read about in the months ahead.

Strategic Offense

- MX Missile: First priority of USAF to offset growing vulnerability of our land-based missile force.
- Long-Range Combat Aircraft (LRCA): To offset bomber force obsolescence and broaden force contribution to national security objectives by providing a new bomber with multiple capabilities.

Tactical Warfare

- Advanced Medium-Range Air-to-Air Missile (AMRAAM): Provides advanced missile to engage enemy aircraft at beyond visual ranges.
- All Weather Tactical Strike: Low-Altitude Navigation and Targeting Infrared System for Night (LANTIRN) pod integrated into F-16/A-10. LANTIRN provides improved target acquisition, navigation, and weapons delivery capability in under-the-weather and night conditions.
- Secure Antijam Communications for Tactical Aircraft and Ground Control Units: The HAVE QUICK program now under way provides near-term Ultra High Frequency (UHF) antijam capability. SEEK TALK program will provide improved capability.

Mobility

- CX: The program uses existing technology to provide an aircraft capable of moving outsize equipment over strategic distances into small austere fields. Augments existing airlift capabilities to meet Rapid Deployment Force and other requirements.
- HX: This program modifies the Army UH-60 Blackhawk helicopter to provide night and adverse weather combat air rescue capability and to improve Special Operations Forces (SOF) capabilities. Near-term acquisition of unmodified UH-60s planned to meet critical requirements.

Training

- Next Generation Trainer (NGT): NGT will replace aging T-37 primary undergraduate pilot training aircraft to ensure continued capability to produce trained Air Force pilots.
- Tanker Transport Bomber (TTB): TTB will use commercially available multijet aircraft to complete training of those primary graduates selected for assignment to operational tanker, transport, or bomber units, instead of the current T-38 fighter-oriented training.

Space

- Space Defense—Anti-Satellite (ASAT) and Surveillance: Programs are going on to develop antisatellite capability and positive surveillance.
- Strategic/Tactical Communications Satellite System: Foresees acquisition of a survivable, long-life, cost-effective satellite and terminal system incorporating the best technology to meet communications needs of our nuclear-capable and tactical forces.

Strategic Defense

- Improved Ballistic Missile Early Warning (BMEWS): Upgrades the current three sites. Replaces sensor control and display equipment, and improves radar ability to detect and report increased missile threat.
- Improved Warning of Sea-Launched Ballistic Missile Attack: Two new PAVE PAWS sites will improve existing capabilities and extend coverage of offshore areas. ■

A PILOT REPORT

USAF air and ground crews will be dealing with—and perhaps flying alongside—the multinational trainer and attack aircraft now in Luftwaffe and Armée de l'Air service.

The Luftwaffe ALPHA JET

BY MARK BERENT

JUST after I released the brakes, I heard a command on Guard channel I hadn't heard in years. I was accelerating down runway two-seven at Fürstenfeldbruck Air Base near Munich, Germany. The time was 2:07 p.m. one day last September with weather as clear and blue as only a south wind from the Bavarian Alps can produce. The command, repeated twice, took me back twenty-five years, when I flew F-86Fs out of Fursty on Zulu Alert. "Stop chatter," the airborne voice said to a ground station, "Stop chatter."

But now I wasn't lifting off to go taunt MiG-15s along the East German border. Instead I was piloting an aircraft called the Alpha Jet. Flying with me was Luftwaffe Lt. Col. Robert Lexhaller. He noted my exclamation at what was to him a routine Guard channel transmission. "Tell you later," I told him, concentrating on line speed checks.

I used very little nosewheel steering as the airplane accelerated past rudder effective speed of forty or so knots. Our acceleration check of eighty knots in twelve seconds was on the money. I rotated at ninety, and we were airborne at 111 knots. I had expected a lot of wing-rocking overcontrol, but was happy to find it did not occur—not thanks to my rusty skills but to the extremely tight and highly stabilized flight control system. The gear and flaps retracted in less than seven seconds and caused no appreciable trim changes.

I was flying the A-model Alpha Jet, courtesy of the Luftwaffe and the 49th *Jagdbombergeschwader* (Fighter-Bomber Wing) based at Fursty. Lexhaller, my instructor, was a fighter veteran who, as all German pilots do, speaks excellent English. After giving me an hour's flight in the six-degree-freedom-of-motion simulator, he briefed our mission, and we were driven to the airplane. Our call sign was "Nelson," Lexhaller's personal handle.

After takeoff, we turned out to the right to enter our low-level flight pattern. I set the radar altimeter at 500 feet, adjusted the throttles to eighty-nine percent, and settled down at 370 knots. The fuel flow was just about 1,100 pounds per engine, which, for our clean configuration, would give us well over an hour's endurance on the deck. Gust response was excellent. To check it, I flew hands off from time to time in the mildly turbulent air. With the yaw damper on, the aircraft maintained excellent heading; yaw damper off produced mild Dutch roll but no significant heading changes.

Features Rate A-Plus

Earlier, Lexhaller had walked me through the preflight. The first thing I noticed was the absence of ground power units since the aircraft can be started electrically from its thirty-six ampere-hour battery. There was nothing unusual to check or any awkward positions to assume while preflighting.

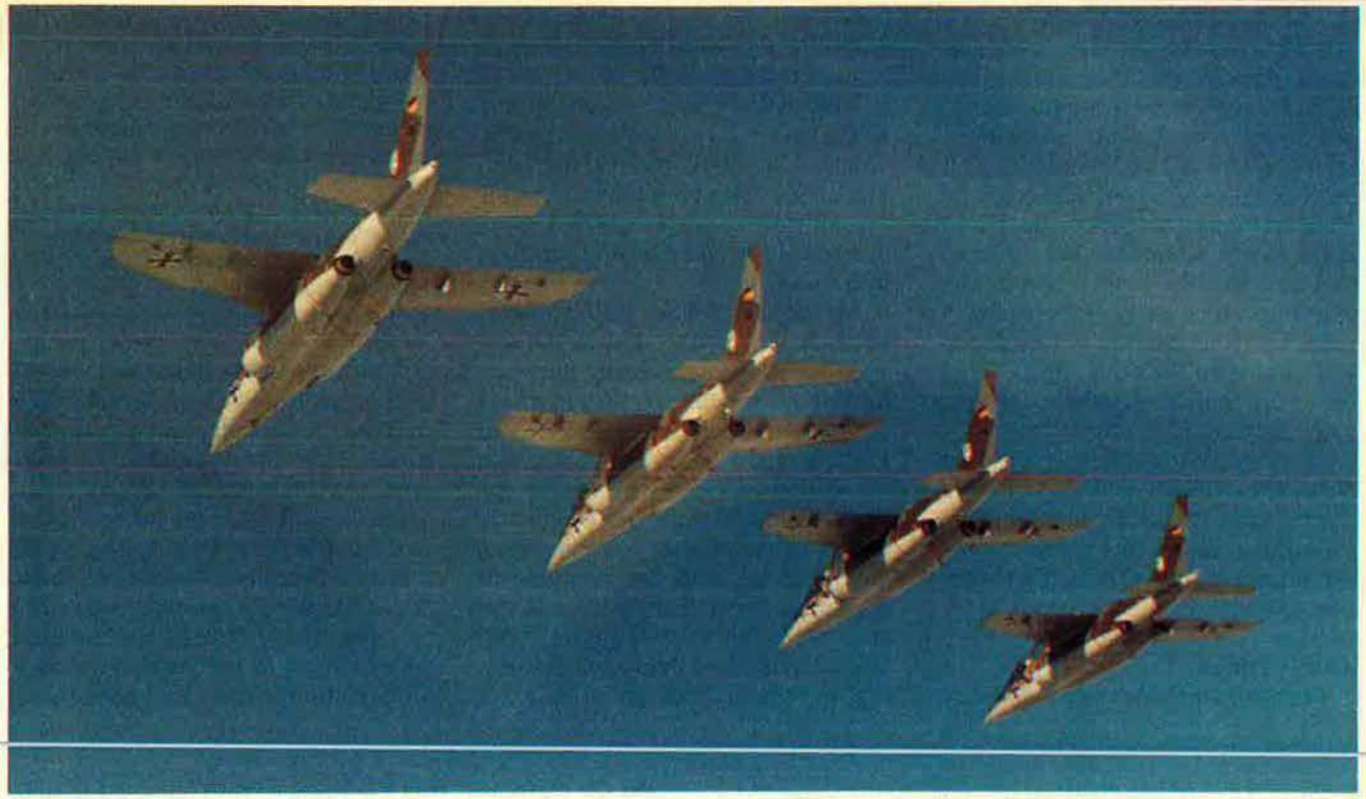
A baggage compartment on the right side of the aft fuselage is a boon for any airplane pilot to take on cross country. Lexhaller also pointed out the hinged tail cone where either tail warning radar or a flare dispenser can be installed. I noted the elevator is the flying slab type. The built-in ladder simplified cockpit entry and is another plus for off-base operations. Strapping in involved two leg garters, five shoulder and waist belts, radio/oxygen connector, and the G-suit hose.

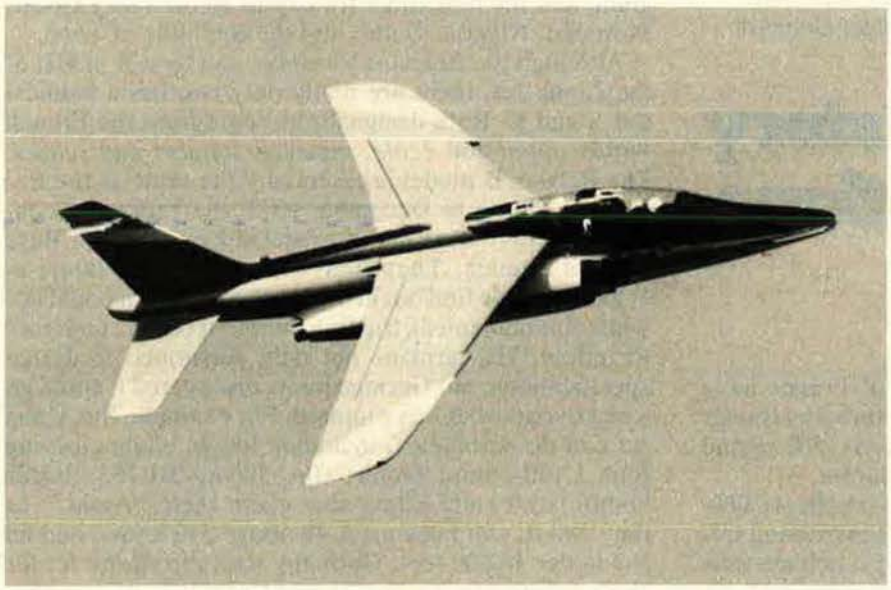
Alpha Jet landing on a highway in France. Operational aircraft may have to use highways if their airfields are knocked out of operation in a future conflict.

We flashed over the Bavarian countryside, contour-flying the hills and forests. Thanks to the high wing, vision to the sides and down was perfect. Over a small country bridge I set the throttles at ninety-two percent and horsed the plane about in several left and right three-G to four-G turns. The airspeed dropped to about 345 and never lost another knot. Very impressive for low-altitude work such as forward air controlling.

The ejection seat in the A model is the US-built Stencel SIIIS. This seat has a better than zero-zero capability, for it is self-stabilizing and has been successfully demonstrated at 150 feet inverted. So far there have been no ejections from the Alpha Jet. The US Marine Corps has sixteen for sixteen successful Stencel ejections from their Harriers.

The seat is comfortable and the cockpit roomy. The flight instruments are standard, glare-free, easy to read, and not clustered. The UHF is located on the lower left instrument panel affording vertigo-





Above, a flight of four Luftwaffe "A" model Alpha Jets in formation over Bavaria. "A" stands for "appui," or support. Left, the aircraft that toured US military bases in late 1980 under sponsorship of Lockheed-California Co., who would build it if selected by the US armed forces.

free channel changes in weather or at night. The IFF mounted on the center pedestal gives the same advantages. There is also a three-channel emergency VHF radio on the left console. I would prefer the armament selector panel, usually located on the right console, in a more convenient to see position.

We pulled up to 10,000 feet and made some simulated dive bomb runs of thirty degrees and forty-five degrees. While the instructor pilot has excellent visibility from the back seat, he cannot see the head-up display or gunsight pipper displays that the front seater can. Having a rear-seat pipper would be a great advantage for instructing new students on the gunnery range.

Feels Like a Fighter

There are many advantages to the aircraft, however. The start sequence, for example, involving two switches and the start button, is rapid and requires minimal pilot input. The jettison button, positioned near the gear handle, is tied into the fuel system and, besides cleaning off stores when activated, tells the computer to allow a fifty degree Centigrade overtemp condition in the turbofans, thereby ensuring max thrust instantaneously. The basic seat and canopy pins are pulled by the ground crew and stored in slots on the seat pan. One main arming lever for each seat prods the occupant's right elbow to remind him to rotate it into the armed position prior to takeoff.

I double-checked the lever in the up position as we climbed out at 280 knots to do some stall series and acrobatics. I made some gentle and steep turns, then a couple of lazy eights. I was impressed again with visibility and flight control smoothness. The airplane simply did not feel like a trainer; it felt like a front-line fighter. Lexhaller talked me through stalls both clean and dirty. In all cases, stall-warning cues were early and adequate. They start with a light airframe buzz and then progress to a robust chop as you fly through the stall warning band. At full stall, about nineteen units' angle of attack on the highly visible AOA indicator, the chop is jarring and,

though stick forces are heavy, they are not excessive. The airplane mildly tries to roll off on a wing, but is easily controlled through rudder. Recovery is swift, sure, and instantaneous. Unload and you have it all back in about 200 feet. The airplane stalls at ninety-six knots gear and flaps down. A student would have to intentionally lose it since the warnings come early and clearly.

From Brad Spahr, a Lockheed test pilot who flies the Alpha Jet, I found out that the Alpha Jet can perform four kinds of spins: standard, oscillatory, flat, and inverted. In all cases the aircraft will depart only if pro-spin controls are held in throughout and will recover hands off though in fewer turns if antispin control is held in.

Annoyances

Forward and downward visibility from the rear seat is outstanding, though I did note annoying glare from the blast shield between the two cockpits. Each cockpit, by the way, has its own easy-to-handle, counterbalanced, manual canopy. The canopy has no distortion and is "fragilized" before ejection by a burn cord activated during the ejection sequence.

An item I found bothersome, both on the ground and in the air, was the constant tangling between my helmet and the ejection seat face curtain handles. Also on the ground I had thought the brakes felt just a bit spongy. Colonel Lexhaller explained that though the brakes do have a light feel, they are more than adequate to hold the airplane at maximum thrust before takeoff and stop the airplane well under 2,000 feet upon landing. Nosewheel steering was touchy but not so much as to bring about overcontrolling.

I did my usual ham-fisted acrobatics at 15,000 feet, ninety-two percent, with entry speeds of 350 knots. The airplane was responsive—roll rate is 220 degrees per second—and showed no tendency to dig in following loop pullout. You can also do high-altitude loops starting at 30,000 feet, topping out at forty. The speed brakes are located just forward of the rudder on each side of the fuselage and require no

Mark E. Berent's active-duty USAF career encompassed more than 1,000 hours flying jet fighter combat aircraft. He maintains current proficiency in single and multiengine prop and jet aircraft. Besides writing for this and other international aviation magazines, he is a novelist. His first co-authored adventure novel, Brass Diamonds, *is in bookstores, with his second novel nearing publication.*

Reflecting a widening trend toward combining training and attack capabilities in a single aircraft, several nations are flying or have on order one of the first operational aircraft of this type.

Alpha Jet: History and Specifications

BY MARK BERENT

DORNIER of Germany and Dassault of France have combined to co-design and manufacture a jet trainer that can carry a 27-mm cannon and six 500-pound bombs. They call their product the Alpha Jet.

The Alpha Jet, a slick little aircraft in the 11,000-pound weight class, is being noted with increasing frequency on the international scene. The French use it as a trainer, the Germans use it as a light attack aircraft, six other countries have bought it, Lockheed may produce it, and the United States Navy just might buy it. USAF is also interested in jet trainers that can carry a pilot through basic and advanced and well into weapons delivery operations, a role the T-38 cannot perform.

In 1969, the German Luftwaffe and the French Armée de l'Air specified requirements for a common aircraft to perform both training and tactical support missions. The respective governments chose the Dornier-Dassault entry over an MBB/Aérospatiale design in 1970. In May of 1972, the two governments signed the research and development contracts. The first prototype Alpha Jet flew in October 1973, several months ahead of contractual schedule. Series production began two years later. By November 1980, 200 Alpha Jets, out of 490 on order, had rolled off production lines. Initial Alpha Jet orders are 200 for Germany, 200 for France, thirty-three for Belgium, and the remainder for export to the Ivory Coast, Morocco, Nigeria, Qatar, and the Republic of Togo.

Although the Belgians assemble and fly a B model of the Alpha Jet, there are really only two basic models, the A and E. Both designations come from the French words *appui* and *école*, meaning *support* and *school*. The Belgian B model is essentially the same as the E.

From March to December 1979, the Luftwaffe conducted field trials of the A model at Leipheim Air Base west of Munich. They flew more than 1,700 hours in 1,300 sorties to find out just what the Alpha Jet could do, while simultaneously training their first batch of instructor pilots. The airplane not only performed to design specifications, but German pilots discovered it could go a bit beyond what was required. For example, the Alpha Jet can do acrobatics, including loops, while carrying four 1,100-pound bombs (the 500-kg BL755 cluster bomb). Luftwaffe pilots also claim their "Alphi," as they call it, can hack an A-10 above 350 knots, and an F-4 under 30,000 feet. Germany uses the Alpha Jet for close air support, reconnaissance, antihelicopter operations, and weapons/instrument training. They do not use it for pilot training since all Luftwaffe pilots are trained in the US in the T-37/T-38 program.

The French are currently phasing in the Alpha Jet to replace the venerable T-33 that, during thirty years of service, amassed 500,000 hours of flying time, training 3,300 pilots. Additionally, the famed nine-ship acrobatic team, the Patrouille de France, has traded in its Fouga Magisters for the new trainer.

While the basic airframe and engines are identical, there are some minor differences between the German close air support version and the French trainer. The A model is most easily recognized by the pitot boom extending from the nose, while the E model has a more rounded nose with spin strakes on each side. Less visible variants on the A model include a steerable nose

great trim changes even when activated at Mach 0.98, the airplane's limit.

Speaking of airspeed limitations, the airplane will try mild aileron reversal between Mach 0.92 and 0.94. The reversal occurs only during small aileron deflection; larger deflections bring the airplane back to conventional response.

Arriving back at Fursty, we had the runway to ourselves. I found it delightful after such a long absence from flying to turn onto initial, make the calls, pitch, fly a tight pattern, then do a touch and go. The first few times I was much too high and hot; the airplane is very clean, and I was very rusty. I essed and slipped something awful, but the airplane was totally forgiving. Final airspeed is about 115 knots, depending on fuel remaining. Flare is instinctive, the runway easy to find with the main gear. I felt sad taxiing back knowing I would have to leave such a fine airplane without taking it through its full capabilities. ■

ALPHA JET AT A GLANCE

MANUFACTURER:	Dornier GmbH and Avions Marcel Dassault-Breguet Aviation	
PRODUCTION LINES:	Oberpfaffenhofen, Germany; Toulouse, France; Charleroi, Belgium	
ENGINES:	Type: Two SNECMA-Turboméca Larzac 04 turbofans	
	Static Thrust (sea level):	2,965 lbs
	Bypass Ratio:	1.13
	Specific Fuel Consumption:	0.71 lb/lb/hr
DIMENSIONS:	Span:	29 ft, 11 in
	Height:	13 ft, 9 in
	Length:	38 ft, 7 in
WING:	Reference Area:	189 ft²
	Aspect Ratio:	4.8
	Sweep:	28°
WEIGHT:	Empty:	7,375 lb
	Full Up (two pilots, internal fuel)	11,025 lb
	Design Gross Weight:	16,000 lb

gear, more powerful brakes, a yaw damper, sophisticated avionics (such optional equipment as a radar altimeter, head-up display, weapons computer, and inertial navigation), and the Stencel ejection seat, rather than the Martin-Baker found in the E.

It is interesting to note that although the French E model incorporates no US-built equipment, the German attack version uses an American ejection seat, a Lear Siegler Altitude-Heading Reference System, and the Kaiser HUD.

The hydraulic, electrical, fuel, and pneumatic systems are simple yet thoroughly modern and easy to service. The hydraulic system consists of three power sources for two separate and redundant circuits. Systems 1 and 2 are driven by pressure-compensated pumps in the left and right engines. System 2 has a constant flow emergency electric pump unit powered by the aircraft battery. Personally, I would prefer a ram air turbine to provide emergency flight control pressure to give some glide distance, since battle damage could knock out both engines and the battery. Both irreversible systems operate at 3,000 psi, using standard NATO H 515 fluid, and each has its own reservoir and accumulator. The hydraulic system powers all three flight controls, the landing gear, antiskid brakes, yaw damper, speed brakes, and the slotted Fowler flaps.

Electrical DC power is supplied by a 9kW starter-generator in the accessory section of each engine and one 36AH battery. AC power is provided by two 115 volt, 400Hz, 400 volt-amp static inverters.

The internal fuel system of the Alpha Jet holds 502 US gallons (3,263 pounds) in three fuselage cells and two internal wing tanks. The system has two submerged DC low-pressure pumps and two accumulators, which allow thirty seconds of inverted flight at max RPM. Ground refueling operations are controlled by a nifty concealed panel near the single-point refueling/defueling connector. There are no provisions for in-flight refueling, although such plumbing could be considered for future export models.

Pneumatics use high-pressure compressor bleed air to air-condition the cockpit, inflate the canopy seal, operate the G-suits, and pressurize the wing tanks.

Propulsion for the Alpha Jet is from two SNECMA-Turboméca Larzac 04 engines. The Larzac 04 is a smokeless, twin-shaft turbofan yielding a design static thrust of 2,965 pounds with a specific fuel consumption of 0.71 lb/lb/hr at sea level. Original engine consideration was for the GE J85, but the coproducers opted for the more fuel-efficient Larzac. The 640-pound engine has advanced technology characterized by low specific fuel consumption, low noise, low infrared signature, and a small frontal area. The engine incorporates a conventional hydro-mechanical fuel control for primary functions and an electronic control for secondary functions. The engines are accessible through large hinged, removable doors on the lower fairings. They can be lowered vertically and changed by three men in less than an hour.

Overall inspection on the slightly-above-shoulder height aircraft is through 200 access doors, direct reading indicators, borescope ports, SOAP plugs, magnetic chip detectors, transducers, and electrical test connections. Maintenance is performed at ground level without the need for ladders or similar equipment. Most avionic and engine components are modular, hence handily replaced. From field servicing through complete overhaul of airframe, engines, and systems seven maintenance man-hours are required per flight hour.

The Alphi is a sturdy little airplane capable of pulling 8.6 positive Gs or 4.6 negative. It has a 10,000-hour fatigue life for the training mission. Since it carries a full day's supply of liquid oxygen and has self-start capability, low-pressure tires, and an extremely short landing and takeoff roll, it can operate neatly from damaged runways, highways, or such surfaces as sod strips. ■

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PARAMETER*	THE COMPETITION	THE HAWK	THE MARGIN
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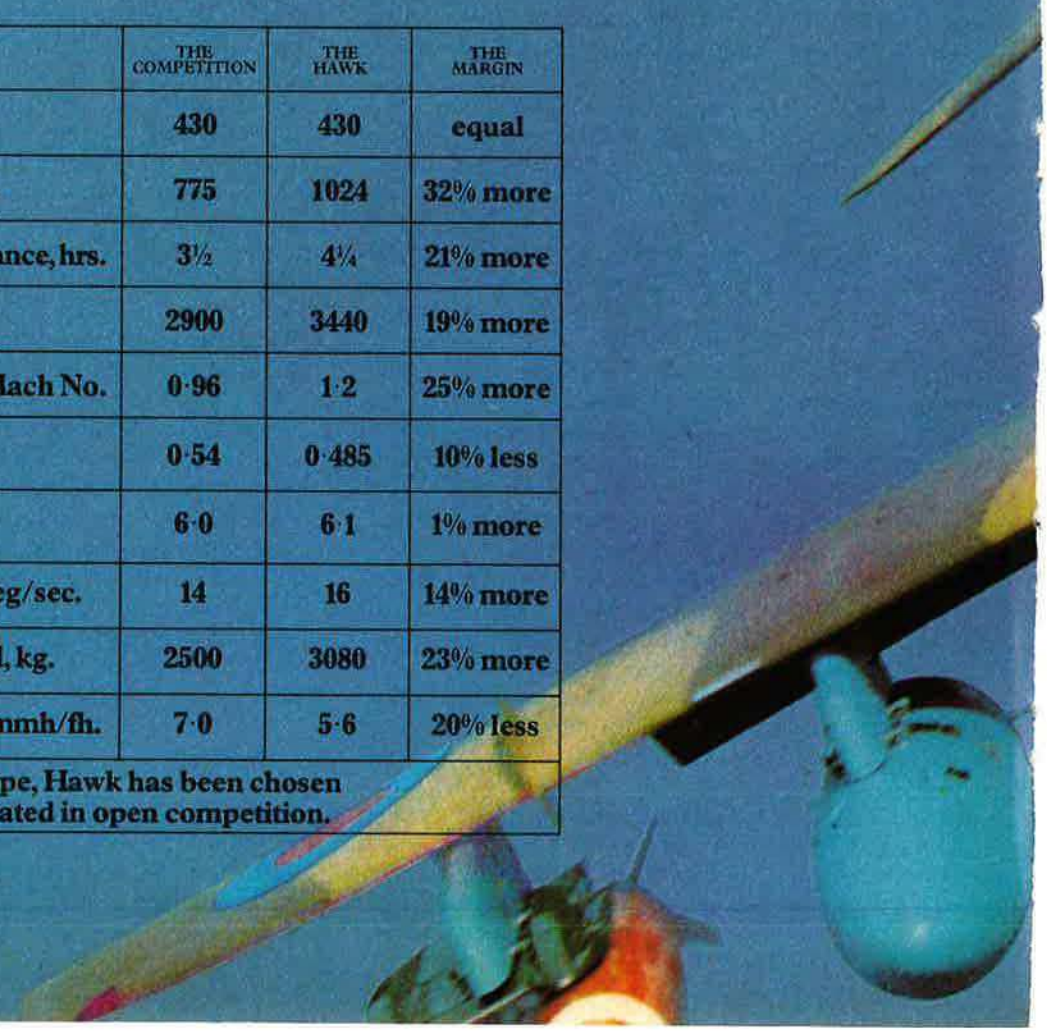
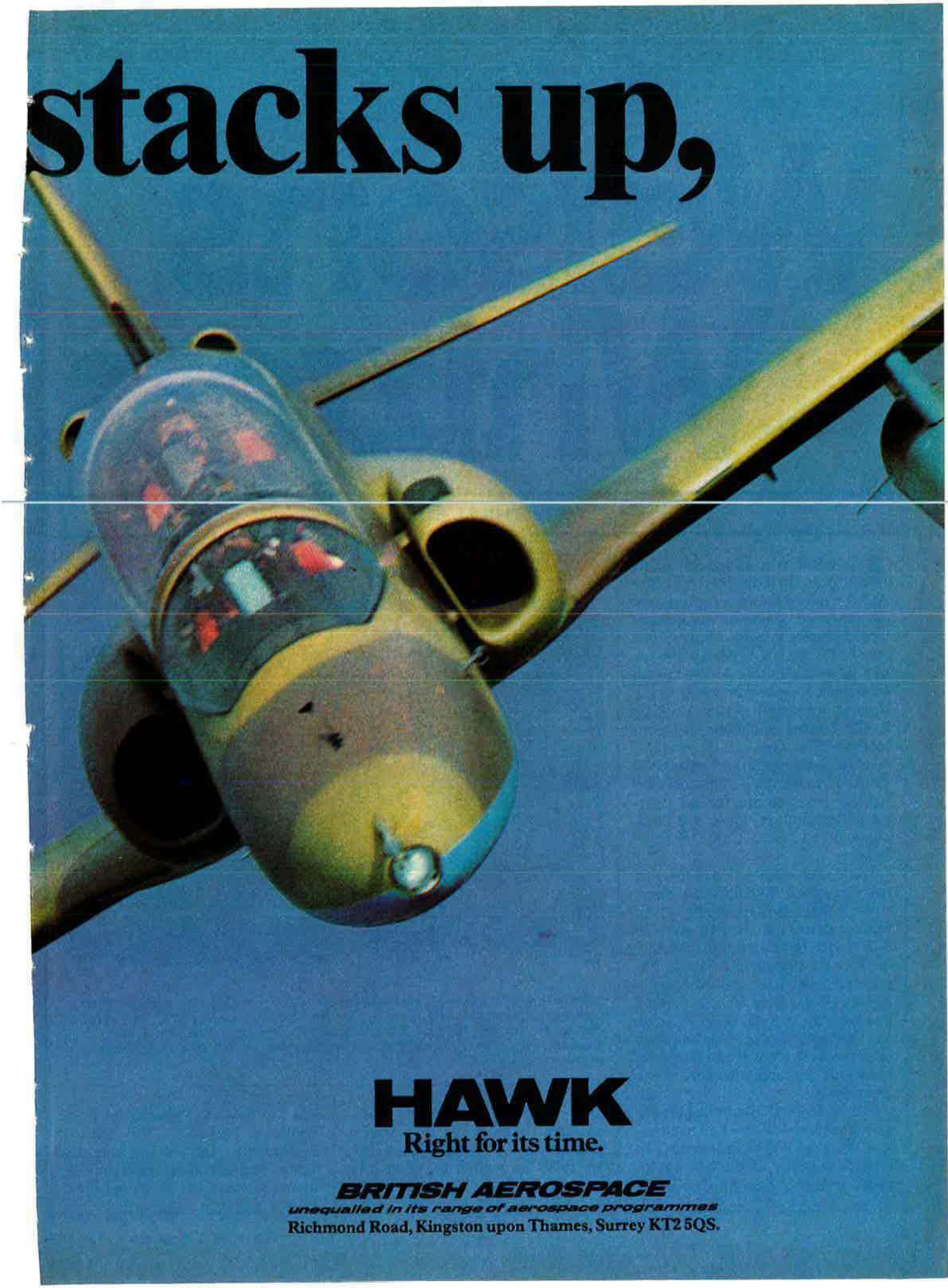
Hi-Lo-Hi sortie radius, km.	775	1024	32% more
High level sortie max endurance, hrs.	3½	4¼	21% more
Ferry sortie, km.	2900	3440	19% more
Demonstrated maximum Mach No.	0·96	1·2	25% more
Clean aircraft static thrust to weight ratio.	0·54	0·485	10% less
Best steady turn load factor 'g' at sea level.	6·0	6·1	1% more
Corresponding turn rate, deg/sec.	14	16	14% more
Demonstrated weapon load, kg.	2500	3080	23% more
"On aircraft" maintenance, mmh/fh.	7·0	5·6	20% less
In Africa, SE Asia and Europe, Hawk has been chosen every time it has been evaluated in open competition.			

