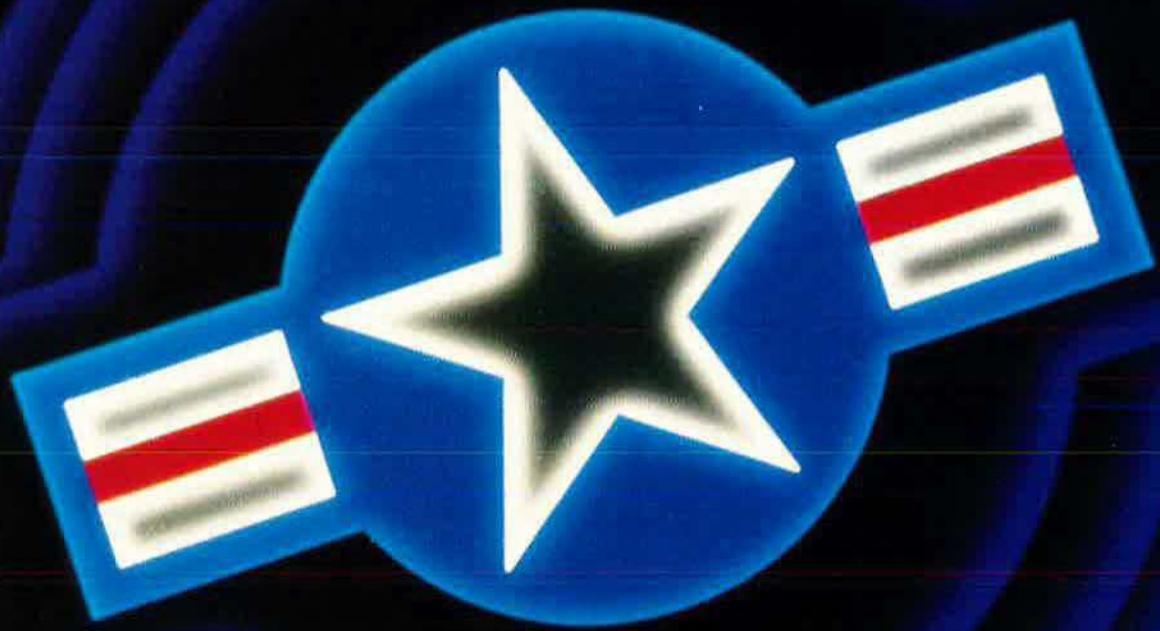
MAY 1983/$3

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION



AIR FORCE ALMANAC 1983

CFM56

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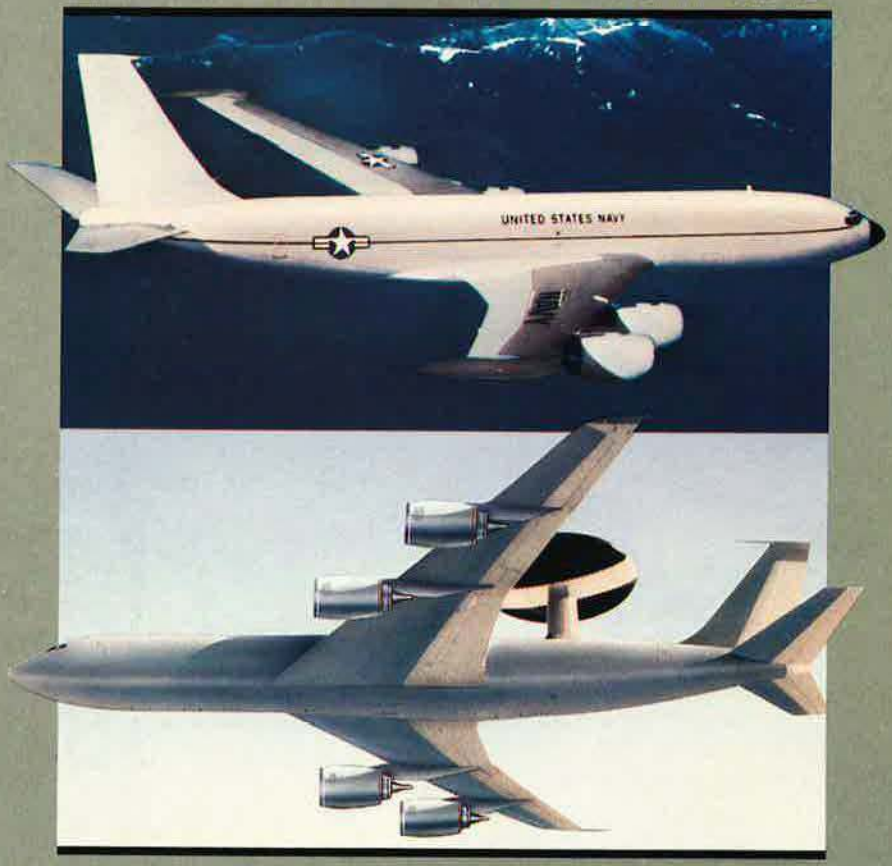

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VOLUME 66, NUMBER 5

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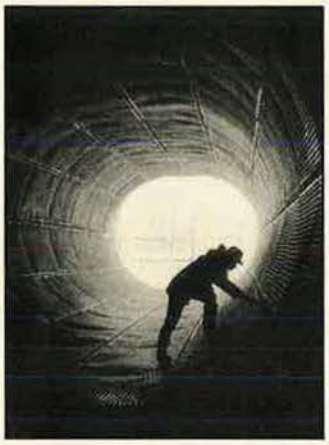

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About the cover: The cover design for this year's Air Force Almanac is by Art Director William A. Ford.

Annual Air Force Almanac Issue

Reports from the Major Commands

Reports from the SOAs, the DRUs, and Air National Guard

An Air Force Almanac

Departments

AIR FORCE Magazine (ISSN 0730-6784) is published monthly by the Air Force Association, Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006. **Phone:** (202) 637-3300. Second-class postage paid at Washington, D.C., and additional mailing offices. **Membership Rate:** $15 per year; $36 for three-year membership (includes $24 for subscription). **Life Membership:** $200. **Subscription rate:** $15 per year; $25 per year additional for postage to foreign addresses (except Canada and Mexico, which are $6 per year additional). Regular issues $1 each. Special issues (Soviet Aerospace Almanac, USAF Almanac issue, Anniversary issue, and "Military Balance" issue) $3 each. **Change of address** requires four weeks' notice. Please include mailing label. Publisher assumes no responsibility for unsolicited material. Trademark registered by Air Force Association.

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AN EDITORIAL

Skilled and Steady

ONCE again we are proud to present the annual Air Force Almanac issue, now well established as the indispensable year-round reference on the United States Air Force. This 1983 edition is just as packed with up-to-date and authoritative information as its predecessors. We at the magazine have many other persons to thank for their assistance in its preparation. To list them all by name would exceed this page. But we owe special thanks to all who helped, from the Secretary, Chief of Staff, and Chief Master Sergeant to scores of people on the Air Staff, and more in the major commands, direct reporting units, separate operating agencies, Air Force Reserve and Air National Guard, as well as our valued friends at *Jane's All the World's Aircraft*.

So much interesting material is in this issue that I encourage you to browse first, then go after items that interest you at your leisure. The statements by the leadership will reward a close reading.

The commands, units, and agencies all tell their own stories, providing a ready-reference benchmark on what they consider important about their roles. The feature articles add spice and information on current topics useful to all who are interested in airpower.

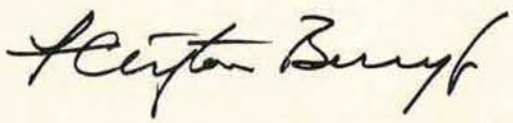
The "almanac" material could well be the most useful and rewarding throughout the year ahead. It is rich and wide-ranging. Like a rich dessert, it should be taken in small bites and digested slowly. A few examples suggest the variety.

For instance, today's Air Force is experienced and stable. Its active-duty officers average thirty-four years of age; its enlisted force averages twenty-six years. As for civilian employees, their average age is 42.7 years and length of service is 14.46 years.

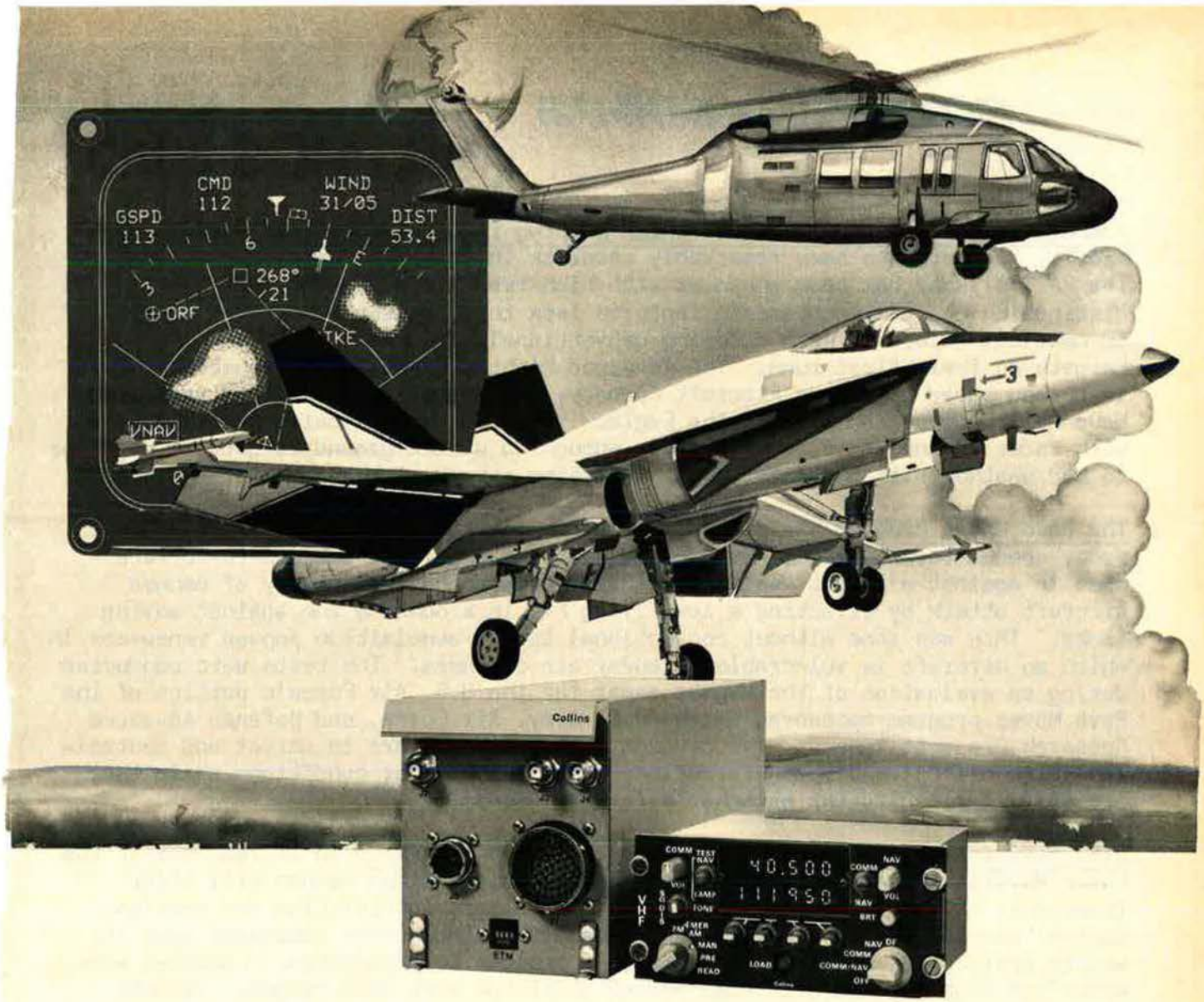
The percentage of active aircraft less than nine years old is a bit higher than two years ago; 26.8 percent compared with twenty-five. In AFRES, twenty percent are now less than nine years old, up from 12.2 in 1981. But for the Air National Guard, only fifteen percent are in that category, down from 19.9 in 1981. Not in the tables, but well worth remembering, is that the reserve forces pull a hefty share of USAF's total commitments, every day of the year.

Finally, another observation not found in the data tables. The US Air Force is cooperating with its allies and its sister services in 1983 to a greater extent than ever before in peacetime. This ranges from daily training with allied forces around the world to formal agreements on training with the Navy, and on training and doctrine with the Army, with more extensive cooperation planned.

All in all, this Air Force Almanac issue offers confidence and hope as well as extensive information. We hope you enjoy its use as much as we enjoyed its preparation.



F. CLIFTON BERRY, JR.
EDITOR IN CHIEF



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A modified dual-role F-15 Eagle, while keeping its capabilities as an air superiority fighter, has been remarkably accurate in U.S. Air Force bombing tests. The F-15's radar has been enhanced with high-resolution mapping modifications to distinguish objects and terrain features less than 10 feet apart from a range of 10 nautical miles. Pilots dropping conventional bombs have hit tank-sized targets on their first runs. The Advanced Fighter Capability Demonstrator F-15 is co-sponsored by Hughes Aircraft Company, builder of the AN/APG-63 radar, and McDonnell Douglas, builder of the Eagle. The program is showing that the F-15, with radar enhancements, is versatile enough to strike ground targets at night or in bad weather with the accuracy of a daytime attack aircraft.

The Pave Mover Program has passed two major milestones. The Hughes Pave Mover radar demonstrated stand-off weapon delivery by guiding a surface-to-surface missile against a target vehicle. It also proved the feasibility of manned aircraft attack by directing a low-flying F-4 in a bombing run against moving tanks. This was done without conventional target acquisition pop-up maneuvers in which an aircraft is vulnerable to enemy air defenses. The tests were conducted during an evaluation of the Hughes radar for the U.S. Air Force's portion of the Pave Mover program sponsored by the U.S. Army, Air Force, and Defense Advanced Research Projects Agency. The program is developing ways to detect and neutralize large offensive armored formations under all weather conditions while they are still far behind the attacker's forward elements.

U.S. Navy and Marine Corps pilots have scored 15 successes in 15 launches of the Laser Maverick missile, showing that the precision-guided weapon will offer tremendous tactical advantages in close air support interdiction and sea-lane control missions. The air-to-ground missile was thoroughly evaluated over its entire operational envelope in tests as a prelude to production. Launches were made from high and low altitudes and at short and very long ranges. Targets included a radar van, a moving self-propelled gun, a tank, an armored personnel carrier, bunkers, and moving boats. Launches were pinpointed by laser beams directed by Navy A-6E Intruder aircraft, Marine OV-10 aircraft, and Marine infantrymen. Laser Maverick uses the same airframe and propulsion system as the TV and Infrared Mavericks, also built by Hughes.

Military aircrews may soon be protected by a system that snuffs out explosions in half the time it takes the eye to blink. The device is based on the Dual Spectrum™ sensing and suppression system carried by U.S. Army M1 Abrams tanks and M2/M3 Bradley Fighting Vehicles. Two detectors monitor selected portions of the infrared radiation spectrum to detect explosive fuel fires caused by enemy warheads penetrating the aircraft's fuel tank or fuel lines. The system won't respond to such false alarms as the flash of projectiles that don't cause explosive fuel fires. Once an explosion has been detected, the system triggers the release of a gaseous-liquid substance, called Halon, to suppress the fire. The system reacts within 100 milliseconds. It was developed by the Santa Barbara Research Center, a Hughes subsidiary.

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AIRMAIL

No Fooling

Your editorial, "Trying to Fool the Troops" *(March '83, p. 8),* is disturbing.

The Washington *Post's* editorial galled me because it implied pay was the sole criterion of military morale. It did not mention quality weapons or patriotism. I responded that a balance of pay and weapons is essential, that our people know both have lagged, and that weapons are equally important to them since they will likely have to fight outnumbered and outgunned.

That someone took my brief, general response (and please note, it was *my* letter) and saw something quite different and specific did not surprise me. What surprised me was that it was you.

AIR FORCE Magazine consistently notes the importance of quality weapons, patriotism, and adequate compensation. If the *Post* was indeed correct, your readers would be better off subscribing to the *Wall Street Journal.* If you are serious about weapons, patriotism, and pay, your editorial did not help.

We do not have license to focus on one service and espouse more pay and weapons. Based on a realistic assessment of public support, we must work with Congress to provide the most prudent possible balance of weapons and pay for all DoD. Yet as we increase one in order to maintain a balance, you decry our "neglect" of the other. You must be aware that Secretary of Defense Caspar Weinberger is working hard to make up the pay lost through the freeze in the next budget.

Your calls for both pay and weapons present your readers with unrealistic expectations and offer them subsequent disappointment. Your attitude helps frustrate our efforts to seek the most prudent possible balance of compensation to attract people in peacetime while providing the weapons they need in war.

The fact is that public and congressional support to provide significant, simultaneous increases for compensation and weapons does not now exist. It seems, therefore, that it is not we who are fooling the troops, but you.

Henry E. Catto, Jr.
Ass't Secretary of Defense
(Public Affairs)
Washington, D. C.

Lessons of Vietnam

General Milton's piece on Vietnam *("The Lessons of Vietnam," March '83, p. 106)* was very interesting to me as I was serving, as was he, on the CINCPAC staff when the war started. I concur with the General that we never had a strategy for winning in Southeast Asia.

As a tactical air operations officer involved in the development of the Rolling Thunder tactical air offensive to eliminate or neutralize North Vietnam's offensive capability, it was particularly distressing not to have the plan executed as it was conceived. It was to have been all over and done with in two weeks—certainly, a bit optimistic, but a far better prospect than the travesty that ensued, one that consumed aircraft and crews to no purpose. I can still recall awaiting approved targets and ordnance loads from Foggy Bottom, neither of which had any relation to the Rolling Thunder plan as it was designed.

I, too, wonder why the military accepted the "vacillating and arrogant dictates" of Foggy Bottom and why "no one turned in his suit in protest." The General suggests that even had senior people left the military services in protest, it "would have caused no more than a ripple." Perhaps, but there is the question of personal conscience.

I remember Adm. Harry Felt, then CINCPAC, saying we should never get involved in a war in SEA. . . . However, the Admiral continued to serve and it was not until after he later retired, when the US was deeply immersed in the conflict, that he wrote an excellent article published by *Reader's Digest* explaining why it was a mistake to be at war in SEA. Robert E. Lee felt his convictions strongly enough to do what he thought was right.

I believe General Milton is correct in his observation about the relationship between DoD, the Joint Chiefs of Staff, and the White House. It is "a formula for disaster—one where no one is in charge, and no one is to blame."

Col. Peter E. Boyes,
USAF (Ret.)
Sacramento, Calif.

General Milton really tells it like it was in his article, "The Lessons of Vietnam." I turned in my suit in those days. What with the most arrogant of all bureaucrats calling bomb loads and targets from his Secretary of Defense seat, and the cream of the crop of our young men, including my sons, turning to the likes of Tom Hayden, Ramsey Clark, and Jane Fonda—it was a sad time.

What an excellent lecture for the future generals in our military academies! But the message is needed even more at Stanford, Harvard, George Washington, etc.—wherever our future leaders are establishing their ways of thinking. As General Milton points out toward the end of his article, the Department of Defense and the service headquarters are bureaucratic monstrosities with no one in charge. In my opinion, the solution will never come from the present crop of leaders; it must come from those now learning to be leaders, both in and out of uniform.

I say let's, somehow, get our straight-thinking, articulate, senior retired military, like General Milton, on university podiums.

Maj. James D. Anderson,
USAF (Ret.)
Grass Valley, Calif.

After some fifteen years of media disinformation, misinformation, bias, and manipulation of the subject, General Milton's "The Lessons of Vietnam" was classic enlightenment. It is required reading for everyone who cares—and should be crammed down the throats of those who do not care.

General Milton made many profound points (we cannot fight any more wars that way; why did not one senior military man resign in protest?

AIRMAIL

etc.), and needs no advice from me. But he missed one point that may be the most important of all:

Never again, under such circumstances, can we allow the national media to act as loose cannon on deck, firing only where they can do us the most harm.

One specific example was Walter Cronkite who, with the obvious support of CBS, blatantly used his platform as an "impartial" newscaster to undercut our Vietnam effort. There were many others.

Lt. Col. James L. Brewer,
USAF (Ret.)
Grant, Ala.

In reference to your March 1983 issue containing the article by Gen. T. R. Milton, "The Lessons of Vietnam":

One did not have to read much further than the first three paragraphs of the article to realize that General Milton spent his tour of Vietnam behind a desk. Then to read on page 108 the footnote on the author only backs up my statement.

I was truly appalled at General Milton's statement concerning Lt. William Calley and the My Lai situation. One would wonder how many times General Milton had the opportunity to spend a few days patrolling the jungles and the hamlets of Vietnam picking up what was left of his friends or consoling a brother infantryman who had just lost a leg, foot, or arm in a Viet Cong boobytrap while the local village inhabitants leisurely stood by watching.

I am not at all condoning what happened at My Lai; however, it is a fact that in the history of Vietnam a lot of the village chiefs and villagers did condone and were a part of the boobytrap program around the area. If General Milton had had the opportunity to be involved with the grassroots combat situation of Vietnam, he would have very quickly and truly realized that our enemy was indeed hard to define. The combat soldier of the Vietnam War realized that he was fighting a war he could not win, so his attitude changed and, in most cases, became one of survivability for himself and his buddies.

Even though My Lai may have been premeditated, quite a few B-17, B-24, B-52, F-4, Huey gunship, and artillery crews well knew in advance of the risk when they "pulled the triggers" that there would be civilians killed, maimed, and whatever. However, this did not stop the program. As far as I am concerned, this was as equally premeditated as the My Lai incident.

It is indeed interesting that we are all able to be an audience for General Milton's expertise, opinions, and feelings in his present retirement. I would like to know where his voice was when he was active in the political bureaucracy of the higher echelon of the military system between 1965 and his retirement from active duty in 1974. Hindsight is 20/20.

May I suggest to General Milton that he avoid mirrors, or else he may see the reflection of an "old misfit?"

Larry A. Brooks
Caruthersville, Mo.

In reference to your March 1983 issue, and particularly the article by Gen. T. R. Milton, "The Lessons of Vietnam":

First, the article helped me to understand much better how we got involved in SEA and, after the involvement, why we failed.

But, sadly, the second realization I had was that high-brass flyboys can still not forgo the opportunity to bring the My Lai skeleton out of the Army's closet and shake it around. You, in one paragraph, have ruined an otherwise well-written article by stooping to the tactics of Jane Fonda and her following.

The many thousands of veterans of the 23d Americal Division should always take pride in the many honorable accomplishments of their Vietnam service.

Jack Curry
Ursa, Ill.

General Milton's article, "The Lessons of Vietnam," was pretty familiar stuff. His "unleash the Air Force" theory of how South Vietnam could have been "saved" is trotted out with predictable regularity by a whole host of retired generals and admirals who either had no personal experience in Vietnam or who spent the war safely ensconced at MACV in Saigon. As a Vietnam veteran, I only wish the "solution" to the war had been that simple.

General Milton repeats all the half-truths and clichés. He blames our military failures on that great American villain, Robert McNamara, while conveniently ignoring our less-than-superb *military* leadership in the field. Certainly, for example, General Milton has heard the term "ticket-punching," knows what it means, and knows the terrible price American troops paid for the practice. Certainly the General has heard the term "fragging," knows what it means, and knows what it says about the military degeneration that occurred in Vietnam. Yet on all these things General Milton, usually verbose, is strangely silent.

After engaging in some rather sophomoric Monday-morning quarterbacking, General Milton, in a particularly obnoxious passage, demands to know why our military leaders didn't "turn in [their] suit[s] in protest" over the "mismanagement" of the war. General Milton, it should be noted, apparently didn't feel that strongly about it at the time, for he certainly didn't turn in *his!*

To his credit, General Milton at least had the honesty to admit that the so-called "domino theory," which was the rationale for our involvement in Vietnam in the first place, was a bunch of crap. But for him to suggest with his very next breath that keeping military dictatorships in power in Thailand, Indonesia, and the Philippines was worth the 58,000 American lives lost in Vietnam shows a lack of understanding on his part of what the United States has historically stood for, as well as a disregard for those brave souls who gave it everything they had.

The General Miltons of this world will *never* be able to (as he says) "exorcise the Vietnam ghost" until the last Vietnam veteran is dead and buried. For as long as there are vets around to tell their children, their neighbors, and their friends what really happened to us, the *real* lesson of Vietnam will continue to be taught.

That lesson, General Milton, can be summed up in two words: *Never again!*

David I. Wyllie
Bakersfield, Calif.

Milton on El Salvador

Gen. T. R. Milton's mention of *El Salvador: Another Vietnam ("Viewpoint," March '83, p. 95)* reminded me of my own viewing of this "masterpiece."

Presented by a reputable theater charging the going seat price for what was reportedly a documentary film, it received "worth seeing" reviews in our local press. Before the running of the celluloid, an individual of Latin American extraction got up and advised that a "discussion session" would follow the viewing.

Documentary in tone, the bias was strongly anti-American. The primary thrust: American business interests encourage American political intervention and, if necessary, American

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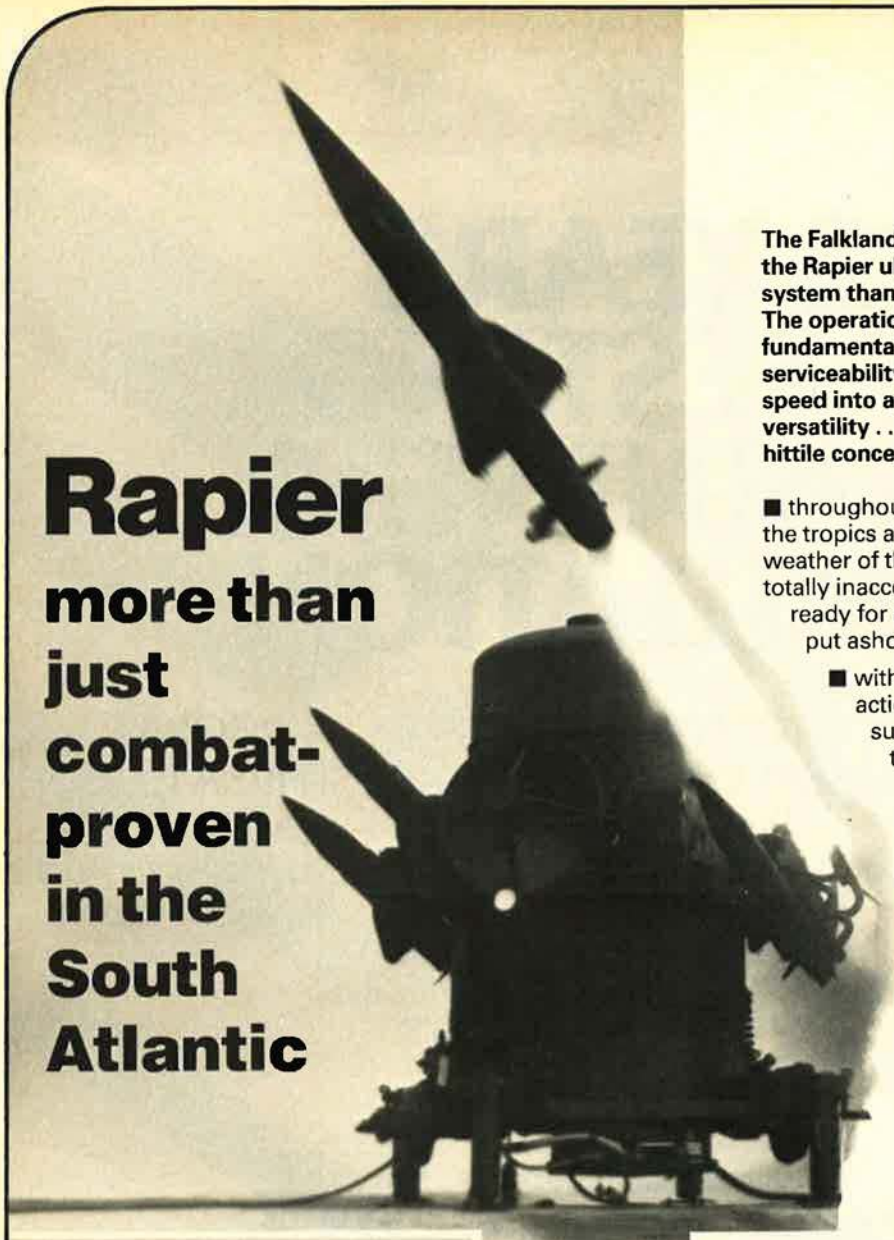
Rapier

more than just combat-proven in the South Atlantic



The Falklands campaign proved far more about the Rapier ultra-low-level surface-to-air missile system than its combat kill capabilities. The operation proved again and again all the fundamental advantages of the system – serviceability . . . transportability . . . mobility . . . speed into action . . . ease of operation . . . versatility . . . the accuracy and lethality of the hittile concept . . .

- throughout the 8-weeks sea voyage through the tropics and into the high seas and foul weather of the South Atlantic, equipment was totally inaccessible for servicing, yet Rapier was ready for action within 25 minutes of being put ashore in the Falklands.
- with equipment and crews experiencing action for the first time, Rapier successfully defended the beach-head through 7 days of repeated attacks by aircraft flying fast and often as low as 10m above water, and making skilful use of ships and terrain to avoid detection and interception.
- as ground troops advanced, Rapier was moved forward swiftly across atrocious terrain offering few options for siting or concealment.
- despite the absence of early warning radar, the operational hazards of confined and crowded zones, and lack of time or facilities for servicing, Rapier destroyed at least 14 aircraft.
- throughout the action, Rapier maintained over 90% availability.
- ease of training and operation was typified by the fact that one aircraft was destroyed by a soldier who received his first training on the sea voyage south.

TOWED RAPIER is at combat readiness with the British Army and RAF Regiment, in the UK, with NATO forces in Germany, and elsewhere overseas. It is also operational with defence forces in Australia, Africa, the Middle East and Far East and has been ordered by the USAF to defend UK air bases and by Switzerland.

TRACKED RAPIER is in full production for the British Army and the first units are now in service.

Rapier-success built on success

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military intervention in the private affairs of sovereign nations.