*Manufacturers' published data



stacks up,



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The US Army Air Forces set high priority on analyzing captured German jet aircraft, both for exploitation and to defend against their possible use by the Japanese. The job of collecting and flying the captured aircraft fell to . . .

Watson's Whizzers

BY JEFFREY L. ETHELL

As World War II ground to its conclusion in Europe, the Allies realized that full exploitation of captured German equipment would require a major effort. Since July 1942, the US Army Air Forces had in operation an Air Technical Intelligence section attached to the overall command of the USAAF in the United Kingdom. By September 1944, Gen. H. H. "Hap" Arnold, Commanding General of the AAF, made the US Strategic Air Forces responsible for all post-hostilities matters, under the command of Lt. Gen. Carl "Tooey" Spaatz.

Little time was wasted in forming the Combined Intelligence Objectives Subcommittee, made up of representatives of British and US diplomatic, naval, air, and scientific intelligence organizations with Supreme Headquarters, Allied Expeditionary Forces Brig. Gen. T. J. Betts as chairman. An effort later known as "Operation Lusty" was launched to seize the technical and scientific personnel and achievements of the Third Reich.

T-2, as USAAF Technical Intelligence became known, had been active since mid-1944, attempting to obtain samples of enemy equipment, using a "Priority One Black List" compiled by the best technical talent. One of the first prizes, obtained by the Americans in October 1944, far behind the British in this effort, was a Heinkel He 177 that was flown to Villacoublay from Toulouse, France, by Col. Harold E. Watson. Hal Watson was delighted with the assignment, having served as a test pilot at Wright Field

Col. Harold Watson's team at Lechfeld on June 10, 1945, just before the beginning of ferry operations to Melun in France. Standing, from left, Fred Hillis, Ludwig "Willi" Hofmann, Hal Watson, Jim Holt, and Karl Baur. Front row, from left, Jim Haynes, Bob Strobell, Bob Anspach, Henry Nolte or Horace McCord, Ken Dahlstrom, and Roy Brown. (Hal Watson via Smithsonian Institution)

One of the two 50-mm-equipped Me 262s, this was Watson's personal aircraft named after his son. Here it is seen at Melun on June 27, 1945. The other Mk 214-equipped aircraft was destroyed after being abandoned by Willi Hofmann en route to Cherbourg from Melun. (Hal Watson via Smithsonian Institution)

in the US. Watson also held a master's degree in aeronautical engineering.

Prior to V-J Day, efforts concentrated on uncovering technical developments the Germans might have given the Japanese. There was a very real fear that the Japanese would use derivatives of German jet and rocket aircraft against the Allies.

Col. Donald L. Putt was made Director of Technical Services for the Air Technical Service Command in Europe, and Watson was appointed Chief of Air Technical Intelligence (ATI) teams to seek out top-priority German aircraft and a host of technical achievements as part of Operation Lusty.

Documents First

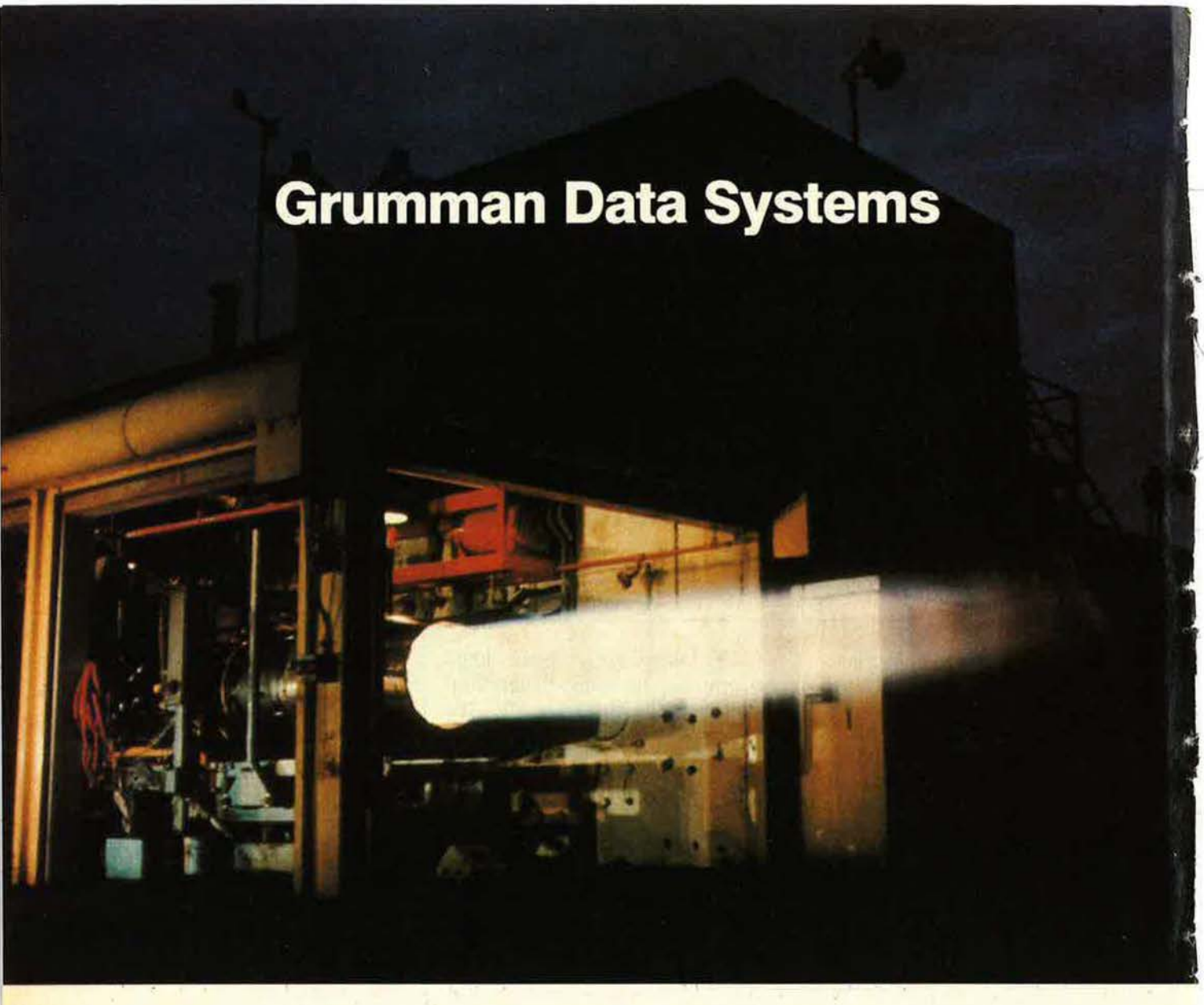
The first major push was to obtain German documents. Watson and Dr. Theodore von Kármán, Director of the US Scientific Advisory Group, set up headquarters in Paris and went after German technicians involved in metallurgy research on the Jumo 004 jet engine, powerplant of the first operational jet fighter—the Messerschmitt Me 262. During their first mission to Aachen in Germany, they located a wide variety of people and set up numerous "targets" of documents and equipment.

Top priority for Watson, however, was collecting Germany's high-performance aircraft in flyable condition, with the Me 262 heading the list. Upon discovery, the following aircraft types were listed for collection at various airfields in Europe: Arado Ar 234; Blohm und Voss Bv 138 and Bv 222; Dornier Do 217M and Do 335; Focke-Wulf Fw 190 A through G, and Ta 152; Heinkel He 111, He 162, and He 219; Junkers Ju 52, Ju 86P, Ju 88, Ju 188, and Ju 388; Messerschmitt Bf 108, Bf 109, Me 163 B and C, Me 262, and Me 410; Siebel Si 204; and several helicopters.

Watson then assembled a group of pilots with technical and engineering backgrounds to fly the aircraft from various fields to three major collection points, and then on to the French port of Cherbourg for shipment to the US. By early June 1945, he had recruited nine pilots and eleven enlisted men from the 27th, 86th, 324th, and 358th Fighter Groups and from the 63d Fighter Wing of Ninth Air Force, along with fourteen Germans, to restore and fly nine Me 262s from Lechfeld airfield in Germany.

Mystery seemed to shroud the

Willi Hofmann taxis out in the Me 262B at Melun with one of the USAAF pilots assigned to the project occupying the aircraft's back seat. (Roy Brown via Smithsonian Institution)



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The only radar-equipped night-fighter version of the Me 262 to be included in Hal Watson's aircraft collection program. Here it is seen at Melun, France, on June 27, 1945. (Hal Watson via Smithsonian Institution)

selection process. 1st Lt. Roy W. Brown, Jr., for example, of the 86th Fighter Group, a P-47 pilot, "first heard of the project when I and another pilot from the same group were sent to Frankfurt in the latter part of May 1945 to be interviewed for a special, unknown (to us, at least) project.

"From the questions asked, I assume I was picked partly because I had a degree in chemical engineering. The other pilot, 1st Lt. James K. Holt, and I flew to Lechfeld around June 3. Here we met four other pilots picked as we were—Capts. Kenneth E. Dahlstrom and Fred L. Hillis and 1st Lts. Robert J. Anspach and Robert C. Strobell."

In early June, Watson continued to log flight time in the Me 262 at Lechfeld. He then ferried the single seater from Lechfeld to test the best route for flying out the rest of the aircraft. Once airborne, he found fuel would not feed from the tank behind the cockpit and was forced to land at St. Dizier, a field far too short for 262 operations. He had trees at one end chopped down to lengthen the runway so he could take off again to get to Melun, the collection point for captured German aircraft. The quick repairs were so effective that he made St. Dizier a standard refueling point.

Turning Neophytes Loose

Watson returned to Lechfeld to fly the Me 262B two-seater before turning his neophytes loose with three German pilots as instructors. Karl Baur, Ludwig "Willi" Hofmann, and Herman Kersting not only were fine instructors but jovial and good-natured as well, despite their POW status.

The 262 reconditionings at Lechfeld were designed to get fuel systems and hydraulics in working order, without worrying about oxygen or radios. During this time, there was still no word on how the aircraft would be transported to the States. The US Navy was not able to make an aircraft carrier available as requested because of the continuing war effort in the Pacific.

The German and AAF mechanics did a creditable job in readying nine more 262s for flights to Melun. To save wear and tear on the aircraft, each US pilot was given a flight in the back seat of the 262B. With Baur in front, Roy Brown recalls, "I took off, circled around once, and landed. It was a stable plane and easy to land. We were warned to land under slight power—that is, with the engines running at a speed a little above idling. This was so that if power were needed on the final approach, it would be available. At idling speed, advancing the throttle would not furnish immediate thrust as with a prop-driven plane."

By June 10, all nine 262s were ready for the flight to Melun via St. Dizier. The 262s were to take off at fifteen-minute intervals, beginning with Willi Hofmann in "Vera," one of the two Me 262s with an Mk 214A 50-mm cannon installed. Hillis was off next in "Joanne," then Anspach in "Pauline," Holt in "Julie," Dahlstrom in "Doris," Brown in "Connie the Sharp Article," Baur in "Marge," Strobell in "Beverly Ann," and Watson in "Wilma Jeanne," which was the other Mk 214-equipped aircraft.

The jet fighter was a new experience for the propeller-oriented pilots. Roy Brown recalls, "My flight to Melun was uneventful. The controls were responsive, and the plane was easy and a pleasure to fly—especially compared with a relatively sluggish P-47. Again, compared with a P-47, the ride was quiet and vibration-free, with a much higher cruising speed."

Weather was excellent. Four airfields en route were singled out for emergency landings, but all aircraft arrived without mishap. Watson, in his after-action report, "strongly recommended that the Me 262 airplanes along with ten trained crew chiefs and pilots be shipped and transferred to Wright Field or to other research centers in the United

The two Ar 234s that were collected by Hal Watson and Karl Baur during an expedition to Stavanger in Norway sit on the runway at Melun on June 27, 1945. (Roy Brown via Smithsonian Institution)

States as a unit in order to accomplish performance and flight testing and comparative analysis with similar American equipment."

First US Jet Squadron

At Melun, the aircraft were repainted—the previous nicknames had been applied by the US engineers assigned to Lechfeld—and each was rechristened by its pilot. Each aircraft was also decorated with the newly designed emblem of the US Army Air Forces's first jet squadron, known already in correspondence and around Europe as "Watson's Whizzers."

The badge depicted Donald Duck riding a Jumo 004 engine around the globe. Each pilot also received a similarly designed leather patch for his flight jacket. So elated were the pilots by the unique situation that they broke the propellers off their AAF lapel wings to signify their new status as jet jockeys. But Watson kept his wings intact, since he had to visit several high commands to discuss the project.

From Melun the captured aircraft would be flown to Cherbourg. Meanwhile, the AAF had prevailed on the British for the aircraft carrier HMS *Reaper* to transport the booty to the US.

Watson moved quickly when he found out *Reaper* was to depart Cherbourg on July 12. He sent his pilots to scout several fields for collectable aircraft. 1st Lt. William V. Haynes joined the Whizzers and was checked out in a two-seater from Schleswig by Hofmann after Roy Brown flew a P-47 over to check on four more 262s. Brown then went on to Grove, Denmark, to inspect three Arado 234 jet bombers and three Heinkel 219 night fighters.

Not wanting to have his Germans arouse suspicion at any of the various airfields, Watson had them wear USAAF uniforms—and keep their chatter to a minimum. Though the Colonel had one of the treasured "Eisenhower" passes, which gave him blanket authority, there was no time for explanations about taking POWs across international borders.

The British authorized the Americans to obtain as many Ar 234s as they needed from Stavanger, Norway, via Grove, Denmark, along with such other planes as the advanced Focke Wulf Ta 152, the last of the 190 versions. Watson flew an Ar 234 from Norway to Denmark to Melun on June 24 with Karl Baur on his wing, refueling at Le Culot. Without radios and never having flown a 234, he planned time and distance to both fields. After the estimated flight time had elapsed, Watson looked down and there was Le Culot. On landing, Baur commented wryly, "No wonder you won the war." They flew on to Melun with the same accuracy.

Visiting Firemen

As Melun became more and more crowded with flyable examples of German technology, several dignitaries visited the field, including airpower advocate Alexander P. de Seversky. The famed aircraft designer made it clear he wanted to fly the Me 262. Watson checked with Spaatz, who could hardly refuse, so de Seversky was put in the rear seat of the 262B. Once airborne, de Seversky found his elation hard to contain as he put the jet aircraft through some demanding maneuvers. Watson did not want to offend his excited guest so he simply held the stick to prevent overstressing of the airframe. All flying in Europe was to be strictly straight and level for training or ferrying. Trials were not to be undertaken until the aircraft had been thoroughly rebuilt in the US.

General Spaatz came to Melun on June 27 for a full military review of the prized aircraft. That afternoon, Watson climbed aboard the Me 262A equipped with R4M rocket launchers and 30-mm cannon. Hillis, the Operations Officer, climbed into the recce 262 and Strobell, the Squadron Commander, boarded a standard 262A with cannon. A flight of three, they lifted off in front of the reviewing stand; climbed out, then came back in trail at high speed, at close to 600 mph, zoomed out of sight, then came back on another run, accompanied by the distinct whine-roar of the Jumo engines. Spaatz's comment: "Wicked!"

Jack Woolams, Chief Test Pilot for Bell Aircraft, had joined the Whizzers and was checked out in the 262. He found it quite a leap forward from the XP-59, America's first jet. One of Woolams's goals was to restore an Me 163 rocket fighter to flying condition. At the time, Bell was designing and building the XS-1 rocket plane for transonic flight research, and Woolams thought flight testing the 163 in Germany would put Bell well ahead of schedule.

Woolams asked that Lechfeld be used as a test field and tried to secure two Me 163Bs along with a German pilot and some mechanics. Though in combat for a year, the 163 had proved a volatile infant with temperamental fuel that often exploded. Watson put the kibosh on the project.

The next major effort was to ferry the aircraft from Melun to Cherbourg. The field at Cherbourg was very short with a set of pipes at one end. On June 29, Watson took one of the 234s, then one of the 262s, into the field and found he had to drag them in just above stall speed and, once past the pipes, chop power to get down within runway length. The other pilots made the flight on July 4.

Roy Brown recalls, "We took off at intervals. That day there was an overcast. We had been told that jet engines were very inefficient at low altitudes, and so I flew above the clouds, letting down shortly before reaching Cherbourg. One of the pilots, Anspach, let down too late

Jeff Ethell, the son of an Air Force officer, has been around military aircraft since childhood. He has been writing about aviation since 1967. He is a commercial pilot with instrument and multiengine ratings, and is a certified flight instructor. He regularly flies with USAF, the USN, and the USMC, in addition to flying such older aircraft as the B-25 Mitchell, P-51 Mustang, and the T-6. His report for us on the T-6 appeared in the January '81 issue. The research for his article this month on Watson's Whizzers resulted from visits with Hal Watson and Roy Brown while writing The German Jets in Combat *for Jane's Publishing Co. The book was released last year.*

Bell's XV-15 goes full tilt.

Flying without auxiliary thrust devices, Bell's XV-15 TiltRotor clocked over 300 knots in level flight at an altitude of 16,000 feet. This surpassed the unofficial world speed record for rotorcraft of 275 knots, set by a Bell high-performance helicopter over ten years ago.

But speed is just one advantage the XV-15 offers the Air Force. Lifting off and landing vertically, rotors rotate 90 degrees in seconds to provide turboprop thrust for forward flight. Flying like an airplane it delivers twice the speed and range of present day helicopter systems on the same amount of fuel.

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SCIENCE/SCOPE

For the first time, the F-15 Eagle has made detailed radar maps using real-time SAR (synthetic array radar) techniques. The maps, made at ranges up to 160 nautical miles and with resolution down to 10 feet, were part of a demonstration of the multimission capabilities of the new F-15 Strike Eagle. The tests were conducted by an F-15 whose AN/APG-63 radar had been modified by increasing its bandwidth and reprogramming its programmable signal processor. All flights were realistic profiles so that new navigation penetration and all-weather weapon delivery modes could be evaluated. The tests were sponsored by McDonnell Douglas Corp., builder of the U.S. Air Force fighter, and Hughes, the radar supplier.

Future versions of the U.S. Air Force's Maverick air-to-ground missile will pack a deadlier punch due to a breakthrough by Hughes in warhead and fusing technology. A new 300-pound alternate warhead with selectable fusing has shown in rugged qualification testing that it can smash through reinforced concrete or a simulated steel ship hull and have the fuse and warhead detonate after penetrating the target. In addition, the warhead's shape enables it to strike a steel hull at shallow angles and not ricochet. The alternate warhead is intended initially for versions of Maverick planned for the U.S. Marine Corps and Navy. Also working on the development are AVCO Systems Division of AVCO Corp., builder of the warhead, and Raymond Engineering, Inc., a subsidiary of Raymond Precision Industries, Inc., which developed the fuse.

An antenna built to extremely close tolerances is a key element of a military weather satellite that will use a microwave sensor to gather vital data about clouds, rain, wind speed, soil moisture, and sea ice. The antenna is a lightweight graphite fiber dish with a gelcoat finish and an aluminum coating two ten-thousandths of an inch thick. The dish is contoured to an accuracy of better than one thousandth of an inch, making it one of the most accurate imaging microwave instruments ever built. Hughes built the antenna for the Defense Meteorological Satellite Program under a U.S. Air Force contract.

Neither darkness, smoke, nor haze will obscure the sight of crews of the U.S. Army's new XM1 main battle tank, thanks to an advanced heat-sensing device. The XM1 Thermal Imaging System (TIS) detects small temperature differences among objects within its view and converts this infrared radiation into television-like pictures. Once the crewmen have spotted a target, they can determine its distance with a laser rangefinder and then direct their fire with pinpoint accuracy. Hughes is under contract to Chrysler Corporation, builder of the tank, to manufacture the TIS and laser rangefinder.

Tactical displays at U.S. military command centers are looking sharper than ever before. A new projector creates yellow-on-blue displays measuring up to 10 square meters in size and much brighter than those of ordinary projection TVs. The greater resolution has been made possible by an exclusive Hughes liquid-crystal light valve. This device converts images from a small cathode-ray tube into a display for projection by a high-intensity arc lamp. This projector is used at ground sites, aboard ships, and in transportable displays.

Creating a new world with electronics

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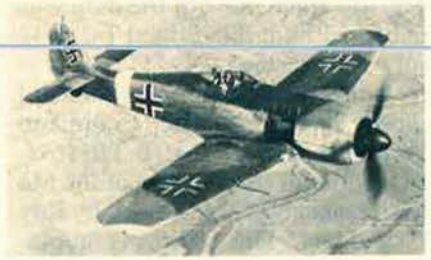


Clockwise from above, a Junkers Ju 290 of the type that made the transatlantic flight; the Do 388, brought to the US aboard the British aircraft carrier Reaper; *one of the two Do 335s brought to the States; and an Fw 190, one of the classic German fighters of World War II brought back for testing.*

and saw the coast of France disappearing behind him. He wasn't sure that he could turn back and find Cherbourg with his limited fuel supply." When Anspach spotted an island, Guernsey, with grass meadows, he landed. Securing diesel fuel from a nearby farmer, he flew out of the meadow and made his way to Cherbourg.

Opening Shock

Willi Hofmann was the last off. After climbing to 3,000 meters, he leveled out. Fifteen minutes into the short flight, he felt a tremendous vibration throughout the aircraft—one engine was throwing turbine buckets. To save the aircraft by bellying in, he descended to 300 meters and suddenly realized he was going to have to abandon the aircraft. On jettisoning the canopy, he was literally pulled from the cockpit at high speed. Unfamiliar with the Irvin parachute and its opening shock, he thought he had hit the ground.

The chute *was* damaged, causing a rapid descent that knocked him unconscious on landing. He awoke to find several French civilians tending him. A real quandary: a German flying an advanced German jet for the Americans after the surrender! How to convince them that he was genuine? Hofmann at first tried to avoid speaking German, but finally persuaded a USAAF officer who had been summoned to raise Watson on the phone in Cherbourg. The next day, the squadron's battered Gooney Bird arrived to take him to an American hospital. Two months later, he was back at Lechfeld describing the last flight of a German pilot in an Me 262.

At Cherbourg, Lt. Col. Malcolm D. Seashore, in charge of overseeing the planes' trip to the US, had them all cocooned against the effects of ocean spray. Even though *Reaper* could not contain the fifty aircraft initially planned on, the loading list was impressive: ten Me 262s (one 50-mm cannon aircraft, four fighters with 30-mm cannon, and one of those with R4M rails, three photo recce aircraft, one two-seat trainer with cannon, one radar-equipped night fighter with cannon); two Me 163Bs; two Ar 234s; three He 219s; two Do 335s; four Fw 190Ds; five Fw 190s with radial engines; one Ta 152H; three Bf 109Gs; one Bf 108; one Ju 88; one Ju 388; one Doblhoff WNF 342 jet helicopter; two Flettner F1 282 helicopters; and one P-51 equipped with a K-18 camera.

Watson's Whizzers, pilots and ground crew (with the exception of the Germans who had been so helpful), boarded *Reaper* and sailed for Newark, N. J., on July 20, 1945. Their leader, however, selected a crew, with Fred McIntosh as co-pilot, and readied the big four-engine Junkers 290 for transatlantic flight. In late July, they hopped the pond via the Azores without incident, shaving one hour off the C-54 record.

Arrival in the States

After a voyage of eight days, *Reaper* arrived at Newark to offload its precious cargo. The aircraft were either prepared for flight or sent by rail to Freeman Field, Ind. Freeman Field was to serve as the USAAF's central base for testing and evaluating foreign equipment.

The pilots who had flown with Watson in Europe now ferried their aircraft to Freeman via Pittsburgh, except Brown who was awaiting discharge from the service.

Watson and Woolams flew the first 262s out of Newark for Pitts-

Russ Schleeh pilots Me 262 T-2-711 near Wright Field, Ohio, during tests to determine the aircraft's performance limits. It was discovered to be superior to the US's first operational jet fighter, the P-80A. This aircraft was later destroyed when Schleeh had to abandon it in flight. (National Archives)

burgh. As they climbed out, still without radios, Watson noticed Woolams gesturing animatedly to descend. Checking his altimeter, it read the metric equivalent of 10,000 feet, the agreed cruising altitude. On landing in Pittsburgh, Woolams exclaimed that they had been at 16,000 feet without oxygen. Watson's altimeter had malfunctioned, and Woolams had feared that they would pass out.

The aircraft arriving by rail began to come in by August 10 and, when Japan surrendered, the rush to gain as much knowledge as possible for use in the Pacific against possible Japanese jet and rocket aircraft slowed down. The goal now was to carefully examine and rebuild each aircraft so that operations could be performed with relative safety. The task was so extensive that the AAF contracted civilian firms to rebuild several of the aircraft.

Hughes Aircraft received one of the Me 262As—T-2-4012—with specific instructions to clean up as much aerodynamic drag as possible. Gaps and the flash tubes for the Mk 108 cannon were sealed. The final touch was several coats of high-gloss paint and some bogus German markings. Hughes pilots found the aircraft incredible in both speed and handling qualities, and superior to the Lockheed P-80, the US's first operational jet fighter.

Howard Hughes, according to the meager records available, saw in his company's restored 262 a chance to steal a march on his contemporaries. He planned to enter the aircraft in the Bendix and Thompson Jet Trophy Races, in which only P-80s were to compete. There was little doubt the Me 262 would have won, but General Arnold heard about Hughes's plan and quickly put a stop to it.

"Nothing Comparable"

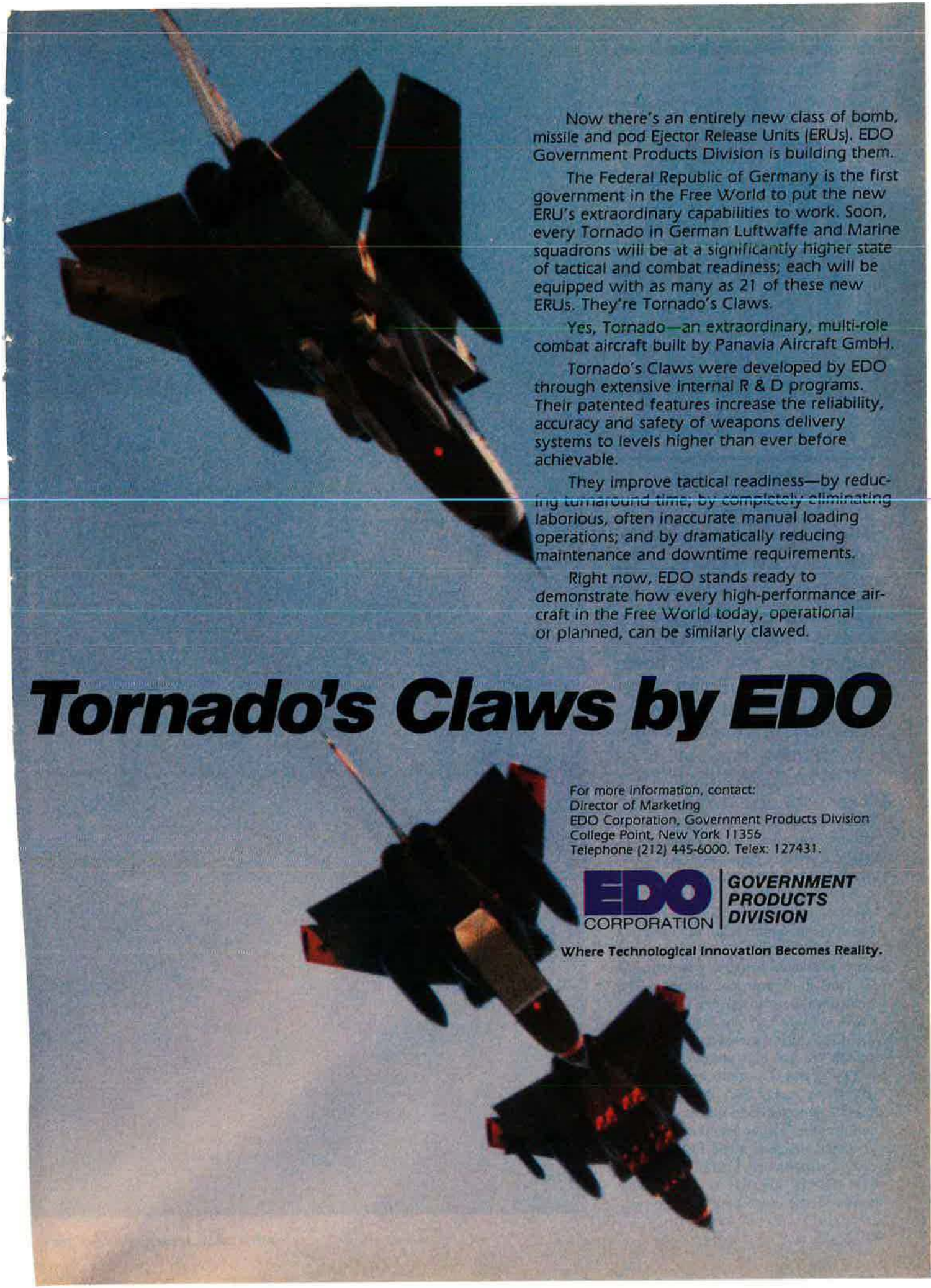
Back at Freeman Field, more 262s were flying, with some transferred to Wright Field for special evaluation. Before completion of the tests, Col. Al Boyd and Hal Watson decided to resolve just how the P-80A and the Me 262A compared head to head. Taking off from Wright Field, with Boyd in the P-80 and Watson in a 262, they flew a test grid to Columbus, Ohio, and back to make a thorough evaluation of all the parameters—speed, climb, dive, and maneuverability.

Watson's candid opinion after three comparison flights: "There was no comparison as far as I'm concerned between the operational capability of the Me 262 in 1945 and the P-80. There was nothing else comparable to the Me 262 in Britain or the US. It was another couple of years before the P-80 began to approach it.

"From the data we got on the 262 we were able to develop the F-86 with similar features—leading edge slats, flying tail, degree of sweep." According to the official USAF Encyclopedia of US Air Force Aircraft and Missile Systems, Vol. 1, by Marcelle Knaack, "North American engineers found that adapting the Messerschmitt 262 sweptwing design would give the [originally straight winged] XP-86 about 70 mph greater speed."

When Boyd reported the results to the higher commands, he was told not to release his findings, particularly since most of the data was gained without the refined T-2-4012 but with the stock T-2-711. However, some of the conclusions did appear in Air Materiel Command Technical Report No. F-TR-1133-ND, entitled "Evaluation of the Me 262 (Project No. NAD-29)," by Roy W. Adams. The following quotation, listed under Conclusions, was marked by an editor's pen to be eliminated from the final report: "Despite a difference in gross weight of nearly 2,000 lb., the Me 262 No. T-2-711 was superior to the average P-80A in acceleration and speed, and approximately the same in climb performance. . . . The Me 262 apparently has a higher critical Mach number, from a drag standpoint, than any current AF fighters."

Hal Watson, in looking back at that feverish program, drew his own conclusions: "If there was one clear statement I could make, it would be this: We plugged all the German technology, scientific data, wind-tunnel testing, and much more that we got into our own research and development. It moved our whole program in aviation ahead four or five years. German technology was so far ahead of us because we were not spending enough money and time on our own projects to allow for it. I see this same dangerous trend today as we face the Soviet Union. I wonder if we have learned the lesson?" ■



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FB-111A MISSION PROFILE

A STAFF REPORT
Photos by William A. Ford
ART DIRECTOR

AIR FORCE Magazine Art Director William A. Ford traveled recently to Plattsburgh AFB, in upper New York state, home of SAC's 380th Bomb Wing, to profile in photographs the activities surrounding a typical training mission in an FB-111A. USAF Capt. Mike Kenny of the 528th Bomb Squadron piloted Ford on a sortie involving two FB-111s, an aerial refueling, a low-level penetration and practice bomb run, and flight maneuvers.

Nicknamed "The Aardvark" because of its long nose, the FB-111A is a two-seat, medium-range, high-altitude strategic bomber. It was developed about twelve years ago as a variation of its tactical fighter counterpart. The fighter-bomber can operate at altitudes above 60,000 feet and can fly faster than the B-52 it is meant to supplement, at both low and high altitudes.

The FB-111A features terrain-following radar that permits low-altitude penetration to the target, and it can handle either nuclear or conventional weapons. (The FB-111A can carry a weapons payload of six AGM-69A SRAM missiles or six nuclear bombs, some combination of the two,

Capts. Bernie Smith and John Plantikow form up after takeoff on the wing of Captain Kenny's FB-111 as they climb above upper New York state.


U.S. AIR FORCE

Over Vermont the bombers rendezvous with a KC-135 tanker from the Air National Guard's 101st Refueling Wing from Loring AFB, Me.

or more than 31,000 pounds of conventional bombs.)

When fully extended, the aircraft's swingwing permits short-field operations and when swept back to its maximum of 72.5 degrees enables the FB-111A to reach twice the speed of sound. The FB-111's two Pratt & Whitney TF30-P-7 turbofan engines consume an average of 10,000 pounds of JP-4 fuel per hour.

With its FB-111As, the 380th Bomb Wing maintains one of the largest alert force commitments in SAC. In his visit to Plattsburgh, Art Director Ford hoped to capture on film the individual and team efforts that go into upholding this commitment, and rode along with camera in hand as Captain Kenny sharpened his skills on a typical training mission.

Getting Ready

Preparation for this particular mission begins about six hours before scheduled takeoff. The crew chief arrives to inspect the aircraft, making sure that all panels are secure and that the tires and struts are properly pressurized. He ensures that the FB-111A is fueled, clears up all maintenance problems, services the hydraulics and emergency systems, inspects the engines, particularly for foreign object damage (FOD), makes sure that oil pressure is adequate, and generally readies the plane for takeoff.

Captain Kenny arrives about ninety minutes before scheduled takeoff. In company with the crew chief, SrA. Kenneth R. Martin *(see front cover),* additional checks and double-checks are performed: hydraulics, computers for flight control and navigation, radar, and others. The aircraft is ready for today's flight.

After takeoff, Captain Kenny explains the initial phase of today's two-ship mission to Bill Ford: "As we proceed south at 20,000 feet, the crews are completing level-off checks, equipment checks, and air refueling checks. The critical time requirements and precise navigation necessary for the refueling and the bombing missions pose no real problems. The FB-111's inertial navigation system is backed up by two digital computers and an advanced attack radarscope."

Less than an hour after takeoff the bombers are over Vermont, where they rendezvous with a KC-135 tanker aircraft from the Air National Guard's 101st Air Refueling Wing. After

hookup with the tanker, the FB-111As each take on about 10,000 pounds of fuel in less than five minutes. The refueling completed, they then disengage to resume the mission.

The FB-111As are now approaching Maine, and turn southeast toward Bangor. On this twenty-minute leg of the mission the crews check weather conditions, coordinate operations with the ground people at the bombing range, and check their bombing equipment.

Today the crews will be practicing at USAF's Ashland Bomb Plot, just south of Presque Isle, near the Canadian border. Their immediate destination is the entry point to a low-level training route called IR-800. This route extends from near Bangor northeast to Ashland Bomb Plot.

Captain Kenny enters the route at 17,000 feet, piloting his aircraft under instrument conditions. The two-ship formation has now broken up, and Captain Kenny and Bill Ford proceed as a single ship.

Practice Bombing

In low-altitude bombing missions, the FB-111A proceeds regardless of adverse weather or night conditions. At the designated point (about five miles into the route), the crew engages the automatic low-altitude terrain-following system that plunges the aircraft at a rate of 12,000 feet a minute down to 1,000 feet. The descent and level-off are closely monitored by the crews to ensure that all goes as planned.

As they fly up the Maine coastline, Captain Kenny says, "We can fly as low as 200 feet over the contour of the earth. This gives us the invisibility we need to penetrate enemy territory." Captain Kenny informs the ground controllers of the estimated time, altitude, and point of entry over the complex. The ground controllers, members of the 1st Combat Evaluation Group, picked up the FB-111 on radar about forty miles from the first target. They are prepared to monitor electronically the bombing run, as Captain Kenny will not drop actual bombs.

About ten seconds before the first target, he switches on a continuous tone radio that is interrupted only when the bombardier pushes the bomb-release button. The ground controllers plot the aircraft across a map of the range and determine by interruption of the continuous tone radio when a "bomb" has been dropped.

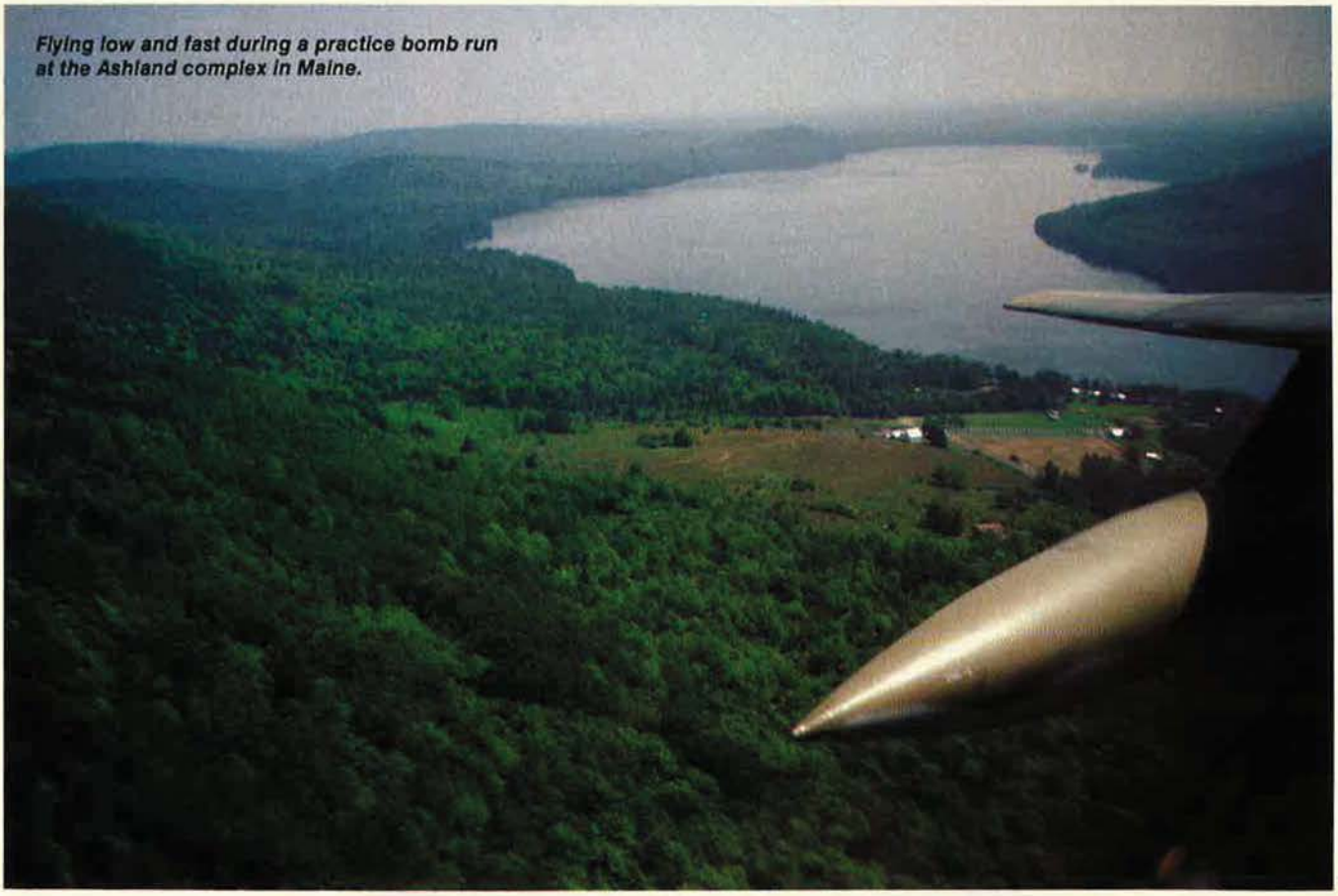
In less than three minutes, Captain Kenny hits two targets by radar, and one target visually, before leaving the Ashland complex. As he nears the Canadian border, he pulls the aircraft up at about a sixty-degree angle and, with both engines near maximum thrust, climbs to 30,000 feet.

During the twenty-minute ride back to Plattsburgh, bomb scores are figured using information already compiled by the Ashland evaluators and ballistics data provided by the aircrews to Ashland. The final result tells the crew how close they would have come to target if they had made an actual drop.

On the return high-altitude flight, the FB-111 aircrews practice stall recovery techniques and flight maneuvers at differing degrees of wingsweep and airspeed. They complete their descent checklists, and recover at Plattsburgh after a total flight time of four hours.

The training mission is followed by another hour or more of maintenance and mission debriefings.

The aircrews of the 380th Bomb Wing receive twelve to eighteen hours of flight training each month. For one week out of every three, they stand twenty-four-hour ground alert — ready to use, if necessary, the skills they have learned and perfected in practice missions such as the one just completed. ■



Flying low and fast during a practice bomb run at the Ashland complex in Maine.

Based on the results of investigations conducted over a four-year period, the Air Force Office of Special Investigations has prepared a report that delineates the problem USAF faces with . . .

Intentional Aircraft Damage:

Who, Why, and What Effect on Mission Capability?

BY WILLIAM P. SCHLITZ, SENIOR EDITOR

WHO are those people within the Air Force who intentionally damage aircraft entrusted to their care? Why do they do it? How widespread are the instances? What is the impact on mission readiness?

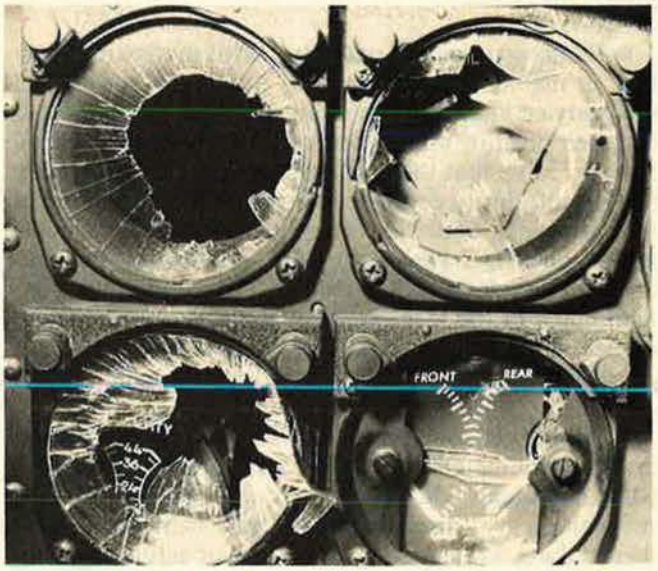
These questions and others are answered in a report prepared by the Air Force Office of Special Investigations, whose agents are often called in to investigate incidents of suspected intentional damage to aircraft. The "AFOSI Crime Special Report" is based on data resulting from 250 aircraft damage investigations conducted by AFOSI from October 1975 through December 1979.

Because aircraft are the heart's blood of Air Force operations, any question of intentional damage to them causes reverberations right up through the respective major command to Hq. USAF. Therefore, once AFOSI is called in, its agents assigned to a case have the immediate task of determining whether or not the damage is, indeed, intentional. In relation to equipment failure, design imperfections, and the like throughout USAF, aircraft damage by intent occurs in but a minuscule number of cases. But even the relative few are serious enough to warrant an extraordinary effort. (The other side of the coin is AFOSI's responsibility to discover when specific instances of aircraft damage are *not* intentional. For example, in one case an electrical cable near a canopy appeared to have been severed by knife cuts. Not so, AFOSI deduced; the damage was simply wear through canopy closures. The verdict cleared personnel of any wrongdoing and also pinpointed a potential problem in other aircraft.)

AFOSI officials are quick to point out the limits of their data base in preparing their report. While Air Force commanders reported a total of 1,186 accidents and other mishaps that caused aircraft damage during the period in question, AFOSI investigators were called in on only the 250 cases (twenty-one percent) where intentional damage was suspected. Nevertheless, despite the limited data base, AFOSI officials believe that the conclusions arrived at in the report should provide commanders with general guidance in the protection of resources and tips on personnel supervision to help prevent future instances of intentional aircraft damage.

The study revealed that the five aircraft most commonly damaged by intent are: fighters (thirty-six percent); transports (21.6 percent); bombers (eight percent); trainers (7.6 percent); and tankers (5.2 percent). The three most commonly damaged aircraft systems identified in the AFOSI investigations were: engines (26.4 percent); airframe components (23.6 percent); and avionics and other electronic systems (14.4 percent).

But who are the perpetrators and what motivates them to damage military aircraft that are integral to their country's defense?



Revenge damage to instruments of one of three O-2A aircraft because of "dissatisfaction with shop management." Estimated cost to repair: more than $14,000.

AFOSI is again quick to point out that in no instance can the word "sabotage" apply—in the sense of enemy-initiated deeds. The motivating factors in intentional aircraft damage border on the mundane—though the results are nonetheless as serious.

First, though, in what career fields are most offenders found? The AFOSI study identified primarily three: Aircraft Maintenance (forty-six percent); Aircraft Systems Maintenance (14.3 percent); and, strangely enough but possibly explained below, Security Police (12.7 percent). In more human terms, the majority of culprits tended to be first-term airmen in grades E-3 and E-4 (63.4 percent) between ages of nineteen and twenty-five.

Areas of Motivation

As for motive, psychological studies determined that four patterns of behavior emerged consistently. Quoting from the report:

- **Revenge.** "Persons who damage aircraft out of anger by disturbing or destroying some part of an aircraft do so because of immaturity and a lack of the interpersonal skills that would allow them to settle their affairs in direct and rational ways. They are defensive, cannot take responsibility for their difficulties, and see their problems as the result of someone else's actions. They

blame others and 'get even' either with some person or the USAF for what they perceive as an injustice. They see their acts as justified and proper to regain their power, stature, or authority vis-à-vis the real or imaginary difficulties. In addition, these persons may act on frustrations which originated at previous assignments, but surface because of current perceived difficulties."

In one case, punctures in an engine cowling that could not have been accidental were traced to a senior airman, who confessed when questioned. His moodiness and other personality quirks would later fit almost exactly the profile created by AFOSI to describe the typical revenge-seeker.

• **Demonstration of Authority.** "This motive may surface in maintenance or security supervisors who feel their advice and/or instructions have been disregarded and their position as a leader has been challenged. Since they perceive that their subordinates are inferior, they feel the inferiority could be interpreted as a reflection of their own lack of ability. Their justification for the aircraft damage is to keep their team 'on its toes' by demonstrating they are still in charge. These individuals exhibit many of the same traits as the revenge-motivated suspect, as they seek to reassure their personal sense of adequacy by manipulating their work—the maintenance or security of USAF aircraft."

• **Need for Recognition.** "Since the USAF rewards individuals for maintaining safety and security, there have been individuals who create their own opportunities for recognition by 'discovering' aircraft damage of their own making. Pressured by perceived or actual competitive requirements, they use the act to overcome a sense of shortcoming. Their intentional damage may be promoted by their own marginal performance, stringent demands for excellence, or the observation that diligence can achieve instant praise. This behavior is common in arson cases and often explains fire-setting by firemen." (The same syndrome may afflict Security Policemen charged in intentional-damage cases. Again, in two of every three cases where the intentional damage was discovered by a crew chief, the crew chief was later determined to be the offender. Recognition seekers found their own damage in 65.5 percent of the cases.)

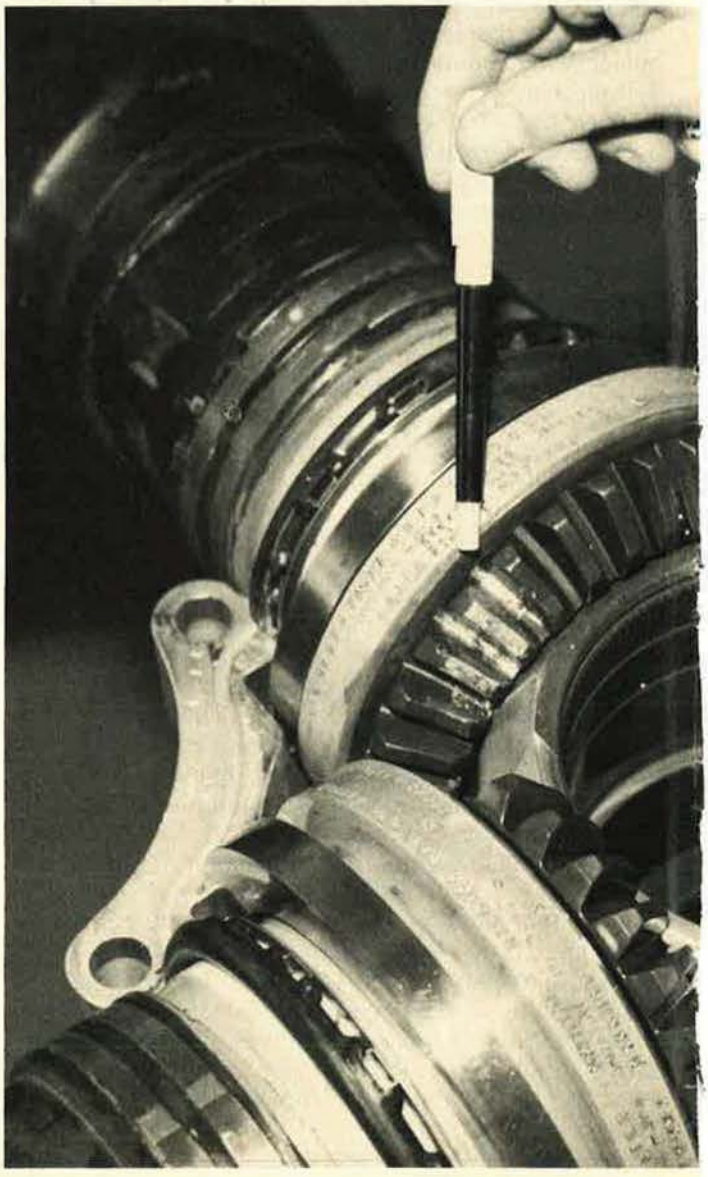
One crew chief was praised highly for discovering foreign objects in the intake/compressor rotors of fighter aircraft to which he was assigned. When his "discoveries" became a series, suspicions were aroused and AFOSI was called in. When questioned, he admitted his misdeeds. An interesting sidelight to this case was that with the initial praise of the crew chief, a subordinate began to "discover" foreign objects in aircraft air compressors. He, too, owned up.

• **Coverup of Accidental Damage.** "While accidental damages occur, some individuals may mask their accidents as willful damage to avoid criticism from others. Since investigation into the incident would be directed toward someone who intentionally damaged the aircraft, this type of individual finds it easier to deny the incident because it really was an accident. They may inflict significant damage to disguise the accident and even 'assist' the investigation away from their direction. These individuals may appear highly dedicated and attentive to detail but inwardly fear failure. New or increased responsibilities create additional pressures on these people and this type of behavior may manifest itself at times of increased stress, *i.e.*, following promotion or during exercises, ORIs, etc."

As a classic example, AFOSI officials cite this case: A young crew chief, his first day on the job, conscientiously worked an hour overtime on his aircraft. During a final check, he slipped climbing out of the cockpit and tore a knob off the instrument panel righting himself. Utter panic. Remembering that a group of teenagers had been allowed to visit the area earlier that day, he smashed the instrument panel with a tool and went off duty. During the inevitable investigation that followed, he alluded to the teenagers but eventually owned up under questioning.

The study concluded that by far the most prevalent motivation was to cover up accidental damage (49.2 percent), followed by the need for recognition (17.5 percent), and then the desire for revenge (15.9 percent). In some cases, motivations were mixed and not clearly definable.

In its study of the 250 incidents, AFOSI ascertained that ninety-seven aircraft (38.8 percent) sustained intentional damage while undergoing maintenance. Damage



investigated by AFOSI was discovered during pre- and post-flight inspections of sixty-one aircraft (24.4 percent). Twelve aircraft (4.8 percent) were damaged while on alert status. AFOSI's report notes that for some unaccountable reason intentional damage incidents peak slightly in March and August, with February and July bringing the lowest numbers, although the "peaks might be explained by possible increased mission-related stresses on personnel or seasonal climatic changes."

Costs—Hidden and Otherwise

The major cost in intentional damage cases, of course, is aircraft down time while repairs are made and, thus, reduced mission capability of a unit.

Information concerning the direct costs of repair was available in 146 of the 250 investigations. In twenty-three cases, the cost of repair was less than $200. But, by the same token, in eleven of the incidents repairs cost between $10,000 and $300,000. In two cases, aircraft were destroyed and completely written off.

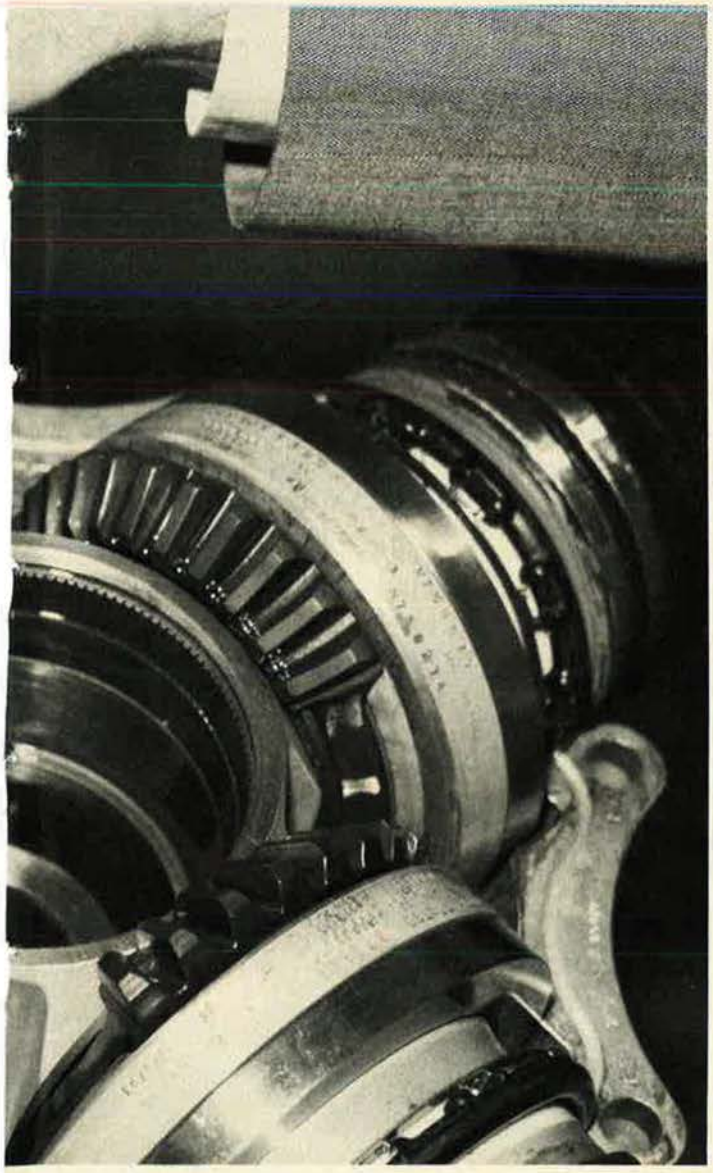
Hidden costs include those of the investigation itself—for instance, the many hours lost by unit personnel and the AFOSI agents in conducting interviews.

In terms of mission impairment, AFOSI ascertained that in 101 of the 250 incidents the "effect of actual or threatened damage was judged to have an immediate impact on the unit mission; in eighty-two instances it was felt the situation had a potentially damaging impact on the mission; and in sixty-seven cases" no mission impairment resulted.

One encouraging factor in all this is the very AFOSI report itself: A body of information exists that analyzes intentional aircraft damage and profiles probable culprits. Widespread knowledge of the report could, in itself, act as a deterrent.

Also, during the period covered by the study there was noted a gradual decline in the number of cases AFOSI was called in to investigate: seventy-two in 1976; sixty-five in 1977; fifty-three in 1978; and barely forty in 1979.

Depending on the seriousness of the intentional-damage offense, punishments range from reprimands to Articles 15 to courts-martial. But, in any case, the Air Force Office of Special Investigations does not mete out punishment. It is strictly an investigative organization that collects and tenders facts. ■



Left, foreign material in the barrel housing of a C-130 propeller caused damage that cost an estimated $650 to repair. Above, with overhaul of an F-4 engine costing about $65,000, damage to its compressor blades is an expensive proposition.

Flight ops aboard the Nimitz without the Nimitz...

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ALL THE WORLD'S AIRCRAFT SUPPLEMENT

APRIL 1981

Except for the added rotodome, the E-3A resembles closely the Boeing 707-320B commercial transport on which it was based

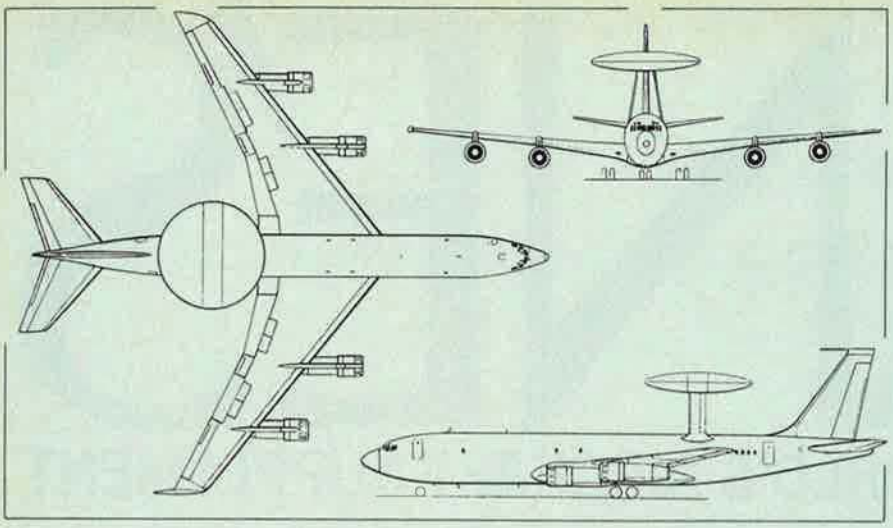
BOEING

BOEING AEROSPACE COMPANY; Head Office: PO Box 3999, Seattle, Washington 98124, USA

BOEING E-3A SENTRY

The E-3A Sentry AWACS (Airborne Warning And Control System) is effectively a mobile, flexible, survivable, and jamming-resistant high-capacity radar station, command, control, and communications centre, installed within a Boeing 707 airframe. It offers the potential of long-range high- or low-level surveillance of all air vehicles, manned or unmanned, and provides detection, tracking, and identification capability within its surveillance capacity during all weathers and above all kinds of terrain. The radar system of later production aircraft also incorporates a maritime surveillance mode. Each of these aircraft is able to support a variety of tactical and/or air defence missions with no change in configuration. Its data storage and processing capability can provide real-time assessment of enemy action, and of the status and position of friendly resources. If this information is not available on board the E-3A, it can be acquired via air-to-ground or air-to-air digital or voice communication links. Onboard communication equipment can receive, transmit, and relay a wide variety of signals, both digital and voice, to and from ground and air stations.

The USAF's first 23 Sentries, equipped to what is now known as 'core E-3A' standard, each have 13 available communication links (seven UHF, three VHF/AM, one VHF/FM, and two HF/SSB), many of them in clear voice. In a new US/NATO Standard configuration, to be introduced on E-3A c/n 24 for delivery to the USAF during 1981, and subsequent aircraft for the USAF and NATO, this communication system is to be replaced by the newly-developed joint tactical information distribution system (JTIDS). This high-capacity system, operating over a single secure communications channel to prevent enemy 'eavesdropping', is capable of providing links with from two to 98,000 participants, depending upon the proportions of an access time cycle allocated to each. Additional advantages of JTIDS are the high speed of communication, and the fact that it is far less vulnerable to enemy jamming than more conventional com-



Boeing E-3A Sentry (four Pratt & Whitney TF33 turbofan engines) *(Pilot Press)*

munication systems. It is assumed that the first 23 E-3As will be retrofitted to this standard at some future date.

In US Air Force service, the E-3A has a dual use: as a command and control centre to support quick-reaction deployment and tactical operations by Tactical Air Command units; and as a survivable early-warning airborne command and control centre for identification, surveillance, and tracking of airborne enemy forces, and for the command and control of NORAD (North American Air Defense) forces over the continental USA. The E-3A provides comprehensive surveillance out to a range of more than 200 nm (370 km; 230 miles) for low-flying targets, and still further for targets flying at higher altitudes.

Boeing's Aerospace Group, as it was then named, was awarded an initial contract as prime contractor and systems integrator for the AWAC system on July 23, 1970. In order to ensure that maximum effort and finance were devoted to the design and development of the most advanced radar and associated onboard systems, Boeing's design submission was based on the thoroughly proven airframe of the Model 707-320B commercial transport aircraft. The only major change proposed for production E-3As was the installation of more powerful Pratt & Whitney TF33 turbofan engines, in lieu of the commercial turbofans then standard for the civil transport models. Two of these aircraft, with the prototype designation EC-137D, were modified initially for comparative trials with prototype downward-looking radars designed by Hughes Aircraft Company and Westinghouse Electric Corporation. After several months of airborne tests the Westinghouse radar was selected, on October 5, 1972.