The "discussion" at the conclusion consisted of this Latin American individual "passing the hat." The money, ostensibly for "medical supplies," was to be provided the Salvadoran rebels through an arrangement in Mexico. The film made some interesting points, but the presentation lost all credibility with this blatant financial pitch supporting a rebellion of dubious merit.

Locking my wallet, I promptly got up and walked out. What bothers me today is that I walked out *alone!*

Geoffrey C. Kelly
Federal Way, Wash.

We Try

Since excellence is the norm with AIR FORCE Magazine, I'm sure that your readers come to take that level of quality for granted. I just wanted to let you know that you did a particularly fine job on the March issue on Soviet aerospace.

The cover painting is fantastic. I had to do a double take to make sure that it wasn't a color photo. Sometimes artists are criticized when paintings look too much like photos, but here is a case where it simply would not have been possible to get a photograph. Hats off to artist William S. Phillips.

Your editorial in the same issue about the pay freeze hits home. If you find out who has been issuing statements in the name of senior DoD officials, perhaps the problem can be solved.

Paul Stillwell
Editor, *Naval Review*
Annapolis, Md.

Three Eagles in the Hilton

I was a Vietnam POW for almost seven years, and I have two comments on Col. Jon A. Reynolds's article in the February issue *("The Eagle in the Hilton," February '83, p. 82).*

First, I agree completely with Jon on the role Robbie Risner played as our SRO (senior ranking officer). I love and admire Robbie more than any man I've ever known. I am so glad Jon wrote the article because I feel Robbie never got the credit he deserved when we were released. Col. John Flynn, the senior prisoner when we were released, got a lot of praise that Robbie deserved, as well as Jim Stockdale and Jerry Denton, also.

My second point is, and I have said it for the last ten years in hundreds of speeches, I believe God put three great leaders in Hanoi to lead us right from the start. Those three men were Robbie Risner, Jim Stockdale, and Jerry Denton. Jon mentioned Robbie and Jim, but omitted Jerry Denton. Commander Denton was the first SRO and did a great job. During his seven and one-half years, *no one* gave the Vietnamese more trouble than Jerry Denton. Robbie Risner and Jim Stockdale were great, but so was Jerry Denton.

As Jon ended his article: "It was a difficult time with few rewards, but if you had to be there [and I was], you couldn't have picked a better CO than Robinson Risner." I agree, but want to add Jim Stockdale and Jerry Denton to the list.

Larry "Lucky" Chesley
Gilbert, Ariz.

AIRMAIL

VaANG History

We are looking for former members and associates of the Virginia Air National Guard interested in a commemorative history book celebrating the unit's thirty-fifth anniversary.

This limited edition book documents the history of the 192d Tactical Fighter Group, tracing its development from the twenty-seven men of the 149th Fighter Squadron with their P-47 aircraft to the 1,000 people who fly and maintain the unit's A-7D Corsair jets today. The 214-page album relates lots of "war stories" and features many photographs dating back to the unit's birth in 1947.

This book is the only complete pictorial history available of our unit. I feel it is a tribute to all those who helped make our organization what it is today.

Anyone interested in the history book should contact the address below.

Maj. Basil Evans, VaANG
192d TFG
Byrd International Airport
Sandston, Va. 23150
Phone: (804) 222-8884

GaANG History

The Georgia Air National Guard's 116th Tactical Fighter Wing located at Dobbins AFB is in the process of compiling a history of the unit. We plan to publish the Wing's complete history, from its original organization, the 128th Observation Squadron in 1941, to the present.

We would like to get in touch with former members in order to gather photos of action scenes and personnel. Also, we want to let everyone know that we will soon have a quality publication giving the complete history of one of the first and finest of the twenty-four Air National Guard wings.

Please contact the address below to send photos or for information.

Maj. William E. Ridley, Jr.,
GaANG
Hq. 116th TFW
Dobbins AFB, Ga. 30069

Shoo Shoo Baby

The restoration crew that has been rebuilding the B-17G *Shoo Shoo Baby* has been searching for four years for information concerning the "barred waist windows" used on our plane. No Boeing blueprints or technical drawings survived. Since this type of waist-gunner's window was used only for a relatively short time, very little usable information has been found in the "normal" files.

If anyone has any photographs showing closeups of inside or outside of this window, or any AAF tech orders or factory manuals giving any part numbers or technical information, please contact us at the address below. (Photos and manuals can be copied and returned.)

Michael D. Leister III
Curator
512MA/AARG
Dover AFB, Del. 19902

Calling All Weasels

Attention all Weasels, ex-Weasels, and former members of the 81st TFS:

The 81st Tactical Fighter Squadron (Wild Weasels) at Spangdahlem AB, Germany, is in the process of remodeling its crew lounge facilities. Included in the renovation will be a large area devoted to squadron history and achievements.

To help make this a first-class project, we need photographs, anecdotes, and other mementos relating to individual or squadron accomplishments. Particularly useful would be information relating to the forty-plus kills achieved by squadron pilots, and specific Weasel achievements.

If you would like to be a permanent part of USAFE's finest tactical fighter squadron's history, please send any information/material to the address below. When the project is completed, you will receive photographs and a description of your contributions to the history section. Any material not used will be returned.

You helped to make this squadron what it is today. We look forward to recognizing your contributions.

Maj. Frederick Williston, USAF
Box 3249, 81st TFS
APO New York 09123

AIRMAIL

US Airpower in Europe

I am compiling a book on the history of the United States military aviation in Europe from 1945–70 with Arthur Pearcy, author of *Dakota at War.* I require photographs with approximate dates and locations, negatives, unclassified stories, logbook extracts, and enthusiastic contacts who flew or served in Europe from Iceland to Turkey. All photographs and material will be returned.

I am anxious to locate a Colonel Keeler who had a farm near Johnstown, Ohio, and who flew SAC B-47 Reflex operations from Lockbourne AFB to RAF Greenham Common.

Please contact the address below.

Tony Weaver
11 Duchy Close
Chelveston, Wellingborough
Northants. NN9 6AW
England

Survival Kits

Wanted: Factual information on the components and packing layout of the most common World War II survival kit, the B-2 para backpack kit. I'd also like to know if any reader has knowledge of the C-1 survival vest used in combat missions in late WW II or Korea.

All letters received will be appreciated and answered. This information is being gathered for the service museums.

Bob Lehmacher
6260 W. 85th
Burbank, Ill. 60459

1st Air Commando Group

I am a model airplane enthusiast and am building a large-scale, radio-controlled model of the P-47D Thunderbolt. The color scheme I am going to use is that of the 1st Air Commando Group. Pictures of the Commandos' P-47Ds are far and few. If anyone out there has any information and/or pictures, please contact me.

I am also curious to know if any of the P-47Ds of the Group had bubble canopies. If so, I would like to know the aircraft's tail numbers.

This information would be very much appreciated. Please contact me at the address below.

Capt. Fred J. Rannalli, Jr., USAF
PSC Box 1864
APO San Francisco 96328

Leadership and Management Center

The USAF Leadership and Management Development Center is presently building a display of its organizational history. Accordingly, we are requesting any photographs and memorabilia from previous members of both LMDC and its predecessors, the Warfare Systems School and the Air University Institute for Professional Development.

Any submissions would be gratefully received. Please contact the address below.

Col. Leroy W. Thornal, USAF
LMDC/ES
Maxwell AFB, Ala. 36112
AUTOVON: 875-7716

Culver Cadet

A former World War II USAAF mechanic told me about a very small, single-seat, all-wood, low-wing monoplane with conventional landing gear that was used to train gunners for the B-29. He called it a "Culver Cadet."

Can someone tell me about this aircraft or tell me where I can find a picture?

Please contact the address below.

J. R. "Bill" Bailey
1541 Eastwood Dr.
Slidell, La. 70458

525th Fighter Interceptor Sqdn.

I am interested in tracing the history of the 525th Fighter Interceptor Squadron. I was an armament troop when the "Bulldogs" were at Bitburg AB, Germany, from November 1961 to November 1964. It was an F-102 outfit at the time.

Any help would be appreciated. Please contact me at the address below.

Al Owens
6948 Georgetown Ave.
Hudsonville, Mich. 49426

56th Fighter Group

I am a historian studying the 56th Fighter Group in World War II. I have completed research into the unit's group and squadron histories at Maxwell AFB, Ala. I would now like to locate pilots who flew with the 56th.

Please contact me at the address below.

Kenneth P. Werrell
576 E. Moye Dr.
Montgomery, Ala. 36109

Escuadron Aereo de Pelea 201

I would like to hear from anyone with any information regarding *Escuadron Aereo de Pelea 201,* the Mexican Expeditionary Air Force Squadron that flew in the South Pacific in mid-1945.

Please contact me at the address below.

Lt. Col. Robert Hecker, USAF (Ret.)
6115 Selma Ave.
Suite 206
Hollywood, Calif. 90028

Dover AFB

I am interested in contacting anyone who served at Dover AFB, Del., prior to 1960 for information for a forthcoming book.

Please contact me at the address below.

Thomas Ofcansky
2054 Generals Way
Dover, Del. 19901

Where Are You?

In searching for the former members of the 451st Bomb Group, it has almost become an obsession to locate the pilots who made up the first cadre who participated in combat flights from bases in Italy. Three of these original pilots who served in the 724th Bomb Squadron who I have yet to locate are Lt. Robert A. Nagle, Lt. Robert L. James, and Capt. Frederick C. Lawton.

If any readers have any information on the whereabouts of these men, please send it to the address below.

Bob Karstensen
1032 S. State St.
Marengo, Ill. 60152

I am looking for Helen Cole. She was a second lieutenant (pilot) in the CAP's St. Paul, Minn., unit in 1945. I am quite sure that she is from the St. Paul area.

If anyone has any information, or knows this person and her whereabouts, please contact me at the address below.

Capt. William B. Harris, USAF (Ret.)
P. O. Box 331
Elkins, W. Va. 26241
Phone: (304) 335-2541

I am searching for information about Roger C. Cooper, who was a US Army Air Forces pilot with the Ninth Air Force during World War II. The only facts that I am now aware of are that Cooper held the rank of captain, served overseas in the European-African-Mideast Theater for more than two years, and was awarded the Distinguished Flying Cross.

I would like to know with what group and squadron Cooper served, the dates of his overseas service, and for what action he was awarded the DFC (and when it took place).

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I would be very grateful if anyone could supply this information. Please contact me at the address below.

Jay W. Crisp
RR #2
Monroeville, Ind. 46773

We are attempting to locate Col. Lee Volet for a reunion. In 1955–56 he was a captain serving as a USAF exchange pilot with the Royal Canadian Air Force's CEPE Climatic Detachment in Namao, Alberta.

Former members of the Detachment have tentatively planned a reunion to be held in Ottawa in late summer 1983.

Please contact the address below.

CEPE Climatic ROC
143 Cameron Ave.
Ottawa, Ontario
Canada K1S OX2

Where are the members of the old 369th Bomb Squadron, the "Fightin' Bitin' Squadron?"

We were together at MacDill AFB, Fla., in 1951–56. It would be great to get news of the group.

Please contact me at the address below.

Marion McElroy
9169 Alcott St., #7
Los Angeles, Calif. 90035

Members of the B-17 crew from the 483d Bomb Group who bailed out near Cracow, Poland, on October 14, 1944, and who were rescued by the Polish Underground are asked to contact me at the address below.

George Shiller
520 Kelton Ave.
Los Angeles, Calif. 90024

I am trying to locate an old friend from Franklin High School in Portland, Ore. (1936).

I came across a picture of him in a book. In it, Lt. Robert W. Deiz was given credit for two FW 190s.

The last I heard he was in the Chicago, Ill., area.

Robert M. Anderson
555 N. Danebo, #58
Eugene, Ore. 97402

I would like to make contact with some old Army buddies. Their names and last known addresses are: Clancy Damron, Williamson, W. Va.; John McKowen, Shreveport, La.; Joaquin C. Carrillo, Jr., Tucson, Ariz.; Richard White, Bangor, Me.; and Bob and Gladys Gray, Van Nuys, Calif.

Please contact me at the address below.

Sandy Cortesio
906 Drake
Centerville, Iowa 52544

Collectors' Corner

I would like to know where I might obtain a desktop model of the B-47 jet bomber. I am interested in obtaining one because I flew B-47s at Homestead AFB, Fla., and in SAC's Reflex Action in Morocco.

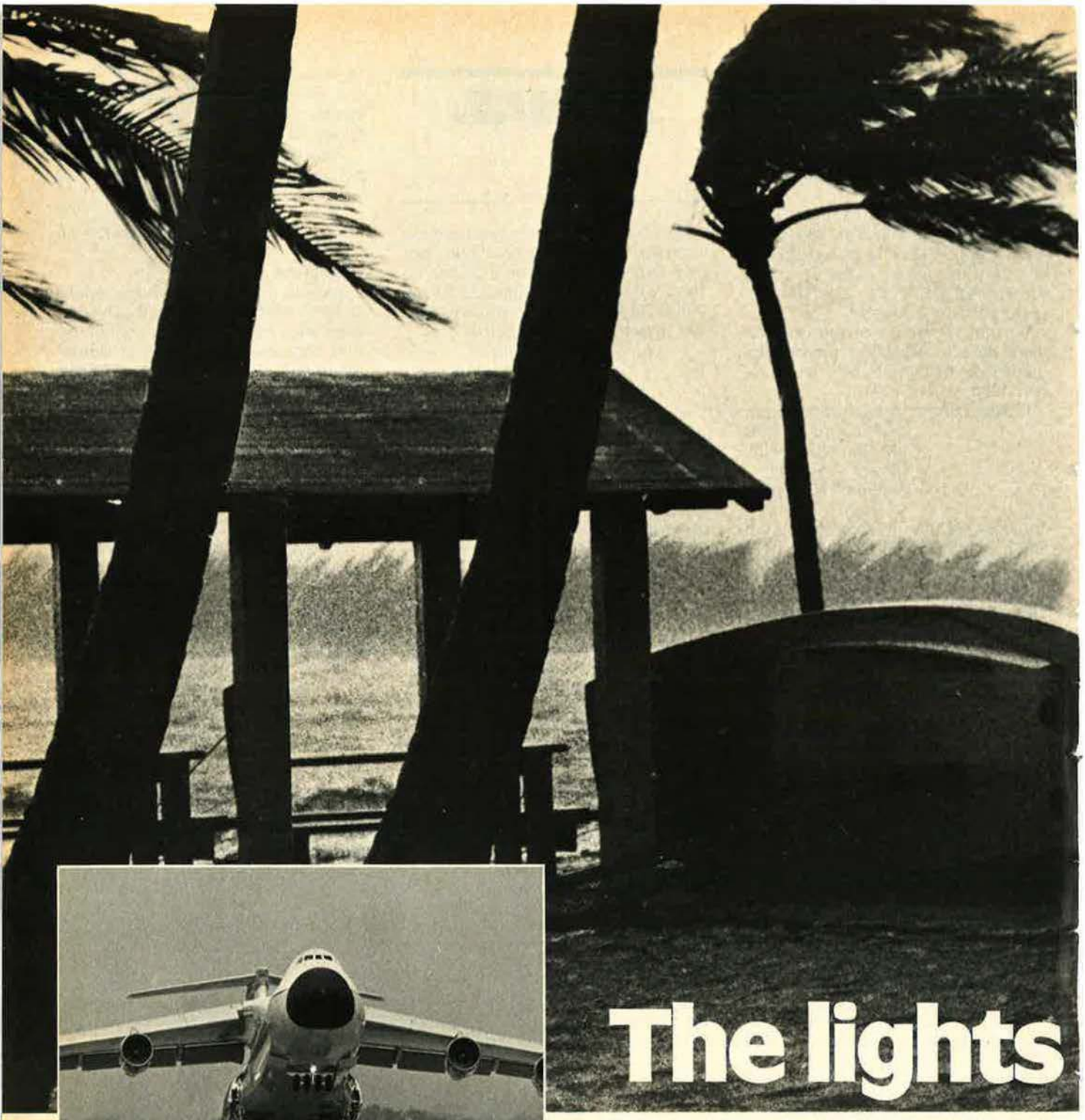
Please contact the address below.

Maj. William A. Cade, Jr., USAF (Ret.)
3186 Mathieson Dr., N. E.
Apt. 7
Atlanta, Ga. 30305

I'm trying to obtain photographs or negatives of B-52/KC-135 aircraft. I'm interested in flight-line or in-flight pictures, and will pay for the copying of material submitted, and will return the material.

Please contact the address below.

James W. Green
451 E. 102d, Apt. 2D
New York, N. Y. 10029



The lights but the C-5

A late-1982 hurricane, lashing out with winds of 125 miles per hour, battered the Hawaiian Islands—leaving thousands homeless and devastation widespread.

On Kauai, damage was especially intense, and the island's entire electrical system was demolished by the storm.

Kauai was powerless.

Responding fast to the urgent situation, two Lockheed C-5s loaded up at Point Mugu Naval Air Station in California and headed for Hawaii. One airlifter carried two 2500-KVA gas turbine generators, each weighing 39,000 pounds and mounted on a 40-foot flatbed trailer. The second C-5 carried an additional generator and a 36,000-pound electrical substation.

Between them, the two C-5s delivered enough equipment to supply Kauai with emergency electrical power through the weeks until regular service was restored.

Reacting swiftly in an emergency with large and heavy loads is one of the C-5's missions. The new C-5B

UPI Photo

lifts the blackout.

continues that tradition—combining improved systems with the C-5A's demonstrated ability to deliver outsized cargo wherever it's needed.

The C-5B's proven electronics will include a simplified automatic flight control system; a lighter, more reliable color weather radar; a state-of-the-art communications/navigation system; and a digital air data computer, among other systems.

Newly developed aluminum alloys will give the C-5B greater structural strength and corrosion resistance. And it will have the new, more reliable TF39-1C engines that are already performing on the C-5A. All of this contributes to lower maintenance hours for the C-5B.

The C-5B. It will be even more capable than the C-5A, an airlifter of unmatched capabilities.

Lockheed C-5

IN FOCUS...

The President's Strategy Surprise

By Edgar Ulsamer, SENIOR EDITOR (POLICY & TECHNOLOGY)

Many in the Pentagon fear that betting on exotic technologies may weaken the case for the FY '84 Defense budget.

Washington, D. C., Apr. 5

On March 23, President Ronald Reagan, in the first of a series of speeches on national defense, suggested a revolutionary approach to strategic deterrence that would be based on the interception and destruction of Soviet ballistic missiles in flight rather than on the threat of retaliation.

Presidential aides likened the importance of this decision to that of the Manhattan Project, which led to the World War II atomic bomb. The President referred to his initiative as an "effort which holds the promise of changing the course of human history." Acknowledging that he was assigning a formidable task to the Pentagon and the scientific community that "may not be accomplished before the end of this century," the President said that "as we proceed, we must remain constant in preserving the nuclear deterrent and maintaining a solid capability for flexible response."

Apparently in order to minimize concern among this country's allies, the President added that "as we pursue our goal of defensive technologies, we recognize that our allies rely upon our strategic offensive power to deter attacks against them. Their vital interests and ours are inextricably linked—their safety and ours are one. And no change in technology can or will alter that reality."

The President's decision to add to his speech the news of a possible shift in national strategy from offensive to defensive deterrence reportedly caught most of the Pentagon and Congress by surprise. The Joint Chiefs of Staff, however, had meetings with the President where the subject of advanced ballistic missile defenses was discussed—the last time on the Sunday prior to his speech.

Many senior members of OSD did not know that the President planned to launch this new strategy until a few hours before he went on the air. Both in the Pentagon and in Congress there was concern that by committing the nation to futuristic technologies of uncertain feasibility and cost, the President may have weakened the case for the FY '84 Defense budget request now before Congress.

The motivation for exploring exotic, twenty-first century technologies to supplant eventually the morally reprehensible concept of mutual assured destruction, as outlined by the President, is beyond reproach. Indeed he held up a vision of great moral appeal:

"Up until now, we have increasingly based our strategy of deterrence upon the threat of retaliation. But what if free people could live secure in the knowledge that their security did not rest upon the threat of instant US retaliation to deter a Soviet attack; that we could intercept and destroy strategic ballistic missiles before they reached our own soil or that of our allies?"

Conspicuously absent from the President's concept of a future deterrent based on defense rather than offense was consideration of air-breathing offensive nuclear weapons that presumably would not be neutralized by future exotic ballistic missile defenses. Yet, currently mature technologies, such as advanced countermeasures and sharply reduced detectability, appear capable of assuring the operational effectiveness of modern air-breathing systems well into the next century.

Interestingly enough, the President conceded that "defensive systems have limitations and raise certain problems and ambiguities. If paired with offensive systems, they can be viewed as fostering an aggressive policy, and no one wants that."

The President provided no clues about the nature of the exotic technologies that would disable Soviet ballistic missiles before they could reach their targets, other than to say that "current technology has attained a level of sophistication where it is reasonable for us to begin this effort. It will take years, probably decades, of efforts on many fronts. There will be failures and setbacks just as there will be successes and breakthroughs."

Committing the nation to a "comprehensive and intensive effort to define a long-term research and development program to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles," he called on the "scientific community who gave us nuclear weapons to turn their great talents to the cause of mankind and world peace; to give us the means of rendering these nuclear weapons impotent and obsolete."

If, as is probable, the President's rhetoric of excising offensive nuclear weapons was meant to take some of the wind out of the sails of the nuclear freeze movement, then it was largely unsuccessful; the nuclear freeze movement's reaction centered on the charge that the President planned to scuttle the SALT I antiballistic missile (ABM) treaty and to launch an arms race in space. The reaction among many defense scientists and experts was only slightly less negative, albeit for different reasons.

Except for a very recent advance in the field of short-wavelength excimer lasers that eventually might lead to the possibility of delivering lethal laser energies into space from ground stations—and doing so reliably with the help of advanced adaptive mirrors—progress in the twenty-plus-year-old quest for militarily useful directed energy (lasers, charged or neutral particle beam, or microwave) weapons has been slow. ("Excimer" is a new coinage denoting lasers that use the so-called noble gases in an excited energy state.) The deadline for deciding whether or not the Air Force is to develop a prototype space-based laser weapon that could

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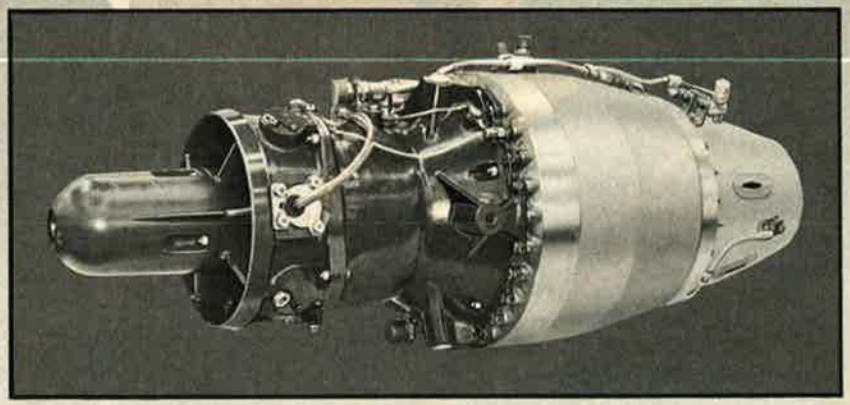

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Furthermore, the actuation systems we pioneered on such missiles as Nike Hercules, Nike Zeus, SUBROC, and Spartan helped establish state-of-the-art technology for today. Among our current applications are MX, Pershing II, Trident, ALCM, ASW/SOW, HARM, and ALWT.

In addition, we have capabilities in electronic systems, including weapons launch controls, air data sensors and computers, solid state power conditioning systems, plus electronic cooling systems. Our experience also includes ground support, environmental, and power drive systems.

So if you're looking for qualified leaders with a solid reputation, contact Garrett's AiResearch Manufacturing Company.

Before you've gone too far.

Write: Missile Systems Sales, AiResearch Manufacturing Company, 2525 West 190th Street, Torrance, CA 90509.

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be used to disable hostile satellites has slipped by one year to 1988.

Neither the Air Force nor the Army has yet launched a concept definition effort to nail down the technologies that might lend themselves to eventual "weaponization." Also, there have been no comprehensive assessments of associated battle management and C³I (command control communications and intelligence) needs, even though their feasibility may prove as critical as the feasibility of the weapons technology itself.

Dr. James P. Wade, Principal Deputy Under Secretary of Defense for Research and Engineering, and other Defense Department experts told the Senate Armed Services Committee last year that space-based surveillance systems capable of operating in tandem with advanced technology ABM systems "would be major systems developments in their own right." DoD experts also testified that it might be possible to fly a space-based laser weapon prototype as early as 1990, but that this would represent a high-risk approach.

Also, such a prototype would have only a limited capability for an antisatellite mission and "almost no capability against aircraft and essentially no capability against ICBM attack. We consider this option to have no growth potential, and it is not an option which we could recommend that the country pursue."

Probably the most difficult problem facing space-based directed-energy weapons—whether lasers, nonnuclear impact designs, or particle beam devices—is survivability. DoD experts testifying before Congress left "little doubt" that space-based weapons can be destroyed by concerted enemy attack, with threats ranging from impact weapons to nuclear effects at long range. It follows that space-based "battle stations"—several hundred of which probably would have to be deployed to provide continuous coverage of Soviet ICBM, SLBM, and intermediate-range ballistic missile launch areas with the density required to intercept some 3,000 Soviet ballistic missiles almost simultaneously—must incorporate standard defensive measures, such as the ability to avoid, engage, and destroy attackers, and exhibit force structure and design characteristics that ensure reasonable survival rates.

Obviously the task of acquiring and cataloging vast numbers of missile targets within a few minutes, attacking them, establishing that they indeed have been put out of action, and reattacking those that were missed in the first pass is of titanic proportions. The problem would become even more difficult if—as is likely—the Soviets deploy decoys, such as infrared emissions that mimic those associated with missile launches.

If, as the President suggested, the US were to commit itself to an exclusively defensive deterrent posture, even a relatively small percentage of Soviet warheads "leaking" through the defensive shield obviously would be intolerable in light of the vast lethality of nuclear weapons. History knows of few perfect defensive systems and supports the axiom that it is easier to attack than to defend.

In this context, Pentagon experts told Congress that systems patterned on this country's Miniature Homing Vehicle antisatellite (ASAT) weapon would represent a major threat to space battle stations. Such an ASAT, when launched by aircraft or small boosters, would be extremely difficult to detect because it could approach from many aspects—including directions where the sensors of the target are blind—and during any portion of the battle station's orbit. Further, such attacks could be launched in salvos. While a space-based directed energy weapon could theoretically destroy a Miniature Homing Vehicle, detecting and acquiring such a wily target in time appears to be beyond even the best available technologies.

Defense Department scientists testified that a space battle station would also be vulnerable to a "space mine" or "fellow traveler," either a conventionally or nuclear-armed weapon that could be detonated by ground command or preprogramming. Assuming that such mining tactics could be spotted in time, the US would have to enforce a sterile "keep out" zone around space-based laser weapons. Since nuclear effects in space retain significant destructive capability over distances of hundreds of miles, this might prove impossible.

The gravest threat to future space-based laser weapons is posed by direct ascent, one-on-one nuclear antisatellites, especially if they are heavily protected with an ablating heat shield to counter the battle station's self-defense capability.

Lastly, DoD experts don't rule out the possibility of laser weapons battling each other, involving attacks on laser battle stations by laser ASATs or even ground-based laser weapons. While scenarios of this sort take on a *Star Wars* tincture, competent scientists point out that if space-based laser weapons indeed prove feasible and practical, the "attacking" laser would have the advantage over the defender.

At this writing, the White House reportedly is drafting an NSSD (National Security Study Directive) that is to outline the scope, direction, and timing of the national effort. Equally important, this NSSD is to establish an organizational structure, including assignment of specific responsibilities, for this program. The National Security Council and other elements of the White House are putatively aware of the danger of a "turf fight" between the Army and the Air Force over which service will have cognizance over what. The Army in the past has been in charge of ground-based ABM, while the Air Force, by decision of OSD and the Joint Chiefs of Staff, is responsible for space. The impending elevation of the Air Force's Space Command to unified command status probably will make it the ideal agency for running the President's program in an operational sense.

Until the new technologies actually have led to the fielding of an operational system, the mere prospect of such a technological panacea must not distract the executive branch and Congress from the resolute support of the five-pronged strategic force modernization program announced by President Reagan on October 2, 1981.

Keeping the Russians in Russia

Sen. Sam Nunn (D-Ga.) urged in a widely noted speech before Georgetown University's Center for Strategic and International Studies that US strategy be revised to "place the conventional horse before the nuclear cart." Arguing for balanced modernization of both the nuclear and conventional forces, he warned, nevertheless, that leaning on our nuclear crutch "can't compensate for conventional weaknesses." The ensuing paramount need is the "development of a military strategy and military forces that deny the Soviet Union any prospect of achieving its objectives through conventional aggression."

Realization of these ambitious goals would require fundamental and bold changes in Western military thinking, he conceded. Key is the concept of "keeping Russian forces in Russia." By interdicting the Soviet Union's tenuous internal lines of communications and limited access to the sea, on the one hand, and by tying

up their forces in places other than where they attack—or threaten to attack—on the other, this bottling-up strategy might become credible, he suggested. Specifically, a Soviet invasion of either Europe or the Persian Gulf region might actuate US responses in the Far East, including the prospect—real or presumed—of the People's Republic of China opening a second front to isolate Soviet forces in the Far East.

Additionally, a modernized US strategy must send a clear message to Moscow that in the event of an attack on NATO "their forces in or passing through Eastern Europe will be subjected to attacks ranging from deep aerial strikes to commando and partisan raids," Senator Nunn proposed. Capitalizing on latent resistance to Soviet hegemony in the satellite states, the US should revive policies in effect in the 1950s when "we trained and fielded special stay-behind forces dedicated to disrupting Soviet military activity in occupied territory and to promoting indigenous popular resistance." Creation of such forces, he argued, "would strengthen deterrence by putting the Soviet Union on notice that it could not expect a free ride in Eastern Europe in the event of an invasion of Western Europe."