The US Air Force announced on January 26, 1973, that, following satisfactory completion of the initial stage of the programme, approval had been given for full-scale development of the AWACS, and production received Congressional approval in the Spring of 1975, although by then the planned purchase had been cut to 34 instead of the 64 aircraft requested originally. The full-scale development test programme involved a fleet of three aircraft completely equipped with mission avionics, and a fourth aircraft equipped for airworthiness testing, and was completed at the end of 1976.

In December 1976 Boeing awarded Westinghouse a contract to develop a maritime surveillance capability that could be incorporated into the E-3A radar system. An aircraft began flight testing this in June 1979, and all E-3A aircraft beginning with production system 22 will incorporate this maritime surveillance mode.

The first production E-3A Sentry was delivered on March 24, 1977, to Tactical Air Command's 552nd Airborne Warning and Control Wing, based at Tinker AFB, Okla. A total of five was delivered by the end of 1977, followed by ten more during 1978, five in 1979, and one during 1980. E-3As achieved initial operational status in April 1978, and have since completed deployments to Alaska, Iceland, Saudi Arabia, the Mediterranean area, and the Pacific. They began to assume a role in US continental air defence on January 1, 1979, when NORAD personnel began to augment E-3A flight crews from TAC on all operational NORAD missions from Tinker AFB. The 552nd AWAC Wing reports directly to TAC Headquarters, at Langley AFB, Va., and consists of several subordinate units. At Tinker, these include the 963rd and 964th AWAC Squadrons, the 966th AWAC Training Squadron, the 552nd Aircraft Generation Squadron (systems support), the 552nd Component Repair Squadron, and the 8th Tactical Deployment Control Squadron (flying EC-135/WC-135 aircraft). Overseas detachments of the 552nd AWACW include the 960th and 961st AWAC Support Squadrons. Based respectively at NAS Keflavik, Iceland, and Kadena AB, Okinawa, Japan, they provide command and control capability to CINCLANT (through the Commander, Iceland Defence Force) and CINCPAC. A third AWAC Support Squadron, the 962nd, is to be activated in 1982 at Elmendorf AFB, Alaska.

Funding for a total of 30 E-3As has been provided through FY '82. Four more will be requested in FY '83 to complete the currently planned force of 34 USAF AWACS. In addition, NATO has approved the acquisition of 18, under a cost-sharing agreement. Full basing details of these aircraft have yet to be announced, but their initial main operating base will be at Geilenkirchen in West Germany; some may later be based in Norway. For these NATO E-3As, much of the avionics will be produced in West Germany, with Dornier as systems integrator. NATO has funded a third HF radio, to cover the maritime environment; a new data analysis and programming group; and underwing hardpoints for self-defence system stores. The new data group, which handles the information gathered by the surveillance radar, IFF, and other systems, is based on a new IBM CC-2 computer with a 665,360-word memory unit (compared with 114,688 words in the CC-1 computer of the earlier aircraft). Coupled with the increased data processing speed and capability is a greater tracking capacity, and the ability to initiate tracks automatically. Also funded by NATO, for its own E-3As only (although there are provisions for it in USAF aircraft), is a radio teletype to link the AWACS with the Organisation's maritime forces and commands. Initial deliveries of E-3As to NATO are scheduled for 1982.

TYPE: Airborne early-warning and command post aircraft.

WINGS: Cantilever low-wing monoplane. Dihedral 7°. Incidence 2°. Sweepback at quarter-chord 35°. All-metal two-spar fail-safe structure. Centre-section continuous through fuselage. Normal outboard aileron, and small inboard aileron on each wing, built of aluminium honeycomb panels. Two Fowler flaps and one fillet flap of aluminium alloy on each wing. Full-span leading-edge flaps. Four hydraulically-operated aluminium alloy spoilers on each wing, forward of flaps. Primary flying controls are aerodynamically balanced and manually operated through spring tabs. Lateral control at low speeds by all four ailerons, supplemented by spoilers which are interconnected with the ailerons. Lateral control at high speeds by inboard ailerons and spoilers only. Operation of flaps adjusts linkage between inboard and outboard ailerons to permit outboard operation with extended flaps. Spoilers may also be used symmetrically as speed brakes. Thermal anti-icing of wing leading-edges.

FUSELAGE: All-metal semi-monocoque fail-safe

Information from the AWACS' radar system is displayed on multi-purpose consoles such as the bank shown here. Operators can control strike aircraft and direct fighter intercepts from these stations

structure with cross-section made up of two circular arcs of different radii, the larger above, faired into smooth-contoured ellipse. Structure strengthened by comparison with that of the commercial Model 707-320.

TAIL UNIT: Cantilever all-metal structure. Anti-balance tab and trim tab in rudder. Trim and control tabs in each elevator. Electrically and manually operated variable-incidence tailplane. Powered rudder.

LANDING GEAR: Hydraulically-retractable tricycle type. Main units are four-wheel bogies which retract inward into underside of thickened wing-root and fuselage. Dual nosewheel unit retracts forward into fuselage. Landing gear doors close when legs fully extended. Boeing oleo-pneumatic shock-absorbers. Main wheels and tyres size 46 × 16. Nosewheels and tyres size 39 × 13. Multi-disc brakes by Goodyear. Hydro-Aire flywheel detector type anti-skid units.

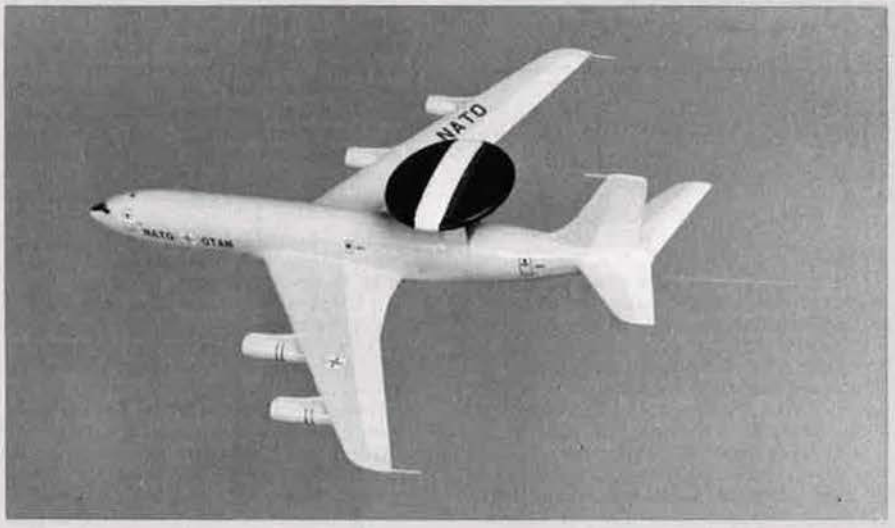
POWER PLANT: Four Pratt & Whitney TF33-PW-100/100A turbofans, each rated at 93.4 kN (21,000 lb st), mounted in pods beneath the wings. Fuel contained in integral wing tanks.

ACCOMMODATION: Basic operational crew of 17 includes a flight crew complement of four plus 13 AWACS specialists, though this latter number can vary for tactical and defence missions. Aft of flight deck, from front to rear of fuselage, are communications, data processing, and other equipment bays; multi-purpose consoles; communications, navigation, and identification equipment; and crew rest area.

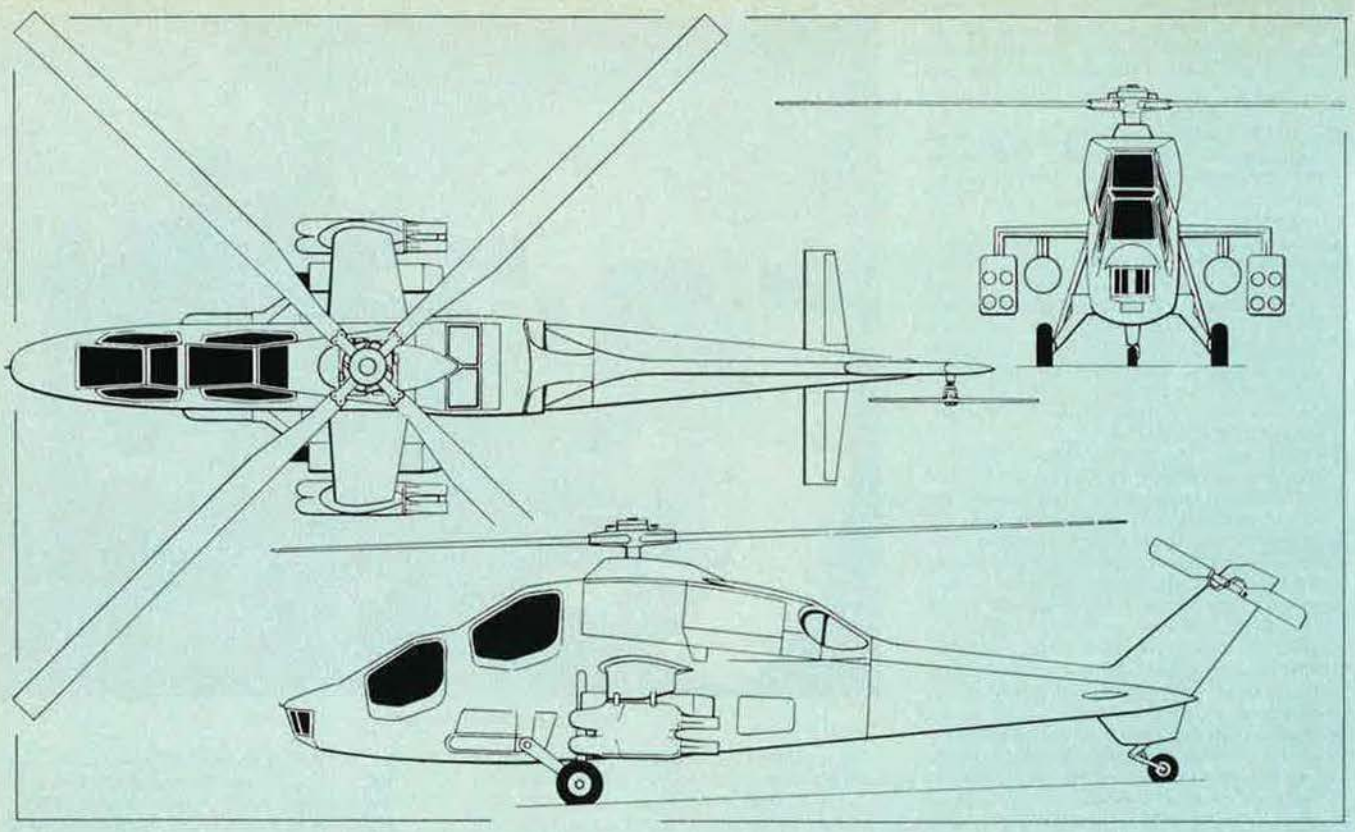
SYSTEMS: A liquid cooling system provides protection for the radar transmitter. An air-cycle pack system, a draw-through system, and two closed-loop ram-cooled environmental control systems ensure a suitable environment for crew and avionics equipment. Electric power generation has a 600kVA capability. The distribution centre for mission equipment power and remote avionics is located in the lower forward cargo compartment. The aft cargo compartment houses the radar transmitter and an APU. External sockets allow intake of power when the aircraft is on the ground. Two separate and independent hydraulic systems power flight-essential and mission-essential equipment, but either system has the capability of satisfying the requirements of both equipment groups in an emergency.

AVIONICS AND EQUIPMENT: Prominent above the fuselage is the elliptical cross-section rotodome which is 9.14 m (30 ft) in diameter and 1.83 m (6 ft) in depth. It comprises four essential elements: a turntable, strut-mounted above the rear fuselage, that supports the rotary joint assembly to which are attached sliprings for electrical and waveguide continuity between rotodome and fuselage; a structural centre section of aluminium skin and stiffener construction which supports the AN/APY-1 surveillance radar and IFF/TADIL C antennae, radomes, auxiliary equipment for radar operation and environmental control of the rotodome interior; liquid cooling of the radar antennae; and two radomes constructed of multi-layer glassfibre sandwich material, one for the surveillance radar and one for the IFF/TADIL C array. For surveillance operations the rotodome is hydraulically driven at 6 rpm, but during non-operational flights it is rotated at only ¼ rpm, to keep the bearings lubricated. The Westinghouse radar operates in the S band and can function both as a pulse and/or a pulse-Doppler radar for detection of aircraft targets. A similar pulse radar mode with additional pulse compression and sea clutter adaptive processing is used to detect maritime/ship traffic. The radar is operable in six modes: PDNES, when range is paramount to elevation data; PDES, providing elevation data with some loss of range; BTH, giving long-range detection with no elevation data; Maritime, for detection of surface vessels in various sea states; Interleaved, combining available modes for all-altitude longer-range aircraft detection, or for both aircraft and ship detection; and Passive, which tracks enemy ECM sources without transmission-induced vulnerability. The radar antenna, spanning about 7.32 m (24 ft), and 1.52 m (5 ft) deep, scans mechanically in azimuth, and electronically from ground level up into the stratosphere. Heart of the data processing capability of the first 23 aircraft is an IBM 4 Pi CC-1 high-speed computer, the entire group consisting of arithmetic control units, input/output units, main storage units, peripheral control units, mass memory drums, magnetic tape transports, punched tape reader, line printer, and an operator's control panel. Processing speed is in the order of 740,000 operations/sec; main memory size is 114,688 words (expandable to 180,224), and mass memory size 802,816 words (expandable to 1,204,224). An interface adapter unit developed by Boeing is the key integrating element interconnecting functional data between AWACS avionics subsystems, the data processing functional group, radar, communications, navigation/guidance, display, azimuth, and identification, and also provides the central timing system. From the 24th production aircraft the new and improved IBM CC-2 computer is installed, with a main storage capacity of 665,360 words. Data display and control are provided by Hazeltine Corporation multi-purpose consoles (MPC) and auxiliary display units (ADU); in present configuration each AWACS aircraft carries nine MPCs and two ADUs. Navigation/guidance relies upon three principal sources of information: two Delco AN/ASN-119 Carousel IV inertial navigation platforms, a Northrop AN/ARN-120 Omega set which continuously updates the inertial platforms, and a Teledyne Ryan AN/APN-213 Doppler velocity sensor to provide airspeed and drift information. Communications equipment, supplied by Collins Radio, Electronic Communications Inc, E-Systems, and Hughes Aircraft, provides HF, VHF, and UHF communication channels by means of which information can be transmitted or received in clear or secure mode, in voice or digital form. From c/n 24, this communications installation is replaced by the newly-developed JTIDS. Identification is based on an AN/APX-103 interrogator set developed by Cutler-Hammer's AIL Division. It is the first airborne IFF interrogator set to offer complete AIMS Mk X SIF air traffic control and Mk XII military identification friend or foe (IFF) in a single integrated system. Simultaneous Mk X and Mk XII multi-target and multi-mode operations allow the operator to obtain instantaneously the range, azimuth and elevation, code identification, and IFF status, of all targets within radar

E-3A communications operator's station



NATO AWACS will be the first operational aircraft painted in the Organisation's own insignia



Agusta A 129 Mangusta light anti-tank, attack, and advanced scout helicopter *(Pilot Press)*

range. NATO E-3As will carry, and USAF aircraft will have provisions for, a radio teletype. NATO aircraft will also be able to carry self-defence system (SDS) stores. This requires the provision of an inboard underwing hardpoint on the starboard side, for one already exists on the port side of standard commercial aircraft to provide a self-ferry mounting for a spare engine. With no immediate requirement for NATO AWACS to carry weapons, these hardpoints will be used to mount additional podded items of ECM equipment.

DIMENSIONS, EXTERNAL:

Wing span	44.42 m (145 ft 9 in)
Length overall	46.61 m (152 ft 11 in)
Height overall	12.60 m (41 ft 4 in)

WEIGHT:

Max T-O weight	147,400 kg (325,000 lb)

PERFORMANCE:

Max level speed	460 knots (853 km/h; 530 mph)
Service ceiling	over 8,850 m (29,000 ft)
Endurance on station, 870 nm (1,610 km; 1,000 miles) from base	6 h

AGUSTA

COSTRUZIONI AERONAUTICHE GIOVANNI AGUSTA SpA; Head Office (Agusta Group): Viale del Ghisallo 20, 20151 Milan, Italy

AGUSTA A 129 MANGUSTA (MONGOOSE)

Preliminary design of this light military helicopter began in 1978, since when it has undergone a number of configuration changes. It entered the final design stage in 1980, and is due to make its first flight in 1982. Three prototypes have been ordered for Italian Army Aviation, and on December 11, 1980, it was announced that these would be powered by Rolls-Royce Gem-2 turboshaft engines.

Initially, the A 129 is intended primarily for specialised attack against armoured targets with anti-tank or area suppression weapons, and will have full night/bad weather combat capability. It is also suitable, in an export version, for the advanced scouting role. Subject to successful completion of test and evaluation programmes, the Mangusta is expected to enter production for the Italian Army (which has a requirement for 60 or more) in 1984.

The following description applies to the A 129 prototypes currently under construction:

TYPE: Light anti-tank, attack, and advanced scout helicopter.

ROTOR SYSTEM: Fully-articulated four-blade main rotor and two-blade tail rotor, each with elastomeric bearings. Main rotor blades, which have a very low vibration level, each consist of a glass-fibre spar, Nomex honeycomb leading- and trailing-edge, and skin of composite materials. Hub has a swashplate of glassfibre composites; all mechanical linkages and moving parts are housed inside the rotor mast. There are no lubricated bearings in the rotor head. Tail rotor blades are also of composite materials.

WINGS: Cantilever mid-mounted stub-wings, aft of rear cockpit in plane of main rotor mast.

FUSELAGE: Conventional semi-monocoque crash-resistant structure, of mainly metal construction. Small and narrow frontal area. Anti-roll bar in forward fuselage for crew protection; armour protection for vital areas of power plant. Airframe has a ballistic tolerance against 12.7 mm armour-piercing ammunition, and meets the crashworthiness standards of MIL-STD-1290.

TAIL UNIT: Sweptback main fin, with tail rotor mounted near top on port side. Small underfin, serving also as mount for tailwheel. Tailplane mid-mounted on tailboom in line with fin leading-edges.

LANDING GEAR: Non-retractable tailwheel type, with single wheel on each unit.

POWER PLANT (prototypes): Two Rolls-Royce Gem-2 turboshaft engines, each rated at 684.5 kW (918 shp) for 2½ min, 631 kW (846 shp) for T-O and 30 min, and 571 kW (766 shp) max continuous. Low noise levels and low infra-red signature.

ACCOMMODATION: Pilot and co-pilot/gunner in tandem-mounted separate cockpits, each cockpit having a low-glint canopy with fall-away side panels for emergency exit. Elevated rear (pilot's) cockpit. Energy-absorbing armoured seats.

SYSTEMS, AVIONICS, AND EQUIPMENT: All main functions of aircraft are controlled and monitored continuously through a central digital data multiplex bus. Avionics include advanced com/nav equipment, and both active and passive self-protection systems (radar warning receiver, chaff/flare dispenser, radar deceiver/jammer, and infra-red jammer). Two separate fuel systems, with cross-feed capability, self-sealing crash-resistant tanks, and self-sealing lines. Automatic fire extinguishing system.

ARMAMENT: Four underwing attachments, inner pair stressed for loads of up to 300 kg (661 lb) each, outer pair (at wingtips) for up to 200 kg (441 lb) each. Up to eight TOW wire-guided anti-tank missiles (two, three, or four in pod suspended from each wingtip station); with these can be carried, on the inboard stations, either two 7.62 mm machine-gun pods or two launchers each for seven 2.75 in air-to-surface rockets. Alternatively, eight Hellfire anti-tank missiles (four beneath each wingtip), plus mast-mounted sight, pilot's night vision equipment, and integrated helmet and display sight system. Other underwing loads can include two 7.62 mm machine-gun pods plus two nineteen-tube launchers for 2.75 in rockets, or two nineteen-tube plus two seven-tube launchers. Telescopic sight unit for TOW missiles, fitted with laser rangefinder and FLIR for target acquisition and designation. Auxiliary fuel tanks can be carried on inboard stations.

DIMENSIONS, EXTERNAL:

Diameter of main rotor	11.90 m (39 ft 0½ in)
Diameter of tail rotor	2.14 m (7 ft 0¼ in)
Wing span	3.20 m (10 ft 6 in)
Length of fuselage	12.16 m (39 ft 10¾ in)
Fuselage: Max width	0.95 m (3 ft 1½ in)
Height over tail fin, tail rotor horizontal	2.65 m (8 ft 8¼ in)
Height to top of rotor hub	3.42 m (11 ft 2¾ in)
Tailplane span	3.00 m (9 ft 10 in)
Wheel track	2.20 m (7 ft 3½ in)
Wheelbase	7.14 m (23 ft 5 in)

AREAS:

Main rotor disc	111.2 m² (1,196.95 sq ft)
Tail rotor disc	3.6 m² (38.75 sq ft)

WEIGHTS (estimated):

Weight empty, equipped	2,400 kg (5,291 lb)
Max internal fuel load	650 kg (1,433 lb)
Max mission T-O weight	3,600 kg (7,936 lb)

PERFORMANCE (estimated, at max mission T-O weight):
Max permissible diving speed with 28 rockets
168 knots (311 km/h; 193 mph)
Max level speed at S/L with 8 TOW
154 knots (285 km/h; 177 mph)
Cruising speed at 2,000 m (6,560 ft)
135 knots (250 km/h; 155 mph)
Max rate of climb at 2,000 m (6,560 ft), ISA + 20°C 600 m (1,968 ft)/min
Max rate of climb at S/L, one engine out
120 m (394 ft)/min
Hovering ceiling IGE, ISA + 20°C
2,560 m (8,400 ft)
Hovering ceiling OGE, ISA + 20°C
2,000 m (6,560 ft)
Endurance (anti-tank mission), no reserves
2 h 30 min
Endurance at 70 knots (130 km/h; 81 mph) at 2,000 m (6,560 ft)
2 h 30 min, plus 20 min reserves
Max self-ferry range at 135 knots (250 km/h; 155 mph):
internal fuel 340 nm (629 km; 391 miles)
internal plus 400 kg (882 lb) external fuel
600 nm (1,112 km; 691 miles)

PILATUS BRITTEN-NORMAN

PILATUS BRITTEN-NORMAN LTD (a subsidiary of Pilatus Aircraft Ltd); Head Office: Bembridge Airport, Bembridge, Isle of Wight PO35 5PR, UK

PILATUS BRITTEN-NORMAN BN-2T TURBINE ISLANDER

The prototype of the Islander flew for the first time on June 13, 1965, and the production prototype on August 20, 1966. This piston-engined version received its domestic C of A on August 10, 1967, and an FAA type certificate on December 19, 1967. Deliveries began in August 1967, and by early 1981 more than 900 had been delivered to operators in approx 120 countries.

Initial production aircraft were designated BN-2; those built from June 1, 1969 until 1978 are BN-2As. Since then the standard model has been the BN-2B, with higher max landing weight and improved interior features which include new passenger seats and covers, more robust door locks, improved door seals, improved stainless steel sills, improved ventilation system for hot and humid climates, smaller-diameter propellers to decrease cabin noise, and redesigned flight deck and instrument panel. The basic Islander is available with a choice of two piston-engine power plants (see 1980–81 *Jane's*), and either standard 14.94 m (49 ft 0 in) span wings or wingtip extensions having raked tips and containing auxiliary fuel tanks. Military versions are known as the Defender and Maritime Defender.

On August 2, 1980, the prototype (G-BPBN) was flown of the BN-2T Turbine Islander, powered by two Allison 250-B17C turboprop engines each flat rated to 238.5 kW (320 shp). These engines enable the BN-2T to use available low-cost jet fuel instead of scarce and costly Avgas, and offer a particularly low operating noise level. Improvements have also been made to the oil cooling system, engine cowling, and propeller control.

British CAA certification of the Turbine Islander was under way in January 1981; FAA type approval was then expected to follow within a few months. Rollout of the first production aircraft is due in June 1981, and output will be initially at the rate of two BN-2Ts per month. The Turbine Islander is available in the same range of applications as the piston-engined Islander (which continues in production), including a military version known as the Turbine Defender.

The following description applies to the BN-2T:

TYPE: Twin-turboprop feederline transport.

WINGS: Cantilever high-wing monoplane. NACA 23012 constant wing section. No dihedral. Incidence 2°. No sweepback. Conventional riveted two-spar torsion-box structure in one piece, using L72 aluminium-clad aluminium alloys. Flared-up wingtips of Britten-Norman design. Slotted ailerons and single-slotted flaps of metal construction. Flaps operated electrically, ailerons by pushrods and cables. Ground-adjustable tab on starboard aileron. BTR-Goodrich pneumatic de-icing boots optional.

FUSELAGE: Conventional riveted four-longeron semi-monocoque structure of pressed frames and stringers and metal skin, using L72 aluminium-clad aluminium alloys.

TAIL UNIT: Cantilever two-spar structure, with pressed ribs and metal skin, using L72 aluminium-clad aluminium alloys. Fixed-incidence (−2°) tailplane and mass-balanced elevator. Rudder and elevator are actuated by pushrods and cables. Trim tabs in rudder and elevator. Pneumatic de-icing of tailplane and fin optional.

LANDING GEAR: Non-retractable tricycle type, with twin wheels on each main unit and single steerable nosewheel. Cantilever main legs mounted aft of rear spar. All three legs fitted with Lockheed oleo-pneumatic shock-absorbers. Goodyear wheels and tyres, standard size of all five being 16 × 7-7; tyre pressures: main, 2.41 bars (35 lb/sq in); nose, 2.00 bars (29 lb/sq in). Size 7.00-6 main-wheel tyres and tubes available optionally. Foot-operated aircooled Cleveland hydraulic brakes on main units. Parking brake. Wheel/ski gear available optionally.

POWER PLANT: Two 298 kW (400 shp) Allison 250-B17C turboprop engines, flat rated to 238.5 kW (320 shp), each driving a Hartzell three-blade constant-speed fully-feathering metal propeller. Propeller synchronisers optional. Integral fuel tank between spars in each wing, outboard of engine. Total standard fuel capacity 518 litres (114 Imp gallons; 137 US gallons). Pylon-mounted underwing auxiliary tanks, each of 227 litres (50 Imp gallons; 60 US gallons) capacity, available optionally. Refuelling point in upper surface of wing above each integral tank. Total oil capacity 5.7 litres (1.25 Imp gallons; 1.5 US gallons).

ACCOMMODATION: Up to 10 persons, including pilot, on side-by-side front seats and four bench seats. No aisle. Seatbacks fold forward. Access to all seats via three forward-opening doors, forward of wing and at rear of cabin on port side and forward of wing on starboard side. Baggage compartment at rear of cabin, with port-side loading door in standard versions. Exit in emergency by removing door windows. Special executive layouts available. Can be operated as freighter, carrying more than a ton of cargo; in this configuration the passenger seats can be stored in the rear baggage bay. In ambulance role can accommodate, in addition to the pilot, a single stretcher, one medical attendant, and five seated occupants; or two stretchers, one attendant, and three passengers; or three stretchers, two attendants, and one passenger. Other possible layouts include photographic and geophysical survey; parachutist transport or trainer (with accommodation for up to eight parachutists and a despatcher); and pest control or other agricultural spraying. Maritime Turbine Islander/Defender versions available, for fishery protection, coastguard patrol, pollution survey, search and rescue, and similar applications.

SYSTEMS: Southwind cabin heater standard. 45,000 BTU Stewart Warner combustion unit, with circulating fan, provides hot air for distribution at floor-level outlets and at windscreen demisting slots. Fresh air, boosted by propeller slipstream, is ducted to each seating position for on-ground ventilation. Electrical DC power, for instruments, lighting, and radio, from two 24V 50A engine-driven self-rectifying alternators and a controller to main busbar and circuit-breaker assembly in nose bay. Emergency busbar with automatic changeover provides a secondary route for essential services. One 24V 17Ah heavy-duty lead-acid battery for independent operation. Ground power receptacle provided. Optional electrical de-icing of propellers and windscreen, and pneumatic de-icing of wing and tail unit leading-edges. Intercom system, including second headset, and passenger address system, are standard. Oxygen system available optionally.

AVIONICS AND EQUIPMENT: Standard items include blind-flying instrumentation, autopilot, dual flying controls and brake system, and a wide range of VHF and HF communications and navigation equipment. Other equipment, according to mission, includes fixed tail 'stinger' or towed 'bird' magnetometer, spectrometer, or electromagnetic detection/analysis equipment (geophysical survey); one or two cameras, navigation sights, and appropriate avionics

Prototype of the BN-2T Turbine Islander (two Allison 250-B17C turboprop engines)

Like the widely-used piston-engined Islander, the BN-2T is basically a ten-seat feederliner

(photographic survey); or 189 litre (41.5 Imp gallon; 50 US gallon) Micronair underwing spraypods complete with pump and rotary atomiser (pest control/agricultural spraying versions); radar, VLF Omega nav system, radar altimeter, marine-band and VHF transceivers, dinghies, survival equipment, and special crew accommodation (maritime versions).

DIMENSIONS, EXTERNAL:

Wing span	14.94 m (49 ft 0 in)
Wing chord (constant)	2.03 m (6 ft 8 in)
Wing aspect ratio	7.4
Length overall:	
standard nose	10.86 m (35 ft 7¾ in)
weather radar nose	11.07 m (36 ft 3¾ in)
Fuselage: Max width	1.21 m (3 ft 11½ in)
Max depth	1.46 m (4 ft 9¾ in)
Height overall	4.18 m (13 ft 8¾ in)
Tailplane span	4.67 m (15 ft 4 in)
Wheel track (c/l of shock-absorbers)	3.61 m (11 ft 10 in)
Wheelbase	3.99 m (13 ft 1¼ in)
Propeller diameter	2.03 m (6 ft 8 in)
Cabin door (front, port):	
Height	1.10 m (3 ft 7½ in)
Width: top	0.64 m (2 ft 1¼ in)
Height to sill	0.59 m (1 ft 11¼ in)
Cabin door (front, starboard):	
Height	1.10 m (3 ft 7½ in)
Max width	0.86 m (2 ft 10 in)
Height to sill	0.57 m (1 ft 10½ in)
Cabin door (rear, port):	
Height	1.09 m (3 ft 7 in)
Width: top	0.635 m (2 ft 1 in)
bottom	1.19 m (3 ft 11 in)
Height to sill	0.52 m (1 ft 8½ in)
Baggage door (rear, port):	
Height	0.69 m (2 ft 3 in)

DIMENSIONS, INTERNAL:

Passenger cabin, aft of pilot's seat:	
Length	3.05 m (10 ft 0 in)
Max width	1.09 m (3 ft 7 in)
Max height	1.27 m (4 ft 2 in)
Floor area	2.97 m² (32 sq ft)
Volume	3.68 m³ (130 cu ft)
Baggage space aft of passenger cabin:	
standard	0.85 m³ (30 cu ft)
maximum	1.39 m³ (49 cu ft)
Freight capacity:	
aft of pilot's seat, incl rear cabin baggage space	4.70 m³ (166 cu ft)
with four bench seats folded into rear cabin baggage space	3.68 m³ (130 cu ft)

AREAS:

Wings, gross	30.19 m² (325.0 sq ft)
Ailerons (total)	2.38 m² (25.6 sq ft)
Trailing-edge flaps (total)	3.62 m² (39.0 sq ft)
Fin	3.41 m² (36.64 sq ft)
Rudder, incl tab	1.60 m² (17.2 sq ft)
Tailplane	6.78 m² (73.0 sq ft)
Elevator, incl tabs	3.08 m² (33.16 sq ft)

WEIGHTS (standard aircraft, no auxiliary fuel):

Weight empty, equipped (incl pilot)	1,869 kg (4,120 lb)
Max usable fuel	395 kg (871 lb)
Payload with max fuel	730 kg (1,609 lb)
Max T-O and landing weight	2,993 kg (6,600 lb)

PERFORMANCE (standard aircraft without auxiliary fuel, at max T-O weight, ISA, unless otherwise stated):

Max cruising speed at 3,050 m (10,000 ft)	171 knots (317 km/h; 197 mph)
Max cruising speed at S/L	156 knots (290 km/h; 180 mph)
Econ cruising speed at 3,050 m (10,000 ft)	141 knots (261 km/h; 162 mph)
Max rate of climb at S/L	335 m (1,100 ft)/min
Rate of climb at S/L, one engine out	68 m (225 ft)/min
Service ceiling	over 6,100 m (20,000 ft)
Service ceiling, one engine out	over 3,050 m (10,000 ft)
T-O to 15 m (50 ft)	396 m (1,300 ft)
Landing from 15 m (50 ft)	329 m (1,080 ft)
Range (IFR) with max fuel, reserves for 45 min hold plus 10%	334 nm (620 km; 385 miles)
Range (VFR) with max fuel, no reserves	447 nm (830 km; 515 miles)

First amateur-built Aerocar Mini-Imp Model C, with lengthened nose and conventional tail fin. An armed military version is being studied. *(Howard Levy)*

AEROCAR

AEROCAR INC; Head Office: PO Box 1171, Longview, Washington 98632, USA

AEROCAR MINI-IMP

The Mini-Imp was designed by Mr Moulton B. (Molt) Taylor, President of Aerocar Inc, as a single-seat all-metal light aircraft stressed to ±9*g* but simple enough to be constructed in 700 working hours, using only a bench drill, sander, and bandsaw, in addition to everyday hand tools and a pop riveter. Assembly involves use of bolts and pop rivets, thereby eliminating the need for welding skill. As a result, five Mini-Imps are already flying, and more than 200 others are being built.

It now appears that the unique qualities of this small aircraft are attracting wider interest. Early in 1981, *Jane's* learned that Aerocar had received an enquiry concerning the possibility of fitting the Mini-Imp with two high rate of fire machine-guns for military applications. Design studies have shown that such weapons could be installed beneath the cockpit, with room in the baggage compartment for a considerable quantity of ammunition. Aerocar has suggested that the nose of a military Mini-Imp might be skinned with Kevlar, as used for bulletproof clothing, to protect the aircraft against small-arms fire from the ground.

Development of the 'long-nose' Mini-Imp, with larger baggage compartment, has led to the introduction of a small conventional fin to supplement the original inverted-V tail surfaces. This modification was tested initially by means of the small radio-controlled model shown in the accompanying illustration. This had a fin that could be retracted remotely in flight, by radio link. By this means, it was possible to determine the optimum fin size required to compensate for the lengthened nose. On the full-scale Mini-Imp, the fin can be made of Aerocar's unique TPG (Taylor Paper Glass) glassfibre/paper core structural material; it will then house the aircraft's radio antennae.

The findings of the R/C model tests were confirmed precisely by flight trials of the first long-nose Mini-Imp Model C, with 74.5 kW (100 hp) Continental O-200 engine, built by Mr Pat Hart of Vancouver, Washington. With hydraulic landing gear retraction, and full electrics, this aircraft (N5587F) has an empty weight of just under 317 kg (700 lb). Full-throttle speed at 2,135 m (7,000 ft) is close to 173 knots (320 km/h; 200 mph), with a cruising speed of 143 knots (265 km/h; 165 mph) IAS at 1,220 m (4,000 ft). It has not been possible to find a controllable-pitch propeller for this Mini-Imp, and the high pitch needed to achieve such cruising speeds results in "not so spectacular" take-off runs; but Mr Hart still leaves the ground in less than 305 m (1,000 ft) at sea level. Rate of climb is 457 m (1,500 ft)/min at 87 knots (160 km/h; 100 mph).

The following details apply to the standard Mini-Imp, built in accordance with Aerocar plans:

TYPE: Single-seat light sporting aircraft.

WINGS: Cantilever high-wing monoplane. Wing section GA(PC)-1. No dihedral. Incidence 4°. No sweepback. All-metal structure of constant chord. Wings pivot 90° to a fore and aft position for towing by motor car and storage. All-metal ailerons, each with trim tab. No flaps.

FUSELAGE: All-metal structure with glassfibre shell.

TAIL UNIT: Inverted V type tail, of all-metal construction, with variable-incidence tailplane surfaces.

LANDING GEAR: Electrically-retractable tricycle type, main units retracting outward. Special highway-type wheels and 6-ply tyres suitable for road towing. Rosenhan wheel brakes. Nosewheel retracts independently of main wheels for road towing.

POWER PLANT: Recommended engine is the turbocharged Revmaster 2100D, driving a Maloof constant-speed metal propeller via the standard extended drive shaft incorporating a Flexidyne dry fluid coupling. Alternative engines in the 44.5-74.5 kW (60–100 hp) range may be installed. Fuel tank in wing centre-section, capacity 45.5 litres (12 US gallons), plus tip-tanks, each of 34 litres (9 US gallons) capacity. Refuelling point on wing upper surface.

ACCOMMODATION: Single semi-reclining moulded glassfibre bucket seat beneath sideways-opening (to port) transparent canopy. Seat folds forward

Radio-controlled scale model of the Mini-Imp Model C, with variable-area tail fin

BAe Jetstream 31 development aircraft (two Garrett TPE331-10 turboprop engines)

to provide access to space for 46 kg (100 lb) of baggage.

DIMENSIONS: EXTERNAL:

Wing span	7.77 m (25 ft 6 in)
Wing chord, constant	0.91 m (3 ft 0 in)
Length overall	4.88 m (16 ft 0 in)
Height over fuselage	1.24 m (4 ft 1 in)
Height over propeller	1.89 m (6 ft 2½ in)
Tailplane span	1.98 m (6 ft 6 in)
Propeller diameter	1.45 m (4 ft 9 in)

WEIGHTS:

Weight empty	236 kg (520 lb)
Max T-O weight	362 kg (800 lb)

PERFORMANCE (prototype, with 51 kW; 68 hp Limbach 1,900 cc engine and wooden propeller):

Never-exceed speed 260 knots (482 km/h; 300 mph)
Max cruising speed at S/L 130 knots (241 km/h; 150 mph)
Stalling speed 44 knots (81 km/h; 50 mph)
Max rate of climb at S/L 366 m (1,200 ft)/min
T-O run 183 m (600 ft)
Range with max fuel over 434 nm (804 km; 500 miles)

BAe

BRITISH AEROSPACE (AIRCRAFT GROUP, SCOTTISH DIVISION); Address: Prestwick International Airport, Ayrshire KA9 2RW, UK

BAe JETSTREAM 31

As the result of an encouraging worldwide market response, involving more than 50 aircraft, BAe announced on January 21, 1981, the production go-ahead for this latest version of the Jetstream light commuter/executive transport. At that date commitments had been received for 13 aircraft (plus nine options) from five operators, and letters of interest covering 30–40 aircraft from 16 operators, most of them from overseas.

First flown on March 28, 1980, the Jetstream 31 is powered by two 671 kW (900 shp) Garrett TPE331-10 turboprop engines, each driving a Dowty Rotol four-blade variable- and reversible-pitch propeller, and offering high fuel efficiency coupled with low operating noise levels. It is being offered in the following three versions:

Commuter. Basic version, designed to carry 18/19 passengers and baggage, and able to operate three 87 nm (160 km; 100 mile) stage lengths without refuelling.

Corporate. Executive version, designed for eight to ten passengers, and able to carry eight passengers for 870 nm (1,610 km; 1,000 miles). Cabin design for North American market undertaken by Dave Ellies Industrial Design Inc, for fitting out at completion centres in the USA.

Special. Intended for military communications, casualty evacuation, multi-engine training, and cargo operations, and for specialist roles such as airfield calibration, resources survey and protection.

A full description of the Jetstream 31 can be found in the 1980–81 edition of *Jane's;* the following are its salient characteristics:

DIMENSIONS, EXTERNAL:

Wing span	15.85 m (52 ft 0 in)
Length overall	14.37 m (47 ft 1½ in)
Height overall	5.32 m (17 ft 5½ in)
Wheel track	5.94 m (19 ft 6 in)
Wheelbase	4.60 m (15 ft 1 in)

DIMENSIONS, INTERNAL:

Cabin, excl flight deck:	
Length	7.32 m (24 ft 0 in)
Max width	1.83 m (6 ft 0 in)
Max height	1.80 m (5 ft 11 in)
Floor area	8.35 m² (90 sq ft)
Volume	16.92 m³ (598 cu ft)
Baggage compartment volume (according to layout)	1.94–2.53 m³ (68.5–89.5 cu ft)

WEIGHTS AND LOADINGS (estimated):

Manufacturer's weight empty	3,450 kg (7,606 lb)
Max T-O and landing weight	6,400 kg (14,110 lb)
Max ramp weight	6,450 kg (14,220 lb)
Max zero-fuel weight	6,100 kg (13,448 lb)
Max wing loading	255.18 kg/m² (52.26 lb/sq ft)
Max power loading	4.73 kg/kW (7.78 lb/shp)

PERFORMANCE (estimated, at max T-O weight):

Max cruising speed:
max continuous power 263 knots (488 km/h; 303 mph)
max cruise power 253 knots (469 km/h; 291 mph)
Stalling speed, flaps down 96 knots (179 km/h; 111 mph)
Max rate of climb at S/L 680 m (2,230 ft)/min
Rate of climb at S/L, one engine out 163 m (535 ft)/min
Service ceiling 9,630 m (31,600 ft)
Service ceiling, one engine out 4,665 m (15,300 ft)
T-O to 15 m (50 ft) 858 m (2,815 ft)
Landing from 15 m (50 ft) 818 m (2,684 ft)
Range with max fuel, six passengers, 30 min reserves at cruising power at optimum altitude, plus 5% 1,108 nm (2,053 km; 1,275 miles)
Range with 18 passengers, reserves as above 420 nm (778 km; 484 miles)

HUGHES

HUGHES HELICOPTERS (Division of Summa Corporation); Head Office and Works: Culver City, California 90230, USA

HUGHES MODEL 500MD DEFENDER II

More details are now available of this advanced version of the Defender to which brief reference was made in the 1980–81 *Jane's*. To increase its multi-mission flexibility, the Defender II can be fitted with operational equipment and armament of types that are associated normally with much larger combat helicopters. They include a Martin Marietta mast-mounted sight (MMS), a 30 mm Chain Gun and integrated fire control system, an air-to-air missile pod, an infra-red suppression system, a pilot's night vision system, and an advanced avionics and mission equipment package. In addition, a four-blade 'quiet' tail rotor is available optionally; this turns at a rate 25% slower than that of the standard two-blade tail rotor and is reported to be 47% quieter in operation.

Martin Marietta's MMS consists of a multiple field of view silicon vidicon TV, with primary display and controls mounted in the co-pilot's position; a laser rangefinder/designator; and a precise stabilisation system. It combines a number of proven components, including a TV sensor and

automatic tracker developed for the target acquisition and designation sight of the AH-64 attack helicopter, the laser rangefinder/designator of the Aquila RPV, and the Paveway gimballed mirror system. Use of the MMS enables the Defender II to hover virtually out of sight behind trees or natural terrain while the crew surveys the battlefield over extended ranges.

The Chain Gun system is based on that which will arm the AH-64, but in this application will have its rate of fire reduced to approximately 350 rounds per minute. The integrated fire control system will ensure that the weapon is used in the most effective mode to score a high percentage of hits on the target. The pod which carries two Stinger air-to-air missiles is mounted from the port side of the fuselage. This high-performance fire-and-forget missile can be carried for use as a defensive weapon: in the event of attack by enemy aircraft the pilot is able to fire a missile and then take immediate evasive action. The availability of both Chain Gun and air-to-air missile armament means that the Defender II can be deployed in both attack and defensive roles. This capability can be extended for night or adverse weather operations by installation of an optional FLIR pilot's night vision system. Aircraft survivability can be enhanced by installation of AN/APR-39 (V-1) equipment, to give warning that the helicopter is being tracked by enemy radar-directed weapon systems, and by the Hughes-developed Black Hole IR suppression system which gives protection from heat-seeking missiles. For all operational roles, the foregoing capabilities can be complemented by an advanced avionics and mission equipment package to improve communications, and provide heading and attitude reference, navigation equipment, and a pilot/observer sensor display.

TYPE: Turbine-powered multi-mission light military helicopter.

ROTOR SYSTEM: Five-blade fully-articulated main rotor, with blades attached to laminated strap retention system by means of folding quick-disconnect pins. Each blade consists of an extruded aluminium spar hot-bonded to one-piece wrap-around aluminium skin. Main rotor blades can be folded. Two-blade tail rotor standard; four-blade 'quiet' tail rotor and rotor brake optional.

ROTOR DRIVE: Three sets of bevel gears, three drive-shafts, and one overrunning clutch. It is basically an uprated version of the standard commercial 500C drive system, designed to give longer service life.

FUSELAGE: Aluminium semi-monocoque structure of pod and boom type. Clamshell doors at rear of pod give access to engine and accessories.

TAIL UNIT: T tail, with horizontal stabiliser at tip of narrow-chord sweptback fin. Small auxiliary endplate fin at tip of tailplane on each side. Narrow-chord sweptback ventral fin with integral tailskid to protect tail rotor in taildown attitude near ground.

LANDING GEAR: Tubular skids carried on Hughes oleo-pneumatic shock-absorbers. Utility floats, snow skis, and emergency inflatable floats optional.

POWER PLANT: One 313 kW (420 shp) Allison 250-C20B turboshaft engine. Two interconnected bladder fuel tanks with combined usable capacity of 240 litres (63.4 US gallons). Self-sealing fuel tank optional. Refuelling point on starboard side of the fuselage. Auxiliary fuel system with 132 litre (35 US gallon) crashworthy internal fuel tank, or two external glassfibre fuel cells with combined capacity of 167 litres (44 US gallons) optional. Oil capacity 5.7 litres (1.5 US gallons).

ACCOMMODATION: Forward bench seat for pilot and co-pilot/observer, with dual controls. Two doors on each side.

SYSTEM: Electrical system includes an engine-driven generator and a nickel-cadmium battery.

AVIONICS AND EQUIPMENT: In addition to optional items mentioned in introductory copy, lightweight avionics equipment similar to that developed for the OH-6A has been adapted for use with Defenders. This equipment comprises AN/ARC-164 UHF/AM, AN/ARC-115 UHF/AM, AN/ARC-114 VHF/FM, ARN-89 ADF, APX-72 IFF transponder, AN/ASN-43 directional gyro, ID-1351 heading and bearing indicator, and C-6533/ARC intercom.

DIMENSIONS, EXTERNAL:

Diameter of main rotor	8.08 m (26 ft 6 in)
Distance between rotor centres	4.62 m (15 ft 2 in)
Height to top of rotor hub without MMS	2.59 m (8 ft 6 in)
Skid track	2.06 m (6 ft 9 in)
Cabin doors (each): Height	1.16 m (3 ft 9½ in)
Max width	0.76 m (2 ft 6 in)
Height to sill	0.76 m (2 ft 6 in)

DIMENSIONS, INTERNAL:

Cabin: Length	2.44 m (8 ft 0 in)
Max width	1.31 m (4 ft 3½ in)
Max height	1.52 m (5 ft 0 in)

Close-up of fuselage of Hughes Model 500MD Defender II military multi-mission helicopter, showing mast-mounted sight, underbelly Chain Gun weapon, and pod for two Stinger air-to-air missiles

Sperry Update 13

A timely report of Sperry Flight Systems activities in the airline, defense, space and general aviation markets.

Omega/strapdown AHRS demonstrates inertial quality accuracies.

An integrated Omega/VLF and strapdown attitude/heading reference system (AHRS) with navigation and attitude accuracy equal to or better than conventional ARINC 561 inertial systems – at approximately one-half the initial cost and one-tenth the cost of maintenance – has been successfully test flown by Sperry engineers.

In addition to inertial quality performance, the Sperry SRS-1020 strapdown AHRS with Canadian Marconi Co. Omega/VLF navigator promises ongoing maintenance costs of less than 50 cents an hour, a tenth that of gimballed gyro inertial systems.

In Sperry's Beech King Air, the AHRS/Omega system achieved bounded navigation track accuracy within 1.5 nautical miles. Navigation accuracy was basically constant regardless of flight time or distance.

The SRS-1020 AHRS with a high capacity digital microprocessor and Sperry's ungimballed miniature flex gyros will contain the Omega/VLF navigator section with no change in external dimensions, making it attractive to operators with mixed fleets of inertial and non-inertial equipped aircraft.

The SRS-1020 AHRS has repeatedly demonstrated a two-sigma pitch and roll accuracy to within 1/4 deg., and to 1.0 deg. in heading. It is designed to replace standard directional and vertical gyros.

RCA Avionics Systems Division acquisition completed.

Sperry has completed the acquisition of RCA Avionics Systems Division, Van Nuys, Calif., based manufacturer of airborne weather radar equipment.

The operation will be administered by the Sperry Flight Systems Avionics Division and continue at the Van Nuys site with the present work force of approximately 600.

▲

Sperry plans to flight test business aircraft, CRT displays

Flight testing of color CRT multifunction displays for business aircraft will begin this year in a Sperry Flight Systems company aircraft.

The electronic cockpit instruments have created wide interest when displayed at recent aviation trade shows. Their first general aviation application is expected to be in business jets.

Pilots will be able to view a variety of navigation, weather, and aircraft attitude displays and information on the CRTs which will replace conventional electromechanical attitude director indicators and horizontal situation indicators.

Display formats, including either single or cross-pointer cue flight director symbols, weather radar or combined weather-navigation information, may be selected or changed at the push of a button.

Sperry, Western to certify performance management system.

The Sperry Performance Management System (PMS) will be FAA certified this fall aboard a Western Airlines Boeing 727.

The PMS uses stored aircraft performance parameters to precisely compute optimum flight profiles for best fuel economy or lowest overall operating cost. Its digital performance management computer controls engine thrust and aircraft pitch attitude automatically through autopilot and autothrottle systems to fly the aircraft for maximum efficiency.

Sperry rolls out 100th PQM-102B target drone

Sperry Flight Systems has rolled out the 100th PQM-102B target drone from the company's conversion facility in Litchfield Park, Ariz. Converted from obsolete F-102 Delta Daggers, the PQM-102s are used for crew training and advanced weapons testing.

The 100th PQM-102B joins 68 PQM-102As converted under earlier Air Force contracts. Forty-five F-102Bs remain to be converted; the last of these aircraft is scheduled for delivery in November of 1981.

Talk to us.

We're Sperry Flight Systems, a division of Sperry Corporation. Talk to us. We'll listen. With us, listening is more than just a word in an advertising slogan; it's part of our philosophy of doing business.

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PHOENIX, ARIZONA 85036

The right rear window rolled down and the Atsugi general looked out, smiling. He pointed his index finger at me admonishingly. "Remember, Russhon," he said . . .

'PHOTOGRAPHERS DON'T COUNT!'

BY CHARLES "RUSH" RUSSHON
Illustrations by Milton Caniff

PHOTOGRAPHERS don't count?

It's strictly a matter of opinion, of course, but I have always believed otherwise.

But, then, what could be expected of someone who has been into photography in one form or another all his life, a guy who, in fact, as an Army Air Forces captain took the first low-level photos of Hiroshima and Nagasaki after the Twentieth Air Force B-29s dropped atom bombs on those two cities in August 1945?

It is only natural, therefore, that I was taken aback when, almost thirty-five years later, a retired general and West Point graduate challenged one of my real claims to fame—that I was the first American to set foot on Japanese soil after World War II—a modest enough claim, in that it's true!

I made this statement to the general in a conversation that took place early last year at the Thayer Hotel, within the grounds of West Point, where I had accompanied a friend—also a retired general and West Point graduate.

My friend, the other general (both were Class of '29), and I were talking about military careers and the world situation. The conversation came around to me, and to the question of whether I, too, was a West Pointer.

I said that I wasn't. I noted proudly that I had entered the service as a second lieutenant and had made my way into the field-grade ranks through combat. I added that a superior, commenting on my ability to get things done, in and *out* of channels, had once categorized me as ". . . just a civilian in uniform."

My friend sensed the need to speak in my behalf, and noted that, despite my not being a West Point graduate, I nevertheless had had a distinguished and interesting career in the service during World War II, service that had kept me in contact with the top levels of the military ever since—another story in itself.

"Isn't that right, Rush?" my friend asked.

Never one to pass up an opportunity to relive past glories, especially in the company of West Point graduates, I launched into the story of my photo mission over Hiroshima and Nagasaki. Then, casually—and unabashedly—I made my long-standing claim that once Japan had capitulated, and while General MacArthur was en route to take over as Supreme Allied Commander, *I* was the first American to step onto Japanese soil.

"No, you weren't!" the general said, in a tone that revealed not only disbelief but indignation.

Obviously, I had struck a sensitive nerve.

"*You* couldn't have been the first American to set foot on Japan after the war, because *I* was," he stated flatly.

"Really, now, General," I replied, speaking in *my* best voice of authority, and with as much patience as I could muster (I am not known as a patient person). "I'm neither a drinking nor a betting man, but in this case if you will agree to listen, I will review the date, time, and circumstances that sustain my

claim. When I am finished, I believe that you not only will have to admit that you are wrong, but will, according to tradition, be obliged to buy us a round of our choice. As for me, I'll have a root beer float with two large scoops of vanilla ice cream!"

As you would expect, generals, especially West Point alumni in the company of their classmates, don't like to be told they're wrong, especially with regard to what they "know" happened almost thirty-five years ago. This general was no exception. But gentleman that he was, he acceded to my request; and he listened, although somewhat skeptically, as I recounted the scenario that took place at Atsugi Air Base, between Tokyo and Yokohama, on August 28, 1945, at 0945 hours Greenwich Mean Time.

"The plane was a DC-3," I said. "Inside were twenty-three officers of General MacArthur's staff who had been hand-picked to precede the General in order to make arrangements for his arrival three days later."

"You're right," the general interjected, hastily staking his claim for expertise in the matter. "And *I* was one of the twenty-three," he said pointedly. He added, "And the pilot was . . ."

At this point we both blurted in unison: "Col. John Lackey!"

Noting both the look of surprise on the general's face, and the pleasure my friend was having in observing this drama, I continued:

"You will recall that Colonel Lackey had taxied the airplane to the wrong side of the airfield to park, opposite from where the Japanese military reception party had been waiting for us. The Japanese, in formal dress uniforms, and with ceremonial samurai swords waving, rushed unceremoniously across the field to greet us. No one aboard the airplane was quite sure what type of 'greeting' we were about to get."

"You're right," the general agreed, and his voice seemed a little friendlier.

As it turned out, the Japanese in the reception committee were not hostile at all, just excited, and now, thirty-five years later, it was clear to both the general and to me that although we had never really met before, both of us had been on that plane at Atsugi. He still couldn't place me, especially since it had been established that I was not "West Point," and I could not place him exactly either. But I was getting closer.

Charles "Rush" Russhon was a combat photographer during World War II and flew 226 combat missions. He served in the CBI under Col. Philip Cochran and Col. John Alison in the 1st Air Commando Group, and later in the 2d and 3d Air Commando Groups in the Pacific. A native New Yorker, Rush is a Life Member of AFA and was the co-founder of the Iron Gate Chapter. He is the model for his friend Milton Caniff's cartoon character "Charlie Vanilla," and gained a certain measure of fame when the James Bond movie "Goldfinger" appeared; in one scene a "Welcome to Fort Knox—General Russhon" greeting appears on the base tower. In a later James Bond film, "Thunderball," Russhon played the part of a two-star Air Force general.

Still, he obviously was dubious about my claim. The further I had gotten into recounting the circumstances, the surer he seemed to have become that I would be proved wrong.

Yet, both of us couldn't be right. And we both realized that the outcome of our dialogue could change the way we each would "report the war" for the rest of our lives.

"As you must recall," I continued, "all the officers had checked their dates of rank, and had agreed that when they deplaned, they would do so according to the time-honored custom in the military—the officer who ranked first would be first in line, and, thereby, the first to set foot in Japan."

"Of course, I recall," the general responded, almost gleefully.

"After all, *I* was the ranking officer, and *I* was the first in line."

"But don't you also recall," I asked, "that after all of you had lined up inside the aircraft, and just before the door was to be opened, a certain captain who was on board as the official photographer walked to the front of the line and placed himself at the door ready to exit? And don't you recall further that the senior officer—it must have been *you* —ordered him back to the end of the line? And isn't it true that the captain stood his ground and responded as politely as he could under the circumstances: 'But, sir, my assigned mission is to take pictures of General MacArthur's staff arriving in Japan to set up the headquarters, and this picture is to be of great significance in the history of World War II. Would you please tell me how I can record this occasion unless I get off the airplane first?'

"And, then," I continued, "isn't it also true that at that moment one of the other ranking officers shouted: 'He's right; why not let him go ahead? After all, *photographers don't count!*'

"Surely, you remember then, without hesitation, the captain climbed out of the plane, cameras in hand, followed by an assistant photographer, Lt. Ben Reyes.

"Therefore, General, while you were the first member of *MacArthur's staff* to set foot on Japanese soil after the war, *I* was the first American; and"—I just couldn't keep from rubbing it in—"Lieutenant Reyes was the second!"

There was a long silence.

"Do you still think photographers don't count?" I needled.

He didn't answer.

The others we had been expecting arrived, and we all went to lunch.

Although drinks were routinely ordered, nothing was said about my root beer float with two large scoops of vanilla ice cream.

No further mention was made of Atsugi or any of the events we had just been reviewing.

After lunch, we all said good-bye and prepared to depart for our respective destinations.

While I was standing in front of the Thayer Hotel waiting for my friend, a long black Lincoln Continental stopped in front of me. The right rear window rolled down and the Atsugi general looked out, smiling. He pointed his index finger at me admonishingly. "Remember, Russhon," he said, "photographers don't count!" The window rolled back up, and the car drove off. ■

In the past two decades, the ascendancy of managerial types, complex societal pressures, and other forces have obscured the real reasons the military profession is different from the rest. It is that . . .

Discipline Means Survival

By Gen. T. R. Milton, USAF (Ret.)

A friend wrote me a despairing note the other day about the state of our military as he sees it. Since he is a long-time friend, and thus a contemporary, his views are slightly suspect, as are always those of the aging when they carp about the young. However that may be, he has a valid point in his complaint that the services sometimes seem to have lost sight of why they exist. Senior officers, in his opinion, have gone along all too willingly in recent years with the sociological and managerial experiments of their transitory civilian masters.

Undeniably, there has been a great effort toward civil rights, race relations, unisex policies, efficiency, and just plain bonhomie. First names, lots of handshakes, and never mind the titles and the little formalities. Lost somewhere in this jolly corporate approach is the stark fact that the military services exist to fight this country's battles. In the Air Force, for instance, there is no conceivable reason for civil engineers, comptrollers, supply technicians, or the Air Staff in its entirety except to support and enhance the mission of the combat units. There was a motto rather widely displayed a few years ago that said, "the mission of the Air Force is to fly and fight, and don't you ever forget it." My friend's impression is that there is a large amount of forgetfulness around as people pursue their specialties and head toward that twenty-year goal, followed by a happy civilian life ever after.

Discipline, patriotism, and precision turned aviation cadets into winning aircrews in WW II. (These are in preflight at Maxwell Field, Ala.)

Part of that forgetfulness can be ascribed to the increasing specialization of military jobs. It is hard for a computer programmer to remember, or even believe, that he belongs to an organization whose purpose is to fly and fight. That is one reason for this lack of mission orientation.

Another reason is that the pressures on the services have been, in this past decade, unsettling and relentless. While some have been necessary and desirable pressures such as those to broaden the opportunities for minorities and women, others have been brought about by the need to fill recruiting quotas for an All-Volunteer Force in a time when military service has been neither popular nor economically competitive.