Another component of the "keeping the Russians in Russia" strategy proposed by the Georgia lawmaker is to maximize the US Navy's ability to deny Russian use of the sea. He defined this objective as "sinking the Soviet fleet and bottling up the remnants. I would include the Russian merchant marine and fishing fleet which operate in concert with the Soviet Navy."

By sinking and blocking the Soviet Navy, Senator Nunn suggested, the US "would gain sea control, protect the lines of communication, and, also, at war's end, leave no viable opposing navy to threaten us, whatever the outcome on land."

Stressing the importance of fusing the operations of naval forces and land-based air, he claimed that the "best way to keep the Soviet Navy in its proper place is to keep it bottled up in the Norwegian, Baltic, and Black Seas and the Sea of Japan. Even if we have to repaint some Air Force planes Navy blue and gold, we must insist that our naval strategy be based on full utilization of land-based air." He counseled the US Navy against taking on Soviet naval power "through massive employment of our carrier-based airpower directly against heavily defended ports and naval installations in the Soviet homeland."

IN FOCUS...

In the tactical arena, Senator Nunn highlighted the importance of achieving tactical air superiority in any theater of operations deemed vital to the US within a few days after the outbreak of hostilities. The top procurement priority from the standpoint of tactical airpower, he claimed, is the "development of improved conventional munitions for delivery from standoff ranges . . . to multiply dramatically the military effectiveness of our existing aircraft."

Stepped-up tactical capabilities should be accomplished primarily through the Guard and Reserve forces who have demonstrated repeatedly—along with those of the other services—that "it is possible to maintain a degree of readiness and combat skills equivalent to or even superior to that of their active-duty counterparts."

He added that integrated active and reserve forces could yield the United States a less costly yet more combat-effective force structure characterized by larger, readier reserves. "The time has come to stop parroting the virtues of the Total Force Concept and make it a reality. Truly ready reserve forces are perhaps the best defense bargain available," he suggested.

Calling for a review of NATO's present doctrine of Forward Defense, he suggested that the capabilities to implement this strategy were inadequate. "NATO is thus confronted with a choice either to drop the concept of Forward Defense as part of NATO's doctrine; or to convert Forward Defense from a theory into a reality by reallocating the NATO defense burden," he urged. Stressing that US ground forces must remain a vital part of the defense of Europe, Senator Nunn said that "to properly implement the new Army-Air Force doctrine of 'Air-Land Battle 2000,' our forces must emphasize maneuverability and flexibility, lighter reinforcements, special operations forces, communications, and second echelon attack."

The allies, on the other hand, must provide a greater share of the "basic ingredients of Europe's initial Forward Defense, including heavy ground forces, more effective utilization of their vast pool of trained reserves, and possible employment of barrier defense. In short, if US forces in Europe are to assume the primary responsibility for disrupting and destroying Soviet second echelon forces, European units must assume the primary responsibility for holding the first echelon in check."

If it is politically essential that Forward Defense remain a key part of NATO's strategy, "it is no less politically essential that our European allies explain to their citizens why they are not providing the forces to implement the Forward Defense of their territory," Senator Nunn complained.

Looking beyond Europe to the Persian Gulf area, he cautioned against slugging it out "tank for tank" with the Soviets in their own backyard and stressed instead the advantage of "light, strategically mobile reaction forces designed to beat the Russians to the vital ground and thereby confront them with the choice of backing off or firing the first shot in a war between two nuclear-armed states. We should also strongly emphasize tactical air and other military capabilities designed to isolate Soviet field forces by severing their lines of communication."

A military strategy based on coalition warfare dictates an arms-control strategy reflecting the same principle: "Our arms-control efforts must enjoy the confidence of our allies as well as our own citizens. We must develop a bipartisan approach to arms control that has some hope of continuity beyond one administration." In this context, he recommended creation of a bipartisan commission to oversee the US arms-control efforts, regular visits and exchanges between US and Soviet defense military leaders, establishment of a joint US/Soviet crisis control center to help prevent accidental nuclear war, and adoption of a "build-down accord" with the Soviets that would commit both sides to eliminate two nuclear warheads for each new warhead added.

Known as the Cohen (Sen. William S. Cohen of Maine)-Nunn Senate Resolution Number 57, this proposal is gaining strong support in both houses of Congress, the Administration, and the Pentagon. In gist, it provides for a mutual guaranteed build-down of nuclear forces without inhibiting essential nuclear strategic and theater force modernization. New nuclear weapons could be deployed to enhance survivability, military stability, and negotiating leverage, but only by "giving up two to get one, which in the view of the sponsors would start both countries down the road toward drastic weapons reductions." ■

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CAPITOL HILL

By Kathleen G. McAuliffe, AFA DIRECTOR OF LEGISLATIVE RESEARCH

Washington, D. C., Mar. 25

Budget Outlook

House Democrats easily dumped the President's proposed defense budget for FY '84, which called for ten percent real growth, and instead agreed to a four percent increase. Under the House plan total national defense spending authority would be $263.8 billion and $235.4 billion in outlays—reductions of $16.4 billion and $9.3 billion, respectively.

However, the Congressional Budget Office (CBO) claimed the House-passed level provides only 2.3 percent growth for defense since the House Budget Committee arbitrarily reduced the CBO inflation rate by a full percentage point. Further, the inclusion of a four percent military pay raise distorts the true picture of real growth.

Focus now is on the Senate Budget Committee, which, prior to the mark-up postponement at the President's request, had been set to vote a five percent defense growth with only four panel members supporting seven percent. Now, however, congressional sources believe 7.5 percent may be approved. The Senate Committee may be swayed to this view by changed economic assumptions, especially a lower deficit projection, and anticipated upturns in the March index of leading economic indicators. If approved by the panel, full Senate passage would almost be assured and conference with the House could result in a compromise real growth rate in the six percent range—a level somewhat more palatable to this Administration.

Pro-Freezers Confused

Members of Congress who support the nuclear freeze resolution differed on whether the legislation allows modernization of the US strategic deterrent.

The report by the Foreign Affairs Committee accompanying the freeze resolution states unequivocally that "a freeze would mean a stop to all activities in any weapons program to be included so that the detection of even one new missile or aircraft would be evidence of a violation." The resolution's intent would even prevent deployment of any dual-purpose system, including F-15s and F-16s, and other dual-capable tactical systems. However, freeze sponsor and Foreign Affairs panel chairman Rep. Clement Zablocki (D-Wis.) told House colleagues that the resolution would in fact allow deployment of such systems as the B-1B and Pershing II.

Other pro-freeze members claimed that only maintenance of current inventory systems would be permitted. This, however, would seem to defy pro-freeze claims of maintenance of essential equivalence, since as systems become inoperable strategic parity would no longer exist.

Ironically, the Foreign Affairs panel chairman further said the freeze resolution, which urges the Administration to negotiate a mutual and verifiable freeze with the USSR, would in no way "hamper or negate our negotiations in Geneva on START or the INF (Intermediate-Range Nuclear Forces)." Perhaps the chairman needs to review his own committee's report on the freeze and brush up on Administration objectives in Geneva.

MX and SICM

Stuffing Minuteman silos with a limited number of MX missiles is gaining popularity in Congress. Ironically, this plan, originally proposed by the Administration as an interim basing solution for MX, was soundly rejected by Congress just one year ago. Many of those members of Congress who support silo stuffing also want to see eventual deployment of a small intercontinental missile (SICM) that could be truly mobile and carry only one warhead.

Rep. William Dickinson (R-Ala.), senior Republican on the House Armed Services Committee, and some panel staff lent support to the plan before the President's MX commission, suggesting further that deception—leaving some Minuteman holes empty of the MX—be included.

Envisioned is deployment of perhaps some 150 MX missiles in multiples of fifty. A strategic builddown could be further incorporated, *i.e.*, for every MX deployed, two or three Minuteman missiles could be dismantled. The President and his commission reportedly were receptive to the idea.

Senior USAF officials told the Armed Services panel that SICM development would not present overwhelming technical problems, but that there would be great difficulty deciding how to make the system mobile. Further, with 1,000 of the small missiles deployed in a mobile scheme, there would be manpower problems as well as security and environmental concerns. Achieving accuracy is also being questioned because of its total mobility, and throw-weight would be severely limited. Air Force officials view it essentially as a possible follow-on system to MX with deployment sometime after the year 1990.

C-17 in Trouble

The Air Force's proposed new outsize-capable inter/intratheater airlifter, C-17, may not last out the current fiscal year. The Defense Department is stalling on submitting to Congress a reprogramming request to pay the $60 million in R&D funds that were appropriated but not authorized last year. The C-17 program needs about $2.5 million per month to stay alive. Without the reprogramming, the program would be forced to shut down in July or August when current funds run out. Then a new development contract would have to be negotiated, ultimately resulting in higher costs.

Various members of the House and Senate are urging the Secretary of Defense to submit the reprogramming, which then would need approval of the Armed Services and Appropriations panels. The Armed Services Committees could well kill the request anyway since they have not been enthusiastic supporters of the program. However, should DoD refuse to act on the reprogramming at all, then it might look ahead to investigation by the appropriations panels of its entire airlift program. This could jeopardize the Air Force C-17 request of $27 million in FY '84. ■

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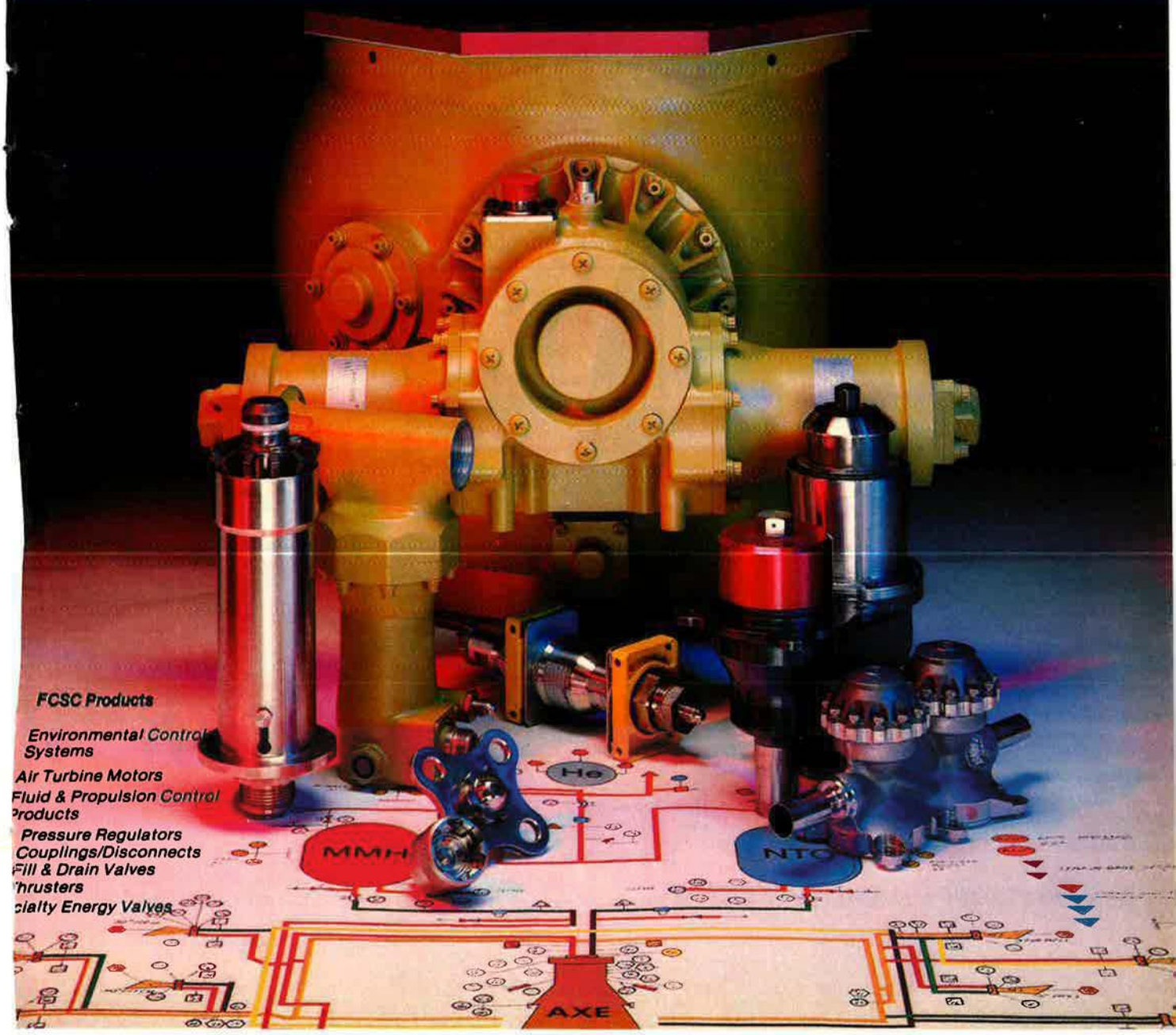

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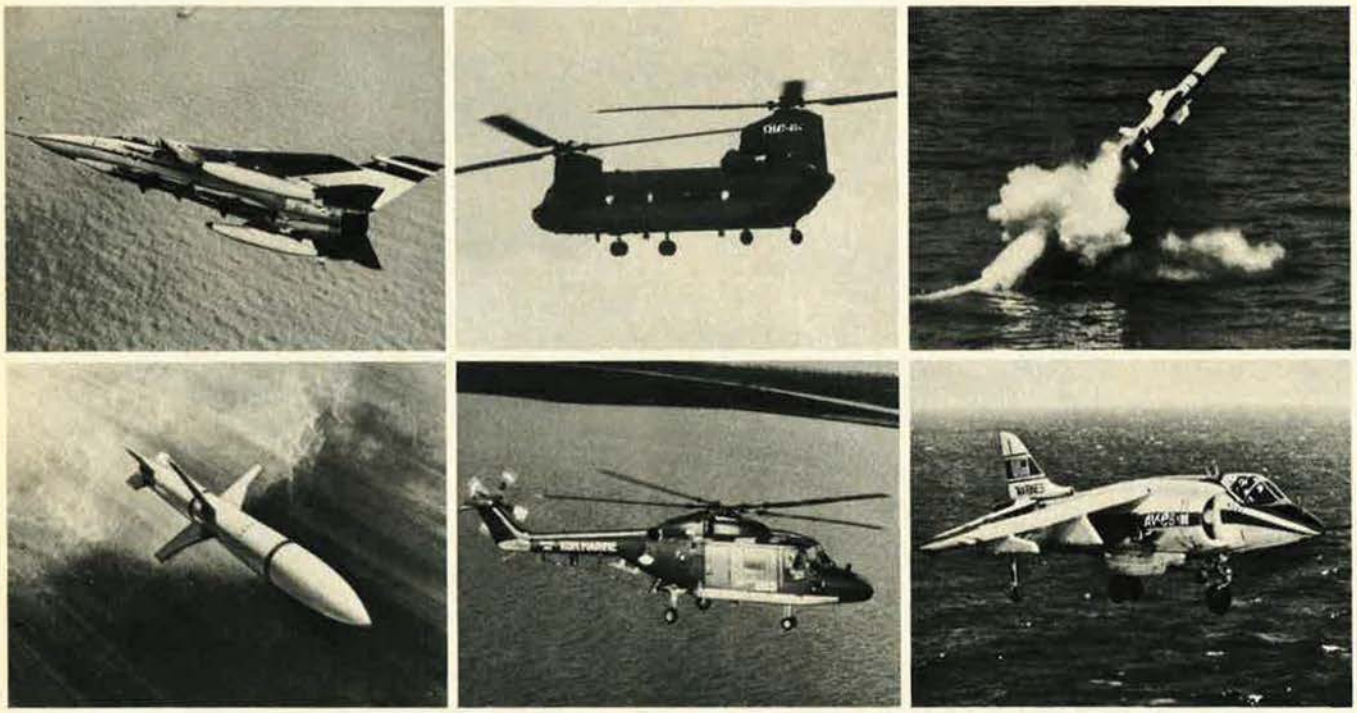

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AEROSPACE WORLD
News, Views & Comments

By William P. Schlitz, SENIOR EDITOR

Washington, D. C., April 4

★ An Air Force Reserve aircrew has been cited for courage and airmanship in safely landing a MAC C-5 following a massive bird strike during the transport's takeoff from Dover AFB, Del.

Fourteen members of the fifteen-person C-5 crew are assigned to the 512th Military Airlift Wing, an Associate unit collocated with the active-duty 436th MAW at Dover. The fifteenth crew member is with Hq. AFRES at Robins AFB, Ga.

On climbout in marginal weather, the aircraft, carrying forty-four passengers and weighing some 678,000 pounds with cargo, hit a large flock of snow geese at an altitude of about 200 feet. Several of the geese were ingested into the aircraft's four engines.

Immediately after impact, one engine overheated and began vibrating. It was retarded to idle. A second engine then caught fire and was shut down. The two remaining "good" engines suffered minor damage but continued to operate, and the aircraft shook violently. Following an emergency fuel jettison, the crew landed the aircraft at Dover without further incident.

Lt. Col. Ralph H. Oates, pilot and aircraft commander, was cited for his exemplary flying skill, professionalism, and outstanding leadership throughout the life-threatening emergency. Commended for their determination, competence, coordinated efforts, and aircrew discipline in facing the emergency were Lt. Col. Wallace M. Morgan, instructor navigator; Maj. Paul G. Grimm, navigator; Capt. David A. Roberts, copilot; CMSgt. Waymond D. Deaton, flight examiner loadmaster; MSgt. Bernard Coleman, flight examiner engineer; MSgt. Leon W. Hipkins II, instructor loadmaster; MSgt. Charles N. Werner and TSgt. John A. Brocklehurst, Jr., engineers; TSgts. Howard T. Culver, Paul A. Lagerman, Robert R. Newkirk, and SSgt. Robert L. Collins, loadmasters; TSgt. Gregory Konersman, engineer/scanner; and Sgt. Anthony D. Bastone, crew chief.

★ The Air Force is cracking down on members who drive under the influence of alcohol and drugs.

Base and local community programs to deal with the problem are being established as a major initiative. The objective is to educate drivers and change their attitude and behavior toward driving while intoxicated (DWI).

An Air Force DWI task force has developed a plan known as "US Air Force Driving While Intoxicated Program Initiatives Guide" that will serve as the basis for developing and administering local DWI programs. The guide is to be distributed to all bases.

National Highway Traffic Safety Administration statistics in the guide indicate that Americans in every age group are living longer except for males ages fifteen to twenty-four. The death rate in this category is three times that of young women of those ages, with drunken and drugged driving primary factors in the higher mortality rate. With more than sixty percent of the military services made up of men under twenty-five, these shocking figures are of deep concern to military officials.

They point out that during the ten years of the Vietnam conflict, 58,000 US military members died. In comparison, during that same span 274,000 US citizens died in traffic accidents involving alcohol. Last winter, a jetliner crashed in Washington, killing seventy-eight. That same day, seventy-three people were killed in the US by drunken drivers.

In a memorandum to service secretaries, Secretary of Defense Caspar Weinberger noted that "nearly 500 service members died last year as a result of" DWI, with injury and property damage estimated at between $110 and $150 million. "It is the No. 1 killer in the Defense Department and the worst form of drug abuse," he added. The key to an effective DWI program is sustained enforcement at the local base and community level, the Defense Secretary said.

To this end, any active-duty member, dependent, or civilian employee convicted of DWI by civil court or court-martial will be restricted from driving a personal vehicle on base for one year. And first-time offenders must complete an alcohol education program before driving privileges are restored.

In addition, an agreement calls for

Flight engineer SSgt. Rick Mrozinsky, right, and PJ A1C Richard Arnold lead children stranded by California's heavy downpours to awaiting helicopter for flight to safer ground. The two are assigned to Detachment 5 of the Aerospace Rescue and Recovery Service, Edwards AFB. The unit conducted six rescues and assists during the spell of turbulent weather. (Photo by SSgt. Tom Cocchiaro)

AEROSPACE WORLD

the NHTSA to provide twelve regional DoD workshops to train personnel involved in local DWI programs.

★ Air Training Command has been selected to receive the Major General Benjamin Foulois Memorial Award for 1982, presented annually to the major command with the most effective aircraft accident prevention program.

In 1982, ATC had the lowest combined Class A (damage over $500,000) and Class B (damage between $100,000–$500,000) mishap rate in its history. With only three Class A mishaps—equaling the command's all-time low in 1975—the rate was the third lowest in Air Force history for a large flying command. ATC had no Class B mishaps for the first time in its history.

In 1982, ATC flew 665,000 hours, an increase of 50,000 hours over the previous year. Flying hours almost equaled those of MAC and TAC, and comprised twenty percent of the total flown throughout USAF. ATC logged more than 1,640,000 landings during flying training, mostly in high-density air traffic environments.

USAF overall logged the best flying safety year in its history, with only 2.33 Class A mishaps per 100,000 flying hours (against 2.37 in 1973). Air Force pilots flew 3,300,000 hours in 1982.

The Foulois Award is sponsored by the Daedelian Foundation, founded in 1959 by the Order of Daedelians, a World War I pilots' group.

★ An Air Force captain who nursed a fuel-starved F-16 to a safe landing has been named to receive the 1982 Aviator's Valor Award.

Capt. William J. Lake, with the 388th Tactical Fighter Wing at Hill AFB, Utah, was test-flying the aircraft following an engine change. Noticing that fuel was being consumed at an unusually high rate (due to a ruptured line), Captain Lake increased altitude, slowed engine speed, and turned toward the nearest landing site—Wendover Airfield in Utah.

Seconds later the captain shut the engine down completely with just 100 pounds of fuel remaining. Faced with a flameout landing from an altitude of 28,000 feet, and in a life- and aircraft-threatening situation, Captain Lake skillfully maneuvered the F-16 in a series of airspeed-conserving turns that helped bring the aircraft to a safe landing.

The Aviator's Valor Award is presented annually by American Legion Aviator's Post No. 743 of New York.

★ In February 1983, the 5,000th successful aircraft ejection was tallied for the seat manufactured by England's Martin-Baker.

According to the company, the first emergency ejection took place in May 1949 and since have occurred under all conditions of flight from zero speed and zero altitude to speeds as high as 700 knots and at altitudes as high as 57,000 feet (17,374 m). Successful ejections have taken place *under water.*

The Martin-Baker seats are in use in the air forces of sixty-eight nations and equip fifty different types of military aircraft, including Phantom, Tomcat, Tornado, Hawk, Harrier, Hornet, Macchi MB 339, HAL Ageet, CASA C101, and Mirage.

For the curious or those who one day may have to resort to use of the device, here's how it works:

By pulling on the firing handle, the pilot activates the ejection gun and the seat is propelled out of the aircraft. As this occurs, the drogue gun and time release mechanism delays are activated, the pilot's services automatically disconnect, his arms and legs are restrained, and emergency oxygen is activated. As the seat reaches the end of the ejection gun stroke, a rocket motor ignites to produce 4,500 pounds of thrust for 0.2 seconds. Asymmetric thrust is built into the motor to ensure that the drogues are streamed clear of the seat and to increase separation between seats in a multiplace aircraft.

At 0.5 seconds the drogue parachutes are deployed to stabilize the seat and align it for parachute deployment, which occurs a second later. The system is designed so that as the parachute deploys, there is positively no chance of a collision between man and seat, which falls clear. The parachute is fully deployed 2.65 seconds after activation.

In the cockpit of the full-scale mockup of the T-46A next-generation trainer are Col. James E. Clifford and Ted M. Lynch of USAF's Preliminary Design Review team, Wright-Patterson AFB, Ohio. Explaining details at the Farmingdale, N. Y., plant are Fairchild Republic's John Barnes, left, and James J. Mastroianni.

This F-16 was recently used for flight tests of a low-drag, dual-store bomb-release system designed by Alkan/Texas Instruments. Being considered for acquisition by the French Air Force and other services, the Alkan system permits near-vertical release to reduce weapon dispersion and is readily adaptable to a variety of aircraft.

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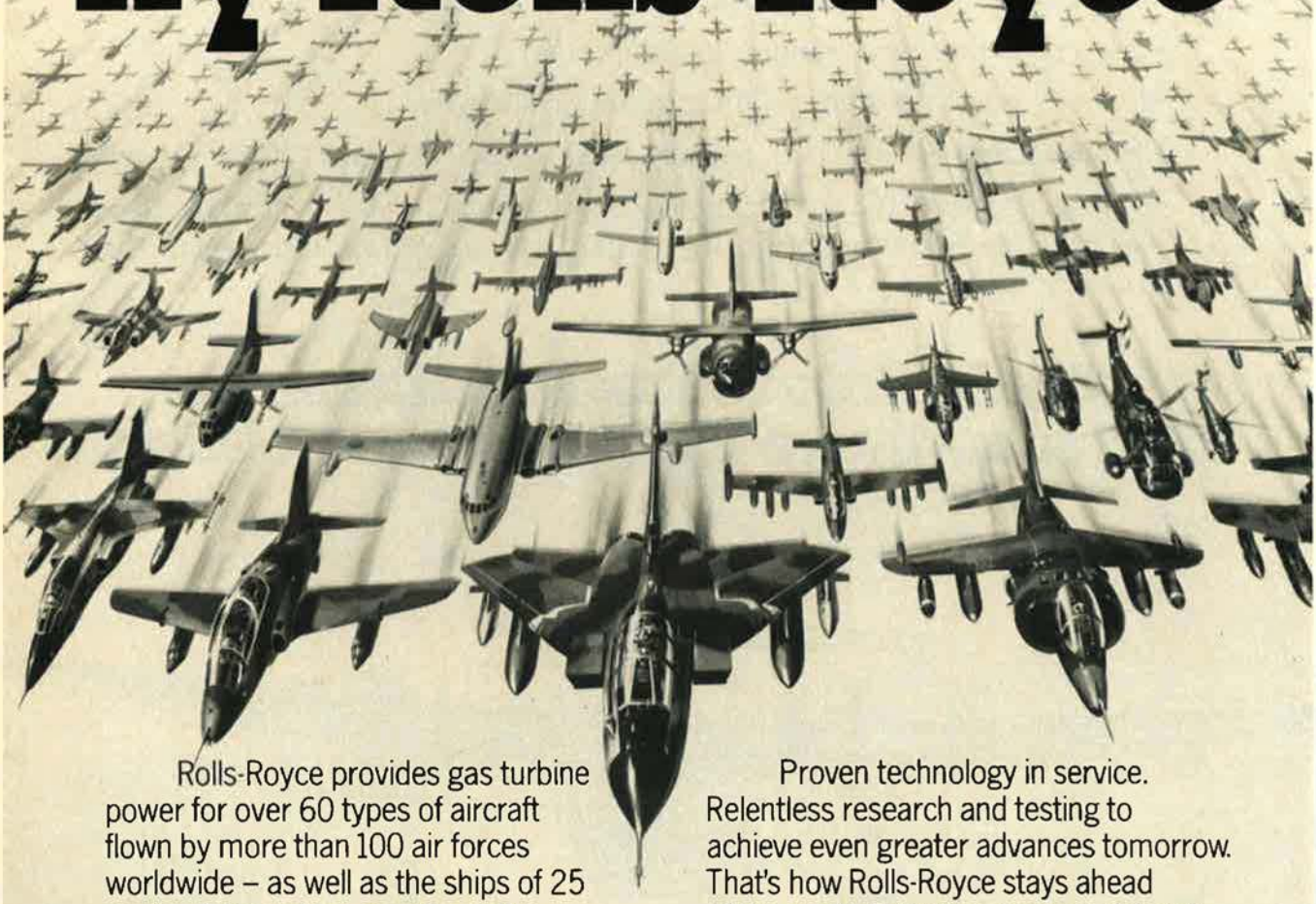

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In activation above 7,000 feet (2,133 m) there is no urgent need for parachute deployment in the quickest possible time, so it is delayed to reduce opening shock.

★ NASA is planning strong participation in this year's Paris Air Show, May 26 through June 5.

In exhibit space in the US Pavilion the space agency will stress a number of themes:

- The achievements of the space sciences program over the last twenty-five years, particularly the knowledge gathered by the planetary probes.
- Space applications, such as materials processing, available to industry.
- Large models of the Space Shuttle and a mixed-media demonstration of its capabilities.
- A theater set up for a large screen presentation in a mixed-media format of what to expect in the way of space exploitation over the next fifty years using technology already within our grasp.

NASA plans to man a customer services booth in the nonpublic section of the pavilion in the hope of attracting commercial users to the Shuttle. Emphasized will be the benefits of "get-away specials"—small, low-cost canisters containing industrial payloads that could go aboard Shuttle missions. People on hand will be able to answer questions on how business can take advantage of the US's National Space Transportation System. In an adjacent area will be computer capability provided by Rockwell International to calculate the likely cost and other data on hypothetical payloads for prospective customers.

A number of NASA's astronauts will be present at the air show, and space agency officials will participate as symposium speakers.

At this writing, NASA was formulating plans for the Orbiter *Enterprise* to tour Europe piggyback aboard a 747 jetliner with the final stop at the air show. There was also the possibility of the NASA/Boeing experimental Quiet Short-haul Research Aircraft putting in an appearance, depending, a spokesman indicated, on such factors as cost and risk.

AEROSPACE WORLD

For its part, the FAA, also exhibiting at the American Pavilion, will present as its theme "A World on American Wings" in a booth forty-four feet wide by twenty feet deep.

In four sections will be depicted "Planning for the 21st Century," "Safety Through Certification," "FAA's International Cooperation," and display cases containing aviation and air traffic control artifacts. There will also be a large video presentation on the history of aviation.

In "Planning" will be displayed air traffic control's past, present, and future, including a full-scale mockup of a possible future ATC console. Collision avoidance and radar systems will also be explained through graphics and other media.

In "Safety" FAA will detail all certification processes from aircraft to pilots and maintenance crews.

In "International" will be demonstrated the application of US technology in aviation worldwide, including the training of foreign nationals.

★ A new breed of weapon—the Air Force's Hypervelocity Missile—during a recent test flight at White Sands Missile Range in New Mexico successfully demonstrated that its unique control system can follow laser guidance commands to a target.

Designed as a small, low-cost weapon for use against advanced armored forces, the HVM relies on its speed of several thousand feet per second for kinetic energy to penetrate its target without the need for an explosive warhead.