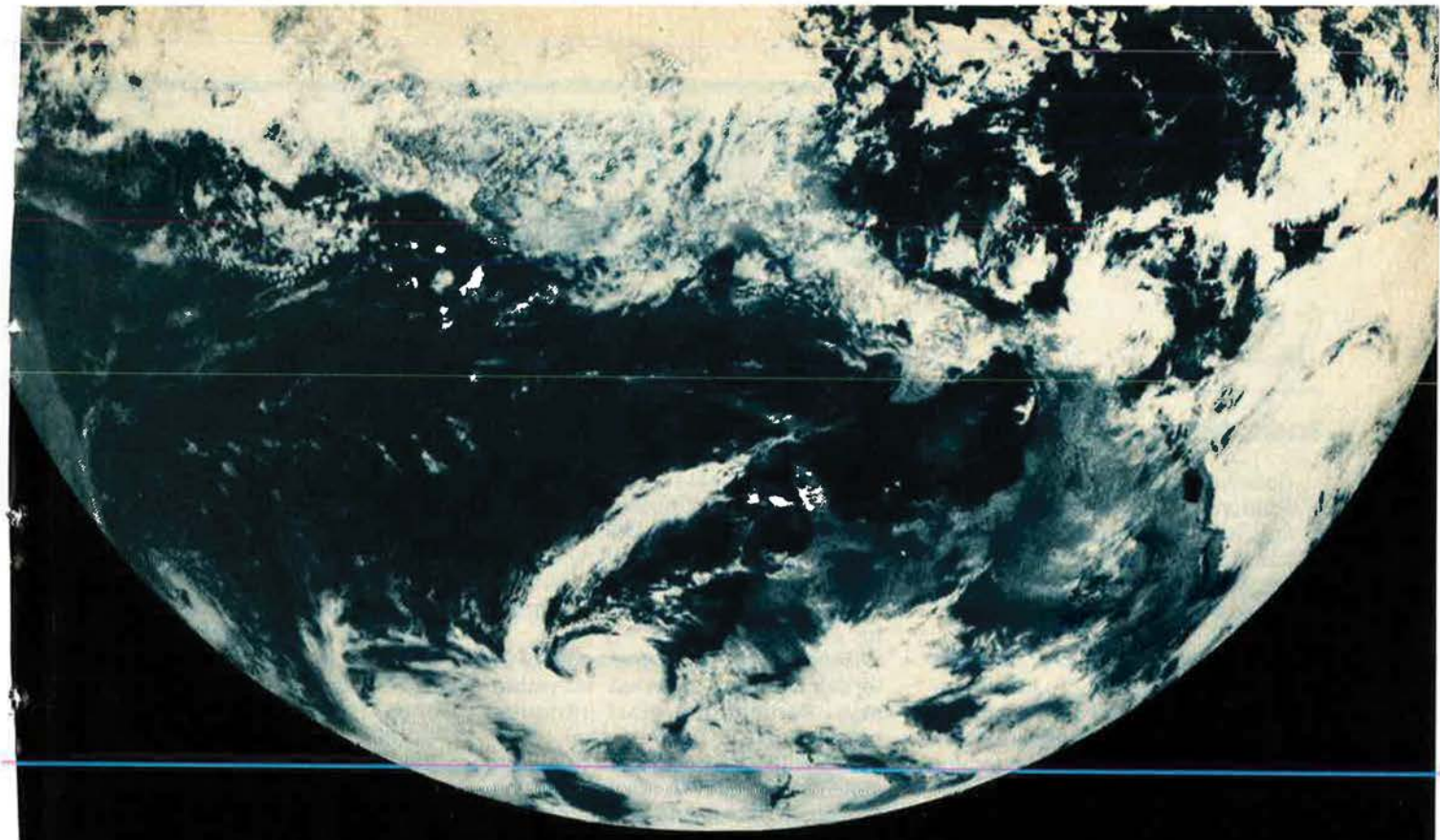
Understandably, the recruiting pitch has emphasized the chance to learn a skill that will pay off in the civilian market while soft-pedaling the rougher side of service life. All in all, fair enough. Recruiting in any business, whether for a college football team or the multinationals, requires the best foot forward. But somewhere in this scramble to create a volunteer military there must be an injection of the martial spirit—that intangible known as *esprit de corps*. *Esprit* is what keeps a noncom out on a hot desert flight line, instead of settling for a nice stable life with the airlines. *Esprit* has more than a little to do with the makeup of the Fighter Weapons School. And it is some sort of *esprit* that has kept all those World War II survivors coming back, year after year, to their group reunions.

The Reagan Administration has shown its determination to stop our military decline. We will see a new bomber, a new carrier, and other much-needed weapons yet to be revealed. Since Mr. Weinberger has made clear his concern about readiness, it appears certain there will be more money for such essentials as munitions and flying time. Military pay, with the recent and projected raises, is not that bad anymore, and neither is the job security, as some rueful laid-off airline pilots have recently discovered. Everything, then, is beginning to look up.

Well, not quite everything. There is still the matter of reminding people in the service who they are. This is a job the military must take on itself. A new emphasis on such things as uniform wear, customs and courtesies of the service, and military discipline would not be a bad place to start.

As we head into the 1980s, an uncertain and dangerous time, our security, perhaps even our survival, will rest with these regular forces. Since there is not the slightest indication that we are going back to a draft, the volunteer idea, for better or worse, is one we will have to accept.

There is more to this business of discipline and a return to being military than just the gratification of a few old diehards. Those of us who have been around awhile can recall the greatly beloved, everybody's pal, commanders whose outfits came apart with appalling losses in combat while other units with tough and unbeloved commanders came through relatively unscathed. It is more conducive to a long life, if not more fun, to go to war in a disciplined outfit. ■



INTERNATIONAL ISSUE

The June AIR FORCE Magazine, with the theme INTERNATIONAL ISSUE, will explore US Air Force cooperation with foreign air forces, including present and future plans.

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AIR FORCE MAGAZINE

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AIRMAN'S BOOKSHELF

Stating America's Case

Counting Our Blessings: Reflections on the Future of America, by Daniel Patrick Moynihan. Little, Brown & Co., Boston, Mass., 1980. 348 pages with index. $12.95.

It is perhaps the curse of the intellectual that, as his perception becomes clearer on any given subject, he is doomed to write more and more about less and less while becoming increasingly difficult to understand. The end result is a constantly shrinking audience and less response to what should be listened to very carefully.

The tragedy here is that Moynihan has a great deal to say and most assuredly should be heard. But because of our inherent system of assigning labels to individuals, the very people most likely to comprehend are the very people least likely to read his work with any degree of seriousness.

While there may be some honest disagreement as to which segment of the body politic is best suited to reverse the current direction in American policy—Moynihan believes the Democratic Left fills that requirement—there should be little discussion necessary concerning the necessity for the reversal. Yet, the American political system, seeking—nay, demanding—as it does an absolute dichotomy between the parties leads to the inevitable result: mediocrity and accommodation.

Counting Our Blessings is Moynihan's attempt to analyze the American phenomenon. He does it through a series of essays penned during the past six years, many of which have been published elsewhere. But there is considerable rewrite and transition, bringing the dozen-odd essays into an integrated whole that quite clearly recaps much of what went wrong in America in the 1970s.

But this is not just finger-pointing at who did what when (although there is some of that); it is a lucid review of the reasons for decisions taken and not taken, of pressures from within and without, of ideological choices made for political reasons (and vice versa). It is a thorough examination of a variety of philosophical and political issues seen from the viewpoint of a man who has been directly involved at various levels of the government for a number of years.

Readers will find a great deal of interest in much of what Moynihan says. Perhaps the most intriguing portion of the book is that which deals with the American failure to state its own case in the world arena. Moynihan feels, and eloquently defends his position, that one of the major problems in US foreign policy is our reticence to proclaim forcefully what it is we stand for.

He argues that the constant official proclamations of guilt are counterproductive in that (a) there is very little for which we should feel guilty, (b) we are on our strongest ground when we argue that freedom and economic growth are in the best interests of all nations, and (c) the alternatives to the American system have demonstrably been catastrophic failures.

Moynihan understands both the system and the problem as well as any political philosopher on the scene today. He has learned the hard way, and, while you may not always agree with the way he says it, you will often be forced to agree with what he says.

—Reviewed by Maj. N. Kent Goldsmith, USAF (Ret.), aerospace industry executive.

Flying in the Fledgling Days

The First Aviators, by Curtis Prendergast and the Editors of Time-Life Books. Time-Life Books, Inc., Alexandria, Va., 1981. 176 pages with index, photographs, and illustrations. $12.95.

The year 1903 marked the Wright brothers' historic first flight, yet because it was executed in relative obscurity—characteristic of the Wrights who later spent bitter years in lawsuits to protect their inventions—other inventors struggled for years afterward to rediscover their path to flight.

The concept of air travel especially captivated the French, and competitions like La Grande Semaine de l'Aviation de la Champagne in Rheims in 1909 spurred aircraft modification and refinements. These led to new records for speed and endurance. The meeting in Rheims of the world's greatest planes and pilots of the time confirmed two *faits accomplis:* one, as David Lloyd George put it, "flying machines are . . . an established fact," and, two, they were big business.

The thrill of competitive flying, and the size of the purse, attracted many businessmen-adventurers with promises of fame, fortune, and immortality. Exhibition flying paid its survivors as much as a thousand dollars a day. As crowds, once breathless at the sight of a plane, now demanded more daredevil feats, and as pilots exacted greater distances and speeds from their aircraft, the number of fatalities soared.

Constructed of wood, bamboo, and linen, early planes afforded little protection and were unstable and difficult to control. George Chavez, the first aviator to fly over the Alps, Calbraith Rogers, who made the first transcontinental flight of the US in 1911, and Harriet Quimby, one of the women pioneers of aviation, were among the more than 200 pilots killed in crashes during those early years.

Louis Blériot's flight across the English Channel in 1909 foreshadowed a new role for aviation: Distance no longer guaranteed safety. As tensions mounted on the Continent, European powers focused on the combat potential of aircraft.

The aerobatics of French pilot Adolphe Pégord demonstrated the airplane's versatility; his vertical dives and inside loops would later be used in combat maneuvers during World War II.

A transatlantic flight, to surpass Roland Garros's 1913 nonstop crossing of the Mediterranean, was hoped

by its sponsors to be proof of the need for world disarmament, "because aeronautics have reached a stage where . . . dreadnought battleships may become futile in their power." Ironically, preparations halted with the outbreak of World War I. Famed early aviation pioneer Glenn Curtiss's flying boat was soon assigned to anti-submarine patrol in England. A new era of aviation history had begun.

More than one hundred photographs, drawings, and reproductions of posters and improbable aircraft help recreate aviation's fledgling days. Among them are classic photographs by Jacques-Henri Lartigue, a pioneer in photography who was also fascinated by speed and movement. *The First Aviators* captures the flavor and exuberance of those early years of flight exploration.

The First Aviators is fifth in the Time-Life series, *The Epic of Flight.*

—Reviewed by Ann Leopard, Editorial Assistant.

A Classic American Bomber

The B-24 Liberator, by Martin Bowman. Rand McNally & Co., Chicago, New York, San Francisco, 1980. 128 pages with many photographs. $14.95.

This book is not just the history of an aircraft, it is the story of an aircraft as seen by the men who flew, maintained, and fought in the B-24 Liberator. It provides an excellent overview of the plane's many different and little-known activities. In addition, the book is the first to include, in detail, the operations of the US Navy B-24s and the Liberators of the RAF.

The Liberator originated in 1939 with a US Army request for a bomber capable of a top speed in excess of 300 mph, with a range of 3,000 miles, and a ceiling of 35,000 feet. The design study by Consolidated engineers was designated the XB-24 and incorporated the Davis high-aspect-ratio wing. On December 29, 1939, the Liberator flew for the first time from Lindbergh Field in San Diego. Production closed with the seven final YB-24Ns built by Ford at the Willow Run, Mich., plant before the contract was terminated on May 31, 1945.

The Liberator was produced in far greater numbers than any other US aircraft in World War II. Its spacious fuselage, long range, and impressive payload capability made it an excellent aircraft for many missions. While the B-24 is best remembered for daylight missions against Germany and the raid on Ploesti in August 1943, it also played a major role in other theaters, particularly against the Japanese in the Pacific.

The author explores many of the missions the B-24 participated in from the "Big League" (the daylight flights of the USAAF against Germany) to the little-known missions, such as Anvil (a top-secret project to fly bomb-laden B-24s by remote control to V-2 sites in France), the delivery of agents and spies, radar counter missions, and the Navy B-24s in the Pacific. He did, however, miss the sizable contributions of the USAAF B-24s in the Pacific.

The book is filled with many new photographs; some of the shots of the B-24 exploding in mid-air are spectacular. They will bring chills to those who flew the B-24.

The B-24 Liberator is an excellent story of a fine flying machine and should bring back memories, fears, and pride in those who flew it in World War II. This book is a must for those who knew the B-24.

Martin Bowman has also written an *Encyclopedia of American Aircraft* and an *Encyclopedia of Russian Military Aircraft.*

—Reviewed by Benjamin S. Catlin, Special Assistant to the AFA Executive Director for Defense Personnel Matters.

New Books in Brief

B-57 Canberra at War, by Robert C. Mikesh. The B-57 is a unique bird, having been designed by the British, and having served USAF in the now-defunct "tactical bomber" role. Its stubby wing design at first put off American evaluators, but they soon changed their minds and put into production the first foreign military aircraft since World War I. Initially manufactured for the night intruder role, the Martin B-57 proved to be capable of many different missions, and went on to rack up a history of service in Korea and in Vietnam. This account by author Mikesh, who logged thousands of hours in the B-57 and who serves currently as Curator of Aircraft at the National Air and Space Museum, is a much-needed history of this sometimes overlooked aircraft. With photos and appendices. Charles Scribner's Sons, New York, N. Y., 1981. 160 pages. $17.95.

A Dream of Wings, by Tom D. Crouch. Subtitled *Americans and the Airplane, 1875–1905,* this book is a history of the feverish American preoccupation with the possibility of flight and the emergence of the science of aeronautics from a "folk technology." The three decades before the first flight at Kitty Hawk were an era characterized by American inventiveness, witnessing such wonders as the electric light bulb, the telephone, and the phonograph. Although many skeptics asserted that flight was impossible, such visionaries as Octave Chanute, Samuel Langley, and August Herring paved the way for the eventual success of the Wright brothers. Tom Crouch has written a detailed history of those early days, drawing on many original sources that provide his account with a sense of contemporaneity. With photos, notes, bibliography, and index. W. W. Norton & Co., New York, N. Y., 1981. 349 pages. $15.95.

Fighter Tactics and Strategy, 1914–1970, by Edward H. Sims. This book is no mere dry analytical work of theory; it is also a living history of the evolution of the use of the fighter aircraft as a weapon of war. Flavored with interviews with some of the great fighter pilots of the past, Sims's study reveals a pattern for success: surprise and speed balanced with a pragmatism that enables a pilot to gain the advantage over his adversary. Though Sims seems at times to overstate the significance of fighters and their pilots to the overall prosecution of a war, his study argues well for the decisive importance in war of the thinking human mind controlling a capable machine. With photos, references, and index. Aero Publishers, Inc., 329 West Aviation Rd., Fallbrook, Calif. 92028, 1980. 266 pages. $12.95.

Go Fly a Sailplane, by Linda Morrow and Ray Morrow. This book is for anyone who, as the authors claim in their introduction, "has ever admired a motorless aircraft and held a 'joy stick' in his hand and felt the immediacy of the atmosphere around him." Written from a "so you want to go soaring" perspective, the authors explain the science of soaring, how to learn the sport and what it entails in training and cost, and how to go about getting a license. The book is written in a commonsense, easy-to-understand style sure to attract younger readers; in fact, the authors point out that a soaring license may be obtained at age fourteen, and profile several accomplished younger sailplane pilots. The book concludes with a list of soaring sites in the US and suggestions for further reading. Illustrated. Atheneum Publishers, New York, N. Y., 1981. 195 pages. $10.95.

—Reviewed by Hugh Winkler, Associate Editor.

Nowotny's Final Encounter

Fighter Pilot Heaven

Hans-Ulrich Rudel at Work

Tornado Over Uppingham

AIR FORCE MAGAZINE ANNOUNCES A SPECIAL OFFER

Keith Ferris Military Aviation Calendar for 1981 at a Reduced Price

A limited number of the beautiful Keith Ferris calendars are still available, and are offered to AFA members and readers of AIR FORCE Magazine at a reduced price.

The twelve military aviation paintings in this year's calendar were specially commissioned by AIR FORCE Magazine, and executed by renowned aviation artist Keith Ferris. This followed the success of the 1980 calendar done by Ferris and aviation writer Jeff Ethell for AIR FORCE Magazine.

This year, we overproduced. Although demand has been high for the calendars, a few are left for purchase at the special price of $4.95, postpaid.

Although the year is one-third done, and four of the month blocks have passed, all twelve of the Ferris paintings are timeless and suitable for framing right now. The twelve paintings represent actual events. They are as historically and technically accurate as painstaking research and careful attention can make them.

Highlighted on this page are:

The P-51 Mustang, in "Nowotny's Final Encounter," 1st Lt. Haydon in his P-51D watching his quarry, Maj. Walter Nowotny, plunge to his death in an Me 262A jet.

A Convair F-106A at sundown high over New Jersey in July 1959: "Fighter Pilot Heaven," a fighter pilot in his element with a new mount.

"Hans-Ulrich Rudel at Work": Oberstleutnant Rudel jinks in his Junker 87G-1 "Stuka" away from his target, a group of Russian T-34 tanks on the Eastern Front.

"Tornado Over Uppingham," depicting a Panavia Tornado heading for home base, RAF Cottesmore, where the Trinational Tornado Training Establishment operates.

The other eight aircraft featured in these twelve paintings are: Cessna T-37 (1963), Grumman FF-1 (1932), Martin B-57 (1965), MiG-21MF (1971), Sopwith Camel (1918), Fairchild C-123 (1968), Martin B-10 (1938), and Mitsubishi "Betty" (1941).

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AFA's Policy Advisors and Advisory Councils for 1981

The Air Force Association's Policy Advisors and the Junior Officer Advisory and Enlisted Councils, all composed of volunteers, counsel the National President on policies and developments pertinent to their fields of expertise.

POLICY ADVISORS

The following Policy Advisors were selected by the National President to serve during 1981 because of their expertise in areas vital to AFA's mission: **CMSgt. Robert W. Carter,** AFA Enlisted Council Chairman, Lackland AFB, Tex., Enlisted Advisor; **Col. Edward L. Claiborn,** Professor of Aerospace Studies, University of California at Berkeley, Berkeley, Calif., Senior ROTC Advisor; **Maj. Gen. Thomas A. Diab,** USAFR, Boston, Mass., Air Force Reserve Advisor; **Lt. Gen. John P. Flynn,** USAF (Ret.), San Antonio, Tex., Veterans Advisor; **Gaylord Giles,** Chief, Special Support Section, Tinker AFB, Okla., Civilian Personnel Advisor; **Dr. Francis X. Kane,** Staff Manager, Requirements Analysis, TRW, Los Angeles, Calif., Scientific Advisor; **CMSAF Richard D. Kisling,** USAF (Ret.), a civilian executive with the Air Force Deputy Chief of Staff, Personnel, Oxon Hill, Md., Retiree Advisor; **Maj. Gen. Dalton S. Oliver,** USAFR, MC, Mobilization Assistant to the Chief, Air Force Reserve, Baton Rouge, La., Medical Advisor; **Col. William T. Reynolds,** USAF (Ret.), Aerospace Education Instructor, Largo Senior High School, Upper Marlboro, Md., Junior ROTC Advisor; **Kenneth A. Rowe,** Virginia Division of Aeronautics, Richmond, Va., Civil Air Patrol Advisor; **Capt. Timothy T. Timmons,** AFA Junior Officer Advisory Council Chairman, Washington, D. C., Junior Officer Advisor; and **Maj. Gen. Darrol G. Schroeder,** Chief of Staff, North Dakota Air National Guard, Davenport, N. D., Air National Guard Advisor.


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Diab


Flynn


Giles


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JUNIOR OFFICER ADVISORY COUNCIL

This Council advises the National President on matters affecting junior officers and includes at least one representative from each Air Force major command and separate operating agency. The council's Executive Committee (pictured) is chaired by **Capt. Timothy T. Timmons,** Washington, D. C. **Capt. Herman "Tony" Peguese,** Wright-Patterson AFB, Ohio, is Vice Chairman. **Capt. Marcia J. Tamblyn,** Scott AFB, Ill., is Recorder. Other JOAC Executive Committee Members are **Capt. Gary W. Burris,** USAF Academy, Colo.; **Capt. Larry M. Chadwick,** Scott AFB, Ill.; **Capt. Kathleen D. Chandler,** Randolph AFB, Tex.; **Capt. John A. "Bob" Crawford,** Randolph AFB, Tex.; **Capt. Mary K. Cutler,** Kelly AFB, Tex.; **Capt. Dale C. Hill,** Langley AFB, Va.; **Lt. Karen M. Kyritz,** Aurora, Colo.; **Capt. Sharon L. Lacey,** Kelly AFB, Tex.; **Capt. Robert W. Lower,** Offutt AFB, Neb.; and **Capt. Lloyd W. Patterson,** Wright-Patterson AFB, Ohio. Council Advisor is **Maj. Gen. William R. Usher,** USAF Director of Personnel Plans.


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This Council, which includes a majority of the Air Force's Outstanding Airmen for 1980, advises the AFA National President on matters concerning the enlisted force. **CMSgt. Robert W. Carter,** Lackland AFB, Tex., is Council Chairman. **CMSgt. Glenn H. Woody,** Randolph AFB, Tex., is Vice Chairman. **SSgt. Kathy A. Walls,** Holloman AFB, N. M., is Recorder. Members are **TSgt. Gary L. Brinner,** Springfield, Ill.; **TSgt. David L. Butler,** Barksdale AFB, La.; **MSgt George Cruz,** Vancouver, Wash.; **SrA. Clifton S. Diaz,** Kelly AFB, Tex.;


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HOW BENNY FOULOIS DID IT HIS WAY

No trumpet fanfare at the White House in December 1935 sent Maj. Gen. Benjamin D. Foulois into retirement as Chief of Air Corps. His relations with the Roosevelt Administration had progressively soured because of disagreements over military spending and over who should bear the main responsibility for the Presidential decision in 1934 ordering the Army Air Corps to fly the mail. Headlines detailing more than fifty crashes and twelve fatalities stained the New Deal banner. FDR never forgave his retiring Chief of Air Corps.

As it turned out, recriminations were mutual. Returning to his home in Atlantic City, N. J., Foulois jumped into the thicket of Republican Party politics. He ran for Congress in 1940, only to be inundated along with most GOP office seekers in the third FDR election sweep.

Although he was hale and hearty during World War II, Foulois was never offered a military assignment, even though Maj. Gen. Jim Fechet, his predecessor as Chief of Air Corps, was brought back on active duty. Foulois got partly even with his detractors; he outlived almost all of them. But he still had a score to settle.

In 1964, twenty-nine years after Foulois retired from service, an idea percolated up through the military bureaucracy. Assuming the wounds of earlier political strife had been healed, somebody sold President Lyndon B. Johnson the idea of striking a medal and writing a citation to honor the feisty old warrior for services to military aviation and the nation.

The ceremony in the East Room of the White House proceeded on schedule. The speeches were delivered and the Presidential presentation made, after which the honoree responded with a brief comment on the times. Looking to the future, Benny Foulois turned full to the distinguished audience, pointed to the paneled entrance and said: "I hope to see President Barry Goldwater walk through that door next year."

Well, a nuclear detonation could not have scattered the bureaucrats faster than those words broke up the ceremony. Benny Foulois had had the last word, and when he passed away in 1968, it could be said in honesty: "He did it his way!"

—Contributed by Murray Green

(AIR FORCE *Magazine will pay $20 for each anecdote accepted for publication.*)

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CAI, A Division of Recon/Optical, Inc.
Calspan Corp., Advanced Technology Center
Canadair, Inc.
Canadian Marconi Co.
Cessna Aircraft Co.
Chamberlain Manufacturing Corp.
Cincinnati Electronics Corp.
Clearprint Paper Co., Inc.
Colt Industries, Inc.
Computer Sciences Corp.
Conrac Corp.
Control Data Corp.
Cubic Corp.
Decca Navigator System, Inc.
Decisions and Designs, Inc.
Dynalectron Corp.
Eastman Kodak Co.
Eaton Corp., AIL Div.
ECI Div., E-Systems, Inc.
E. I. Du Pont de Nemours & Co.
Emerson Electric Co.
E-Systems, Inc.
Ex-Cell-O Corp.—Aerospace
Fairchild Industries, Inc.
Fairchild Western Systems, Inc.
Falcon Jet Corp.
Federal Electric Corp., ITT
Ford Aerospace & Communications Corp.
Garrett Corp.
Gates Learjet Corp.
General Dynamics Corp.
General Dynamics, Electronics Div.
General Dynamics, Fort Worth Div.
General Electric Co.
GE Aircraft Engine Group
General Motors Corp.
GMC, Delco Electronics Div.
GMC, Detroit Diesel Allison Div.
GMC, Harrison Radiator Div.
Goodyear Aerospace Corp.
Gould Inc., Government Systems Group
Grumman Corp.
GTE Products Corp., Sylvania Systems Group
Gulfstream American Corp.
Harris Corp., Government Communications Systems Div.
Harris Corp., Government Systems Group
Hayes International Corp.
Hazeltine Corp.
HITCO
Honeywell, Inc., Aerospace & Defense Group
Howell Instruments, Inc.
Hughes Aircraft Co.
Hughes Helicopters
Hydraulic Research Textron
IBM Corp.—Federal Systems Div.
IBM, Office Products Div.
International Harvester Co.
Interstate Electronics Corp.
Israel Aircraft Industries Int'l, Inc.
Itek Optical Systems, a Division of Itek Corp.
ITT Defense Communications Group
ITT Telecommunications and Electronics Group—North America
Kelsey-Hayes Co.
Kentron International, Inc.
Lear Siegler, Inc.
Leigh Instruments, Ltd.
Lewis Engineering Co., The
Litton Aero Products Div.
*Litton Data Systems
Litton Industries
Litton Industries Guidance & Control Systems Div.
Lockheed Corp.
Lockheed Aircraft Service Co.
Lockheed California Co.
Lockheed Electronics Co.
Lockheed Georgia Co.
Lockheed Missiles & Space Co.
Logicon, Inc.
Loral Corp.
Magnavox Government & Industrial Electronics Co.
Marconi Avionics, Inc.
Marquardt Co., The
Martin Marietta Aerospace
Martin Marietta, Denver Co.
Martin Marietta, Orlando Co.
McDonnell Douglas Corp.
MITRE Corp.
Moog, Inc.
Motorola Government Electronics Div.
*NORDAM
Northrop Corp.
OEA, Inc.
O. Miller Associates
Pan American World Airways, Inc., Aerospace Services Div.
Perkin-Elmer Corp., Computer Systems Div.
Planning Research Corp.
Products Research & Chemical Corp.
Rand Corp.
Raytheon Co.
RCA, Government Systems Div.
Rockwell Int'l Corp.
Rockwell Int'l Defense Electronics Divs.
Rockwell Int'l Defense Electronics Operations
Rockwell Int'l North American Space Operations
Rockwell Int'l Rocketydyne Div.
Rohr Industries, Inc.
Rolls-Royce, Inc.
Rosemount Inc.
Sanders Associates, Inc.
Satellite Business Systems
Science Applications, Inc.
Sierra Research Corp.
Simmonds Precision, Instrument Systems Div.
Singer Co.
Space Applications Corp.
Sperry Corp.
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Sundstrand Corp.
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Talley Industries, Inc.
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Texas Instruments Inc.
Thiokol Corp.
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United Technologies Corp.
UTC, Chemical Systems Div.
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Vought Corp.
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THE BULLETIN BOARD

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Surgeon General Demands Hospital Buildup

The Air Force Surgeon General, Lt. Gen. Paul W. Myers, has come out strong for huge sums to build up the Air Force's deteriorating medical facilities. "We could use $100 million a year for the next twenty-five years to bring them up to acceptable standards," he declared recently.

The oft-postponed replacement hospital at Wright-Patterson AFB, Ohio, currently estimated to cost $109 million, is high on General Myers's priority list. USAF got no hospital construction funds last year and is likely to do little better this year. However, next year and succeeding years should see the annual $100 million target reached or exceeded, General Myers's office said. The Surgeon General said one of his major goals this year is to convince DoD and Congress that "we can deliver health care more economically to the entire Air Force family, active and retired, if we are given the proper funding to do the job."

Retirees receive medical care at military hospitals as sort of an afterthought, but General Myers wants to make them and their families "full partners in the beneficiary responsibilities we have."

The Surgeon General's office, meanwhile, reported that physician manning continues to improve and is only about 100 below authorized strength of 3,542. Of course, Air Force medical officials feel the authorization is too low. Fewer Air Force medical officers, however, are dropping out, and increasing numbers of new doctors who hold government scholarships are entering, a spokesman said.

Pay System Blasted, Revision Sought

The military pay system is terribly outdated, being tied to an era when footsoldiering was the principal military skill. It's time to loosen the link between pay and rank, reward the more needed people, and reduce the compensation of those less necessary.

That's the nub of a new study, presented in an eighty-five-page pamphlet called "Paying the Modern Military." It is authored by Col. Martin Binkin, USAF (Ret.), and Irene Kyriakopoulous and published by the Brookings Institute.

Unlike the present pay system where all enlisted personnel can progress from E-1 through E-9 (and in the Air Force where the promotion opportunity is identical for all skills), they urge a pay grade range in unskilled jobs of perhaps E-1 through E-7. For highly technical skills it might be E-3 through E-9. Thus, a radar technician would earn more than a supply clerk, whose pay would be cut back. Overall, the military budget would be reduced, they feel.

The authors also argue that revamping the pay system would clear the way for overhauling the military retirement system, which they say "has been resisted on the ground that the present system plays a vital role in retention." They see an "occupation-based" pay structure encouraging the selective retention of skilled people, longer service performed by them, and as a result a retirement arrangement similar to that of civil servants.

Although they recognize that their plan flies in the face of military tradition, Binkin and Kyriakopoulous say the demands of today's complex defense force and the difficulties in retaining skilled people dictate that military leaders revamp the pay structure to make it competitive with the civilian economy.

AFA Advisory Councils Meet

Two of AFA's most active advisory groups, its Junior Officer Advisory and Enlisted Councils, held their first meetings of 1981 recently in conjunction with the AFA Board of Directors' midwinter meeting. The JOAC, chaired by Capt. Tim Timmons, and the enlisted group, chaired by CMSgt. Robert Carter, serve to advise both the Air Force and AFA on matters of concern to their respective constituencies. The JOAC is currently putting together a booklet aimed at helping new officers adjust to a service career. The Enlisted Council—made up primarily of the previous year's Outstanding Airmen—is gearing up for speaking engagements to spread

The lapel pin makes it official as AFA Executive Director Russell E. Dougherty, left, presents an Association membership to Secretary of the Air Force Verne Orr at the Pentagon shortly after the new Secretary took office last February.

the Air Force word to both in-service and civilian groups.

The Councils were welcomed by AFA President Vic Kregel and addressed by Maj. Gen. William R. Usher, Director of Personnel Plans, DCS/M&P, who is the advisor to the JOAC. CMSgt. Kenneth Black, Commandant, SAC NCO Academy, met with the Enlisted Council to help them plan their speaking presentations. Other speakers before the Councils included CMSgt. William Hazelton, USAF/MPXHM, who updated the groups on the new Air Force Family Program, and AFA Executive Director Russ Dougherty and AFA Chairman of the Board Dan Callahan. Council members were urged by President Kregel to become active in their local AFA chapters.

LMDC Can Always Use a Few Good People

If you're a very special master or senior master sergeant, the Air Force encourages you to apply for a four-year tour with the Directorate of Management Strategies and Education at the Leadership and Management Development Center at Maxwell AFB, Ala. In a recent message to all commanders, Headquarters urged them to get the word out in all possible ways that there is a continuing requirement for applicants for this duty.

Selectees, called Leadership Strategists/Consultants, will serve as leadership and management consultants to commanders throughout the Air Force, helping them improve the effectiveness of their organization through better management, leadership, and communications. In addition to field consultation, Strategists also teach leadership and management skills in workshops aimed at the newly commissioned officer and supervisors at all levels. Obviously, a good deal of travel can be involved.