The missile is to measure less than four inches in diameter, will weigh less than forty-five pounds, and can be carried in sizable numbers aboard aircraft.

In an attack, an aircraft or helicopter could launch several missiles and guide them simultaneously to various targets by a pod-mounted carbon-dioxide laser system on the aircraft.

In this latest milestone test, a HVM was ground-launched to measure response of its unique impulsive-thrust control system to signals from a laser-guidance unit on the launch pad. Derived from technology developed by Vought Corp., the spin-stabilized missile makes course corrections by firing jets of gas through small opposed nozzles on its forward section.

The control system requires no moving parts, has extremely fast reaction time, and eliminates a number of complications associated with conventional moving-surface control systems, officials said.

The HVM is one of a family of hypervelocity weapons being developed by Vought for such diverse roles as ground vehicle launch, ship defense, and missile site protection.

"Gathering of Eagles" at Air University

June 4, 1983, will be a red-letter day for Air University and its Air Command and Staff College. On that day, exactly 200 years from the first public demonstration of the Montgolfier hot-air balloon in Paris, the ACSC Class of 1983 will host twenty-five famous aviators from around the world at a class graduation dinner.

The "Gathering of Eagles" is listed among the official events of this year's celebration of the Air and Space Bicentennial. The gathering is a class project that is being financed through the sales of a lithograph reproduced from an original painting by artist John Ficklen of Atlanta, Ga., depicting aircraft flown by the famous aviators.

Among the aviators who will attend are World War II and Korean War ace Francis Gabreski, around-the-world flyer Maj. Gen. Leigh Wade, England's John Cunningham, France's Pierre Closterman, and Finland's Olli Puhakka. Germany, Canada, Australia, and Japan will also be represented, among other countries, to give the event a truly international flavor.

AFA's Montgomery Chapter will assist Air University by hosting a luncheon for the aviators on June 4.

ACSC has scheduled a number of informal events over a three-day span during which the graduating students will have the opportunity to mingle with their illustrious guests. Some 1,400 people, among them Bob Hope, are expected to attend the formal graduation dinner at Montgomery's Civic Center. A highlight of the dinner will be another class project—a 35-mm sound/light presentation, narrated and with background music, reviewing the careers of the aviation guests.

Last year, during "Great Moments in Aviation History I," the 1982 graduating class hosted famous American aviators.

AEROSPACE WORLD

★ In line with a previous announcement concerning the active-duty force, the two AFRES special operations units have been reassigned to Fourth Air Force, McClellan AFB, Calif., and on mobilization will report to MAC.

Previously, the 919th Special Operations Group, Eglin AFB, Fla., and the 302d Special Operations Squadron, Luke AFB, Ariz., belonged to the Tenth Air Force, Bergstrom AFB, Tex. TAC would previously have gained the units on mobilization.

The changes are the result of USAF's consolidation of special operations and combat rescue resources under MAC. The action is to increase efficiency and combat capability by centralizing budgeting, training, manning, organizing, and equipping the special operations and rescue forces, officials said.

In a related move, the 920th Weather Reconnaissance Group at Keesler AFB, Miss., which formerly reported directly to Fourth Air Force, has been reassigned to the 403d Rescue and Weather Reconnaissance Wing at Selfridge ANGB, Mich.

Of the sixty-six fixed-wing aircraft and helicopters in USAF's special operations forces, ten AC-130 Spectre gunships are assigned to the 919th SOG and six CH-3E helicopters to the 302d SOS.

The 403d RWRW now controls fifteen HC-130 aircraft and eight HH-3, five HH-1H, and five UH-1N helicopters assigned to its four aerospace rescue and recovery squadrons and seven WC-130s flown by the 920th WRG.

Active force rescue and special operations forces are assigned to MAC's

William H. Tunner
1906–1983

Lt. Gen. William H. Tunner, USAF (Ret.), died of a heart attack in southern Virginia in April. The AFA Charter Member was seventy-six.

General Tunner began his thirty-two-year service career with graduation from West Point in 1928.

In the 1930s, he served in various tactical and training units in the Army Air Corps and began his lifelong association with military airlift when he joined the Ferrying Command in 1939. During World War II, he was the mainspring behind the effort to ferry US-built aircraft worldwide, capping his wartime service by organizing the "Hump Airlift" from India to China.

Postwar, General Tunner served with Military Air Transport Service and in 1948 ramrodded the successful Berlin Airlift. Continuing to serve with MATS, he marshaled airlift forces to resupply UN forces in Korea in 1950, where the first large-scale medevac program for wounded was established. General Tunner commanded USAFE from 1953 to 1957 and Military Air Transport Service, now MAC, from 1958 to his retirement in 1960.

In 1982, AFA established the Lt. Gen. William H. Tunner Aircrew Award in his honor for the best overall crew in MAC.

Air Force Signs Share-Savings Agreement

AFSC's Electronic Systems Division (ESD) and Westinghouse Electric Corp. recently signed a share-savings agreement aimed at producing better-quality products and achieving higher productivity while at the same time substantially reducing the cost of military systems.

The agreement, signed by Division Commander Lt. Gen. James W. Stansberry and Thomas J. Murrin, president of the company's Energy and Advanced Technology Group, is the first of its kind in that it changes a DoD practice that requires contractors to lose all cost savings in negotiating future contract prices.

For a number of years, defense contractors have not modernized their facilities or business practices and overall productivity has declined because of outdated procedures, processes, and equipment. This has resulted in the escalation of the costs of military systems.

"This agreement is the herald of a new era of government/industry cooperation," General Stansberry said. "We have to work to change the present practice of penalizing contractors who modernize their operations. After a contractor achieves real savings, the company is entitled to a reasonable return."

Westinghouse now can earn half of the savings resulting from its factory modernization investment program up to the amount necessary to provide a commercial rate of return on investment. At the same time, costs of Air Force electronic and weapon systems will be reduced by the government's half of the savings.

"In our agreement, we are giving Westinghouse the opportunity to earn a fair dollar incentive for cutting costs. Westinghouse can make a bigger profit, while we estimate that the Air Force will save more than $400 million on major production programs over the next ten years," General Stansberry said.

Further savings will result from other Westinghouse-produced defense systems and a "technology-transfer" clause in the contract that requires the company to share its manufacturing improvements with other contractors.

The share-savings incentive was added to $7 million in "seed" money on a demonstration contract ESD awarded the Westinghouse Defense and Electronic Center in Baltimore, Md., in July 1981. Westinghouse added its own monies to the Air Force funds to accelerate its factory modernization plans. These include robotic-enabled assembly of cables and harnesses, a robotized storeroom—that makes up parts kits totally under computer control—and an advanced electronic assembly station for circuit boards.

As Westinghouse proposes internal improvements and their projected cost reductions, the Air Force will evaluate them, then negotiate the incentive amount Westinghouse will receive.

Major programs involved initially in the share-savings agreement are the E-3 airborne warning and control system radars, the F-16 radar, and electronic countermeasure pods for fighter aircraft.

The agreement is part of ESD's GET PRICE (Productivity Realized through Incentivizing Contractor Efficiency) program. A pioneer effort to encourage defense contractors to use modern manufacturing technology, the program's ultimate aim is to reduce the escalating price of military systems.

"Contractors who participate in it will improve their prospects for future Air Force business," General Stansberry said. "Our program is a big step toward rewarding efficient contractors. We're already seeing its success in Westinghouse's operations, and it's pointing the way for other companies to join with the Air Force in its war on costs."

Westinghouse was selected as the initial firm for the GET PRICE share-savings program because it does a large Air Force business—more than half of its total—and commitments for better quality products and higher productivity have been made at its highest management levels.

Mr. Murrin said: "We are delighted with the advancement of this cooperative relationship. Reinvestment of the savings achieved through improved quality and productivity enables us to further accelerate the development and implementation of technologies in improved facilities." —M.B.P.

The F-16: Standard of excellence in fighter performance.

Pilots who have gone up against the F-16 Falcon are the first to say that it is far and away the world's best air-to-air fighter. Even with a heavy bomb load, the F-16 has the thrust and maneuverability to take the fight to the enemy, and win.

GENERAL DYNAMICS

When it Comes to International Training the Air Forces Come to Link

The U.S. Air Force long has depended upon Link Flight Simulation Division for advanced training systems. T-37's, T-38's, T-39's, F-4's, F-5E's F-111's, C-130's, B-52's—all have been simulated by Link

The Air Force also selected Link for the multi-national F-16 program —one of the most extensive undertakings in simulation history.

Link is producing F-16 simulators for installation not only in the United States but also in Belgium, Denmark, the Netherlands and Norway —the countries which are jointly producing the single-engine lightweight advanced technology fighter. At least 18 simulators are being provided, including some for other countries planning to acquire the versatile aircraft.

Link
FLIGHT SIMULATION DIVISION
THE SINGER COMPANY

Each of these tactical flight training systems will simulate the performance and flight environment of the General Dynamics F-16A aircraft, including the highly complex on-board avionics. Like all other simulators Link has built for the Air Force, the F-16's will substantially reduce training costs while upgrading pilot proficiency. They will make a significant contribution to the security of the United States and its allies.

When it comes to simulation, nations come to Link! Binghamton, N.Y. 13902

See demonstration of F 16 simulator with Digital Image Generated Visual System at The Singer Company, Booth J7, Batiment Hall # 1, 35th Paris Air Show, May 27—June 5

Twenty-third Air Force, activated March 1 at Scott AFB, Ill.

★ The National Aeronautic Association announced that T. A. Wilson of the Boeing Co., with the support of the FAA, industry, and the airlines, will be awarded the Collier Trophy for 1982.

Cited was the development simultaneously of the 767 and 757 advanced technology airliners that feature a common, two-crew flight deck; advanced digital systems; hybrid, composite materials; and state-of-the-art aerodynamics.

Besides the simultaneous development—an "unequaled accomplishment"—the two jetliners have been offered with a choice of engines from the outset, another industry first. Efficient jet engines combined with advanced aerodynamics have led to substantial reductions in fuel burn and thus overall operating costs, NAA noted.

The Collier Trophy was established in 1911 and first presented to Glenn Curtiss for his achievements in developing a seaplane.

AEROSPACE WORLD

★ **NEWS NOTES**—MAC **C-5 and C-141B transports** are to be **repainted in the greens and browns of the European I camouflage pattern.** With the work being done during routine depot maintenance, the C-5 camouflaging should be accomplished by 1988 and the C-141 fleet by late 1986, officials declared.

"Guardians of the High Frontier" has been selected as the **motto of the new Space Command** by Gen. James V. Hartinger, Commander. Of the more than 1,700 ideas submitted, the motto was coined from suggestions made by **Brig. Gen. Carl N. Beer** and **MSgt. George D. Policani** of Hq. Space Command and **SSgt. Albert R. Swanson** of the Air Force Academy. Cadets there contributed more than 400 ideas, officials said.

Died: Maj. Gen. Harry G. Armstrong, USAF (Ret.), aerospace medicine pioneer and co-founder of the Air Force Aerospace Medical Research Laboratory at Wright-Patterson AFB, Ohio, where he helped develop aircraft first-aid kits, oxygen systems, shoulder-type safety belts, and the human centrifuge. His textbook on aerospace medicine was considered the authoritative work for more than two decades. General Armstrong died of heart failure in Washington, D. C., in February. He was eighty-three.

Died: entertainer Arthur Godfrey, flying enthusiast and long-time honorary member and backer of AFA, of complications resulting from his twenty-five-year bout with lung cancer, in New York City in March. He was seventy-nine. In 1956, during his enormously popular television program, the "Ole Redhead" recommended the April issue of AIR FORCE Magazine as required reading for all Americans because of its special report on SAC. The public responded with requests for 160,000 additional copies.

Godfrey was a past member of AFA's

INDEX TO ADVERTISERS

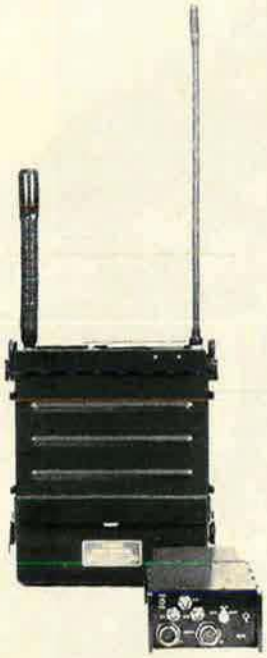
AEROSPACE WORLD

Jim Lacy has been appointed AIR FORCE *Magazine's Advertising Sales Manager for the West Coast territory. A graduate of the University of Colorado with a major in marketing, Lacy has extensive experience in advertising, working with major accounts at Dailey & Associates and J. Walter Thompson Co. in senior capacities. Lacy is also a licensed commercial pilot with instrument and multiengine ratings.*

National Board of Directors and had many AFA firsts to his credit. He was a prominent participant in the Association's first Outstanding Squadron Dinner at the Air Force Academy. He was the first master of ceremonies at the New York City Iron Gate Chapter's Air Force Ball, an event that is now in its twenty-first year. He emceed AFA's big Anniversary Dinner Dance program in salute to the Twenty-fifth Anniversary of the Air Force, and also emceed past Honors Nights programs, and was an active participant in many other AFA local and national events. An accomplished pilot with his own plane, he flew many AFA leaders, including national directors, to a number of AFA-sponsored functions around the nation. He championed the men and women of the armed forces and was a leading supporter of AFA programs in support of all military people. ■

Data Mates:

Tactically Speaking.



The PM-15 is the newest member of Motorola's growing family of tactical radio equipment.

Now, for the first time a small, multiple-bit-rate modem is available for tactical UHF communications. The PM-15 adaptive tactical modem mates with UHF transceivers for data transmission rates of 300 bps, 1200 bps, and 2400 bps.

Front panel selection of either 29 MHz or 70 MHz IF interfaces provides broad tactical radio flexibility. And the PM-15's power efficiency lets the unit operate for 30 hours on one BA 5590 battery for both LOS and SATCOM communications.

If you'd like to know more about our tactical data mate and how easily it lets you communicate sensitive data, call 602/949-3548 or contact the Motorola Government Electronics Group, P.O. Box 2606, Scottsdale, AZ 85252.

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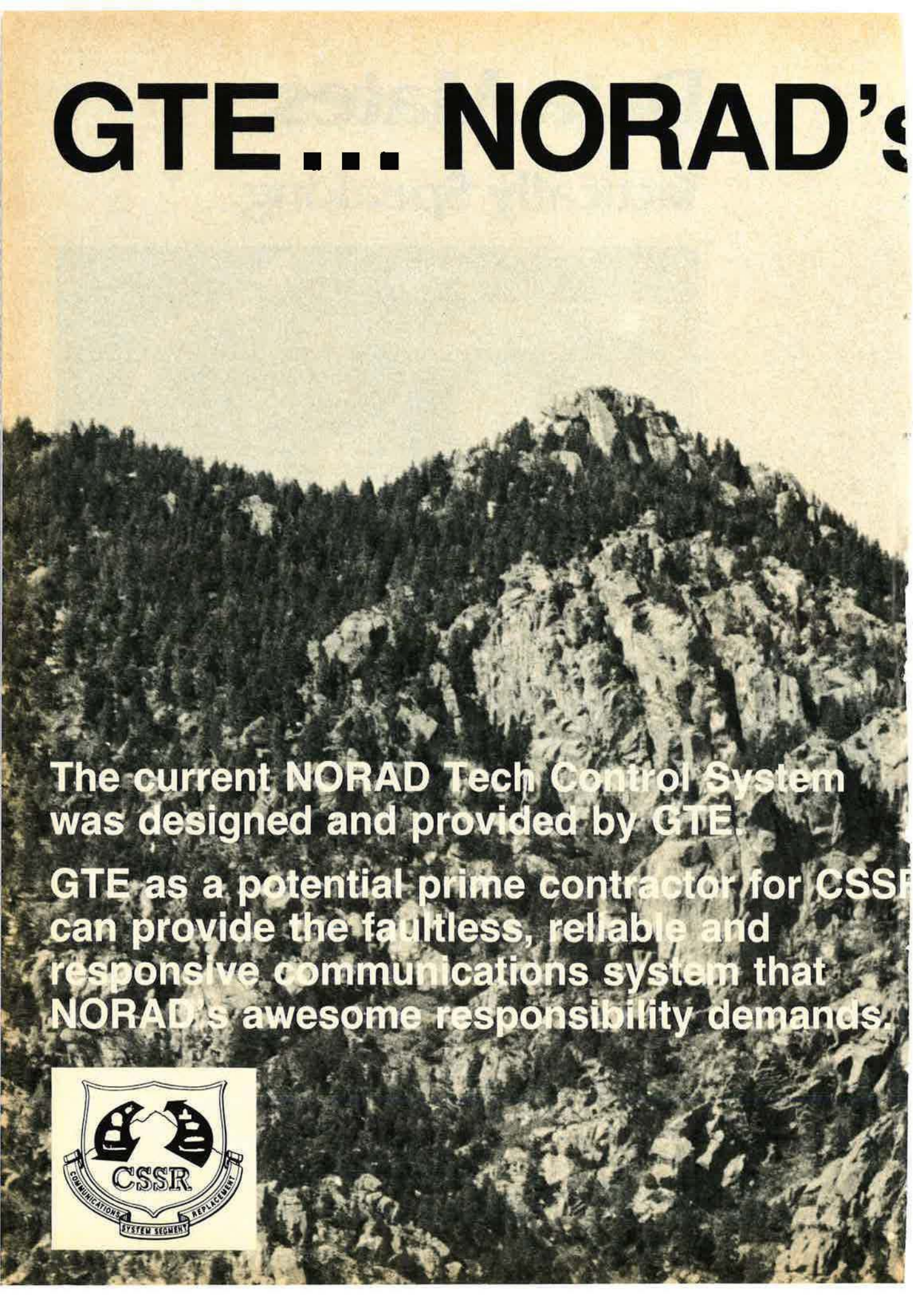
Making electronics history.

See the Motorola exhibit in Booth A-270 at AFCEA East, June 14-16, in Washington, D.C.

GTE... NORAD's

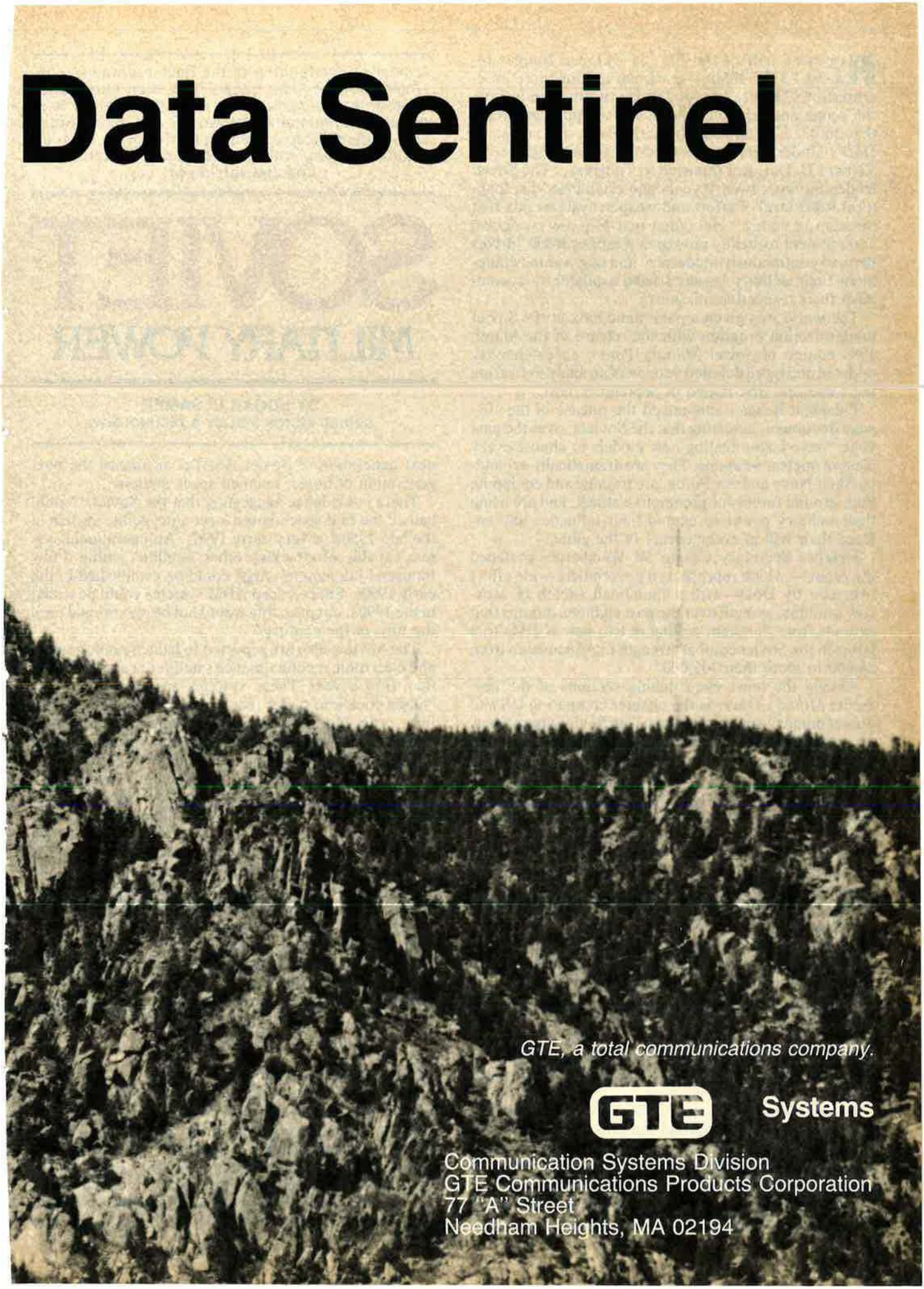


The current NORAD Tech Control System was designed and provided by GTE.

GTE as a potential prime contractor for CSSR can provide the faultless, reliable and responsive communications system that NORAD's awesome responsibility demands.

CSSR
COMMUNICATIONS SYSTEM SEGMENT REPLACEMENT

Data Sentinel



GTE, a total communications company.

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A clear understanding of the Soviet armed forces, their doctrine, their capabilities, their strengths, and their weaknesses is essential in order to shape and maintain effective US and allied forces. The Defense Department helped provide such an understanding with the recent publication of an updated version of . . .

SOVIET MILITARY POWER

BY EDGAR ULSAMER
SENIOR EDITOR (POLICY & TECHNOLOGY)

ROUGHLY half of the FY '84 Defense Budget request—$124 billion—is earmarked for force modernization. The need to modernize results mainly from the scope and tempo of the Soviet weapons programs that outdistance this country's efforts in vital areas. As DoD's Under Secretary for Research and Engineering Richard D. DeLauer reported to Congress, "The Soviet leadership over twenty years ago established the long-term R&D level of effort and weapon systems mix that threaten us today." He added that Moscow's ironclad commitment to steady growth in weapons R&D "drives them to continuously modernize and upgrade the equipment their military services have available to accomplish their respective missions."

The world was given a panoramic look at the Soviet modernization program with the release of the March 1983 edition of *Soviet Military Power,* an extensively updated and more detailed version of an analysis bearing the same title first issued in September 1981.

President Reagan announced the release of the 107-page document, asserting that the Soviets, over the past year, "have begun testing new models in almost every class of nuclear weapons. They are dramatically expanding their Navy and Air Force, are training and equipping their ground forces for preemptive attack, and are using their military power to extend their influence and enforce their will in every corner of the globe."

Defense Secretary Caspar W. Weinberger prefaced the report—which represents a government-wide effort overseen by DoD—with a thumbnail sketch of Moscow's military growth over the past eighteen months that extends from the flight testing of two new ICBMs to a boost in the Soviet combat strength in Afghanistan from 85,000 to more than 105,000.

Among the most eye-catching sections of the new *Soviet Military Power* is the chapter comparing US and Soviet military space programs. The Soviet Space Shuttle, which recently was photographed for the first time by US satellite cameras, is credited with a payload roughly twice that of the US Space Shuttle. In the case of a 180-kilometer orbit, the US system can carry 29,485 kilograms, compared to 60,000 kilograms for the Soviet vehicle. The Soviets are shown also to have under development an even larger heavy-lift space system that can take a payload of between 130,000 and 150,000 kilograms to low orbit.

This, the US intelligence community reported, is six to seven times the US Shuttle's payload. One of the purposes of this system—that, like the Soviet Shuttle, has not yet flown—is to deploy "a large manned space station by about 1990 to maintain a military presence in space." The new analysis also suggests that "the Soviets will use the heavy-lift space boosters to orbit even larger space stations and space modules before the end of the century. Such space stations could weigh more than 100 tons and be able to support a large crew for extended periods without replenishment."

In terms of space weapons, there are indications that the USSR is moving beyond the present class of anti-satellite vehicles (ASATs)—that are now operational and can destroy low-orbiting satellites—toward "a very large, directed-energy research program." This effort appears to include the "development of beam weapons which could be based either in the USSR, aboard the next generation of Soviet ASATs, or aboard the next generation of Soviet manned space stations."

There is evidence suggesting that the Soviets "could launch the first space-based laser antisatellite system in the late 1980s or very early 1990s. An operational system capable of attacking other satellites within a few thousand kilometers' range could be established in the early 1990s. Space-based ABM systems could be tested in the 1990s, but probably would not be operational until the turn of the century."

The Soviets also are reported to launch photographic and electronic reconnaissance satellites at a rate of more than fifty a year. These systems are used to provide "target location, target identification and characterization, order-of-battle, force monitoring, crisis-monitoring and situation assessment, geodetic information for ICBM targeting and mapping for military forces."

Space-based worldwide surveillance and warning also is picking up speed with the result that "a number of US and allied military forces" are now under constant Soviet surveillance. These systems include an ICBM launch detection system and such ocean surveillance systems as the nuclear-powered RORSAT radar satellites. The US document predicts that the Soviets eventually will deploy a "multisatellite detection, surveillance and attack-warning system against strategic and nonstrategic ballistic missiles and possibly bombers, as well."

The majority of Soviet military space programs has been specifically designed to support terrestrial military operations. But the increasing emphasis on antisatellite technology, the report finds, is building the capability for "direct space warfare operations."

Strategic Nuclear Forces

At the top rung of the escalation ladder, strategic nuclear warfare, Soviet military doctrine is tailored for a "first or preemptive strike" while the US policy of retaliation after absorbing a first strike is seen as the "least favorable" option. In between, the report suggests, the Soviets allow for launch under attack contingencies where offensive forces would be executed after weapons aimed at the USSR have been launched but before they

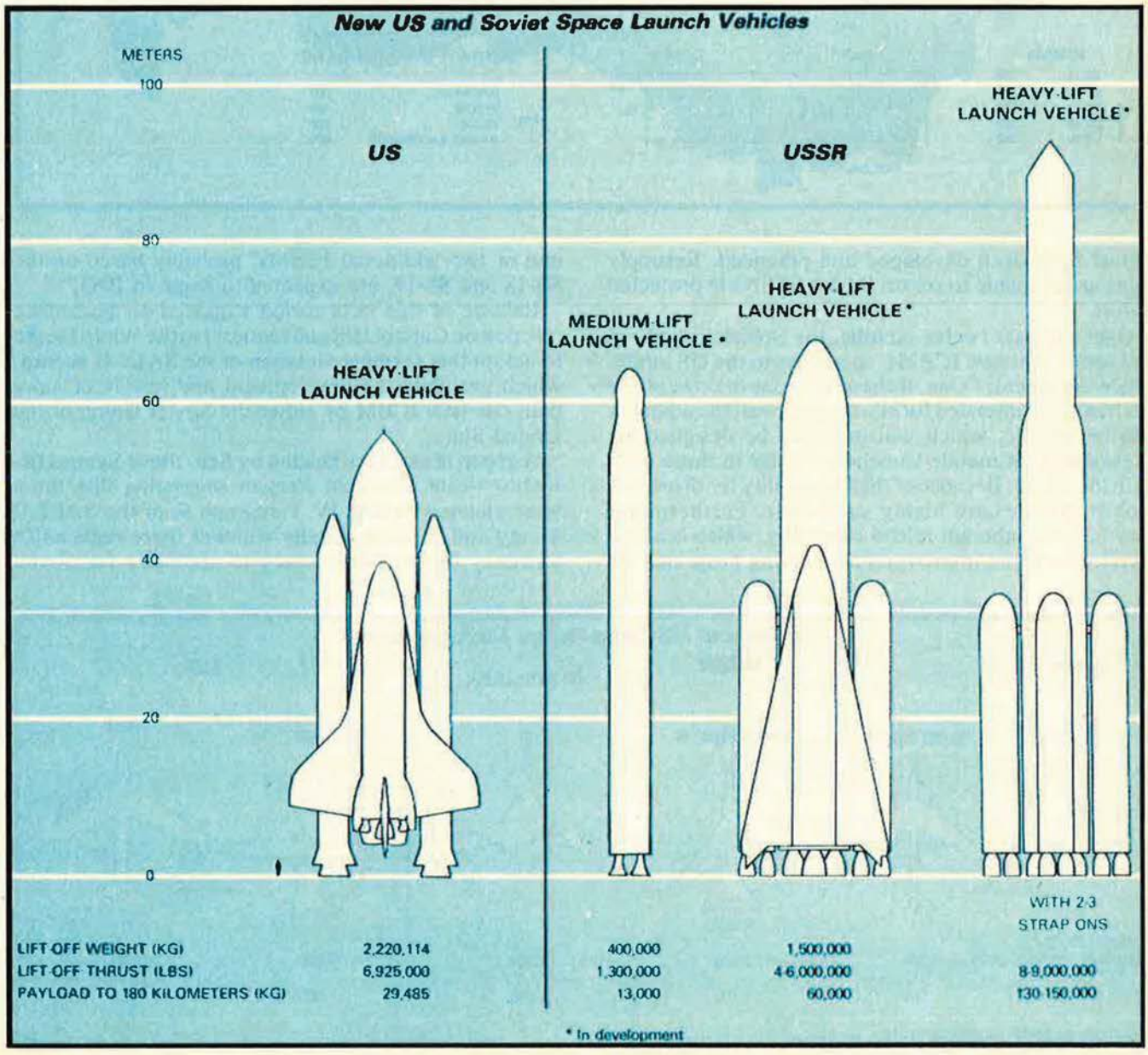
hit their targets. The new US analysis finds that the Soviets appear to believe that nuclear war might last for weeks or even months, and have factored this into their force development.