This key assignment, says the Air Force, "offers an opportunity to have a positive and definitive effect on Air Force leadership and enables SNCOs to broaden their preparation for more challenging future assignments." However, selection competition is rough. Applicants (from any AFSC) must have a "varied and outstanding record, superior interpersonal skills, exceptional speaking and writing ability, and top military appearance and bearing." While college credit or a degree in management is looked on with favor, it is not required. What is required, as the message makes clear, is to be one of the Air Force's "high achievers."

Those who want more information should write to Col. Robert E. Culton, USAF, Director, Management Strategies and Education, Maxwell AFB, Ala. 36112, or call AUTOVON 875-6446.

DoD Attacks Drug Paraphernalia

The Defense Department has cranked strong antidrug paraphernalia language into its drug-abuse directive and has told the services to keep the devices off military installations.

"Take appropriate action when the availability of drug-abuse parapher-

AFA BELIEVES...

Vietnam Veterans Memorial Fund

AFA is a firm supporter of the aims of the Vietnam Veterans Memorial Fund. To update you, our members, on this worthwhile cause, "AFA Believes" brings you this message from Jan C. Scruggs, President of the VVMF:

There were more than 2,700,000 American servicemen and women who served in the Vietnam War, our nation's longest and most controversial military involvement. More than 300,000 Americans were wounded, and more than 57,000 died.

Those who served did so with the same patriotic motives and devotion to duty as Americans have for more than 200 years. Sadly, there were no welcome-home parades or gala events for those who returned to a society bitterly divided over this war.

The time is past due to pay tribute to those who responded to their country's call to duty. Recently, Congress has authorized two acres of land alongside the Lincoln Memorial in Washington for a memorial to Vietnam Veterans.

The purpose of the Vietnam Veterans Memorial is to recognize and honor those who served and died. It will provide a symbol of acknowledgment of the courage, sacrifice, and devotion to duty of those who were among our nation's finest. Those who served and died embodied values and ideals prized by this nation since its inception.

The memorial will make no political statement regarding the war or its conduct. It will transcend those issues. The hope is that the creation of the memorial will begin a healing process, a reconciliation of the grievous divisions wrought by the war. Through the memorial both supporters and opponents of the war may find a common ground for recognizing the sacrifice, heroism, and loyalty that were also a part of the Vietnam experience. Through such a recognition the nation will resolve its history fully.

The leadership of this country has given the Vietnam Veterans Memorial effort overwhelming endorsement. The original resolution proposing the site was "cosponsored" by all 100 members of the US Senate and 196 members of the US House of Representatives. The sponsors represented all elements of the nation's political spectrum.

The design for this tribute to those who served will be decided by a national competition, which is now in progress.

The competition is the largest ever held in the United States. The one major requirement for the memorial is that it display the names of all American servicemen killed in the war.

The memorial will not receive any funding from the US Government; rather it will be built through contributions from the American people. However, the bottom line of all this is that the Vietnam Veterans Memorial will exist only if everyone pitches in to help.

The Air Force Association has been at the forefront in helping to build this memorial. When we needed help, the Air Force Association war veteran members from around the nation did much in enabling us to obtain the legislation authorizing this memorial by the US Congress.

I hope that everyone associated with this fine organization will continue to help. You can be proud of the part you play in helping to build the Vietnam Veterans Memorial, a memorial that will make a significant contribution to our American culture and heritage now and for generations to come.

—JAN C. SCRUGGS

nalia reveals a threat to the discipline, health, welfare, or morale" of the troops, the subsequent Hq. USAF message to the field quoted the Defense notice as saying.

The DoD message described drug paraphernalia as "all equipment, products, and materials of any kind that are used, intended for use, or designed for use, in planting, propagating, cultivating, growing, harvesting, manufacturing, compounding, converting, producing, processing, preparing, testing, analyzing, packaging, repackaging, storing, containing, concealing, injecting, ingesting, inhaling, or otherwise introducing into the human body a controlled substance in violation of the Controlled Substance Act."

AFA/USAF Recruiting Team of the Year Honored

For the second year in a row, AFA has sponsored, along with the Air Force, an unusual and effective motivational program for super recruiters. Brought in last month to Washington, D. C., and New York City for national recognition were the best recruiters from each of the Air Force's five recruiting regions, and the top Air National Guard and Air Force Reserve salesperson.

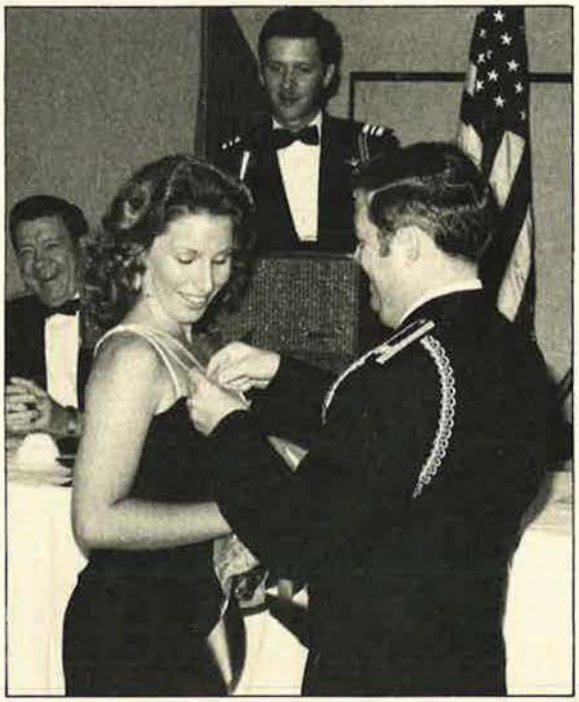
Selection factors included recruiting success last year, professionalism, and involvement in community activities. The team includes:

MSgt. Michael W. Twaroski, based in Jamestown, N. Y.; MSgt. Maxie W. Williams III, Gainesville, Fla.; SSgt. John E. Hoime, Buffalo, N. Y.; SSgt. Emmanuel J. Vaughn, Gary, Ind.; MSgt. George H. Schaefer, Clark Air Base, the Philippines; MSgt. Ruth L. Webb-Fuchs, Travis AFB, Calif.; and SMSgt. Klaus D. Siebert, New Orleans, La.

Sergeants Twaroski, Williams, Hoime, Vaughn, and Schaefer are from Air Force Recruiting Service's five geographically based groups. Sergeants Siebert and Webb-Fuchs represent the Air National Guard and the Air Force Reserve, respectively. (This is the second year Sergeants Siebert and Webb-Fuchs have been selected for the team.)

AFA hosted the spouses for the trip, which included meetings in Washington with senior Air Force officials and members of Congress. AFA's Nation's Capital Chapter hosted the group for an evening in Washington. The group then traveled to New York for formal recognition at the annual National Air Force Salute sponsored by the Iron Gate Chapter of the Air Force Association.

The "Recruiting Team of the Year" program was created by AFA in 1979 when, for the first time in the history of the All-Volunteer Force, Air Force enlistments fell short of their goals. The program serves to focus attention on the need for a national program to recognize the efforts of recruiters. The active-duty Air Force, Air National Guard, and Air Force Reserve all achieved 100 percent of their recruiting goals in fiscal year 1980.



Maj. C. Wharton Cole, Arnold Air Society Advisor for AFROTC Det. 150 at the University of Florida in Gainesville, awards Angel Flight member Linda Van Liew a pin designating her a finalist in the Society's "Little General" competition. Miss Van Liew will compete for "Little General" at the Arnold Air Society's 1981 National Conclave in Colorado Springs, Colo. Looking on from the rostrum at this Dining-Out ceremony is AAS Cadet Maj. Steven Sandridge, and to his right is MAC Commander in Chief Gen. Robert E. Huyser, special guest at the Dining-Out. The Arnold Air Society is an affiliate of AFA.

THE BULLETIN BOARD

"Minor" Bills Up Again

Many military personnel legislative proposals that failed to win congressional approval last year are back again for another try this year. Included are so-called "minor" measures that don't affect many people, but are important to the few involved. Here are some of the more interesting proposed laws waiting in the wings at the Pentagon and on Capitol Hill:

- Permanent tax relief on tuition and other academic expenses for persons with Armed Forces Health Professions scholarships.
- Authorize a tax credit of up to $500 for personnel overseas with a child under nineteen and who do not maintain a household in the US. Applies to members who earn less than $10,000.
- Repeal off-duty job restrictions that prohibit enlisted military band members from moonlighting as musicians.
- Increase the pay assumption used to compute death-disability benefits for Civil Air Patrol members killed or injured while involved in CAP activities—to the monthly salary rate of $746.
- Exempt military exchanges and morale, welfare, and recreation (MWR) activities from the Randolph-Sheppard Act, pertaining to vending machine revenue-sharing for the blind. Military MWR facilities could lose up to $118 million depending on how the Act is interpreted, according to DoD.
- Increase the ceiling on the number of foreign students who can receive instruction at each US service academy from twenty-four to forty at any one time.
- Permit the Army and Air Force to appoint doctors with at least four years of service credit to the medical corps reserve in pay grade O-3. Currently the authorized appointment grade is O-2.
- Remove the rule that a person have two years remaining at a college to be eligible for the Senior ROTC program.
- Permit the service academies to nominate applicants at any time during the year, thus providing the schools more flexibility to compete with other colleges for outstanding students.
- Increase the ROTC subsistence allowance from $100 to $150 per month.
- Authorize a BAQ for bachelor E-4s, with under four years of service,

SPEAKING OF PEOPLE

How Best Curb OER Inflation?

By Ed Gates, CONTRIBUTING EDITOR

Inflation in Officer Effectiveness Reports (OERs) has soared in the past couple of years. USAF recently told this magazine that "approximately nine out of ten OERs prepared on Air Force line officers, lieutenant through lieutenant colonel, have contained a top box evaluation of potential."

Nine out of ten are top box! Sound familiar? In years past, that kind of inflation caused alarm, near panic at times, throughout the officer corps. Service leaders despaired when by late 1974 ninety-two percent of the then 100,000-plus member officer force received "nines," the loftiest rating at the time.

Picking the truly best qualified officers for promotion was all but impossible under those circumstances, the service stressed at the time. Little is said about it now. Leaders then were desperate for a better system; for years they had probed alternatives. There were staff studies, workshops, surveys, and senior leadership reviews galore.

The upshot was the "controlled" OER system that allowed only twenty-two percent of the force to receive a top box and fifty percent to receive either a top or second box. The other 50,000-plus officers were doomed to box three or lower, any of which were generally regarded as "the kiss of death" or a "ticket to civilian life."

The controlled system lasted less than four years. Ratees and raters alike denounced it, declaring it destroyed morale and contributed to the retention problems of the late 1970s. So Air Force lifted the controls, but it now finds itself back in the familiar role of allowing top ratings for nearly all.

The main difference is that Air Force leaders don't seem particularly concerned. Nor are rank-and-file officers, if their general silence on the inflation issue is a true guide. AIR FORCE Magazine asked the Manpower and Personnel Center, which operates the OER program, about this. Why no official heartburn now that heavy inflation has returned? Why no attempt to curb it?

The Center responded that under a controlled system the spotlight naturally "focuses on the rating of potential itself as a key indicator of ratee quality." But in a system without controls, other parts of the OER, "such as the narrative comments of evaluators and the duty description, which portrays scope and level of responsibility, influence an assessment of overall quality and potential vis-à-vis the potential ratings."

The Center also said the return of predominantly top boxes is really no surprise "because of the overall excellent quality of the officer corps. . . ." That no doubt is the case, but the overall quality of today is certainly no greater than it was a few years ago, maybe slightly less.

Officers in the early 1970s were more concerned about OERs than today because of the force draw-downs and the threatened RIFs, the Center also said. The sharply reduced force-outs in the "up or out" program of the past couple of years is doubtless a related factor in the dwindling concern about OERs.

Over the years, according to the Center, USAF has considered and tried various actions that might cut rating inflation. But nothing has really worked or shown much promise of working.

Furthermore, doing things like "changing forms with the single objective of reducing rating inflation is likely to provide only temporary relief," the Center said.

But authorities say they have learned that the usefulness "of an OER system is not dependent on the potential rating alone, as this is only one facet of the information OERs provide." It follows, they say, that rating inflation is no reason for abandoning "personnel appraisal systems" as is sometimes suggested. They're still useful for many assignment and other personnel decisions.

Heavy rating inflation is also prevalent in Airmen Performance Reports, the Center reporting that "most of those airmen in the senior grades receive top ratings." Again the basic reason given is "the high quality" of those veteran NCOs "who have successfully passed through competitive promotion processes and expanded their experience base as they demonstrated their abilities in different assignments."

The Air Force, then, has no plans to introduce either a new OER or APR system, despite severe rating inflation that rivals that of previous years. It's probably just as well—no workable alternative seems to be in sight. ■

and lower graders in a leave or travel status during a PCS.

- Reduce the work week for DoD firefighters from an average of seventy-two to fifty-six hours, and allow a twenty-five percent premium pay.
- Ensure that military personnel and federal civilian workers are paid during periods when enactment of appropriations bills are delayed.
- Require the services to comply with court decrees, orders, or property settlements in connection with the divorce or separation of a military retiree. Federal civilian employees must comply.
- Amend current law to authorize former members of the armed forces who are totally disabled as the result of a service-connected disability to travel on military aircraft with the same priority as retirees.

Sixty-five—A Key Birthday

Uncle Sam provides ten benefits of special interest to "older veterans," a group (age sixty-five and older) that is growing by leaps and bounds as the World War II contingent ages. The Veterans Administration says there are 3,000,000 sixty-five-and-over vets today and foresees 7,000,000 by 1990.

To assist these people, the VA has produced a new easy-to-read pamphlet, "Veterans Benefits for Older Americans," which vets can obtain free at the nearest VA regional office. It will be followed soon by videotape cassettes explaining the benefits, for use by senior citizen and veterans' groups. The offices' toll-free numbers appear in the white pages of local phone directories under "US Government."

The ten specific VA benefits discussed are: medical care, disability compensation, disability pensions, government life insurance, death

pension, dependency and indemnity compensation, reimbursement of burial expenses, burial in a national cemetery, headstone or grave marker, and burial flag. The pamphlet explains the eligibility rules and tells how to apply.

In a related move, DoD recently reminded CHAMPUS users that the law requires they lose eligibility for CHAMPUS when they become entitled to Medicare's Hospital Insurance (Part A). (The only exception is the over-sixty-five dependent of an active-duty member.)

Medicare is the Social Security Administration's health insurance program for people sixty-five years of age or older (and for some people under sixty-five who have a disability or chronic kidney condition).

Detailed information about Medicare can be obtained from any local office of the Social Security Administration, or from the Health Benefits Advisor at a Uniformed Service medical facility, or by writing OCHAMPUS or the CHAMPUS Fiscal Intermediary serving your area. If you or a member of your family expect to become entitled to Medicare in the near future, you need to know how you will be affected and what the Medicare benefit will be.

Expanded Benefits Sought for Ex-POWs and Former Hostages

Congressman G. V. (Sonny) Montgomery (D-Miss.) has introduced legislation expanding existing eligibility for veterans medical and compensation benefits for former prisoners of war. The bill would also extend VA education benefits to all US military personnel among the hostages released by Iran.

Mr. Montgomery, the new Chairman of the House Committee on Veterans Affairs, said his proposal was based on the recommendation of a two-year-long Veterans Administration survey of an estimated 100,000 living ex-POWs. The VA study found a significantly higher death rate among the group than for non-POW vets. It also showed a higher incidence of physical and psychological disability.

"Based on these findings and the hardship these men have endured at the hands of our enemies," Mr. Montgomery said, "it would seem only reasonable to liberalize existing benefits and services."

According to the Congressman, the bill would cut to sixty days the present required six-month duration of POW status for the presumption of dietary deficiencies. It would also authorize both in-patient and out-patient services in VA medical facilities on a priority basis and establish a VA Administrator's Advisory Committee on former POWs. The bill would also, if approved, grant service-connected status to psychoneurosis and psychosis for former POWs regardless of when such a disability is first shown, Mr. Montgomery said. Current law only grants service-connected disability documented within two years of discharge and proper documentation appears to be one of the major stumbling blocks for many ex-POWs in substantiating their claims for VA benefits.

"POWs who returned from Vietnam received very thorough medical examinations and follow-up treatment," he said. "It is also clear that the hostages at the present time are being given complete physical and psychological evaluation." However, Mr. Montgomery indicated that, especially in the case of World War II POWs, many were repatriated at the end of the war without adequate screening. "The records are just not there," he said.

"Many of these veterans have been carrying the mental and physical scars of the prison camps and death marches for years," Mr. Montgomery said. "While the VA has always tried to give them the benefit of the doubt, I believe we have to put these adjustments into law.

"We owe a very special debt of gratitude to all those who have suffered the injustice and deprivation of imprisonment while in service to this country," he concluded. "We intend to ensure that our government recognizes that very special service and sacrifice in full."

THE BULLETIN BOARD

Volunteers Sought for Turkey

Airmen don't much care for duty in Turkey, so volunteers for duty there are rare.

The Air Force, accordingly, has launched a new project aimed at attracting volunteers. It's called T-BOP, which stands for "Turkey–base of preference" and is expected to run for five years. All airmen currently assigned to Turkey, with a date of return of August 1981 or later and lacking an assignment, can seek a BOP in the US or elsewhere overseas.

Like other BOPs, winning a favorite base depends on the member's skill and whether or not there is a vacancy at the preferred site. Applicants can list three to five BOPs, in or out of the United States.

Approximately 4,000 USAF members are serving in Turkey, compared to 1,200 US soldiers and a handful of sailors and Marines. The T-BOP announcement follows close on the heels of Hq. USAF reports of planned improvements in base recreational and morale programs in Turkey.

Short Bursts

The Air Force this month will select a small number from those active-duty **officers seeking flying training.** Although a relatively short list, this program is cited by many junior officers as a top morale booster. Approximately 100 nonrated officers will be selected for pilot training, while about ten nonrateds will get navigator training. Additionally, some twenty-five current navigators will be picked for pilot training.

Not surprising to those who have watched **soccer** take hold in this country is the news that USAF will, for the first time, send a team to interservice competitions this year. It is seeking thirty top-notch players to attend a training camp, May 4–23, at Langley AFB, Va. Interservice play at Fort Gordon, Ga., will follow, May 24–30. Base MWR offices have details.

As part of its continuing emphasis on family assistance, USAF will now allow members selected for an unaccompanied overseas tour (or an accompanied tour where it's not expected the family will be able to join for twenty weeks) **seven days permissive TDY to hunt for a house off-base** to leave the spouse and kids. In a major advance, MAC space-available transport can be used for such house-hunting trips. Check with your local CPBO if you're interested.

Air Force commanders were cautioned recently by Hq. USAF that they should be **"prudent in granting advance leave to members."** While USAF is not discouraging advance leave for emergency, personal, or morale problems, the reminder emphasizes that users may find themselves in financial difficulty at discharge time if they haven't earned back advance leave. In such cases, cash payments are due.

Congress has zinged the services on **fraud and abuse of ID cards** and the GAO has estimated that $50 to $60 million a year is lost just through CHAMPUS and health care unauthorized users. So Headquarters wants those who process such cards to tell these facts of life to "customers who ask, complain, or object about providing birth certificates, marriage cer-

tificates, or other legal documents" when applying for the plastic authorizers. It's emphasized that the purpose of this documentation is to protect the customer's privileges and benefits, and the best legal proof of age, relationship to sponsor, etc., are these documents, a Hq. USAF message explains.

An **expansion of the Palace Chase Program** to nonrated officers has been announced by the Air Force Manpower and Personnel Center. This program, formerly restricted to enlisteds and rated officers, allows separation from active duty (after one year) and assignment to an Air Force Reserve or ANG unit. Some nonrated engineers (AFSCs 28xx, 305x, and 55xx) still are not eligible, but all others may now apply. Those accepted double their remaining commitment—that is, if an officer has two years of active duty left, he or she will have to spend four years in the Reserve or a Guard unit. Base personnel offices have all the information.

It's the little things that count. Many recent retirees have noticed that their **computer-generated retirement orders do not reproduce well,** and are shoddy documents to represent twenty or more years of dedicated service. The Air Force agrees and has directed bases handling retirement orders that "if your copier is reproducing inferior copies, send the master to the base duplicating center."

Headquarters wants all overseas-bound members requiring **small-arms training** to take it before departing their losing base "whenever possible." In sending bases new small-arms training schedules for port locations, the Commander, AFMPC, points out that port site training is to be used only "when it is absolutely necessary. . . ." Ports generally schedule such training only a couple of days a week and departure confusion could occur. Also stressed is availability of proper clothing for training, preferably the utility uniform. McGuire AFB, N. J., notes that it has an open-air range without cover, and a field jacket without liner is not good enough for extremely cold days. Those not properly dressed "will be refused training."

Two hundred and ten of the nation's 272 **living Medal of Honor recipients** attended several events at the recent Presidential Inaugural. This was the largest gathering of Medal wearers in history.

A total of $24.9 billion will be sought for the Veterans Administration in FY '82, the largest request ever for this agency. If approved, the funds would provide treatment for an estimated 1,352,000 in-patients and 18,400,000 out-patient visits; provide compensation payments to 2,300,000 veterans; pay pensions totaling more than $4 billion to approximately 878,000 veterans and 989,000 survivors; allow VA to open four new nursing home units, bringing the total of such units to 100; increase research in areas such as spinal cord injury, amputees, aging, Agent Orange cases; and provide for employment of 219,000 VA employees.

Senior Staff Changes

PROMOTIONS: To be **Lieutenant General:** James W. **Stansberry.**

CHANGES: B/G William P. Bowden, from Ass't DCS/Logistics Operations, Hq. AFLC, Wright-Patterson AFB, Ohio, to Dep. Dir., Logistics Plans & Prgms., DCS/L&E, Hq. USAF, Washington, D. C. . . . **B/G Charles B. Jiggetts,** from Dir., Comm. & Data Processing, J-6, Hq. USPACOM, Camp Smith, Hawaii, to Dep. Cmdr., Combat Comm. & Reserve Force Matters, Hq. AFCC, Scott AFB, Ill. . . . **B/G Maurice C. Padden,** from Dep. Dir., Nat'l Military Command Center (#4), J-3, OJCS, to Dep. Dir., Ops., Nat'l Military Command System, J-3, OJCS, Washington, D. C. ■

AFA NEWS

Chapter and State Photo Gallery

By Dave C. Noerr, AFA AFFAIRS EDITOR

For the second straight year, the Langley AFB, Va., Chapter has donated $400 to the Air Force Enlisted Men's Widows and Dependents Home Foundation, Inc. H. W. (Rocky) Jones, Chapter President (center) presents the check to D. N. Masone (left), Foundation President and Chief Executive Officer, while Ed Henges, Assistant Foundation President, looks on. The proceeds were from a golf tournament that the Chapter hopes to make an annual event to benefit the Foundation.

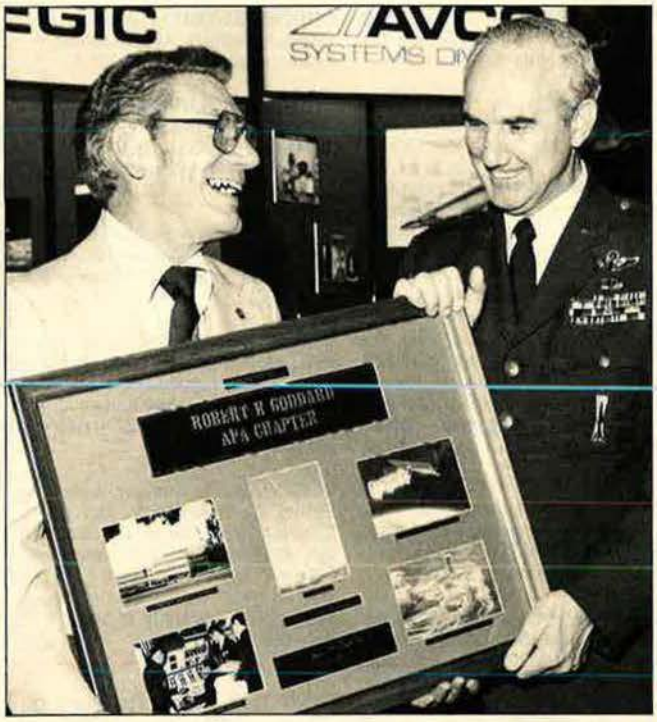
At a recent combined luncheon meeting of the Mid Ohio Chapter and Chapter 96 of the Federal Managers Association, Maj. Gen. Marc C. Reynolds, USAF, Vice Commander of the Acquisition Division and Deputy Chief of Staff for Acquisition at Hq. AFLC, Wright-Patterson AFB, Ohio, spoke on logistics and acquisition in USAF today. Pictured with General Reynolds are (from left): Robert J. Puglisi, National Vice President for the Great Lakes Region; Col. James A. Tillotson, USAF, Commander of the Aerospace Guidance and Metrology Center at Newark AFS, Ohio; General Reynolds; Mid Ohio Chapter President Joe Kennedy; and Norm Scohy, President of Chapter 96 of the Federal Managers Association. (Photo by Dick Larson)

The highest honor that a Governor of Indiana can bestow on an individual is the "Sagamore of the Wabash" award. Maj. Gen. Charles C. Irions, USAF, a native Hoosier who has contributed much to Indiana State AFA, was presented his certificate at a meeting of the Southern Indiana AFA Chapter by past Indiana State AFA President Roy P. Whitton, who arranged with Hoosier Governor Otis Bowen for the commission. Shown above, from left to right, are Dr. Thomas O. Middleton, M.D., Southern Indiana Chapter President; General Irions; and former state president Roy Whitton.

MSgt. Robert Sherrill of Richmond, Va., holds a Scott Associate plaque with which he was honored as the outstanding US Air Force recruiter in the Richmond area during fiscal 1979–80. Sergeant Sherrill received the plaque from AFA's Richmond, Va., Chapter during a recent luncheon honoring two Air Force general officers recently posted to the area. Brig. Gen. Alfred M. Miller, Jr., left, is the new Commander of the Defense General Supply Center-Bellwood; and Brig. Gen. Paul D. Wagoner, second from right, is the new Commander of 20th NORAD Region/Air Division at Fort Lee AFS, Va. Host at the luncheon was George W. Davis, Jr., right, Richmond Chapter President. (Photo by MSgt. Robert Flournoy, VaANG)

CALENDAR OF EVENTS

April 11–12, **Mississippi State AFA Convention,** Biloxi . . . May 1–2, **Idaho State AFA Convention,** Boise . . . May 1–2, **South Carolina State AFA Convention,** Charleston . . . May 2, **Phoenix Sky Harbor Chapter's Sixth Annual Ball,** Phoenix Country Club, Phoenix, Ariz. . . . May 15, **Arizona State AFA Convention,** Tucson . . . May 15–18, **Florida State AFA Convention,** Miami . . . May 16, **Kansas State AFA Convention,** Wichita . . . May 16, **Michigan State AFA Convention,** Detroit . . . May 23, **AFA Nominating Committee and Board of Directors Meeting,** The Broadmoor, Colorado Springs, Colo. . . . May 23, **Twenty-second Annual Outstanding Squadron Dinner,** The Broadmoor's International Center, Colorado Springs, Colo. . . . May 22–24, **Washington State AFA Convention,** Spokane . . . May 23, **Connecticut State AFA Convention,** Windsor Locks . . . June 12–13, **Alabama State AFA Convention,** Mobile . . . June 12–14, **Illinois State AFA Convention,** Belleville . . . June 19–21, **New York State AFA Convention,** Niagara Falls . . . June 26–28, **New Jersey State AFA Convention,** Cape May . . . June 26–28, **Texas State AFA Convention,** San Antonio . . . July 17–18, **Ohio State AFA Convention,** Youngstown . . . July 17–19, **Pennsylvania State AFA Convention,** Hershey . . . August 7–8, **Missouri State AFA Convention,** Springfield . . . August 13–15, **California State AFA Convention,** Lompoc . . . August 21–22, **Colorado State AFA Convention,** Colorado Springs . . . September 14–17, **AFA National Convention,** Washington, D. C.



Carrol D. Buford, left, newly installed President of AFA's Robert H. Goddard Chapter at Vandenberg AFB, Calif., receives a photographic montage of the mission of the 1st Strategic Aerospace Division from the 1st STRAD Commander, Maj. Gen. Jack L. Watkins. Following the installation of officers, General Watkins spoke on "The Essence of National Defense," highlighting the SAC mission and the vital need for force modernization.

The 1980–81 Officers and Council members for the West Suburban, Ill., Chapter were installed recently during ceremonies at the Officers' Club at O'Hare Field in Chicago. The new Officers and Council members are (from left to right): Front row—Lee Webster, Vice President; George Kacin, Treasurer; Don Clark, Secretary; past national director Lee Cordell, President; and Council members Ken Richardt and Al Strom. Back row—Norm Gallant and Jim Garbe, Council members; Chuck Klima, Vice President; and Bob Begina, Council member.

The Chicagoland-O'Hare, Ill., Chapter had their annual Christmas Ball in early December at the Chicago Yacht Club. Entertainment at the Ball was provided by the Air Force Academy "Moods in Blue" ensemble, pictured above. Enjoying the "Moods in Blue" are Col. Walter "Gibby" Varton, left, Commander of the Air National Guard at O'Hare International Airport; and AFRES Maj. Gen. Ted Sorensen, right. Guests attending the Ball (pictured at right) included Col. Charles Yates, USMC, left; Maj. Gen. Norma Brown, USAF, Commander of Chanute Technical Training Center, Chanute AFB, Ill., center; and Maj. Gen. Hal C. Tyree, Jr., Commander of the Illinois Air National Guard.

AFA STATE CONTACTS

Following each state name, in parentheses, are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

ALABAMA (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma): **Frank M. Lugo,** 5 S. Springbank Rd., Mobile, Ala. 36608 (phone 205-344-9234).

ALASKA (Anchorage, Fairbanks): **Frank X. Chapados,** 1426 Well St., Fairbanks, Alaska 99701 (phone 907-452-1286).

ARIZONA (Phoenix, Sun City, Tucson): **John P. Byrne,** P. O. Box 1705, Sun City, Ariz. 85372 (phone 602-974-7137).

ARKANSAS (Blytheville, Fayetteville, Fort Smith, Little Rock): **Arthur R. Brannen,** 605 N. Hospital Dr., Jacksonville, Ark. 72076 (phone 501-982-2585).

CALIFORNIA (Apple Valley, Edwards, Fairfield, Fresno, Hawthorne, Hermosa Beach, Long Beach, Los Angeles, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Mateo, Santa Barbara, Santa Monica, Yuba City, Vandenberg AFB): **Richard C. Doom,** P. O. Box 2027, Canyon Country, Calif. 91351 (phone 213-887-2923).