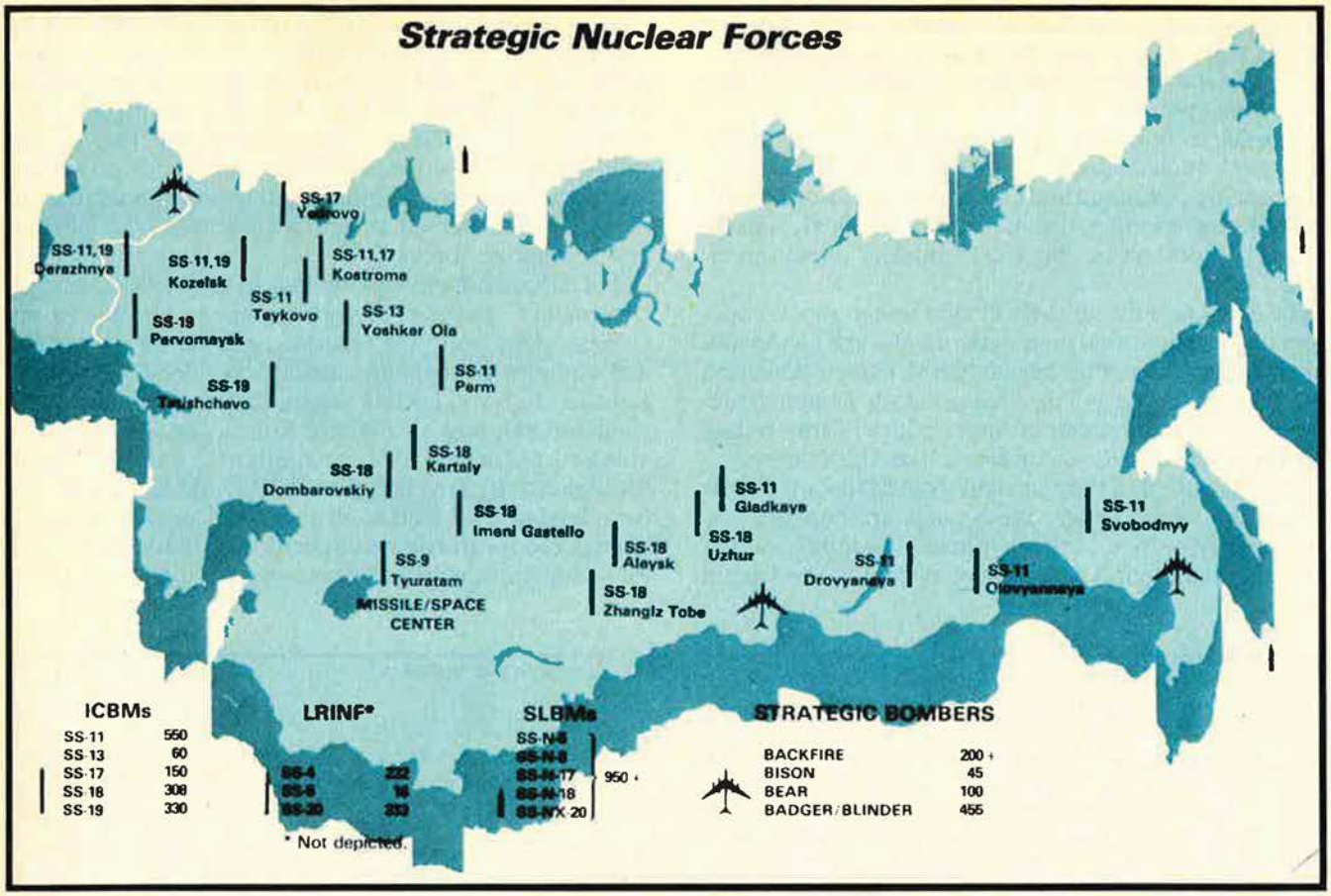
In order to hone their preemptive attack capability, the Soviet nuclear forces "practice almost constantly, emphasizing command and control under various conditions. During wartime, the main mission of Soviet intelligence is to determine the West's nuclear attack intentions."

The Soviets built up their launch-under-attack capability by strengthening their network of warning sensors that includes a satellite-based ICBM launch detection system, an over-the-horizon radar missile launch detection system, and a chain of large, phased-array radars that rings the USSR, according to the US analysis.

To make sure that they can carry out follow-on strikes after an initial exchange, the Soviets are boosting the survivability of their strategic nuclear weapons and the associated command and control systems. The launch control facilities for offensive missiles are housed in superhard silos or on off-road vehicles. Also, "higher commands have multiple hardened facilities and mobile command facilities and aircraft available for their use. Bombers have alert procedures and dispersal fields. Ballistic missile submarines can be placed in tunnels near their home ports, submerged in deep fjords just off their piers, dispersed and protected by Soviet surface and submarine forces."

The US document asserts that the Soviet doctrine of "protracted" nuclear warfighting pivots on "follow-on strikes, along with war reserves, protection for people and equipment, and the capacity to reload launchers. For their ICBMs, LRINFs [long-range intermediate nuclear forces], and air defense forces, the Soviets have stocked extra missiles, propellants, and warheads throughout the Soviet Union. ICBM silo launchers can be reloaded in a matter of days, and provisions have been made for the decontamination of those launchers. Plans for the survival of necessary equipment and per-



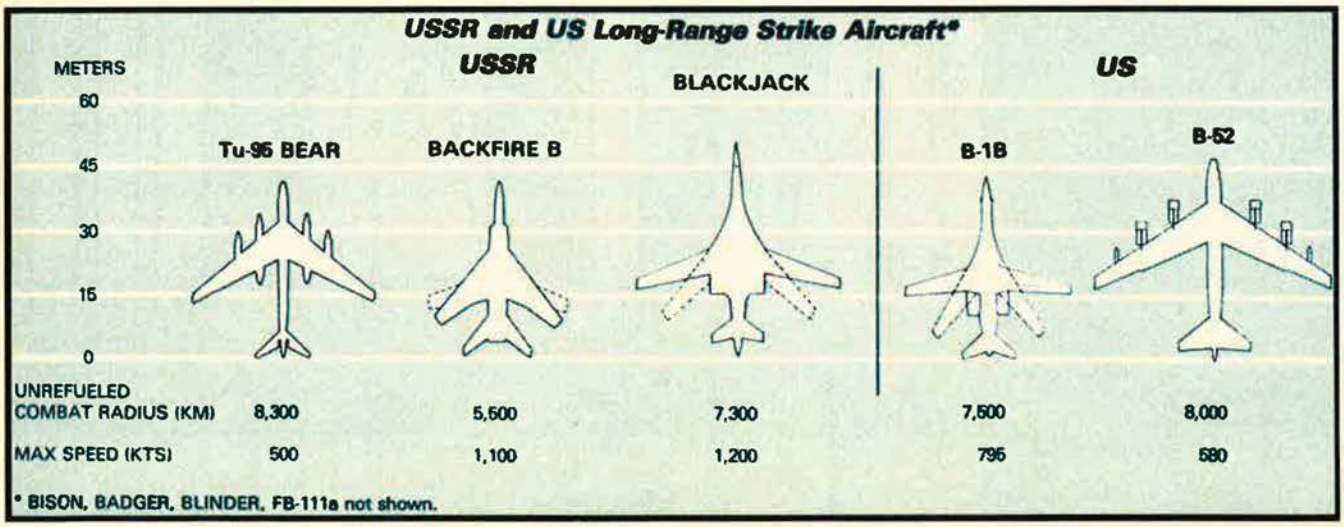


sonnel have been developed and practiced. Resupply ships are available to reload Soviet SSBNs in protected waters."

Over the past twelve months, the Soviets rolled out and tested two new ICBMs, according to the US intelligence document: "One of these is about the size of the US MX [and] intended for silo deployment; the other is a smaller missile, which will probably be designed for deployment on mobile launchers similar to those used with the SS-20. Because of their capability for dispersal, mobile missiles are highly survivable. Furthermore, they have an inherent reload capability, which is also a significant force improvement. Testing programs for one or two additional ICBMs, probably based on the SS-18 and SS-19, are expected to begin in 1983."

Release of this information triggered an immediate reaction on Capitol Hill and requests to the White House to act on this seeming violation of the SALT II accord, which prohibits the development and testing of more than one new ICBM by either the Soviet Union or the United States.

A group of senators headed by Sen. Steve Symms (R-Idaho) wrote President Reagan suggesting that these tests violated Article IV, Paragraph 9, of the SALT II Treaty and asked pointedly whether there remains "a tendency by the bureaucracy to apologize for Soviet



Artist's concept shows flight-test of the new Tupolev strategic bomber. This and the accompanying charts are from the new DoD-issued booklet.

misbehavior and violations which you criticized other Administrations for exhibiting?" A similar letter signed by thirteen members of the House urged the President to act on this issue as part of what appears to be "an expanding pattern of Soviet activities that are contrary to existing agreements." There are indications that the Administration may be chary of confronting the Soviets concerning the testing of two new missiles because of the possibility that this country might wish to develop both MX and a small, single-warhead ICBM suitable for mobile deployment.

The development of new, fifth-generation ICBMs is taking place in phase with incremental improvements of the deployed fourth generation. The US analysis points out that the Soviets "improve those components of a weapon system that need improving and retain those portions that are satisfactory. In this manner they have greatly improved the reliability and capability of their current ICBM force." By way of a benchmark, the Soviets have deployed more "MX-like ICBM warheads" of great accuracy in each of the past three years than are contained in the entire MX force envisioned to number 100 missiles.

The modernization of the USSR's nuclear ballistic missile submarines and the associated SLBMs includes the launching of a second *Typhoon*-class SSBN, the world's largest submarine of this type, and deployment of the SS-N-20, the world's largest SLBM. The *Typhoon,* equipped with twenty SS-N-20 launchers, is expected to achieve full operational status by the end of this year. Future Soviet SLBM developments, according to the document, probably will lead to improved accuracy to complement the large-yield warheads carried by these weapons as well as to tests of a new large SLBM later this year. The Soviet Navy is also developing—and will soon put in service—a cruise missile with a range of about 3,000 kilometers that can be launched from submarine torpedo tubes. The principal mission of the new cruise missile, designated the SS-NX-21, is nuclear strike.

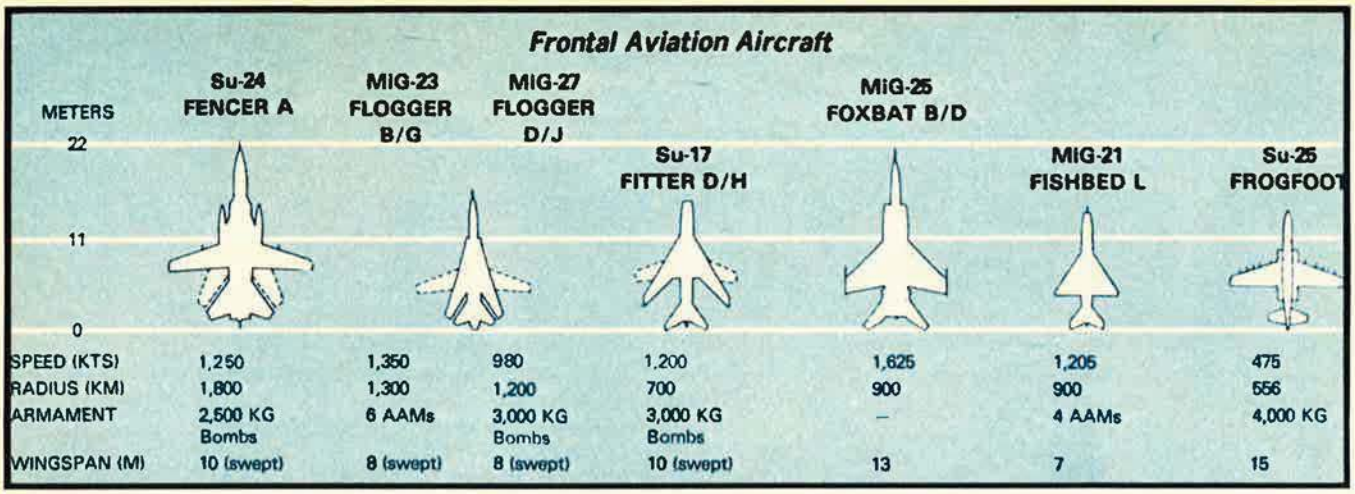
The report provides additional information about the new Soviet strategic bomber known as Blackjack. This swing-wing design appears to have an unrefueled combat radius of about 7,300 kilometers, compared to the B-1B's 7,500 kilometer radius. Maximum speed of the Soviet bomber is about 1,200 knots, compared to the B-1B's 795 knots. The Soviet bomber is reportedly about twenty-five percent larger than the US design and will be capable of "long-range subsonic cruise with supersonic high-altitude dash and subsonic/transonic low-level penetration. This new bomber is likely to be a multiple-role aircraft that could deliver both free-fall bombs and air-launched cruise missiles to intercontinental range. The Blackjack could be introduced to the operational force as early as 1986 or 1987."

The Soviets also are developing "at least" one long-range air-launched cruise missile (ALCM) with a range of some 3,000 kilometers. "Carried by the Backfire, the Blackjack, and possibly the Bear, it would provide the Soviets with greatly improved capabilities for low-level and standoff attack in both theater and intercontinental operations. ALCMs could be in the operational force by the mid-1980s," according to *Soviet Military Power.*

The US analysis sees evidence of "sweeping organizational changes in the command structure of the Soviet air forces," aimed at improving the integration of bombers into all types of air operations. The Soviets seemingly rely on bombers for a variety of roles, including "conventional strikes in the European and Asian theaters, antiship operations, reconnaissance, and nuclear operations in a protracted conflict." At present, the Soviet strategic bomber force consists of almost 900 strike and support aircraft.

Strategic Defenses

The USSR's strategic defense forces dwarf those of the United States and include interceptor aircraft, surface-to-air missiles, antiballistic missiles, and a host of passive defenses such as surveillance and warning systems, and civil defense. "When combined with the strong counterforce orientation of Soviet strategic offensive forces, these efforts point to a strategic con-



cept of layered, in-depth defense of the homeland."

A phased-array radar with 360 degree coverage—about twice that of the defunct US Safeguard ABM system—is under construction near Moscow. This is coupled to extensive ABM R&D programs that include a rapidly deployable system.

In the field of air defense, the US analysis reports that the Soviets have deployed about 600 modern, strategic interceptors capable to some extent of engaging low-altitude targets. In addition, deployment of Foxhound A, an interceptor with a "true look-down/shoot-down capability" is under way. Further, two other look-down, shoot-down fighters are in development and "should enter service soon. As these three types of aircraft replace or augment older types, the Soviet capability to defend against low-altitude aircraft, including cruise missiles, will increase," the US document suggests.

There are parallel improvements in SAMs also, mainly aimed at low-altitude targets. These newer systems reportedly demonstrate longer range, particularly at low altitude; improved mobility; increased target handling capability; and increased firepower.

Theater Warfare Forces

The Soviets enjoy a monopoly in longer-range intermediate-range nuclear forces. Their arsenal consists of 351 SS-20 missiles, each capable of carrying three warheads over a distance of about 5,000 kilometers, as well as 248 older single-warhead SS-4s and SS-5s. The US and its allies possess no such weapons at this time. The Soviet force can deliver an initial salvo of more than 1,300 nuclear warheads. Further, the SS-20s are equipped for refire so that each launcher actually contains two missiles. Of this force, more than two-thirds are presently located within range of NATO. These Soviet missiles, according to the US report, are highly mobile and can be moved rather rapidly. From their present sites they can cover all of Western Europe, the Middle East, parts of Africa, and most of Asia including China, Korea, Japan, the Philippines, and Alaska. If moved to eastern Siberia, they could be targeted against the US mainland.

Backing up the Soviet longer-range theater nuclear forces in Europe are about 950 short-range missiles and nuclear artillery plus as many as 2,500 nuclear-capable aircraft.

In terms of ground forces, the new US analysis finds that there are now more than 190 ground force divisions, an increase of ten divisions since 1981. There is evidence that these forces are undergoing major organizational changes. Operational Maneuver Groups (OMGs), patterned after the World War II Mobile Group concept, are being formed, apparently to take advantage of the recent comprehensive modernization of the Soviet ground forces. These OMGs are relatively autonomous, tank-heavy raiding forces constituting division- and corps-size formations at *army* and *front* levels, respectively, according to the US document. "Organized for commitment from the outset, OMGs would be expected to penetrate the enemy's rear areas quickly and independently of the main body of forces," according to the report.

In case of war with NATO, "the OMG would facilitate commitment of reinforcements by securing terrain over which additional Soviet forces must pass while hindering NATO's efforts to reinforce its forces. Additionally, although the OMG concept has been developed for conventional offensive operations, it is also well-suited for exploitation of nuclear strikes," according to *Soviet Military Power.*

The Soviets divide Eurasia into three military theaters: Western, Southern, and Far Eastern. The forces assigned against NATO continue to receive the newest and most capable systems. Almost half of the total active-duty ground forces, ninety-four divisions, are located opposite the Central and Northern regions of NATO. Another twenty divisions are situated in the Transcaucasus and North Caucasus Military Districts, available for deployment against NATO's southern flank. There is also a strategic reserve comprising sixteen divisions that can be deployed quickly against NATO. Lastly, the six Warsaw Pact allies of the USSR can contribute an additional fifty-five active divisions.

In the aggregate, the Warsaw Pact has three times as many tanks in Europe as NATO. The most modern Soviet tank, the T-80, featuring "collective nuclear/biological/chemical protection, enhanced firepower and survivability" is being deployed to the Soviet Groups of Forces in Eastern Europe. There is evidence that the Soviets have produced about 1,900 T-80s over the past eighteen months.

The Defense Department document credits Soviet

ground forces with massive upgrading and expansion of their artillery firepower, especially so far as nuclear-capable pieces are concerned. Two new types of 152-mm guns that are nuclear-capable are deployed with Soviet forces in Eastern Europe. Additionally, the "Soviets are continuing deployment of nuclear-capable heavy artillery brigades armed with the mobile 240-mm self-propelled mortar and the 203-mm self-propelled gun. The recent deployment of the 203-mm gun outside of the USSR, coupled with the appearance of the new 152-mm guns, indicates the importance Soviet doctrine places on the capability to deliver low-yield nuclear strikes relatively close to forces," according to the US report.

The recent reorganization of the Soviet forces led to the creation of an Army Aviation Branch that the Defense Department termed a dramatic change reflecting "Soviet emphasis on creating well-balanced combined armed forces at many organizational levels." The number of attack helicopters—mainly Mi-24s and Mi-8s—confronting NATO has been boosted from about 400 to about 800 over the past few years. At the same time, a new heavy-lift helicopter is entering service, thus enhancing battlefield mobility. Designated the Mi-26 Halo, this new system is the world's largest helicopter, capable of carrying internally two airborne infantry combat vehicles or about 100 combat-equipped troops.

Soviet Airpower Trends

The general revamping of the Soviet military included a major reorganization of the command structure for Soviet air and air defense forces. The Defense Department analysis terms the change a significant improvement in air war capabilities that "provides the Soviets with a peacetime organization that closely approximates their wartime structure for the employment of airpower. This will allow a more rapid transition to a wartime posture and will enhance operational flexibility and coordination through centralized control of air assets at *front* and *theater* levels."

Accompanying organizational change are changes in tactics, training, and equipment, so far as Frontal Aviation, the Soviet tactical air force, is concerned. "Soviet doctrine places great emphasis on achieving air superiority from the very onset. To implement doctrine, the Soviets have recently made significant changes in their air combat tactics and training programs. Pilot independence and initiative are now stressed. The continual technological upgrading of equipment and increasing proficiency in combat employment of that equipment have resulted in greatly increased Soviet aviation capabilities in the Western Theater, particularly the ability to strike into the NATO rear area," according to the Defense Department analysis.

Frontal Aviation has undergone this modernization and reorganization as the result of systematic plans to increase its offensive capabilities. As a means toward this end, the Soviets have, since 1978, introduced six new series of advanced fighters and three new versions of reconnaissance/ground-attack aircraft. The MiG-29 Fulcrum and the Su-27 Flanker are expected to become operational in the mid-1980s and probably will be deployed widely in the Western Theater shortly thereafter. These twin-engine designs, currently undergoing flight testing, are "supersonic, all-weather counterair fighters with look-down/shoot-down weapon systems and beyond-visual-range air-to-air missiles. They may have a secondary ground attack role; in particular, the Fulcrum may have a true dual role capability similar to that of the US F-16 and F-18," the US analysis suggests.

Airlift, in the past somewhat of a stepchild of Soviet military aviation, is now in the mainstream of Moscow's modernization effort. The C-141-like Il-76 Candid is entering the inventory of Military Transport Aviation (VTA) at a rate of thirty aircraft per year. The Soviets reportedly also are developing a new heavy-lift transport comparable to USAF's C-5. When deployed in significant numbers, the new airlifter "will increase the airlift potential in support of power-projection goals and provide greater wartime capacity to lift airborne combat divisions," according to the Defense Department. The new Soviet airlifter is said to have a payload of 120 metric tons that can be carried over a distance of about 4,600 km.

Prodigious Defense Production

The technological gap between the US and the USSR has narrowed sharply since 1981, according to the new analysis. A key reason for this advance is that the Soviets have the world's largest R&D manpower—estimated at more than 900,000 scientists and engineers, compared to fewer than 700,000 on the part of the United States. The percentage of Soviet R&D manpower engaged in defense-related work is high, probably in the order of from fifty to seventy-five percent of the total number.

Supporting this force is the world's "largest military industrial base" that includes more than 150 major plants located throughout the USSR. In turn, these key facilities are supported by a "network of thousands of feeder plants." In recent years, the military has absorbed about fifteen percent of the Gross National Product of the USSR, compared to less than seven percent for the US, and, "if current trends continue, the Soviet military share of the GNP will approach twenty percent by the late 1980s."

Cumulative costs—expressed in dollars—of Soviet military investments over the past decade were eighty percent higher than US investments; in terms of R&D spending, the Soviets topped the US investment by about seventy percent over the same period, according to *Soviet Military Power.*

In summary, the US analysis finds that the main role of the Soviet war machine "is to undergird, by its very presence, the step-by-step extension of Soviet influence and control by instilling fear and promoting paralysis, by sapping the vitality of collective security arrangements, by subversion, by coercive political actions of every [kind]."

Warning that the lengthening shadow of Soviet military power can neither be wished away nor ignored, the Defense Department, nevertheless, sees no basis for despair: "We have the capacity to restore a stable balance and to do so without jeopardizing our other national goals. The combined resources of the United States and its allies dwarf those of the Soviet orbit. More to the point, we have reservoirs of strength without counterpart in the Soviet Union: the concepts and values of the great civilizations which are our priceless legacy." ■

THE MATURING OF THE KC-10

An initial cadre pilot tells how the Extender enhances mobility—and says it's also fun to fly.

BY MAJ. CHARLES E. BAILEY, USAF

As the stretched airlifter eased up into a refueling position behind me at 25,000 feet, the receiver pilot asked an age-old question: "Can you spare any extra gas?" Using my sincerest tone of voice, I rogered back: "Sure . . . How'd you like about 200,000 pounds?"

Now that exchange suggests a double lesson: Heretofore, no single tanker aircraft could offer that much fuel, and this added capability could not come at a better time in aerial requirements for strategic mobility. The tanker with all that spare fuel is the new KC-10A Extender belonging to the Strategic Air Command.

Big, bold, and beautiful to fly, the KC-10 expands Air Force capability to move fuel and cargo on a global scale. In fact, a second nickname for the Extender might be the "Supplementer." The aircraft is "tried and trued" in a mix that supplements general-purpose, airlift, and strategic conventional assets. The KC-10 demonstrates a truly synergistic potential for enhancing strategic mobility—not bad for a two-year-old!

Born from the concept of the Advanced Tanker/Cargo Aircraft of the mid-1970s, the KC-10 has quickly matured in its primary mission of mobility enhancement. The first months of nuts-and-bolts testing led directly into the anticipated capabilities.

The Extender has used its advanced aerial refueling boom to pump a variety of fuels to almost every Air Force system with wings and refueling receptacles. The Navy has also gotten a workout with the tanker's built-in hose-reel assembly for refuelers equipped with probes.

With as much as 350,000 pounds of fuel on board at altitude (available if the "Ten" has been refueled in flight), the jumbo tanker has redefined the concept and potential of aerial refueling. Consequently, if

one word best describes the reputation earned by the Extender during this teething period, it must be "worldwide." And, adding the word worldwide to mobility sets the global stage for three short stories about KC-10s in action.

Worldwide Mobility

The first story begins in the spring of 1981 when a KC-10 showed its capability in a tanker/cargo workout. Loaded to its maximum takeoff weight of 590,000 pounds, the three-engine jet headed east out of Tulsa International Airport, Okla., toward RAF Wittering. As eight A-7 Corsairs joined the KC-10 in formation, their forty-four support personnel settled into airline seats aboard the high-flying Extender and got ready for hot meals. Behind the support troops, 36,000 pounds of palletized cargo waited for offloading in England. After receiving 207,000 pounds of in-flight fuel among them, the deploying A-7s landed in England several hours later, with a smiling Extender crew landing immediately behind them. Their single KC-10 had freed two C-141s and four KC-135s at a net savings of $300,000.

The second story begins little more than a year later when another KC-10, primarily in a tanker role, headed west from Barksdale AFB, La. After completing a scheduled stop at Hickam AFB, Hawaii, the aircraft made for New Zealand's Auckland International Airport. The mission was to support a C-141B StarLifter in an airdrop of supplies to scientific and naval personnel in Antarctica during the annual Operation Deepfreeze.

On the dark and cloudy morning of June 21, 1982—the shortest day of the year down under—the KC-10 pilot taxied onto the Auckland runway and throttled up to 157,000 pounds of high-bypass fanjet thrust. As the three-engine heavyweight accelerated down the runway, an autothrottle system "clamped" each engine to a precise setting for takeoff power. At the proper speed, comfortable back pressure on the small control column brought the nose of the big aircraft up for takeoff. A steady pull toward twenty degrees of pitch, and the ship was off to Antarctica with runway and power to spare.

In its airlift capacity, the KC-10 can accommodate bulk cargo, oversize vehicle loads, or a mixture of troops and cargo. As a tanker, its large capacity redefines the potential of aerial refueling.

As the Extender headed due south, a steady climb brought it to 28,000 feet and into continuing darkness. On autopilot, the airplane climbed an alert as it automatically leveled off and adjusted to the preset cruise airspeed of 0.82 Mach. The autopilot in use (one of two available) was also coupled to three inertial navigation systems (INS) that aimed the Extender on a course that would gradually overtake the C-141B that had launched out of Christchurch in lower New Zealand.

The lone StarLifter soon showed up as a steady blip dead ahead on the pilots' multicolor radar screens. Normally, the view through the Extender's cockpit picture windows makes visual acquisition of other aircraft a piece of cake during rendezvous. On this mission, however, it was a challenge to sort out the StarLifter's lights from the stars in the faint polar dawn. As the other plane blinked into view, a verbal crosscheck of the INS displays on the two ships confirmed an on-time, on-course estimate to the air refueling control point.

Although fuel transfer was still an hour off, the KC-10 boom operators, sitting almost 150 feet behind the cockpit crew, began a final check. Despite a steady drop in the outside temperature toward −90°F, the big boom performed as advertised when the primary operator maneuvered it to each extreme of the large refueling envelope.

When offloading finally began, the flight was some 600 miles further south than any of the previous Deepfreeze refuelings. By the time 67,400 pounds of jet fuel had been pumped into the C-141B, the Extender had flown almost 1,100 miles deeper into Antarctica than any previous air refueling mission.

Reserve Better Than Ever

Since the C-141 had received so much extra fuel well into the mission, its reserves for returning from the bottom of the world were better than ever. By the time the tanker and airlifter had finished flying twelve and fifteen hours, respectively, the team had raised the total payload delivered from twenty-six drop containers (17,000 pounds) the previous year to forty-seven drop containers (28,000 pounds). Significantly, the KC-10 had replaced three KC-135s previously required.

Story number three is also a Pacific tale about the KC-10 in a tanker role. In the early fall of 1982, six PACAF F-15 Eagles were mated with a KC-10 en route to the annual William Tell shootout at Eglin AFB,

Fla. Flying high and hot, the tanker/fighter cell worked its way east with in-flight refueling for both the Eagles and the Extender.

The trip from Kadena AB, Okinawa, Japan, took the seven crews one-third of the way around the world in less than fifteen hours. When the blue fighters finally pulled into the chocks at Eglin, they were greeted by well-rested crew chiefs who had launched them from Kadena. These had made the long journey in KC-10 comfort as part of a support contingent of fifty-nine. With them, thirteen cargo pallets weighing twenty-seven and a half tons also journeyed in "comfort." Savings from this nonstop profile may be projected into a variety of future scenarios: minimum en-route basing and ground congestion, reduced fuel drawdown in-theater, shorter turnaround times (crew chiefs arrive with their fighters), minimum times en route, and direct routing.

These three short stories are not unique or special KC-10 tales. They are typical results when the KC-10 is used as a tanker, airlifter, or combination of both.

Growing Audience of Customers

As the first new aerial tanker since the mid-1950s, the KC-10 joins a maturing fleet of KC-135s in the effort to satisfy the needs of a large and varied audience of in-flight customers. Today, every US combat aircraft currently in development or in planning includes provisions for air refueling.

With roughly 4,500 refuelable aircraft already in the inventories, there is the potential for a whopping 6,000 by mid-decade. And NATO, with an estimated 11,000 refuelable aircraft, is expected to raise that number to 15,000 in the same period.

In the face of such overwhelming numbers, the addition of a few (or more) KC-10s might not appear as a serious response to the problem. Fortunately, the big tanker's numerous capabilities are redefining the rules of engagement for managers of aerial refueling.

As a splendid supplement to the workhorse KC-135 fleet, the KC-10 and its size generates big numbers: the fuel capacity of the KC-135A is approximately 187,000 pounds, but the KC-10 load is almost 350,000 pounds; and each of the turbojet engines on the KC-135 offers 12,925 pounds of thrust for heavyweight takeoffs, compared to the KC-10's high-bypass fanjets rated at 52,500 pounds of thrust apiece.

In comparison with the KC-135A, a fully loaded KC-10 can haul more fuel from less runway over a greater distance (of course, KC-135 reengining programs will narrow that as the decade progresses). This translates into a radius delivery capability of 200,000 pounds of fuel at 2,000 miles, double to triple the KC-135A's delivery capability. This increase in the availability of airborne fuel permits greatly improved use and distribution of tanker resources, as well as mobility forces.

With multiservice, multination potential, the KC-10 is expanding the Navy's aerial refueling environment. Exercises at sea have matched the KC-10 to a wide range of Navy aircraft, and it has successfully refueled dozens of aircraft on a single sortie. As a carrier in the sky, one fully loaded KC-10 provides special flexibility to the Navy's tanker aircraft by fueling them, sending them on their way in several different directions, and then refueling them again later. This cycle can be repeated again and again because of the KC-10's fuel capacity.

The Extender comes especially well equipped to accommodate the Navy's probe-and-drogue method of refueling. Instead of the boom-mounted nine-foot hose and basket of the KC-135, the KC-10 carries an internal hose-reel assembly in its lower aft fuselage. The system provides receivers with stable airspace and good views of their tanker because its big basket can be trailed at seventy to eighty feet.

In instances where aircraft equipped with receptacles, such as the E-3 AWACS system, are mixed during joint employments with the Navy, the KC-10 boom operator may simply reel in the long drogue hose and then lower the boom.

Strenuous Endurance Efforts

Since the KC-10 can haul so much fuel for the Navy, the Air Force, or anyone else, typical missions can be strenuous endurance efforts for the crews. Fortunately, overall noise levels in the aircraft are quite low, especially in the cockpit, where a normal tone of voice replaces the interphone and headset for communications between pilots and the flight engineer. Pressurization and temperature control tame all climatic extremes in the air or on the ground, thanks to the tanker's airliner heritage. Airline-style seats, galley, and latrine combined with rest bunks for the crew reduce aircrew fatigue in a manner rarely known in military aircraft.

Large, long-range fuel offloads by KC-10s make it possible to stretch the deployment of US airlift forces to a greater degree than ever before. With large amounts of airborne fuel available on direct routes to a given theater of operations, cargo aircraft are less constrained in their balance of payload vs. fuel at takeoff.

Since the KC-10 offers such large offloads en route, payloads may be increased at the point of origin, and it can eliminate en route fuel stops that create "critical-leg" segments between refueling stops requiring the most fuel and, hence, least cargo. Direct, nonstop routing decreases delivery time, increases use, and eliminates nonproductive ground time and costs.

Single or multiple employments of KC-10 assets go a long way toward minimizing uncertainties about overall airlift deployment. Use of the KC-10 can reduce or eliminate en-route basing, dependence on local fuel supplies, and the need for fuel supplies in-theater or at the destination. Two typical stories highlight the work of the KC-10 with airlift aircraft.

In 1981, three KC-10s and one C-5 Galaxy made a nonstop delivery of equipment from CONUS to Southwest Asia. The C-5 loaded with 144,000 pounds of cargo launched from Dover AFB, Del., and was followed a short while later by the first KC-10 heading east out of Pease AFB, N. H. Takeoff times, airspeeds for optimum fuel use, and a safe abortable location for air refueling were all planned to put the C-5 on the boom at the precise time.

Just as the first KC-10 had closed on the jumbo airlifter from the rear for rendezvous, the second KC-10 would close in, since it had buddy-launched with, and refueled from, the third KC-10. The first KC-10's

High above Texas, F-15s on an extended training mission out of Holloman AFB, N. M., rendezvous for refueling with a KC-10 from Barksdale AFB, La.

offload to the Galaxy totaled 120,000 pounds, and the second KC-10's offload, well into the Mediterranean, added another 61,000 pounds to the airlifter.

At the end of the 6,500-mile journey, the C-5 crew had a fuel reserve of 50,000 pounds. The three KC-10s, in turn, recovered nonstop to Pease and finished their night mission with very conservative fuel reserves (the third KC-10 had the highest, 75,000 pounds).

The second story of airlift support includes eight KC-10s. Seven (the eighth was a ground spare) staged out of Loring AFB, Me., to support twenty-two C-141Bs participating in the annual Reforger exercise. As part of NATO's Autumn Forge players, the C-141s hauled troops and equipment nonstop to Germany. Refueled by twenty KC-135s in the European theater, the StarLifters yoyoed right back home to the US for their third fueling with the Loring KC-10 force. The mission was a success, and it saved a lot of tire rubber and time.

A Cargo Aircraft as Well

When used to support airlift, the KC-10 opens the door for in-flight fuel delivery and for cargo delivery. Its 169,000-pound capacity for palletized cargo enables it to augment airlift forces under certain conditions. Twenty-seven roll-on pallets can be fitted onto the large cargo deck through a cargo door measuring 102 inches by 140 inches. In an augmentation role between major aerial ports, those KC-10 pallets could include bulk cargo, oversize vehicle loads, or a mixture of troops and cargo.

As a derivative of a commercial convertible freighter, the Extender's palletized seating sections for as many as seventy-five troops can be added and still leave seventeen pallet spaces for delivery of equipment. If desired, the fuel and cargo capability can be used to deliver bulk POL stores to crisis areas.

In one sense, "bulk" is one of the better words to describe the KC-10's impact on strategic mobility via its aerial refueling and transport capability. Such versatility makes the Extender ideally suited for use in deploying the new unified command—US Central Command for Southwest Asia (USCENTCOM). USCENTCOM reaction to hot spots will indeed require a steady flow of men and supplies over long distances requiring an even steadier flow of in-flight refuelings. A further note emphasizes another critical factor in the success of any continuing USCENTCOM effort—the surge capability of equipment used to sustain deployed forces.

As a derivative of commercial aircraft, the KC-10 combines proven civilian turnaround capability with field-tested surge results based on a week of round-the-clock flying out of Loring in 1981. The two KC-10s flown in the Loring forward-based scenario met a test goal of fifteen flying hours per day per airframe for a limited surge operation.

Since then, the Extender's maintenance and logistics procedures have matured through worldwide experience. Built-in test equipment and the simplifying technology of state-of-the-art "out with the bad black box and in with the good" greatly enhance the jumbo tanker's potential in a real-time rapid-deployment scenario.

Flexibility

In addition to potential RDJTF use, other potential roles for the KC-10 could include support of B-52s on ocean surveillance missions by adding to their range and on-station capabilities. And, in staging an entire support package from the US, the KC-10's long air legs can support global reconnaissance activity, despite restrictions on overseas staging bases for tankers.

The KC-10 has a big role to play, but it is a big airplane. And it is a safe airplane with all the latest wonders of automation and redundancy guarding its numerous systems. Yet, perhaps the best thing that can be said about the Extender, purely from a pilot's perspective, is the familiar one-liner: "It's fun to fly!" ■

Maj. Charles E. Bailey is a course officer in the Air Command and Staff College of 1983. A Senior Pilot with more than 3,000 hours' flying time, including 600 in the KC-10A, he was commissioned through OTS in 1969. He earned his pilot's wings in 1970 and then transitioned to the KC-135A, which he eventually flew as standardization, squadron, and Combat Crew Training School instructor pilot. He also flew the KC-135A during two combat periods in Southeast Asia. After staff duties at Castle AFB, Calif., as a curriculum development manager and author of the KC-135 weapon system trainer test plan (pilot), he joined the KC-10A initial cadre test pilot team, later serving as one of the operational squadron's first flight commanders. He holds a MS degree in systems management and an MA in education.

Fighting Falcons Find A Home at Hahn

The 50th Tactical Fighter Wing stationed in Germany has become the first USAFE unit to be equipped with the F-16.

BY WILLIAM P. SCHLITZ
SENIOR EDITOR

"WELCOME to the club!" was the response of our NATO allies last year to the first US Air Force F-16 Fighting Falcon wing to be based in Europe.

In ceremonies at Hahn AB, Germany, in July, four F-16-equipped allies—Belgium, Denmark, the Netherlands, and Norway—formally welcomed USAF F-16s to the Alliance.

But the new F-16 wing hadn't appeared, as it were, out of the blue. USAFE's 50th Tactical Fighter Wing had already been stationed at Hahn, flying F-4E Phantoms. The previous year, Hq. USAF had decided to reequip the wing with F-16s with minimum interruption in NATO on-line capability. This meant strict adherence to a timetable to transition the 50th's three fighter squadrons—the 313th, 10th, and 496th—to the new aircraft in turn. The actual transition took place from December 1981 through last June.

This was easier said than done, because prior to the arrival of the first F-16 almost the entire operational and support underpinnings of the wing had to be restructured. For example, pilots had to be trained to fly the new aircraft. Of the pilots then assigned to the wing, about forty percent were selected to stay aboard for the transition. These were put through a three-month F-16 training program at Hill AFB, Utah, or MacDill AFB, Fla.

Also in the interim, other experienced F-16 pilots were reassigned to the 50th Wing from units in CONUS. Finally, to fill out the wing's contingent of more than 100 pilots, others were assigned brand new from the fighter pilot training pipeline.

By the same token, the wing's maintenance and support also underwent reshaping in accordance with the timetable. For example, maintenance folk schooled in the intricacies of the F-4's GE J79 engine had to be reeducated to deal with the F-16's modular P&W F100-200 engine.

Ease of Maintenance

That the F-16 was designed for ease of maintenance is typified by its engine.

"The engine can be pulled out of the aircraft in thirty-five to forty minutes," noted Col. Dale C. Holt, wing deputy commander for maintenance. "The engine consists of six modules, each of which can be replaced in a matter of hours. From the outset, the engine was designed to do away with depot maintenance," he added.

"Engine in-shop time has been cut to twenty-five percent of that required by the F-4," Colonel Holt said. "Of course, it's nice to have aircraft—and their engines—in mint condition straight from the factory to start off," he added.

Faced with an F-16 bed-down program of less than a year, the wing also dispatched crew chiefs and other key support people for training in the US at Hill and MacDill or by prime contractor General Dynamics. With the return of this cadre, the wing then retrained about eighty percent of its maintenance and support personnel itself.

Flight-line maintenance of the F-16 was set up TAC-style, noted Colonel Holt, instead of centrally managed. "An array of specialists is with the crew chief on the flight line, to troubleshoot avionics problems, for example," he stressed. With experts in refueling and changing tires right at hand, the ultimate objective is increased sortie rates. Colonel Holt also underlined that the F-16's design made it "much easier" to remove and replace components.

A major element in the transition was to be the construction from the ground up of an Avionics Integrated

Support (AIS) Facility, a soundproof, dust-free, and temperature/humidity-controlled structure. This new concept in intermediate avionics support also would require wing people trained in AIS techniques to man a series of test stations handling line-replaceable items in the F-16's various systems—flight controls, navigation, weapons delivery, communications, and the especially sophisticated electronic countermeasures equipment.

"Lead time in developing the AIS was rather complex," commented Col. Richard W. Waite, wing deputy commander for resources. "Once the building construction phase was completed, the electronic equip-

ment—straight from the factory—was delivered to Hahn by C-141s. We then set it up in record time—two hours, thirty-four minutes. Then, of course, it all had to be tested before the arrival of the F-16s."

Another project that required special consideration within the timetable was construction of a building to house the F-16's hydrazine solution. The chemical compound is so corrosive that it is stored aboard the aircraft in a rugged, twenty-six-liter stainless-steel tank designed to withstand intact heavy impacts such as endured during crashes. The hydrazine is used as fuel for the Emergency Power Unit (EPU), an engine-backup system unique to the F-16 that provides electrical and hydraulic pressure when needed.

The EPU is used strictly for emergency engine restarts in flight. The F-16 has self-contained, internal capability for conventional engine starts.

Once the ground storage structure was completed, crews had to be trained in the use of special garments and safety techniques in handling the toxic substance and to deal with spills should they occur.

Horrendous Flying Weather

A major problem confronting any flying unit in Central Europe is the atrocious weather.

Hahn, at its location and altitude, experiences flying weather as bad as at any installation in Europe. Statistically, the base has averaged 244 flying days a year, considered less than adequate to accomplish the training mission. Since all three of the wing's fighter squadrons have gone operational, weather-canceled sorties have averaged 114 per month. However, despite the weather, the wing has averaged 1,000 sorties per month from November 1982 to the present.

"But since the wing is still in a 'build mode,' flying statistics are still somewhat deceiving," commented Col. John M. Davey, Wing Commander. "With three combined squadrons fully operational and the arrival of better weather, the sortie rate should increase substantially. The next step is to move into sortie surge exercises," he added.

Still, by December 1982, the wing had logged 10,000 flying hours and intends to achieve its objective of 25,000 hours by October of this year.

Despite ferocious weather and other flying imponderables, the wing has maintained a creditable safety record. Two aircraft have been lost—one in December 1982 and one in January 1983. Both pilots—1st Lt. Richard A. French and Capt. Donald J. Hoffmann—ejected safely.

Helping to maintain flying proficiency in the face of bad weather is the wing's cockpit simulator, the first in USAFE. With Hahn suffering "the worst weather in USAFE," simulator instructor Capt. Terry Taylor noted, instrument practice on the simulator is an operational necessity. "When it becomes fully operational, our pilots will average two-plus hours a month on the simulator," he pointed out. "With more than 100 pilots in the wing, the simulator will be in operation twelve to sixteen hours a day.

"The simulator training here is different from that of F-16 units in the States," commented Captain

ABOVE: In accordance with NATO's requirement for hardened facilities, TAB-V aircraft shelters have been constructed at Hahn to give its F-16s a measure of protection from aerial attack. RIGHT: As is the policy throughout USAFE, heavy emphasis is placed on performing tasks while dressed against chemical warfare.

Taylor. "We fly in typical European low-ceiling and low-visibility weather conditions. Our simulator instrument training takes on an extra meaning when we know our instrument skills are likely to be challenged on our next flight. The simulator is also designed to be used for tactical training. Presently it has the capability of simulating the delivery of any weapon the aircraft can carry," he stressed. Also, missions can be simulated to targets all over Central Europe—strictly on instruments, according to Captain Taylor.

A future simulator capability may be the addition of a digital radar land mass system to depict such ground returns as cities and rivers.

As with cockpit simulators anywhere, the wing's is also used extensively by maintenance folk to practice conventional engine runups, instrument checkout procedures, and the like.

Because of bad weather, high-density air traffic, and crowded range use, the 50th Wing—as do other fighter units in Europe—deploys for weapons training to bases in Italy, Turkey, or Spain. Each of the three flying squadrons is slated for such deployments two months of the year. In effect, this means the wing will be short a squadron six months of each year. The deployments are package propositions, with wing maintenance and support people boarding MAC transports for extended TDY.

While away from Hahn, a particular squadron's sortie rates and weapons delivery effectiveness are carefully monitored at home, as are any serious maintenance problems. Each morning, wing headquarters reviews sorties flown, results, and types of mission.

50th Wing Missions

Based on its unique capabilities, Hahn's F-16 missions are threefold. As a "swing-force" fighter, it can complement the more sophisticated F-15 in the air-superiority role. This is already a proven partnership, based on realistic flying training.

As well, the F-16 can supplement the F-4, F-111, and A-10 in close air support and interdiction missions.

"We train differently from F-16 units in CONUS, which are regarded as a broader, worldwide warfighting force," stressed Colonel Davey. "Here, we're specifically tasked to defend Central Europe and thus have the need to tailor our tactics to the NATO environment. In this we take into consideration the various Warsaw Pact threats in a NATO environment and our unique weapons capability. Also, we are learning lessons from our NATO allies who have been flying the F-16 for some time," the wing commander added.

"The F-16's range on air-to-ground missions exceeds that of the F-4, and technologically it is a quantum leap over the Phantom," noted Colonel Davey. "The F-16's advanced avionics give it the ability to put 'dumb' bombs on target with great accuracy in low-ceiling/visibility conditions. This capability has reduced the requirement for laser-guided munitions," he added.

A comparison between the F-16 and the Phantom in terms of sortie rates is not possible because that information is classified. However, the mission-capable rate for the F-4E in Fiscal Year 1982 was 64.6, compared with the F-16's 66.7. In fact, the F-16 had the highest MCR of any Air Force fighter in FY '81 and FY '82. It was also pointed out that the F-16 is much easier to maintain than the Phantom.

"An anticipated modification calls for the F-16 to be equipped with an improved radar fire control system for firing advanced medium-range air-to-air missiles at multiple targets in rapid succession," noted Colonel Waite. "The F-16 will then have a one-two punch, AMRAAM and Sidewinder, plus the aircraft's rapid-fire 20-mm cannon that can be used both in air-to-ground and air-to-air attacks," he added.

Unusual Training Capabilities

The purpose here is not to present a profile of the F-16's operational capabilities (*see "Gallery of USAF Weapons," p. 147 of this issue).* However, the Commander of the wing's 313th Tactical Fighter Squadron, Lt. Col. Ron Morrow, singled out several of the aircraft's attributes that make it an exceptional weapon system and training tool.

"The F-16 combines a fire-control computer and a very accurate inertial navigation system to provide the pilot with several different attack modes in both air-to-surface and air-to-air missions. The pilot chooses the mode desired based on the mission to be accomplished. The fighter pilot considers the mission objective, tactical environment, and defenses and weapons to be employed in his mission planning."

When airborne, according to Colonel Morrow, the pilot will then select the different modes of navigation and attack with switches found on the stick and throttle.

"Information needed to make tactical decisions and put weapons on target is portrayed in the Head-up Display as the pilot shifts between attack modes," noted Colonel Morrow. "Such information as basic flight parameters, navigation guidance, and precise weapons deployment data is displayed on the HUD," he added.

"A truly significant improvement in training has been made with the F-16's videotape recorder," Colonel Morrow stressed. "On the VTR, a pilot can record a major portion of his mission as seen through the HUD or his radarscope along with audio information."

With the VTR, the pilot can review his mission to determine navigation precision and weapons employment accuracy, the 313th Commander pointed out. "He can reconstruct complex air-to-surface missions and air-to-air engagements for a complete analysis," Colonel Morrow said. "Many details of such missions occur and pass in fleeting seconds. Previously, these factors were often lost in extensive post-mission briefings. Now the pilot can see and hear his flight immediately after landing. He sees his successes and errors and can analyze each," Colonel Morrow noted.

"The real-time feedback provides a tremendous training tool for a fighter pilot that was not previously available in fighter aircraft," he said.

The Wing and Its COBs

The 50th Wing has additional responsibilities besides training for

combat in Central Europe. Each year, for example, a fighter squadron from CONUS will deploy to one of the Collocated Operating Bases the 50th Wing is obligated to support. The 50th acts as host and is instrumental in preliminary planning for the deployment. This is a tall order, requiring more than a routine effort.

For example, a team of wing pilots will visit the guest unit prior to the deployment. There, the team will brief as thoroughly as possible on matters ranging from what to expect in the European flying environment to the dedicated radio frequencies.

"Also prior to the deployment," commented Colonel Davey, "the wing acts as liaison with the COB's NATO host government. The exercises planned are expandable to include a joint effort by the CONUS forces, those of the host nation, and in-place USAFE units," he added. "All this is detailed in a Joint Support Plan that lists host nation and USAFE (meaning 50th Wing) support, and defines what equipment the deploying force will bring with it aboard the MAC transports from CONUS."

People from the 50th Wing are involved in housekeeping at the COB throughout the deployment, providing, among other things, a fleet of ground-support vehicles.

"On a day-to-day basis other than during deployments from CONUS, we are required to ensure that the COBs are stocked with minimum essential warfighting materials," noted Colonel Davey. "We are responsible for maintaining more COBs than any other USAFE wing," he added.

Another important facility maintained by the wing is the 50th Ammunition Supply Squadron located some thirteen miles southwest of Hahn, at Wenigerath, Germany. From its 144 munitions storage sites and forty-one miles of improved roads, the 50th ASUPS—one of only three such units in USAFE—trucks munitions to thirty separate NATO and Air Force installations in the Central European region. With a staff of more than 250 wing people, who also provide fire protection, security, and maintenance, the facility operates a fleet of fifty-five vehicles. It has the capacity to store 10,680 metric tons of explosives.

SSgt. Ramon Mendez inspects noise suppressor inside the Hush House at Hahn. (Photo by A1C Dave Polinsky)

The wing also is responsible for operating munitions support squadrons at Büchel and Nörvenich in Germany and Volkel in the Netherlands.

At Hahn, the wing is associated with a number of attached tenants—for example, a communications squadron whose commander acts as the wing deputy/communications. In support of the wing, an ATC field training detachment with some twenty-six instructors teaches such basics as engine maintenance and aircraft system fundamentals. Students graduate to the flight line for follow-on training before certification.

An explosive ordnance flight with regional responsibilities is under wing management, as is a combat support group. The wing has a weather detachment assigned.

Also stationed at Hahn is an Army air defense battery equipped with Chaparral SAMs and Vulcan 20-mm cannon.

Other Facilities at Hahn

The construction program at Hahn is far from complete. With the NATO commitment to harden facilities, three squadron operations centers are being built. As elsewhere in Europe, they are designed with chemical warfare filters and decontamination provisions. A hardened alert facility is already operational.

In conjunction with the hardening effort, Hahn has instituted a "tone-down" program—in effect, the camouflage of buildings and facilities to blend in with the rural landscape.

A unique facility at Hahn is its "Hush House." From the outside, the Hush House resembles an oversize Quonset hut. Inside at one end is a huge funnel-like noise suppressor. The Hush House is relatively new to Hahn, having gone into operation last January.

The Hush House is useful in several ways. First, Germany observes "quiet hours," when noisy operations such as engine runups are *verboten*.

"In the Hush House aircraft engines can be tested without their removal from the aircraft," noted MSgt. Frank Nichols, NCOIC. "The Hush House is a big help in easing maintenance. We can bring aircraft in out of the elements and test engines around the clock if need be," he added.

The Air Force plans the installation of twenty-five such structures in CONUS, England, and Europe.

Some sixty hardened TAB-V aircraft shelters have been built at Hahn, and others are planned to house the wing's seventy-plus fighters.

Finally, another recent addition has been the BAK-14 emergency barrier arresting system on Hahn's runway. ■

TURKEY:

NATO's Southeastern Keystone

Having weathered the worst crisis it has faced in decades, Turkey now seems headed for better days. Problems remain, manageable but persistent, to challenge the leaders of this ancient country.

BY GEN. T. R. MILTON, USAF (RET.)

Military service to the country is every Turk's right and duty.

—Turkish Constitution

A BLOCK or so north of the Istanbul Hilton a new high rise dominates the ridge above the Bosporus. It is the Turkish Officers' Club, and an uninformed visitor might think it the typical excess of a military regime. He would be badly mistaken. The club was begun well before the generals took charge of the government, but that is not the point.

Kemal Ataturk, military genius and political visionary, left a legacy to the Turkish officer corps. They are the designated guardians of the Turkish Republic, the ones who keep Turkey pointed toward Ataturk's goal of a secular nation with modern aspirations and ties to the West. This officer corps is a special group, democratically selected from all segments of Turkish society, strictly educated and charged with defending the Republic against all enemies.

When, as sometimes happens, the enemy within becomes a threat to law and order, the military—the Army, really, for that is the dominant service—moves in. This occasional exercise of power has never been accompanied by corruption, as is so often the case in military governments. Privileges, such as the club in Istanbul, are provided the serving officer, but his pay remains modest and his reputation for honesty unquestioned.

This is the third time since the death of Ataturk in 1938 that the Army has seized power. Each time it has done so reluctantly and only after the politicians have lost control. In the first two instances, the soldiers turned the government back to the politicians once military justice had calmed things down. This third time, however, the military regime looked a little deeper and decided, together with civilian academics and parliamentarians, that the constitution itself was a factor in Turkey's recurring tendency toward political chaos.

Accordingly, a new constitution was drafted and, after much controversy, was accepted by popular referendum last November. It bears a similarity to de Gaulle's French constitution and, as was the case in France, has gone into effect under the aegis of an Army general.

First of All a Soldier

General Kenan Evren is beyond doubt the most popular figure in Turkey. He has looks, charisma, and a politician's knack for getting his message across, but he is first of all, as was Ataturk, a soldier. When he made his decision to intervene, the situation in Turkey had become desperate. The terrorists, beyond putting everyone's life in danger, were fast approaching their goal of total disruption. The economy was paralyzed by strikes, inflation was well into triple digits, and parliament was deadlocked, unable to agree on anything. When General Evren sent his troops into the streets on September 12, 1980, Turkey had reached the brink of anarchy.

Thirty months later the results are there for anyone to see. Inflation, while still worrisome, is down to twenty-six percent and falling. The economy, while not exactly booming—as whose is?—is recovering, with factories now operating at about eighty-five percent of capacity. The strikes have ended because the government has forbidden them, but there seems to be a widespread view that because things are so much better there is little reason to strike. Besides, wages are indexed to inflation, and employers may not cut back on production or lay off employees without first submitting their reasons for these actions to skeptical government scrutiny.

The real bonus of the soldiers' regime, however, has been the suppression of terrorism, to the evident joy of the population at large. As antiterrorist campaigns go, this one has been relatively bloodless, not even remotely similar, for instance, to the Dirty War in Argentina. Nevertheless, there have been a series of visits by various human rights commissions resulting in predictable denunciations of Turkish government behavior.

Undoubtedly, there have been instances of police overzealousness in the treatment of terrorists. Given the murderous brutality of the terrorists, along with killings of police and soldiers and the Turkish propensity for the direct approach, it would be strange had there not been some police excesses. Even so, the government has cracked down on offenders and is bringing some of them to trial. Not, it is worth adding, in response to public pressure, for the public seems to feel the terrorists deserve whatever they get.

Life, in short, is back to normal in Turkey, or considering the turbulent history of the last fifteen years, better than normal. The universities, hostage a few years ago to a violent radical fringe where moderate professors needed armed bodyguards in order to lecture, are once more quiet.

And while a group of professors discharged by the government in February will doubtless have their cause taken up, in the name of academic freedom, by academicians somewhere, one respected economics professor told me he now has true academic freedom for the first time in many years: He can teach without fear of threats of violence. As for his cashiered associates, he has no regrets. They were, in his opinion, at the heart of the universities' problems.

Turkey, then, appears to have weathered its worst crisis, a fact that should bring comfort to its NATO allies. Unhappily, life is not that simple. Liberal socialists have an instinctive abhorrence of a military regime, however enlightened that regime may be and however severe may have been the provocation for a military

coup. Thus, among the various socialist-governed allies, including Portugal and Spain, the most recent and still tentative NATO member, there is disapproval of Turkey's government.

Perhaps the memories of Salazar and Franco are too recent to allow for objectivity, but there is scant resemblance between the government of General Evren and the former dictatorships of Spain and Portugal. Besides, come October, there will be popular elections and a return to parliamentary rule, with General Evren continuing to serve as President for a term of seven years.

Continued Friction With Greece

Another shadow is cast on Turkey by its neighbor and theoretical NATO ally, Greece. While relations between these old adversaries have always been tenuous, in recent times they have scarcely been worse than at present. There is, first of all, the matter of Cyprus and the continued presence of the Turkish army on the northern half of that island as insurance that Turkish interests will not again be threatened by Greek aspirations.

The impression one gets of the outlook from Ankara is that whatever one thinks of the Turkish occupation—or, for that matter, the Turkish invasion of Cyprus—is more or less irrelevant. The Greek Colonels' regime, in its dying moments, gave the Turks an excuse to take care of a situation that had long bothered them, namely, the threat to the Turkish Cypriot minority. The matter is now settled, there will evidently continue to be a Turkish Federated State of Cyprus, and the world can look elsewhere for a problem to solve.

With the Cyprus question at an impasse, the active area of Greek-Turkish confrontation is in the Aegean Sea, and like most disputes in the Balkans, this one is complicated. It has its genesis in the 1974 Turkish invasion of Cyprus.

Prior to 1974, the Athens FIR (Flight Identification Region) extended, as it still does on the maps, across the Agean almost to the Turkish coast. In those days, Turkey accepted these Greek responsibilities and routinely filed flight plans. Following the Cyprus debacle, Greece withdrew from the NATO military arena, and that, as the saying goes, started a whole new ball game. The Sixth Allied Tactical Air Force headquartered at Izmir was, until 1974, jointly manned—at least some of the time—by Greek, Turkish, and US personnel under a USAF lieutenant general, and it served as a calming influence on Aegean air operations.

After 1974, a Turkish three-star general took command, with a USAF deputy and, it goes without saying, no Greeks on the staff. When Greece reentered the integrated military structure in October 1980, after a singlehanded diplomatic tour de force by SACEUR, Gen. Bernard Rogers, the matter of Aegean airspace was left unresolved. The Turks refused to file flight plans for military operations in Aegean international airspace, and the Greeks began to intercept Turkish military flights. Greek Prime Minister Andreas Papandreou has now extended his territorial claims to ten miles around each island and has threatened to invoke the twelve-mile limit called for in the Law of the Sea Treaty. Like other arguments between these old adversaries, this one does not lend itself to an early solution.

So far, the situation in the Aegean has not resulted in a serious incident, but with frequent Greek Air Force interceptions of Turkish flights, the danger of one does exist. The Turkish Defense Minister, Mr. Haluk Bayulken, an ebullient, multilingual career diplomat who was once Foreign Minister, produced a map showing the effect in the Aegean of an enforcement of Greek twelve-mile limit claims. Briefly, and according to Mr. Bayulken's map, such an enforcement would make the Aegean a Greek lake, with Turkey unable to venture from its own shores. At that point, I gathered the situation would become intolerable and require direct action, a *casus belli*.

The Turks appear anxious to avoid any real trouble with Greece over this question of Aegean territorial waters, taking the view that in time Greece will see the light—if not during Mr. Papandreou's watch, then, eventually, with someone else in charge. Nevertheless, the dispute is a real one, and it has the potential for serious trouble. Greece used the Aegean island dispute as the reason for a last-minute withdrawal from the NATO command post exercise, WINTEX, thus putting a little more distance between itself and the Alliance.