COLORADO (Aurora, Boulder, Colorado Springs, Denver, Fort Collins, Grand Junction, Greeley, Littleton, Pueblo, Waterton): **Jack E. Ingles,** 1131 S. Nome St., Aurora, Colo. 80012 (phone 303-370-7575).

CONNECTICUT (East Hartford, North Haven, Storrs, Stratford, Westport, Windsor Locks): **Frank J. Wallace,** 935 Poquonock Ave., Windsor, Conn. 06095 (phone 203-688-3090).

DELAWARE (Dover, Wilmington): **John E. Strickland,** 8 Holly Cove Lane, Dover, Del. 19901 (phone 302-678-6070).

DISTRICT OF COLUMBIA (Washington, D. C.): **Bob Givens,** 1750 Pa. Ave., N. W., Suite 400, Washington, D. C. 20006 (phone 202-637-3346).

FLORIDA (Broward, Cape Coral, Fort Walton Beach, Jacksonville, New Port Richey, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tallahassee, Tampa, West Palm Beach): **Lee R. Terrell,** 39 Hemlock Dr., Fort Walton Beach, Fla. 32548 (phone 904-882-4486).

GEORGIA (Athens, Atlanta, Columbus, Rome, Savannah, St. Simons Island, Valdosta, Warner Robins): **Lee C. Lingelbach,** 217 Ridgeland Dr., Warner Robins, Ga. 31093 (phone 912-922-7615).

GUAM (Agana): **Joe Gyulavics,** P. O. Box 21543, Guam 96921 (phone 671-734-2369).

HAWAII (Honolulu): **William B. Taylor,** 233 Keawe St., #630, Honolulu, Hawaii 96813 (phone 808-531-5035).

IDAHO (Boise, Twin Falls): **Ronald R. Galloway,** Box 45, Boise, Idaho 83707 (phone 208-385-5247).

ILLINOIS (Belleville, Champaign, Chicago, Elmhurst, Peoria): **Kurt Schmidt,** 2009 Vawter St., Urbana, Ill. 61801 (phone 217-367-6633).

INDIANA (Bloomfield, Indianapolis, Lafayette, Logansport, Marion, Mentone, South Bend): **Donald E. Bradford,** 2420 Fox Harbour South Dr., Indianapolis, Ind. 46227 (phone 317-784-4235).

IOWA (Des Moines): **William D. Sampson,** 2600 48th Pl., Des Moines, Iowa 50310.

KANSAS (Topeka, Wichita): **Cletus J. Pottebaum,** 6503 E. Murdock, Wichita, Kan. 67206 (phone 316-683-3963).

KENTUCKY (Louisville): **Ray H. Sanders,** 2517 Windsor Forest Dr., Louisville, Ky. 40272 (phone 502-935-8208).

LOUISIANA (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Shreveport): **John H. Allen,** 10064 Heritage Dr., Shreveport, La. 71115 (phone 318-797-3306).

MAINE (Limestone, N. Berwick): **Alban E. Cyr,** P. O. Box 160, Caribou, Me. 04736 (phone 207-492-4171).

MARYLAND (Andrews AFB, Baltimore): **William L. Ryon,** 8711 Liberty Lane, Potomac, Md. 20854 (phone 301-299-8717).

MASSACHUSETTS (Boston, Falmouth, Florence, Hanscom AFB, Lexington, Taunton, Worcester): **Zaven Kaprielian,** 428 Mt. Auburn St., Watertown, Mass. 02172 (phone 617-924-5010).

MICHIGAN (Battle Creek, Detroit, Kalamazoo, Marquette, Mount Clemens, Oscoda, Petoskey, Southfield): **Howard C. Strand,** P. O. Box 668, Battle Creek, Mich. 49016 (phone 616-963-1596).

MISSISSIPPI (Biloxi, Columbus, Jackson): **Don Wylie,** P. O. Box 70, Biloxi, Miss. 39533 (phone 601-374-3611).

MISSOURI (Kansas City, Knob Noster, Springfield, St. Louis): **William A. Dietrich,** 904 Carnoustie Dr., Kansas City, Mo. 64145 (phone 816-561-2134).

MONTANA (Great Falls): **Lucien E. Bourcier,** P. O. Box 685, Great Falls, Mont. 59403 (phone 406-453-1351).

NEBRASKA (Lincoln, Omaha): **Lyle O. Remde,** 4911 S. 25th St., Omaha, Neb. 68107 (phone 402-731-4747).

NEVADA (Las Vegas, Reno): **James L. Murphy,** 2370 Skyline Blvd., Reno, Nev. 89509 (phone 702-786-1520).

NEW HAMPSHIRE (Manchester, Pease AFB): **Charles J. Sattan,** 53 Gale Ave., Laconia, N. H. 03246 (phone 603-524-5407).

NEW JERSEY (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, E. Rutherford, Forked River, Fort Monmouth, Jersey City, McGuire AFB, Middlesex County, Newark, Trenton, Wallington, West Orange): **John P. Kruse,** 1022 Chelten Pkwy., Cherry Hill, N. J. 08034 (phone 609-428-3036).

NEW MEXICO (Alamogordo, Albuquerque, Clovis): **Joseph H. Turner,** P. O. Drawer 1946, Clovis, N. M. 88101 (phone 505-762-4535).

NEW YORK (Albany, Brooklyn, Buffalo, Chautauqua, Garden City, Hempstead, Hudson Valley, New York City, Niagara Falls, Plattsburgh, Queens, Rochester, Rome/Utica, Southern Tier, Staten Island, Suffolk County, Syosset, Syracuse, Westchester): **Thomas J. Hanlon,** P. O. Box 400, Buffalo, N. Y. 14225 (phone 716-632-7500).

NORTH CAROLINA (Asheville, Charlotte, Fayetteville, Goldsboro, Greensboro, Kitty Hawk, Raleigh): **William M. Bowden,** 509 Greenbriar Dr., Goldsboro, N. C. 27530 (phone 919-735-5884).

NORTH DAKOTA (Concrete, Fargo, Grand Forks, Minot): **Warren L. Sands,** 7 Spruce CC Village, Minot, N. D. 58701 (phone 701-852-1061).

OHIO (Cincinnati, Cleveland, Columbus, Dayton, Newark, Youngstown): **Francis D. Spalding,** 718 Martha Lane, Columbus, Ohio 43213 (phone 614-866-9381).

OKLAHOMA (Altus, Enid, Oklahoma City, Tulsa): **Aaron C. Burleson,** P. O. Box 757, Altus, Okla. 73521 (phone 405-482-0005).

OREGON (Eugene, Portland): **Martin T. Bergan,** 12868 SE Ridgecrest, Portland, Ore. 97236 (phone 503-288-5611, ext. 236).

PENNSYLVANIA (Allentown, Beaver Falls, Chester, Dormont, Erie, Harrisburg, Homestead, Lewistown, Philadelphia, Pittsburgh, Scranton, State College, Washington, Willow Grove, York): **John B. Flaig,** P. O. Box 375, Lemont, Pa. 16851 (phone 814-238-4212).

RHODE ISLAND (Warwick): **King Odell,** 413 Atlantic Ave., Warwick, R. I. 02888 (phone 401-941-5472).

SOUTH CAROLINA (Charleston, Columbia, Myrtle Beach, Sumter): **Worth T. Allen,** 1020 Butler St., #6, Columbia, S. C. 29205 (phone 803-776-5121, ext. 204).

SOUTH DAKOTA (Rapid City, Sioux Falls): **Charles P. Benson, Jr.,** Box 90, Rapid City, S. D. 57709 (phone 605-394-2026).

TENNESSEE (Chattanooga, Knoxville, Memphis, Nashville, Tri-Cities Area, Tullahoma): **Polly Murphy,** Twin City Real Estate, Midland Shopping Center, Alcoa, Tenn. 37701 (phone 615-983-4414).

TEXAS (Abilene, Amarillo, Austin, Big Spring, College Station, Commerce, Corpus Christi, Dallas, Del Rio, Denton, El Paso, Fort Worth, Harlingen, Houston, Kerrville, Laredo, Lubbock, San Angelo, San Antonio, Waco, Wichita Falls): **William W. Roth,** P. O. Box 360, San Antonio, Tex. 78292 (phone 512-226-8301).

UTAH (Brigham City, Clearfield, Ogden, Provo, Salt Lake City): **William J. Gibson,** 5013 South 2275 West, Roy, Utah 84067 (phone 801-773-4307).

VERMONT (Burlington): **John Navin,** 350 Spear St., Unit 64, South Burlington, Vt. 05401 (phone 802-658-0770).

VIRGINIA (Arlington, Danville, Harrisonburg, Langley AFB, Lynchburg, Norfolk, Petersburg, Richmond, Roanoke): **H. B. Henderson,** 10 Cove Dr., Seaford, Va. 23696 (phone 804-838-1300).

WASHINGTON (Seattle, Spokane, Tacoma): **Harry E. Goldsworthy,** 40 Parkwood Circle, Spokane, Wash. 99203 (phone 509-534-5739).

WEST VIRGINIA (Huntington): **James Hazelrigg,** Rt. 3, Box 32, Barboursville, W. Va. 25504 (phone 304-522-3616).

WISCONSIN (Madison, Milwaukee): **Kenneth Kuenn,** 3239 N. 81st St., Milwaukee, Wis. 53222 (phone 414-747-5300).

WYOMING (Cheyenne): **Linn A. Wallace,** 409 Saddle Dr., Cheyenne, Wyo. 82001 (phone 307-771-6988).

Do You Need To Supplement Your CHAMPUS Coverage?

Get AFA's new

CHAMPLUS

AFA's new CHAMPLUS program *really* picks up where CHAMPUS leaves off. Plus features give you basic protection in areas many programs don't cover at all . . . and *extra* protection against severe, prolonged illnesses or injury that could otherwise cost *you* $5,000 . . . $10,000 . . . or more *from your own pocket.*

Full coverage for AFA retired members under 65 and their eligible dependents.

Dependent coverage for AFA active-duty members.

Coverage is *guaranteed* for eligible members.

Next page, please, for complete information

AFA CHAMPLUS ... New, Strong Protect

When a Single Accident or Illness Could Cost *You* Thousands of Dollars, You Need AFA CHAMPLUS . . . for *Strong* Protection against Costs CHAMPUS Doesn't Cover!

For military retirees and their dependents . . . and dependents of active duty personnel . . . more and more medical care is being provided through the government CHAMPUS program.

And, of course CHAMPUS pays 75% of allowable charges.

But today's soaring hospital costs—*up to $500 a day* in some major metropolitan medical centers—can run up a $20,000 bill for even a moderately serious accident or illness.

Your 25% of $20,000 is no joke!

AFA CHAMPLUS protects you against that kind of financial catastrophe *and* covers most of your share of routine medical expenses as well.

YOUR INSURANCE IS NON-CANCELLABLE

As long as you are a member of the Air Force Association, pay your premiums on time, and the master contract remains in force, your insurance cannot be cancelled.

ADMINISTERED BY YOUR ASSOCIATION . . . UNDERWRITTEN BY MUTUAL OF OMAHA

AFA CHAMPLUS insurance is administered by trained insurance professionals on your Association staff. You get prompt, reliable, courteous service from people who know your needs and know every detail of your coverage. Your insurance is underwritten by Mutual of Omaha, the largest individual and family health insurance company in the world.

AFA OFFERS YOU HOSPITAL BENEFITS AFTER AGE 65

Once you reach Age 65 and are covered under Medicare, AFA offers you protection against hospital expenses not covered by Medicare through the *Senior Age Benefit Plan* of AFA Hospital Indemnity Insurance. Members enrolled in AFA CHAMPLUS will automatically receive full information about AFA's Medicare supplement program upon attainment of Age 65 so there will be no lapse in coverage.

HOW AFA CHAMPLUS WORKS FOR YOU!

WHO IS ELIGIBLE?

1) All AFA members under 65 years of age who are currently receiving military retired pay and are eligible for benefits under Public Law 89-614 (CHAMPUS), their spouses under age 65 and their unmarried dependent children under age 21 (or age 23 if in college).
2) All eligible dependents of AFA members on active duty. Eligible dependents are spouses under age 65 and unmarried dependent children under age 21 (or age 23 if in college).

EXCEPTIONAL BENEFIT PLAN

(See chart at right)

FOUR YEAR BASIC BENEFIT. Benefits for most injuries or illnesses may be paid for up to a four-year period.

PLUS THESE SPECIAL BENEFITS . . .

1) Up to 45 consecutive days of in-hospital care for mental, nervous, or emotional disorders. Outpatient care may include up to 20 visits of a physician or $500 per insured person each year.
2) Up to 30 days care per insured per year in a Skilled Nursing Facility.
3) Up to 30 days care per insured per year and up to 60 days lifetime in a CHAMPUS-approved Residential Treatment Center.
4) Up to 30 days care per insured per year and up to 60 days lifetime in a CHAMPUS-approved Special Treatment Facility.
5) Up to 5 visits per insured per year to Marriage and Family Counselors under conditions defined by CHAMPUS.

AFA CHAMPLUS BENEFIT SCHEDULE

Care	*CHAMPUS Pays*	*AFA CHAMPLUS Pays*
	For Military Retirees Under Age 65 and Their Dependents	
Inpatient civilian hospital care	CHAMPUS pays 75% of allowable charges	CHAMPLUS pays the 25% of allowable charges not covered by CHAMPUS.
Inpatient military hospital care	The only charge normally made is a $5.00 per day subsistence fee, not covered by CHAMPUS.	CHAMPLUS pays the $5.00 per day subsistence fee.
Outpatient care	CHAMPUS COVERS 75% of outpatient care fees after an annual deductible of $50 per person ($100 maximum per family) is satisfied	CHAMPLUS pays the 25% of allowable charges not covered by CHAMPUS after the deductible has been satisfied.
	For Dependents of Active Duty Military Personnel	
Inpatient civilian hospital care	CHAMPUS pays all covered services and supplies furnished by a hospital less $25 or $5.00 per day, whichever is greater.	CHAMPLUS pays the greater of $5 per day or $25 of the reasonable hospital charges not covered by CHAMPUS.
Inpatient military hospital care	The only charge normally made is a $5.00 per day fee, not covered by CHAMPUS.	CHAMPLUS pays the $5.00 per day subsistence fee.
Outpatient care	CHAMPUS covers 80% of outpatient care fees after an annual deductible of $50 per person ($100 maximum per family) is satisfied.	CHAMPLUS pays the 20% of allowable charges not covered by CHAMPUS after the deductible has been satisfied.

NOTE: Outpatient benefits cover emergency room treatment, doctor bills, pharmaceuticals, and other professional services.

There are some reasonable limitations and exclusions for both inpatient and outpatient coverage. Please note these elsewhere in the plan description.

Against Costs CHAMPUS Doesn't Cover

APPLY TODAY!
JUST FOLLOW THESE STEPS

Choose either AFA CHAMPLUS In-patient coverage or combined In-patient and Out-patient coverage for yourself. Determine the coverage you want for dependent members of your family. Complete the enclosed application form in full. Total the premium for the coverage you select from the premium tables on this page. Mail the application with your check or money order for your initial premium payment, payable to AFA.

Get AFA's new

CHAMPLUS

LIMITATIONS

Coverage will not be provided for conditions for which treatment has been received during the 12-month period prior to the effective date of insurance until the expiration of 12 consecutive months of insurance coverage without further treatment. *After coverage has been in force for 24 consecutive months, pre-existing* conditions will be covered regardless of prior treatment.

EXCLUSIONS

This plan does not cover and no payment shall be made for:

a) routine physical examinations or immunizations

b) domiciliary or custodial care

c) dental care (except as required as a necessary adjunct to medical or surgical treatment)

d) routine care of the newborn or well-baby care

e) injuries or sickness resulting from declared or undeclared war or any act thereof

f) injuries or sickness due to acts of intentional self-destruction or attempted suicide, while sane or insane

g) treatment for prevention or cure of alcoholism or drug addiction

h) eye refraction examinations

i) Prosthetic devices (other than artificial limbs and artificial eyes), hearing aids, orthopedic footwear, eyeglasses and contact lenses

j) expenses for which benefits are or may be payable under Public Law 89-614 (CHAMPUS)

QUARTERLY PREMIUM SCHEDULE

Plan 1—For military retirees and dependents

In-Patient Benefits

Member's Attained Age	*Member*	*Spouse*	*Each Child*
Under 50	$19.03	$23.30	$11.00
50-54	$23.78	$29.10	$11.00
55-59	$30.13	$36.90	$11.00
60-64	$39.65	$48.55	$11.00
In-Patient and Out-Patient ***Benefits***			
Under 50	$26.80	$31.05	$27.50
50-54	$33.48	$38.80	$27.50
55-59	$42.43	$49.18	$27.50
60-64	$55.83	$64.73	$27.50

Plan 2—For dependents of active duty personnel.

In-Patient Only	None	$ 8.80	$ 4.40
In-Patient and Out-Patient	None	$35.20	$22.00

Note: Plan II premiums are listed on an annual basis. Because of the very low cost, persons requesting this coverage are asked to make annual payments.

APPLICATION FOR
AFA CHAMPUS SUPPLEMENT INSURANCE

Group Policy GMG-FC70
Mutual of Omaha Insurance Company
Home Office: Omaha, Nebraska

Full name of Member _____
Rank Last First Middle

Address _____
Number and Street City State ZIP Code

DATE OF Birth _____ Current Age ____ Height ____ Weight ____ Soc. Sec. No. _____
Month/Day/Year

This insurance coverage may only be issued to AFA members. Please check the appropriate box below:

☐ I am currently an AFA Member. ☐ I enclose $13 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine).

☐ I am over 65 years of age. Please send information on AFA's Medicare Supplement.

PLAN & TYPE OF COVERAGE REQUESTED

Plan Requested (Check One)	☐ AFA CHAMPLUS PLAN I (for military retirees & dependents) ☐ AFA CHAMPLUS PLAN II (for dependents of active duty personnel)	
Coverage Requested (Check One)	☐ Inpatient Benefits Only ☐ Inpatient and Outpatient Benefits	
Person(s) to be Insured (Check One)	☐ Member Only ☐ Spouse Only ☐ Member & Spouse	☐ Member & Children ☐ Spouse & Children ☐ Member, Spouse & Children

PREMIUM CALCULATION

All premiums are based on the attained age of the AFA member applying for this coverage. Premium payments are normally paid on a quarterly basis (see table for rate table). Upon request, however, they may be made on either a semi-annual or annual basis.

Quarterly premium for member (age ____) $_____

Quarterly premium for spouse $_____

Quarterly premium for ____ children @ $_____ $_____

Total premium enclosed $_____

Requests for active duty dependent coverage under Plan 2 should include annual premiums.

If this application requests coverage for your spouse and/or eligible children, please complete the following information for each person for whom you are requesting coverage.

Names of Dependents to be Insured	Relationship to Member	Date of Birth (Month/Day/Year)

(To list additional dependents, please use a separate sheet.)

In applying for this coverage, I understand and agree that (a) coverage shall become effective on the last day of the calendar month during which my application together with the proper amount is mailed to AFA, (b) only hospital confinements (both inpatient and outpatient) or other CHAMPUS-approved services commencing after the effective date of insurance are covered and (c) any conditions for which I or my eligible dependents received medical treatment or advice or have taken prescribed drugs or medicine within 12 months prior to the effective date of this insurance coverage will not be covered until the expiration of 12 consecutive months of insurance coverage without medical treatment or advice or having taken prescribed drugs or medicine for such conditions. I also understand and agree that all such pre-existing conditions will be covered after this insurance has been in effect for 24 consecutive months.

Date _____, 19____ _____
Member's Signature

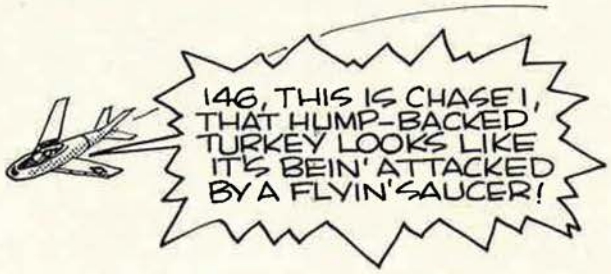
NOTE: Application must be accompanied by check or money order.
Send remittance to:
Insurance Division, AFA, 1750 Pennsylvania Ave., NW, Washington, D.C. 20006.

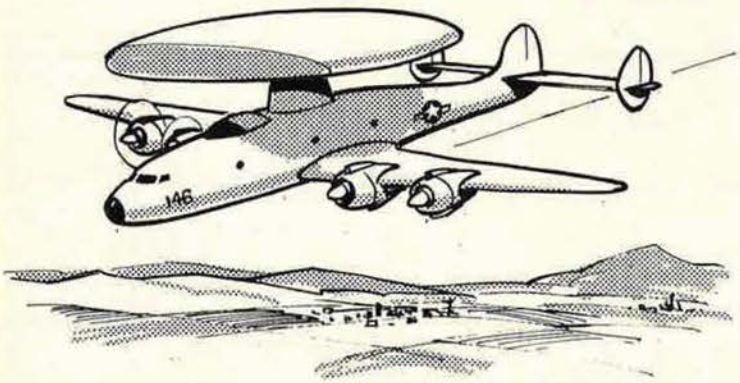
Form 6173GH App.

Bob Stevens'

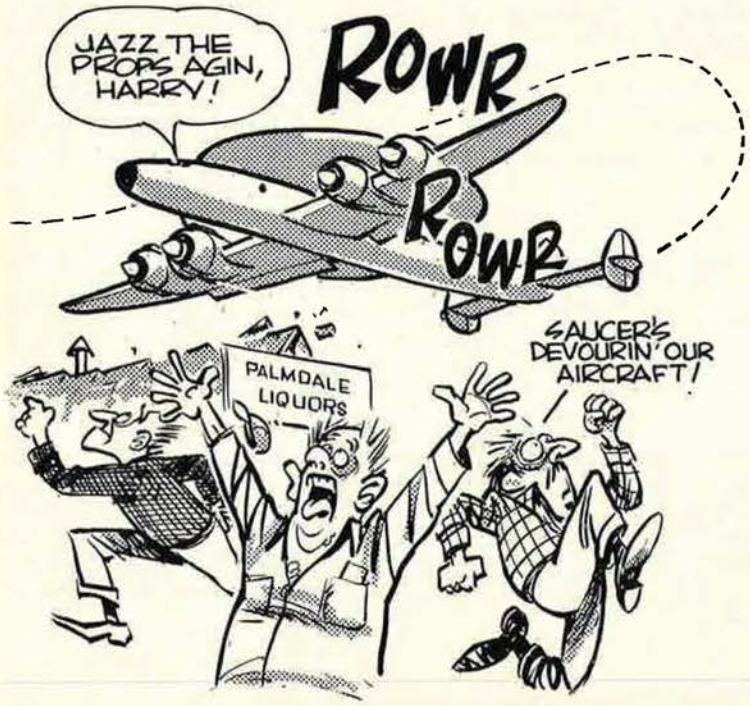
"There I was..."

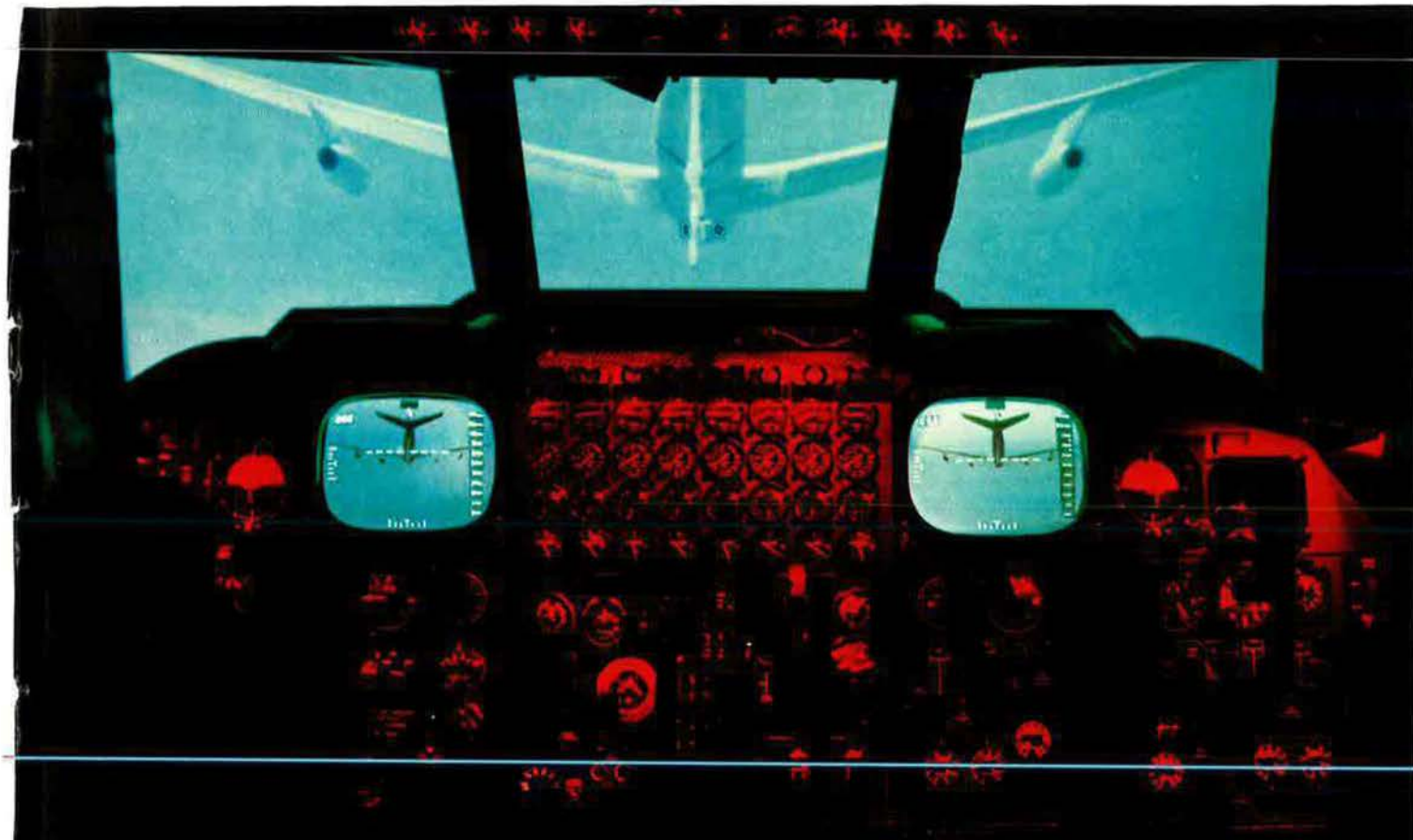
THE FLYING SAUCER/UFO MANIA (AKA "PROJECT BLUEBOOK") WAS AT VIRULENT LEVEL IN THE MID-50s. FROM OUR DUSTY ARCHIVES, WE DUG OUT THIS STORY ABOUT A CONTRACTOR CREW DELIVERING A NEW EC-121 TO EDWARDS AFB FOR TESTING—





THE CREW PROCEEDS TO DO A REAL NUMBER OVER THE THEN-SPARSELY SETTLED NEIGHBORING TOWNS.





LINK & LRCA: A NATURAL!

Plans for the Long Range Combat Aircraft may still be up in the air but LRCA can be assured a safe landing.

Simulation training is the answer—training that can best be supplied by Link. Only Link is experienced in the type of total systems integrated training which LRCA will require.

Link gained its unrivaled experience by undertaking such programs as the B-52 Weapons Systems Trainers—the largest simulation contract ever awarded.

B-52 WST's provide fully integrated training, coordinating crews of the flight deck, offensive weapons station and defensive avionics station.

They also provide, for the first time, completely integrated representations of out-the-window visual scenes, landmass radar return, low light level TV and forward-looking infrared. The visual scene and displayed imagery (shown above in the WST cockpit) remain correlated and in proper perspective throughout the entire takeoff, landing and low-level terrain-following modes of operation.

This advanced technology is readily adaptable to training pilots of the nation's newest aircraft.

Predestined partners: Link & LRCA!

Full crew coordination, full visual integration

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FLIGHT SIMULATION DIVISION
THE SINGER COMPANY

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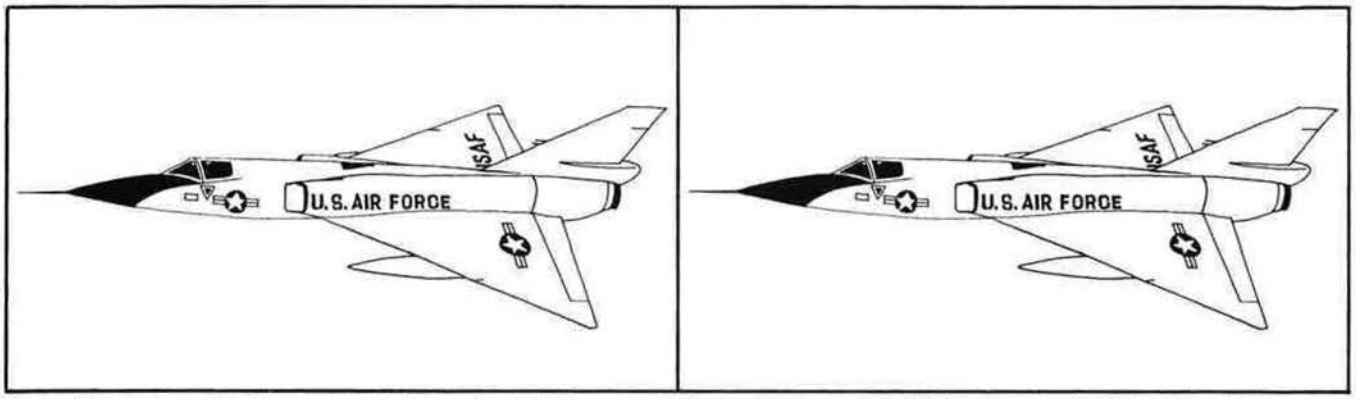

America's top Air Defense fighter for 1956 **America's main Air Defense fighter for 1981**

America's Air Defense is riding on a plane that's older than some pilots flying it.

It's sad but it's true. We still have to depend on a fighter from the 50's for continental defense —an aircraft that was once supreme, but now is not only range-limited, but radar-limited, armament-limited and expensive to maintain.

There is a fighter selected for USAF strategic defense that is without compromise. It can outfly, outfight, and outperform any other aircraft in the air. It can carry out continental and world-wide defense assignments—bomber threat, cruise missile penetration, line-of-communication protection and even anti-satellite.

The F-15 Eagle.

The Eagle's multi-mission avionics give unprecedented advantage in air-to-air intercept. Sidewinder missiles, Sparrow missiles, 20mm cannon, anti-satellite weaponry, and remarkable fuel capacity combine for long range and an awesome arsenal to confront any foe. The F-15 Eagle. Its very presence is evidence of national resolve.

F-15 Eagle

MCDONNELL DOUGLAS