Turkey, then, appears to have weathered its worst crisis, a fact that should bring comfort to its NATO allies.

Turkey, while not ignoring the behavior of its neighbor and curious ally—the best Turkish troops are probably those based on the Aegean—is, nonetheless, once more concentrating its military attention on the agreed NATO threat to the north and east. The major winter exercise this year took place at Erzurum, high in the snow-covered mountains of eastern Turkey. As if to emphasize the importance of the event and call attention to the fact that Turkey is concerned with the Soviet, not the Greek, threat, President Evren, together with his service chiefs and a trainload of journalists, witnessed the maneuvers.

Lack of Modern Arms

If sheer courage and will to fight were sufficient, there is no question the Turks would do well against anybody. Gallipoli and Korea are modern-day proof that the traditions of Suleiman the Magnificent are intact. The trouble is that although traditional military virtues still count, battles these days tend to go to the best-equipped.

The border with the Soviet Union alone runs nearly 400 miles, not counting the 600 miles of Black Sea coast. If sheer numbers were a valid measure of strength, the Turks would appear to be in good shape against the threat. The Turkish Army, with 570,000 troops, outnumbers an estimated twenty-six Soviet divisions in the Transcaucasus and Turkestan by about two to one. Unhappily, it is the only Turkish advantage, for the Army's equipment is old, worn, and short of parts, a poor match for the modern armament across the Soviet border.

The Turkish Air Force is similarly handicapped as it flies an assortment of museum pieces into the 1980s. Except for one wing of eighty F-4Es, along with eight RF-4Es, the fighter inventory should not encourage optimism. F-100Cs and Ds, F-5As and Bs, and F-104s make up the rest of the approximately 375 combat aircraft in the Turkish Air Force. And while the F-104s have been in the TAF for twenty years, they will clearly be around years longer. The Turks are buying the discarded F-104s of the Luftwaffe as a source of replacement aircraft and spare parts.

The Turks are also negotiating with Egypt for thirty-five F-4Es the USAF took out of its hide as part of the Camp David accords. This deal for the Egyptian F-4s is an interesting exercise in bazaar tactics involving two sides expert at the game. The Turks want the airplanes, the Egyptians want to unload them, but there is haggling yet to take place. To add a further bit of Mideast intrigue

If sheer courage and will to fight were sufficient, there is no question the Turks would do well against anybody.

to the scenario, there are those who suspect Greece, with its long and close Egyptian connections, of doing what it can to gum up the works. Perhaps that is one of those rumors, but Mr. Papandreou cannot be enthusiastic over the prospect of more F-4s for Turkey.

If the Turkish Air Force can buy the Egyptian F-4s, it will hasten the retirement of the venerable F-100s. But the main hope for Air Force modernization is pinned on a brand-new fighter. The choice appears to lie between the F-18A and the F-16C—the Turks deny interest in either the F-16A or the Northrop F-20, the latter severely handicapped by its prototype status.

By the time this article appears, a choice may have been made, for the Turks, being realists, want the matter settled before presidential election year politics divert America's attention. Last February, they seemed to be leaning toward the F-18A, although an evaluation team was leaving for the US to take one final look.

For whatever reason, perhaps because its experience with the F-4 has been happier than with the single-engine F-100s and F-104s, the Turkish Air Force appears to want a twin-engine fighter, which puts the F-18A clearly in the pole position. The fact that taking on a Navy airplane will complicate a supply system presently geared to USAF support does not worry senior TAF officers who say impassively they can work with our Navy as easily as they can with our Air Force.

Two engines may be a persuasive selling point, but there is more to this fighter purchase than that. The Turks are determined to develop an aircraft industry, and this new fighter—of whatever make—will mark the first step. From the standpoint of cost-effectiveness, coproducing a fighter in Turkey probably makes no sense, especially in view of the limited (150 aircraft) production run for the Turkish Air Force and the doubtful prospects of sales to other countries. Systems analysts, however, are not prominent in Turkish policymaking circles, if, in fact, they exist at all.

Instead, an important factor in determining which airplane to buy, maybe even the decisive one, will be the nature of the coproduction and offset deal that is offered. The competing aircraft companies are well aware of this, and so the various inducements the Turks are mulling over wander afield from the normal business of the aircraft industry.

Aircraft Coproduction Objective

Whatever airplane finally wins out, the program will cost, according to Turkish estimates, $5 billion, of which the Turkish share will be $1.8 billion. These figures may be low, as is generally the case with aircraft production cost estimates. If there are major overruns, Turkey may have to swallow more than it is counting on. Nevertheless, the Turks appear determined to start an aircraft industry, and the specter of increased costs will not discourage them.

Much is riding on this new fighter program beyond the considerable dollar sums involved. In a very real sense, the offset agreement that will make the coproduction possible is viewed by Turkish officials as expiation for the sins of the American arms embargo. According to Defense Minister Bayulken, a coproduction agreement, along with other commercial offsets, will do much to reassure the Turkish man in the street that the US is once more a dependable friend.

In the meantime, there is nothing second-rate or third-worldish about the Turkish Air Force other than, perhaps, some of the airplanes it flies. The bases are excellent, discipline and morale give every evidence of being high, and the training is realistic and, judging from the posted training charts, adequate by our standards. Maintenance facilities are modern: the depot at Eskisehir, for instance, has a complete engine and aircraft overhaul capability employing, like our own depots, civilian labor. While Eskisehir is now operating only one shift, there is an available labor pool ready and eager to expand the operation to three shifts. What is lacking, as is the case in much of Turkish industry, is money. Even so, a $200 million project is under way to improve and modernize Air Force industrial facilities.

All of this is reassuring evidence that Turkey, after a perilous time, is on the road toward recovery. Along with this recovery has come the reestablishment of cordial relations with the US. It has not been easy, because the embargo left deep scars that will take a long time to heal. Nonetheless, working relations are far removed from the icy atmosphere of a few years ago, and they will continue to improve barring another about-face in Washington.

If there is a new occasion for a reversal in Turkish/American relations, it may well come, as it has before, over some fresh Turkish confrontation with Greece. The Turks resent what they feel to be the power of the Greek lobby in the US. It is the Turkish view that American policy toward Turkey has been too readily

influenced in the past by the pressures of that lobby, and they express some uncertainty over American policy down the road under future administrations. Some sort of permanent and lasting commitment, like the fighter coproduction agreement, is thus high on their list of priorities.

Air Bases Under Construction

Meanwhile, this renewed Turkish-American entente is being validated by a burst of construction at Incirlik and an agreement, signed in November 1982, for the development of a number of collocated operating bases. While these bases are for NATO, not Rapid Deployment commitments, they will add substantially to the number of western Mediterranean air bases capable of taking USAF deployments.

The USAF organization which goes by the title of TUSLOG has a lot to do these days. The years of the embargo were a frustrating time for TUSLOG (which may soon drop that acronym to become an air division of USAFE). Buildings deteriorated, living standards dropped, and Turkey became a hardship tour to be avoided. The family housing at Incirlik consisted of rotting old trailers, relics of long-abandoned bases in France and Libya. Besides, there was the terrorism that made travel unsafe and life generally unpleasant for everyone, Turks and Americans alike.

Systems analysts, however, are not prominent in Turkish policymaking circles, if, in fact, they exist at all.

That was yesterday. Today, the program under way at Incirlik, the main USAF operating location in Turkey, is transforming the place from an austere outpost to something approaching a garden spot. The 800 new family quarters now taking shape have the look of California suburbia, appropriate enough considering the California look of that part of Turkey: snowcapped mountains a few kilometers north, beaches just to the south and, something California cannot match, ancient history in every direction.

The new airmen dormitories are spacious, attractive, and absolutely first-class, as is all the $80 million construction programmed for that base. A newly resurfaced runway will complete the task, and Incirlik will resume its role as a NATO alert base. The excellent weapons range 150 miles to the northwest, shared with the TAF, is an added reason for Incirlik's importance.

It would appear, then, that the US is in Turkey for the long haul. Certainly, the Turks hope so, for despite an occasional tendency toward xenophobia, they are genuinely desirous of a close relationship with America. A visitor becomes aware of this in conversations, in observing the easy working relationships between Turkish and American military people, and by noting the widespread effort to make English Turkey's second language.

There are still tough times ahead for Turkey with its growing and restless population, an uncertain economy battered by dependence on foreign oil, and the always threatening situation in the neighboring Mideast. The war between Iraq and Iran is a serious worry, as it is to all Moslem countries bordering on that conflict.

Ataturk abolished the power of the mullahs in making Turkey a secular state, but he did not do away with religion. Islam is still very much alive in the land if the number of new mosques means anything, and while the Turkish brand of Islam is obviously a relaxed one, it is still Islam. There is a natural desire on the part of Turkey to maintain cordial relations with its Moslem neighbors. The bloody struggle marking Khomeini's attempt to turn the calendar back a few hundred years is a troublesome complication.

Despite some professed optimism that oil will eventually turn up, it appears Turkey will remain hostage to outside sources of petroleum. Good relations with Iraq and even with Libya's ineffable Qaddafi are simply in Turkey's essential interest, given its dependence on what those countries provide. Therefore, US and Turkish aims in the Mideast may sometimes take divergent courses.

On the main threat, however, there is no basis for concern over any difference of opinion. Turkey is a staunch NATO member and, in that context at least, a firm and reliable partner of the US. As we found out in Korea, and the British long before at Gallipoli, it is far better to have Turks as friends than as enemies.

The Turks, in fact, want easy relations with all their neighbors, a desire that should not be confused with softness. Even Bulgaria, once part of the Ottoman Empire as was everything else in the great crescent extending from Spain to Vienna, is the beneficiary of friendly Turkish gestures these days, despite Bulgarian complicity in Turkish terrorism.

Trucks rolling along the highway on their way to Damascus are evidence of Turkey's easy relationship with Syria, and Turkish military leaders profess no concern over the newly installed Syrian SA-5s—with Soviet crews—which pose a threat to Incirlik aircraft operations.

Lebanon, with its hopeless divisions and potential for further trouble, does cause some concern, but it is hard to judge Turkish attitudes toward any new Mideast conflict. Turkey's own interests, which, as we have noted earlier, may not always coincide with ours, will naturally come first. But all things being even approximately equal, the restored Turkish/American relationship should have a bright future. ■

Gen. T. R. Milton's by-line is familiar to AIR FORCE *Magazine readers through his monthly "Viewpoint" column and regular insightful feature articles. This article is based on General Milton's recent trip to Turkey and to other nations of NATO's Southern Flank. His companion article on the situation in the Mediterranean will appear in the June '83 issue of* AIR FORCE. *General Milton served as the US Representative to the NATO Military Committee after long and distinguished service in World War II and thereafter in Europe, the Pacific, and the US.*

The Track to Survival

Someone had to find out if a pilot could eject from an airplane at supersonic speed and live.

BY JOHN L. FRISBEE

On October 14, 1947, Capt. Chuck Yeager broke the sound barrier in the experimental rocket-propelled X-1. Scientists and engineers now knew that an airplane and its pilot could safely fly faster than the speed of sound. But could a pilot bail out at such speed and survive? That was a question that had to be answered quickly, for USAF's first supersonic fighters were just over the horizon.

It was certain that the wind blast on leaving the cockpit could dislocate limbs and break bones. There also would be rapid—almost instantaneous—deceleration, subjecting the pilot to very high G loads. Some scientists thought the human body could endure no more than eighteen Gs, or eighteen times the force of gravity—far less than a pilot would experience in a supersonic bailout.

Two approaches to the problem were evident: first, build a complex, heavy, expensive ejection capsule for the pilot; second, find out what stresses an unprotected human *could* survive. The Air Force assigned the second approach to flight surgeon Lt. Col. John Paul Stapp, a bachelor with a philosophical bent, a quiet sense of humor, a love of classical music, and unquenchable curiosity.

Under Colonel Stapp's direction, Northrop Aircraft Co. built at Edwards (then Muroc) AFB, Calif., a 2,000-foot rail track for a rocket-driven "sled" that could accelerate to nearly 1,000 mph. Toward the end of the track, scoops beneath the sled would dig into a pool of water, jerking the sled from several hundred miles an hour to a stop in just over a second, simulating the deceleration of a high-speed ejection. Early passengers were dummies. At the end of one run, the safety harness broke and the dummy plunged through a one-inch wood windscreen, sailing 700 feet across the desert. A few more rides, a few improvements, and it was time for the first human passenger.

In December 1947, Paul Stapp began riding the sled at increasing speeds. By May of the following year, he had rocketed down the track sixteen times and withstood a force of thirty-five Gs during deceleration. So much for the eighteen-G limit of human endurance.

What was the sudden stop like? Colonel Stapp reported: "It felt as though my eyes were being pulled out of my head. . . . I lifted my eyelids with my fingers, but I couldn't see a thing. . . . They put me on a stretcher, and in a minute or two I saw some blue specks. . . . In about eight minutes . . . I saw one of the surgeons wiggle his fingers at me, and I was able to count them. Then I knew my retinas had not been detached, and that I wasn't going to be blind."

Stapp hits the water brake at the end of a 632-mph rocket sled run.

Colonel Stapp continued to ride the sled at Edwards until 1953, when he was sent to Holloman AFB, N. M., to work with a longer track and an improved sled called *Sonic Wind*. There, on December 10, 1954, the forty-four-year-old Stapp rode the sled to a record 632 miles an hour, decelerating to zero in a second and a quarter with a force of more than forty Gs. Momentarily his body weight was about 6,800 pounds. Wind blast and deceleration were equivalent to a high-altitude ejection at supersonic speed.

Out of these wild rides came improved helmets, arm and leg restraints, better aircraft seats, stronger safety harnesses, and techniques for positioning the body to help absorb unearthly forces. And for Paul Stapp? During his twenty-nine rides came several retinal hemorrhages, cracked ribs, and two broken wrists. The second he set himself while walking back to the Aero Medical Field Laboratory that he headed.

Colonel Stapp was named winner of the Cheney Award for 1954. That award recognizes acts of "valor, extreme fortitude, or self-sacrifice in a humanitarian interest performed in connection with aircraft." That same year, he also won AFA's Theodore von Kármán Trophy for distinguished service in the field of aerospace science. But for unassuming Paul Stapp, the greatest reward was the knowledge that he had helped make a dangerous profession a little less hazardous—that many jet pilots who had to abandon their planes were still alive and flying.

War is the breeding ground of heroes. In times of peace, few have the opportunity or the dedication and courage to risk permanent injury or death, as Lt. Col. John Paul Stapp did repeatedly, so that others may live. He exemplified in extraordinary measure "the noble quality we call valor." ■

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Streamlining the Air Arm

BY THE HON. VERNE ORR
SECRETARY OF THE AIR FORCE

Today's Air Force is smaller, but its people are brighter, better prepared, and go further to do more.

IN the Air Force's quest for excellence, change and challenge have been constant companions. Today, the United States Air Force is the most powerful air arm in the world—a position achieved because its people have been able to meet the challenges created by a constantly changing world. In this article, I would like to review some of the changes in the Air Force that have occurred since its inception more than thirty-five years ago and to examine the challenges many of these changes pose for us today.

Secretary Orr: ". . . challenge is the inseparable companion of change."

Composition of the Air Force

Since its establishment as a separate service following World War II, dramatic changes have occurred in the composition of the Air Force. Our people form the basis for deterrence, and ultimately our national defense, and are the most valuable asset in any branch of the armed services.

In comparison to our past, today's Air Force is composed of fewer though more highly qualified and educated people, representing a broader cross section of the population.

Over the past thirty-five years there has been considerable fluctuation in the number of people in the Air Force. From a World War II peak of 2,400,000 men and women in 1944, we dropped rapidly over two years to less than 500,000 as a result of the postwar drawdown. However, with growing concern over Communist aggression in Korea, the Air Force once more began adding to its ranks; until, in 1952, we had more than doubled in size to about 973,000. After a slow tapering off, the Vietnam conflict brought our strength to more than 905,000 in 1968. Today, our Air Force has about 583,000 people on active duty—a somewhat smaller but streamlined force of volunteer professionals.

While the number of personnel in the force has decreased, its quality has not. In fact, the education level of our men and women has improved steadily since the early 1950s. In the years following the Air Force's creation, only about fifty percent of the officers had a college education and about the same percentage of the enlisted personnel had earned a high-school diploma. In contrast, today we can boast of a more highly educated force.

For example, better than ninety-nine percent of the active-duty officers have a college education; forty-three percent of our officer corps possess the equivalent of a master's degree or higher. Ninety-eight percent of our enlisted personnel have completed high school.

The people picture is bright, but the future presents us with a challenge to sustain the progress that we have made. We must continue to recruit highly educated, self-motivated officers and enlisted personnel; but that will not be easy. On the one hand, there will be a smaller number from which to recruit. More importantly, as I pointed out in January's issue of AIR FORCE Magazine, the growing scientific illiteracy of today's youth will have a significant impact on our efforts.

Competing With Industry

The technological edge that has been the foundation of our strategy—to be able to man and maintain technologically superior weapons to overcome numerically superior Soviet forces—is at risk. Today, we are experiencing a shortage of nearly 2,500 military and civilian engineers in the Air Force. To fill this gap, we will have to compete with industry for the talent that will be available.

It is true that our forces are paid better today than ever before. For example, an Air Force captain's base pay has grown twenty-four percent over the last eighteen years in constant 1983 dollars, and a staff sergeant has realized a thirty-three percent increase during this same period after adjusting for inflation. The challenge before us today is to ensure that the pay comparability that was finally achieved in FY '82 will be restored in FY '85.

Another significant change has been the steady expansion of the role and opportunities for women and minority group members in the Air Force.

On June 12, 1948, Congress passed the Women's Armed Service Integration Act, establishing Women in the Air Force (WAF) as a permanent part of the service. At that time, only 300 women officers and 4,000 enlisted women were authorized, representing less than one percent of the force. The number did not rise much beyond this level until after the outbreak of the Korean War.

By contrast, today we have more than 10,000 women officers and 55,000 enlisted women, 11.2 percent of the force. That figure will grow to more than 12,000 officer and 64,000 enlisted women by 1987, or 11.6 percent of the force. Today, the Air Force has a larger percentage of women and more women officers than any other service. Since 1976, women have been admitted to the Air Force Academy. The current enrollment of nearly 500 women comprises close to eleven percent of the student body.

Since its creation in 1947, the Air Force has taken the lead among the services in expanding the role of minorities. When President Truman signed Executive Order 9981 on July 26, 1948, official support for black participation in military aviation became national policy. By the early 1950s, each branch of the military had adopted policies of equal treatment for blacks. However, many segregated units still existed.

Pressure to integrate these units began to build in 1951. With increas-

ing numbers of blacks joining the service, the all-black units approached full strength while a number of all-white units remained under strength. The Air Force played a prominent role in the integration effort. In fact, a Korean war correspondent in a 1950 Baltimore *Afro-American* article said integration could be described in two words: "Air Corps."

Today there are nine black generals in a totally integrated Air Force. This year, Air Force Lt. Col. Guion S. Bluford will become the first black American in space.

The Air Force's appreciation for the value of black Americans is indicative of our services' attitude toward all minority groups in our society. Today, for example, more Hispanic Americans are being recruited than ever before and have a higher retention rate than the Air Force average.

Another dimension of the change in the composition of today's Air Force is the growing number of two Air Force member families. Prior to the 1970s, there were very few active-duty couples, in part because pregnant women were normally not permitted to continue their Air Force careers. Since that rule was changed in 1971, the number of Air Force couples grew. In 1975, there were 8,500 couples, representing 2.8 percent of the force. Today there are more than 23,000 couples, representing eight percent of the force.

Not only has there been an increase in the number of couples but as couples remain on active duty there has also been an increase in their rank. As the number and rank of joint spouses increases, the difficulty of dual assignments grows. The Air Force will continue to make major efforts to accommodate couples, but obviously no guarantee can be made that we will always be able to find solutions to individual cases.

Air Force Mission

The basic Air Force mission to fly and fight has been expanded; a fact, in part, reflected in the term "aerospace." Today, Air Force responsibilities for defense and deterrence cut across the entire spectrum of conflict and are met in a diverse operational environment that includes the atmosphere and suborbital, orbital, and deep space. The current mission of the Air Force is expanding in two specific directions.

First, the Air Force is moving more and more into space. With the end of the test phase of the Shuttle program this past summer, space has become no longer a place to visit. It has become a place to work. The threat that we face results from the fact that space is no longer a benign sanctuary.

In underlining the growth in Air Force effectiveness through the years, Secretary Orr points out that the C-5 can carry twenty times the cargo of the C-47 and transport that cargo twice as far.

Today, we are dependent on space for warning, communications, and command and control of our forces worldwide. The challenge before the Air Force is to ensure that this capability is not lost, and that no nation that would wish us ill will ever be in a position to dominate this medium.

New Interservice Accord

A second area of mission expansion is joint operations. It is, to be sure, not a new one, but recent events only reinforce its increasing importance. One factor that contributed to the British South Atlantic success, in the words of the British on-scene commander, was "the single joint force commander in a joint headquarters location."

Recognizing this lesson, the Air Force has undertaken a number of initiatives to emphasize and enhance joint operations. Our approach is embodied in a Memorandum of Agreement with the Navy to accelerate efforts to defend jointly the sea lines of communications. Our initial efforts will involve sea-lane air defense and increased use of our land ranges for Navy training. But this is only the first step; for we project, in the future, an increase in the scope and frequency of all aspects of joint maritime operations. Similarly, working with the Army on the "Air-Land Battle 2000" concept, we have signed recently a Memorandum of Understanding that highlights the need for joint activities with that service.

Air Force Systems

While there has been an expansion of the Air Force mission, the number of Air Force weapon systems over the years has decreased both in quantity and types. Yet, while there has been a decrease in force levels, there has been a significant increase in capability. Technology has enabled us to field air, missile, and space systems that give us the edge in maintaining a viable deterrent in the face of an ever-increasing number of Soviet weapons.

During World War II, aircraft production peaked in March of 1944 with the production of 9,100 aircraft a month, an increase of more than 2,000 percent in four years. Between January 1940 and August 1945, in fact, the Army Air Forces took delivery of more than 230,000 planes. By 1947, however, as a result of the decision to reduce to lower peacetime levels, the inventory had decreased to 10,000 planes. By 1950, the Air Force inventory of active aircraft was down to

8,700. At that time, we had six major types of bombers and five major fighters.

Following the outbreak of the Korean War in June 1950, our inventory grew so that by the end of the decade we had nearly 19,000 aircraft. The year 1954 was significant for it saw the phaseout of all nonjet fighters and the B-29 bomber, and the introduction or development of the B-52, B-57, and B-58 bombers.

Today, our two strategic aircraft (B-52 and FB-111) and six different fighters and attack aircraft (F-4, F-15, F-16, F-111, A-7, and A-10) are part of an overall Air Force inventory of more than 9,000 aircraft. This coming fiscal year we hope to procure 213 new ones, of which 168 will be fighters.

Correspondingly, we have reduced our total flying hours from more than 7,000,000 in 1960 to fewer than 3,000,000 hours in 1982. Likewise, there has been a decrease in the number of active Air Force major installations from about 240 in 1960 to 134 in 1982.

These reductions, which have occurred despite our expanded mission and increased global responsibilities, require us to seek innovations and efficiencies. One example of such efficiencies is that our people move less frequently today than they did earlier. Since 1974, we have cut the number of permanent change of station (PCS) moves by more than half, from 640,000 to 310,000. Although the cost per move has tripled over that period, we have drastically reduced PCS outlays as a percentage of the Air Force budget.

Air Force Effectiveness

The extraordinary increase in effectiveness that our modern weapons have attained is highlighted by comparisons between earlier systems and current ones.

- Our newest and smallest fighter—the F-16—can carry twice the bomb load of the B-17 Flying Fortress of World War II fame. Moreover, these modern aircraft are more survivable, far more likely to hit the target, and more maintainable. Modern, "smart" munitions further increase their effectiveness.
- The C-5 can carry more than twenty times as much cargo as the C-47 (DC-3) and transport that cargo twice as far. At the peak of the Berlin Airlift, it took 1,400 flights to deliver 13,000 tons of food and supplies; using C-5s we could have transported the same supplies in 117 flights.
- In the Vietnam War between 1965 and 1968, the Air Force sent 874 aircraft sorties with conventional gravity bombs to attack the Thanh Hoa bridge—a vital link in the North Vietnamese supply chain to the South. The bridge remained intact and we lost eleven aircraft in the process. By contrast, in 1972, using precision-guided weapons, a single flight of eight F-4s, using laser-guided bombs, dropped the bridge without a loss.

It should be noted that while our weapon systems have become more complex, there has been no decrease in reliability or safety. The maintainability features incorporated into current inventory aircraft like the F-15 and F-16 have enabled maintenance functions to be performed in less time, thereby contributing to higher sortie rates than in older aircraft. Similarly, today's aircraft are safer to fly.

The tragic casualties in the early days of aviation were the price paid to bring flight, an experimental concept, to the status of a major means of transportation. As we gained more and more experience in the air, the number of accidents and casualties leveled off and began to decline. Fatal accidents and destroyed aircraft per 100,000 hours flying time were cut by more than half between 1950 and 1960. We reduced them nearly another fifty percent between 1960 and 1982. The flying safety rate for this past year was 2.3 accidents per 100,000 flying hours, the lowest in history.

In the search for excellence, challenge is the inseparable companion of change. It has been said that there are no "permanent" changes since change itself is permanent. One thing is constant, however. The basic factor for dealing successfully with change is the individual who accepts the challenge and gives his or her best to meet it. During the past thirty-five years, our service has undergone many changes. Because of our people, we have been better able to ensure the security of our nation. It is my belief that it will always be this way. ■

Verne Orr was appointed to his post by President Reagan, with whom he served in the California state government and during the Presidential campaign and transition. He served in the Navy during World War II, and was discharged from the Naval Reserve in 1951 as a lieutenant commander. He earned a bachelor of arts degree from Pomona College and a master's in business administration from the Stanford Graduate School of Business.

If support for an improved defense posture slackens, it may become difficult to stand firm when national interests are threatened.

"WE'RE eyeball to eyeball, and I think the other fellow just blinked." These memorable words, voiced by Secretary of State Dean Rusk during the tense days of the Cuban missile crisis in 1962, capture the real meaning of deterrence. In this case the Soviets blinked because we were strong enough to call their hand, and they knew it. As a result, their plans to place nuclear missiles in Cuba were stopped short.

Deterrence isn't new to Americans. The fortifications that lined our shores from the late 1700s through the mid-1940s were there for use in combat, but they were also to persuade enemies that attacking us would be costly—more costly than it would be worth. Our early Navy was small and had no real hope of controlling the seas, not even those near our coastline. We did hope, however, that having a Navy, even a small one, would deter an enemy from attacking.

Prior to 1945 we recognized the value of deterrence, but its role was secondary. We didn't maintain large standing forces to deter war. Armed forces were mustered and weapons were procured for combat, not to prevent an attack from happening.

Deterrence the Main Objective

With the advent of nuclear weapons, this changed. Deterrence moved from its secondary position to become the main objective of our military forces. The great destructive power of nuclear weapons raised doubts whether there could be a "winner" in a nuclear war, and put a premium on preventing war. Along with these new weapons came the belief that the best way of avoiding war is to have strong forces—in particular nuclear forces—that can cause unacceptable damage to an enemy even if he decides to attack first. The example of the Cuban missile crisis, I believe, illustrates this.

The nuclear capability we have today began with the B-29 bombers of World War II fame. Soon after the war, B-29s were replaced by the first truly intercontinental bomber, the B-36. It was a huge airplane for its day, with a gross weight of 277,000 pounds. With

Of Forces And Flinching

BY GEN. CHARLES A. GABRIEL
CHIEF OF STAFF, UNITED STATES AIR FORCE

the B-36 began the succession, through the B-47, B-58, and B-52, that continues today in the B-1B and the advanced technology bombers we are developing.

In the early days of the nuclear age things were much simpler because America had clear superiority. The situation soon changed though when the Soviets exploded their first atomic bomb in 1949, well before we thought it would be possible, fielded long-range bombers in the mid-1950s, and deployed their first ICBMs. Less than a decade after the nuclear age had begun, our monopoly in nuclear striking power was over, never to return. But even though the monopoly was gone, we kept our edge well into the 1960s by exploiting our technological advantage and developing a triad of nuclear forces—manned bombers, ICBMs, and submarine-launched ballistic missiles.

This triad of forces has worked—it is a very effective deterrent—because it has unique and mutually reinforcing characteristics that could not have been obtained had we chosen to rely on only one or even two types of systems. First, it provides insurance. Should a problem develop in one of the parts that make it less effective—the current vulnerability of Minuteman missiles is such a problem—then the other "legs" of the triad can fill the gap and ensure that deterrence is maintained until the problem can be fixed.

The triad also taxes the enemy's economic and technological strength and prevents him from concentrating his resources. If we had a force composed only of bombers and SLBMs, for example, the Soviets could focus their resources on defeating these two types of systems, perhaps rendering our deterrent ineffective.

Finally, the triad complicates Soviet attack planning because three different problems must be dealt with instead of just one or two. Timing and coordination alone are very difficult when faced with three separate forces operating on land, at sea, and in the air. There is little chance that all three triad legs could be knocked out at the same time, no matter how well planned and executed the attack.

General Gabriel: ". . . we in the West have become complacent . . . "

Deferred Modernization

Until recently, the strength of the triad and its ability to deter Soviet aggression were unquestioned. Ironically, the system may have worked too well. Western Europe, the scene of almost constant war in the first half of this century, has enjoyed nearly forty years of peace, despite the presence of a hostile, expansionist Soviet Union. Because the Soviets have not attacked, we in the West have become complacent, and have repeatedly deferred needed modernization of our strategic weapons until now we are in bad shape—the aging B-52 fleet is in need of replacement, and our Minuteman force is becoming less effective and is vulnerable to attack.

When this is contrasted with Soviet strategic force improvements, it is easy to see why decisive action is necessary. The Soviets have developed and deployed new, more powerful, and increasingly accurate strategic systems. Since 1974, they have fielded three new ICBMs—the SS-17, SS-18, and SS-19. This brings total warheads in their ICBM force to more than 6,000—an increase of 4,500 from 1974. Additionally, although not yet deployed, they have two new ICBMs that are being flight-tested.

Their latest submarine-launched ballistic missile systems have improved accuracy, throw-weight, and reliability. The new twenty-tube Typhoon submarine, for example, is the largest in the world. It will be operational soon with the SS-NX-20 MIRV-capable missile.

The Soviets continue to build thirty Backfire bombers each year while retaining the Bear and Bison bomber forces. Finally, they are testing a new bomber, the Blackjack A. It will be able to carry a variety of payloads, including modern cruise missiles.

Collectively, these Soviet developments seriously challenge the credibility of our nuclear deterrent. During the same period—since 1974—we have deployed only one new strategic submarine and missile—the Trident—and within the last few months we have just activated the first B-52 squadron equipped with cruise missiles. It's clear that, if we do not continue our force modernization, we face dangerous inferiority. We have to implement the President's proposed actions for modernizing and strengthening our strategic forces—all of them.

The President's five-point plan, announced in October of 1981, calls for:

- Improving our aging strategic bomber force by fielding 100 B-1B bombers. We are also to accomplish research and development on an advanced "Stealth" bomber;
- Modernizing our ICBM force;
- Enhancing the survivability and performance of our command control and communications systems;
- Upgrading our defenses against bomber and cruise missile attack; and,
- Deploying a new, more capable submarine-launched missile—the Trident D-5.

The Air Force has responsibility for most of this comprehensive program. By 1990, if kept on track, the program should roughly double the number of strategic weapons that could retaliate after a Soviet first strike. We will significantly improve our ability to destroy hardened Soviet targets with our ICBMs and SLBMs, and to penetrate his defenses and attack key targets with our bomber and cruise-missile forces. Additionally, we will be better able to communicate with our forces during and after an attack.

These things will happen, of course, only if planned actions are carried out, and here's where the rub comes in. All elements of the President's pro-

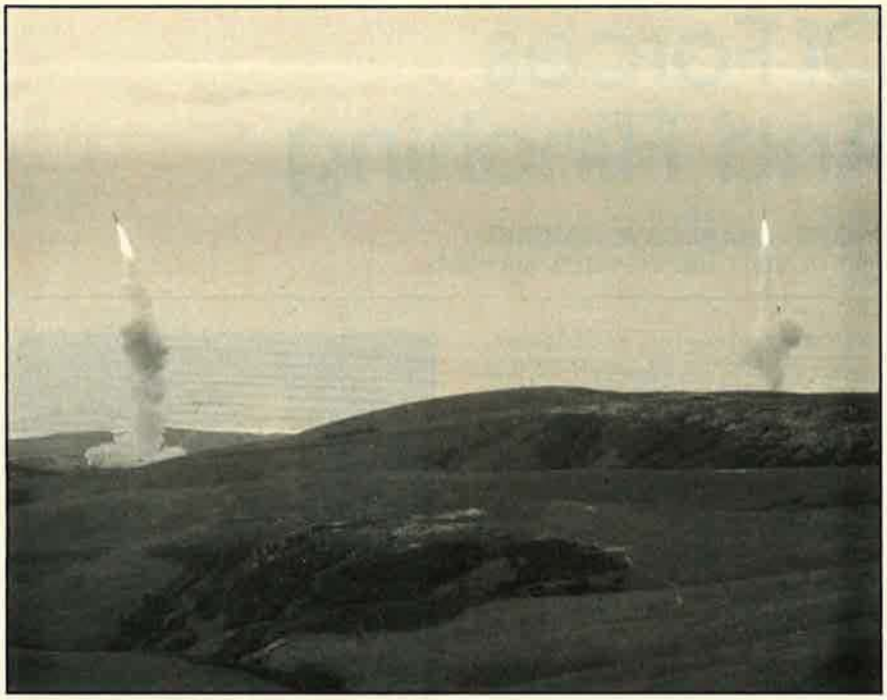
gram are proceeding well except for ICBM modernization. While we have studied, restudied, and debated, the Soviets have relentlessly continued to modernize. Discussion and debate is important, but as it proceeds we must not forget that we have to maintain a strong triad. The triad's strength, the insurance it provides against vulnerability and potential Soviet breakthroughs, the drain it places on the enemy's economy, and the difficult attack-planning problems it causes would be seriously weakened if we were to fall short in our attempts to modernize our ICBMs.

We can't, as a nation, let this happen. Land-based ICBMs are an essential part of our deterrent capability and have unique qualities that they alone can provide.

One of the most important of these qualities is sovereign basing. To attack our land-based ICBMs, the Soviets must at the same time make the decision to attack the United States. This keeps the threshold of deterrence high. In attacking US territory, the Soviets could harbor no doubt that we would retaliate.

The second advantage resides in the characteristics ICBMs have as weapons. They are responsive, have prompt hard-target capability (can reach their targets in about thirty minutes), have high peacetime alert rates, excellent command and control, and the lowest operating costs of any triad leg. They complement bombers, which take several hours to reach their targets, and SLBMs, which cannot react as promptly.

The third advantage falls into the area of Soviet perceptions. The Soviets have invested heavily in ICBMs, and seventy-five percent of their nuclear strength resides in their strategic missile forces. Our ICBMs can get to Soviet targets quickly and disrupt their ability to execute, control, and pace an attack on us. This bolsters the psychological aspects of deterrence. It keeps the Soviets from gaining an advantage early in a conflict, and denies them the opportunity to blackmail us immediately following an initial attack.



The Soviet perceptions of the capabilities of US strategic ICBM forces, according to General Gabriel, bolster the psychological aspects of deterrence. Modernizing these forces sends a message "that we mean business."

A Strong Message

Finally, modernizing our ICBM forces sends a strong message to the world that we mean business. It shows our allies that we can make the really hard decisions—decisions similar to those we have asked them to make in modernizing the Theater Nuclear Forces. It also shows the Soviets that we intend to bargain in the START talks from a position of strength. This is vital in negotiating equitable agreements to reduce strategic arms, as our past dealings with the Soviets illustrate.

If we take full advantage of our current progress—progress made possible by the strong commitment of the American people and by the measured investments being made in national defense—we can continue to look the bear in the eye without flinching.

Here's where I'm concerned the most. Many Americans are beginning to question the need for increased defense spending. These questions, in my judgment, arise from genuine concern with the state of the economy and the size of the federal deficit. But we must be careful not to let these concerns jeopardize the progress we are making in rebuilding our defenses. We must sustain the badly needed modernization of our forces now under way—in particular the modernization of our strategic forces. The latter are particularly vulnerable to cuts because the job they do is not well understood—but it is a job that must be done. The threat won't allow us to return to the mode of putting off badly needed improvements, like the modernization of our ICBM forces, year after year.

We can, as a nation, afford the improvements the President has proposed. We are spending only a little more than six percent of our GNP on defense today as compared to about eight or nine percent in the 1950s and 1960s—a time when we enjoyed clear nuclear superiority. Further, it looks as if the economy is beginning to recover, and will be better able to support planned defense improvements. The most recent information available shows the leading economic indicators in January up 3.6 percent, the largest increase in thirty-three years. Durable goods, housing, and automobile production are also up.

Can our country afford to support a strong military and vital strategic modernization? Yes! We have to. With continued moderate growth in defense spending, America will have the forces she needs to deter aggression. I can think of no more important an investment for us to make. ■

Gen. Charles A. Gabriel graduated from the US Military Academy in 1950. He flew 100 combat missions during the Korean conflict and was credited with two MiG-15 victories. After staff positions both in the US and Europe, he was assigned as commander of a reconnaissance wing in Thailand in the early 1970s, where he flew 152 combat missions in F-4s. Subsequently serving in key posts in TAC, Korea, and Hq. USAF, General Gabriel assumed command of USAFE in August 1980. He was assigned as Air Force Chief of Staff in July 1982.

The Best Institution Ever

BY CMSGT. ARTHUR L. "BUD" ANDREWS
CHIEF MASTER SERGEANT OF THE AIR FORCE

A personal perspective on leadership and service.

WHEN I was asked to contribute an article to AIR FORCE Magazine, I was somewhat at a loss as to what to say. I could have discussed the Air Force in terms of leadership, discipline, commitment, or a calling. But for the most part, my comments on these subjects have been presented by USAF, the Air Force Association, and other organizations over the last nineteen months. So what I would like to do is just touch on the pride and happiness I have had during my tenure as Chief Master Sergeant of the Air Force.

When I was notified that I was the new CMSAF, I was absolutely on Cloud Nine. Now that I am just a few months from retirement, I can honestly say that I am still there. I attribute that to a combination of many things—mostly to being a part of the best institution I have ever known. And that is the US Air Force.

I feel very honored to have been a part of this institution, and to have been able to express some of my thoughts, concerns, and perceptions of where the Air Force has been, where it is going, and how we are going to get there.

When I assumed the position of CMSAF, the aspect that impressed me most was the support I got from the Secretary of the Air Force, the Chief of Staff, and the Vice Chief of Staff, to name a few. These and many others have supported me and have been available when necessary.

Chief Andrews has been seventh in USAF's top enlisted post (see below).

In turn, they have allowed me to provide what advice and counsel I could contribute to affect the welfare and morale of our enlisted corps. To have had that sort of backing from the top leadership of the Air Force has to have been one of the highlights of my tenure as CMSAF.

Needless to say that while I'm gratified to have served my country and the Air Force, I'm also sad that I have to take my leave of this great institution. But by the same token, I believe that the timing is about right. We have so many highly qualified noncommissioned officers serving that it would be an injustice not to provide one of them an opportunity to reach the apex of the enlisted force.

History has shown that we have done very well in the area of leadership, and one reason is that we continuously improve upon it. We just don't allow the leadership to get stale.

Over the years, we have had absolutely superior officer leaders in our Air Force—Jimmy Doolittle, Tooey Spaatz, Hap Arnold, and Chappie James, to name just a few. And just as they have passed the reins of leadership to their successors, we in the enlisted corps can also be very proud of our achievements. Such outstanding leaders as Paul Airey, Donald Harlow, Richard Kisling, Thomas Barnes, Robert Gaylor, and James McCoy, my predecessors as CMSAF, have provided the Air Force and the nation with solid guidance.

I am truly honored to have had the opportunity to know and work with these past enlisted leaders. I'm convinced that men and women about to graduate from basic military training, the technical schools, and our Air Force Academy will provide leadership of equal quality in the Air Force of tomorrow. I'm totally convinced, also, that such leaders are not born but are made. Influencing them will be a multitude of society's forces, including their parents, teachers, and such role models as have been named above.

If there is any advice I'd give to the men and women of the Air Force aspiring to leadership, it would be for them to learn the art of being a true and solid follower first.

To the Air Force Association, I appreciate the opportunity to present these comments before I conclude the almost thirty years of my military career and my final assignment as CMSAF. I extend my sincerest wishes to each and every one. ■

CMSAF Arthur L. "Bud" Andrews is the seventh Chief Master Sergeant of the Air Force. From Boston, Mass., he enlisted in the Air Force in 1953. Starting as a security policeman, he served as a First Sergeant until 1977, when he became Senior Enlisted Advisor at Electronics Systems Division. He subsequently moved to SEA at Air Force Systems Command in May 1978. He held that post until assuming his present job in August 1981.

Flanking the incumbent, CMSAF Arthur "Bud" Andrews, are the six previous Chief Master Sergeants of the Air Force. From left, Paul Airey, Robert Gaylor, Thomas Barnes, Donald Harlow, Richard Kisling, and James McCoy.

B-1B TEST PROGRAM

UNDERWAY.

The B-1B long range combat aircraft Flight Test Program is underway–ahead of schedule.

The test aircraft, the second of four B-1 prototypes produced by Rockwell International's North American Aircraft Operations, was fitted with a new flight control system to simulate the flight handling qualities of the new B-1B multi-role bomber.

The successful completion of this test flight marked a significant milestone in the production of the B-1B, which is scheduled to begin entering the Strategic Air Command inventory during 1985.

At Rockwell International, we're proud of our aircraft heritage. And we're proud to be building the Free World's most effective strategic aircraft: the B-1B.

Rockwell International

...where science gets down to business

Air Force Communications Command

A MAJOR COMMAND

SUPPORT of three Space Shuttle flights, air traffic controller assistance to the Federal Aviation Administration, the introduction of new equipment systems, and emergency assistance to disaster victims were some of Air Force Communications Command's highlights in 1982.

Although these subjects received much of the command's attention, the worldwide AFCC community of 50,000 people continued support of seven primary mission areas:

- **Base Communications,** ranging from telephone and message centers to on-base radio nets.
- **Combat Communications,** mobile communications-electronics and air traffic services to field commanders in support of wartime requirements, tactical exercises, and emergency relief efforts.
- **Interbase Communications** links via radio, cable, and satellite, including nearly half of the Defense Communications System, which serves all military activities.
- **Air Traffic Services** from control towers, radar facilities, and other navigational and landing aids, plus evaluation of these facilities with specially equipped aircraft.
- **Data Automation Services,** including the acquisition and evaluation of computer systems and maintenance and enhancement of the software for many common-user programs.
- **Engineering and Installation** of communications, air traffic services, and other electronic equipment including replacement, retrofit, and on-site depot-level maintenance actions.
- **Maintenance and Evaluation** of existing and new communications, air traffic, data automation, weather, intrusion detection, and radar systems.

These mission activities are directed from AFCC's Scott AFB, Ill., headquarters, where the Commander, Maj. Gen. Robert F. McCarthy, and his staff manage seven communications divisions, an engineering and installation center, nine data automation units, and field units at 429 locations around the world. Some 16,000 AFCC-gained Air National Guard and Air Force Reserve people raise the command's total force size to more than 66,000.

During three flights of the Space Shuttle *Columbia* in 1982, AFCC provided vital navigation information during the last few minutes of descent to landings. AFCC units also provided tactical air navigation (TACAN) facilities as well as other local communications support at landings sites in New Mexico, California, and Senegal. All of the TACANs were flight-checked for accuracy by AFCC-operated facility checking aircraft.

AFCC continued to provide direct personnel support to the FAA. By mid-December, ninety-four AFCC air traffic controllers were still working at thirty-one FAA locations. About 600 Air Force controllers have participated in this support in the aftermath of the controller walkout in August 1981. The last deployed AFCC controllers will return to their normal duty locations by the summer of 1983.

AFCC began to realize the fruits of improvement in communications and air traffic services systems in 1982. Projects affecting AFCC's air traffic posture included a modification program to replace Air Force-owned navigational aids with state-of-the-art equipment and a redesign of transportable landing control central systems to improve air traffic control communications capabilities. The command has also begun replacing obsolete communications systems linking its air traffic control facilities at almost 100 locations around the world.

In addition to active efforts in the air traffic control arena, the command also stayed abreast of developments in the rapidly changing communications industry by installing and operating several new administrative and command and control communications systems in 1982. Replacing aged equipment with modern systems will go a long way toward meeting AFCC users' requirements.

A prime example of these modernization efforts are SCOPE DIAL and SCOPE EXCHANGE programs to upgrade base telephone services. They will replace outdated, overburdened electromechanical telephone switching systems installed in the '50s and '60s. Initial steps in this area were made in 1982 under SCOPE DIAL, when the first three of eighty-seven scheduled electronic telephone switches were installed. In late fall, the first contract under the SCOPE

Maj. Gen. Robert F. McCarthy, center, AFCC Commander, discusses tropospheric scatter communications during Exercise Gallant Eagle with Capt. Richard J. Brooks, left, officer in charge, and TSgt. Ian B. Carson, site team chief of ANG's 283d CCS, Savannah, Ga. (Photo by 1st Lt. Bob Ballew)

In Korea, Sgt. Robert Foley works on high-frequency antenna during construction of the Korean Tactical Range (Photo by TSgt. Bertram W. I. Mau)

EXCHANGE program was awarded to begin the modernization of Air Force-leased base telephone services.

AFCC also began fielding several new tactical communications systems that will give forward based commanders a multitude of quick-reaction teletype, radio, facsimile, and satellite communications services. These new systems will enhance command and control of operations when combat forces are operating in austere, limited communications areas.

The year 1982 also saw AFCC's engineering and installation personnel carrying a heavy burden. With fifty-eight percent of their assigned workload designated as high priority, they expended more than 650,000 engineering and 2,650,000 installation man-hours installing, removing, and refitting communications-electronics equipment systems. One of their most visible accomplishments was the integration and installation of the communications system in the United States Central Command headquarters facility at MacDill AFB, Fla. By all estimates a two-year job, the project was completed by an augmented engineering and installation team in less than twelve months.

All of the changes affecting the command were not limited to new equipment or systems. In late 1982, the command was preparing to activate a Space Communications Division at Peterson AFB, Colo. This new division, activated in January 1983, supports the communications requirements of the recently created Space Command and the North American Aerospace Defense Command.

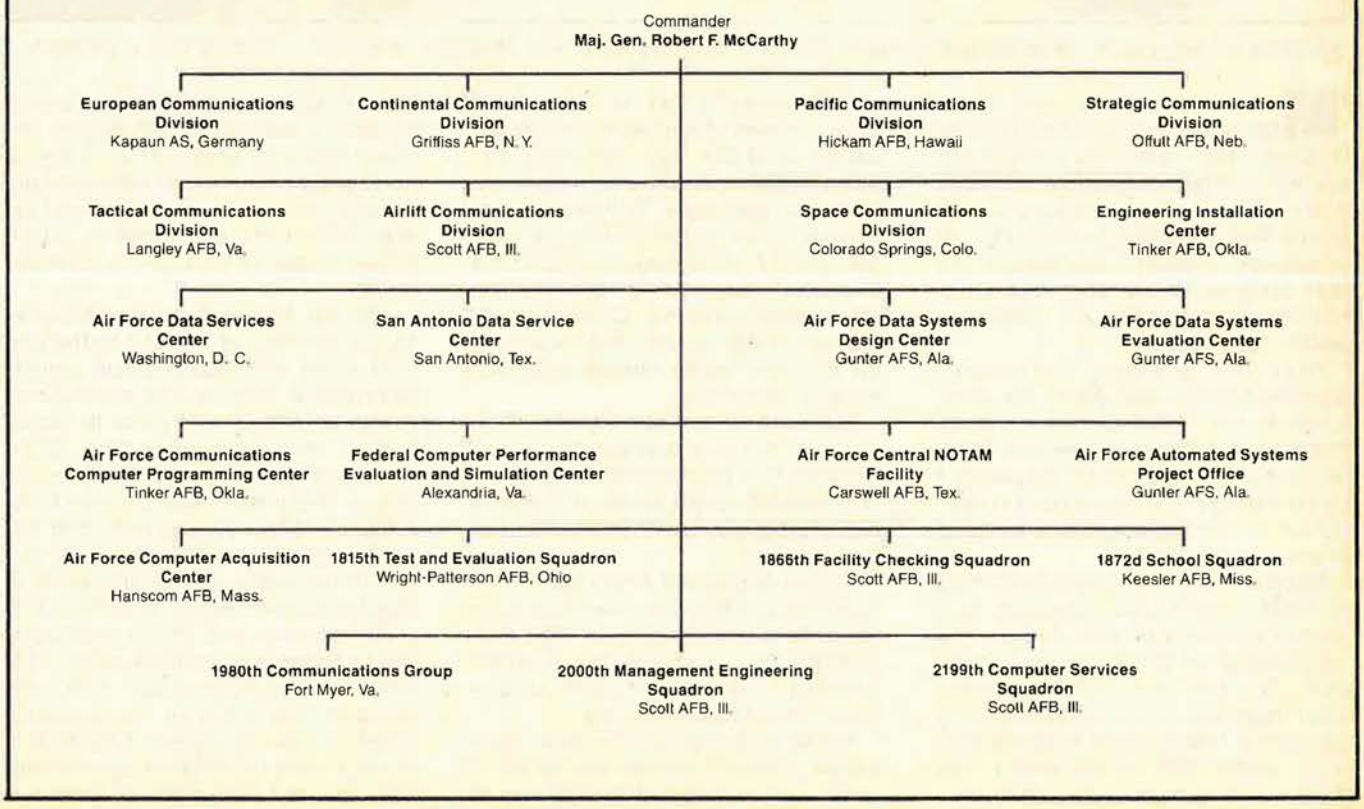
Members of AFCC played vital roles in emergencies throughout the year. In January, military and civilian members at Hq. AFCC helped St. Louisians who were victims of hypothermia during a severe cold period. In May, AFCC members helped recovery and cleanup operations following a tornado at Altus AFB, Okla., and in August the communicators performed tasks after Tropical Storm Faye tore through the northern portion of Luzon, the Philippines. When a tornado ripped through New Baden, Ill., a town near Scott AFB, AFCCers from all over the base joined in with the rescue and cleanup work.

Other AFCCers were honored for individual acts of heroism and air traffic controllers were credited with numerous aircraft saves during the year.

These accomplishments would not have been possible were it not for the command's dedicated officers, airmen, and civilians, including ANG and Reserve forces working around the world. The people of AFCC met the challenges of 1982 head-on, and they will continue to do the same in the future. ■

AIR FORCE COMMUNICATIONS COMMAND

Headquarters, Scott AFB, Ill.



Air Force Logistics Command

A MAJOR COMMAND

Maintenance technicians delve into the mysteries of an A-10 at Sacramento ALC, McClellan AFB, Calif. (Photo by Paul J. Lambert)

"MY basic premise is that everything we do should contribute in some clearly identifiable way to our overall combat capability, because that's what we in the military are all about. And if what we do doesn't contribute, we shouldn't be doing it. It's that simple," said Gen. James P. Mullins, Commander, Air Force Logistics Command.

With this operating philosophy, General Mullins laid down the challenge to his 95,000 people in seven states and numerous overseas locations. And in 1982, AFLC responded by providing not only a strong contribution to combat capability, but also at an increased level.

Warner Robins Air Logistics Center at Robins AFB, Ga., brought to a highly successful conclusion the "stretching" of the Air Force's C-141 fleet. The last of the 270 stretched StarLifters was delivered to the using command late in June and the program ended $20 million under cost and ahead of its original schedule.

Oklahoma City ALC at Tinker AFB, Okla., moved ahead with the modification of B-52s with offensive avionics systems and cruise-missile integration packages. Following completion of the first aircraft in January, Tinker AFB modified an additional fourteen B-52s during 1982 and enabled Strategic Air Command to achieve initial operational capability for the first cruise missile-equipped wing in December.

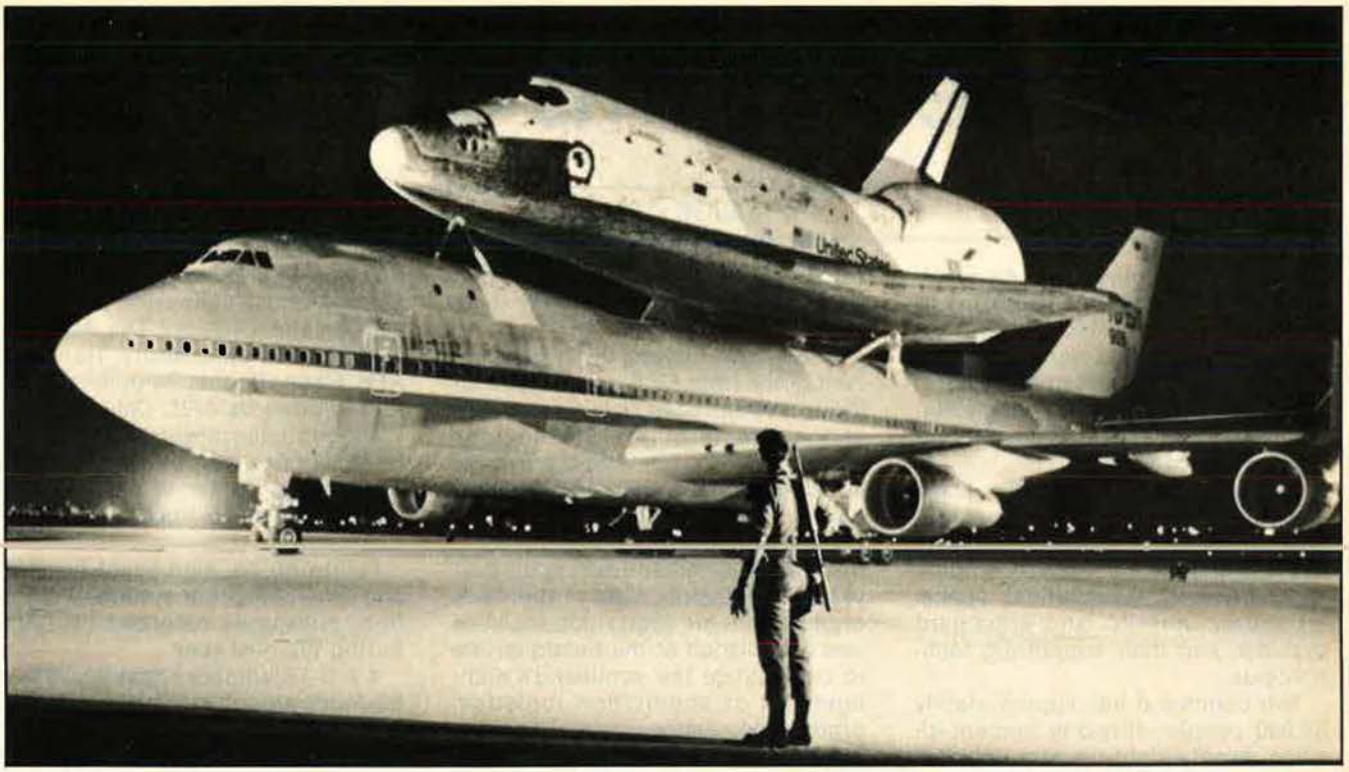
San Antonio ALC at Kelly AFB, Tex., is well along on a vast program to rewing the C-5. Eight Galaxies are at the Lockheed-Georgia plant at Marietta and production is either ahead of or on schedule.

Ogden ALC at Hill AFB, Utah, spent more than 7,800,000 man-hours on depot-level maintenance in 1982. Production included 218 F-4 aircraft, fifty-six F-16 aircraft, and ninety-seven Minuteman missiles.

These major projects—and thousands of others carried out by AFLC units—are only tips of the iceberg so far as AFLC's contributions to combat capability are concerned. Across the seven states in which AFLC installations are located and at detachments around the world, the command responded to the challenge of intensified support to USAF's combat forces.

The Air Force Contract Maintenance Center at Wright-Patterson AFB, Ohio, with 360 contract administrators at twenty-five contractor plants or sites from Korea to Saudi Arabia, managed more than 3,000 contracts with a value of more than $7 billion. Major work was done on F-4s, F-15s, F-111s, J79 engines, and aircraft subsystems. More than $2 billion in contracts was administered in Saudia Arabia, Egypt, and Pakistan.

At the other end of the spectrum, the Air Force Acquisition Logistics Division at Wright-Patterson AFB provided strong input to the development of new systems. AFALD furnished weapon-system developers with tailored packages of "lessons



One of AFLC's "customers"—the Orbiter Columbia *piggyback aboard a 747. AFLC provides fuel and liquid propellants for NASA. (Photo by Arthur Johnson)*

learned" on older systems to aid in development of new ones. Packages were furnished for the B-1B, T-46, HH-60D, the Advanced Tactical Fighter, and the Joint Vertical Experimental aircraft. AFALD's activities are designed to reduce life-cycle costs of new weapon systems.

Large sums of money are involved in AFLC's mission activities.

The command managed almost $40 billion last year, including some $13 billion that its International Logistics Center handled in foreign military sales. Other elements of this huge amount of money included some $9 billion in stock fund operations, $8 billion in procurement funds, and more than $5.5 billion in operations and maintenance money.

A program called "Meaningful Measures of Merit" focuses AFLC's total resources and command effort on areas that produce payoffs for the combat forces, enhancing their ability to deter and fight.

The program looks at literally hundreds of key indicators across the entire spectrum of AFLC's operations on a recurring basis and relates AFLC performance to the combat capability of USAF commands.

Meaningful Measures of Merit encourages new and imaginative techniques to overcome serious lead-time and funding constraints to ensure combat forces have the means to meet any threat.

"Meaningful Measures of Merit," General Mullins noted, "is an effort to find ways of measuring those things we really need to measure that truly contribute to the combat capability of the Air Force."

Additional action is expected later this year to ensure that the command keeps pace with its stepped-up activities. A major reorganization of AFLC headquarters is in the planning stages, a move that is expected to provide greater impetus to support. Policy and operational functions, in many cases, will be separated to permit top management attention to be focused on each.

From the scientist to the secretary, from physicist to blue-collar worker, AFLC's orientation is now, more than ever, on combat support. ■

AIR FORCE LOGISTICS COMMAND

Headquarters, Wright-Patterson AFB, Ohio

Air Force Systems Command

A MAJOR COMMAND

THE primary mission of Air Force Systems Command (AFSC) is to advance aerospace technology; apply it to operational aerospace systems development and improvement; and acquire qualitatively superior, cost-effective, and logistically supportable aerospace systems.

AFSC designs, constructs, tests, and purchases weapons and equipment for Air Force operational and support commands. Primary emphasis is given to aeronautical, space, electronic, missile, and armament systems, and their supporting technologies.

The command has approximately 54,000 people—fifty-one percent civilian, twenty-eight percent enlisted, and twenty-one percent officer. The nature of its research, development, test, and acquisition mission makes AFSC the Air Force's major employer of scientists and engineers.

Systems Command will manage about $34.7 billion in FY '83. Of this amount, $26.8 billion is for procurement of aircraft ($11.2 billion), missiles ($3.6 billion), and other equipment ($1.1 billion); research, development, test, and evaluation (RDT&E) ($9.6 billion); operations and maintenance ($1.0 billion); and military construction ($0.3 billion). The remaining $7.9 billion includes foreign military sales ($6.0 billion), reimbursables ($1.2 billion), and military pay ($0.7 billion).

AFSC administers thirty-six percent of the total Air Force budget, although comprising only 6.5 percent of the people at 141 installations worldwide. The command currently administers more than 42,000 active contracts totaling some $110 billion.

Some organizational changes took place in the command during the past year. A new deputy chief of staff-level organization for acquisition logistics was established at the headquarters to consolidate the command's management of acquisition logistics, product assurance, standardization, and computer resources.

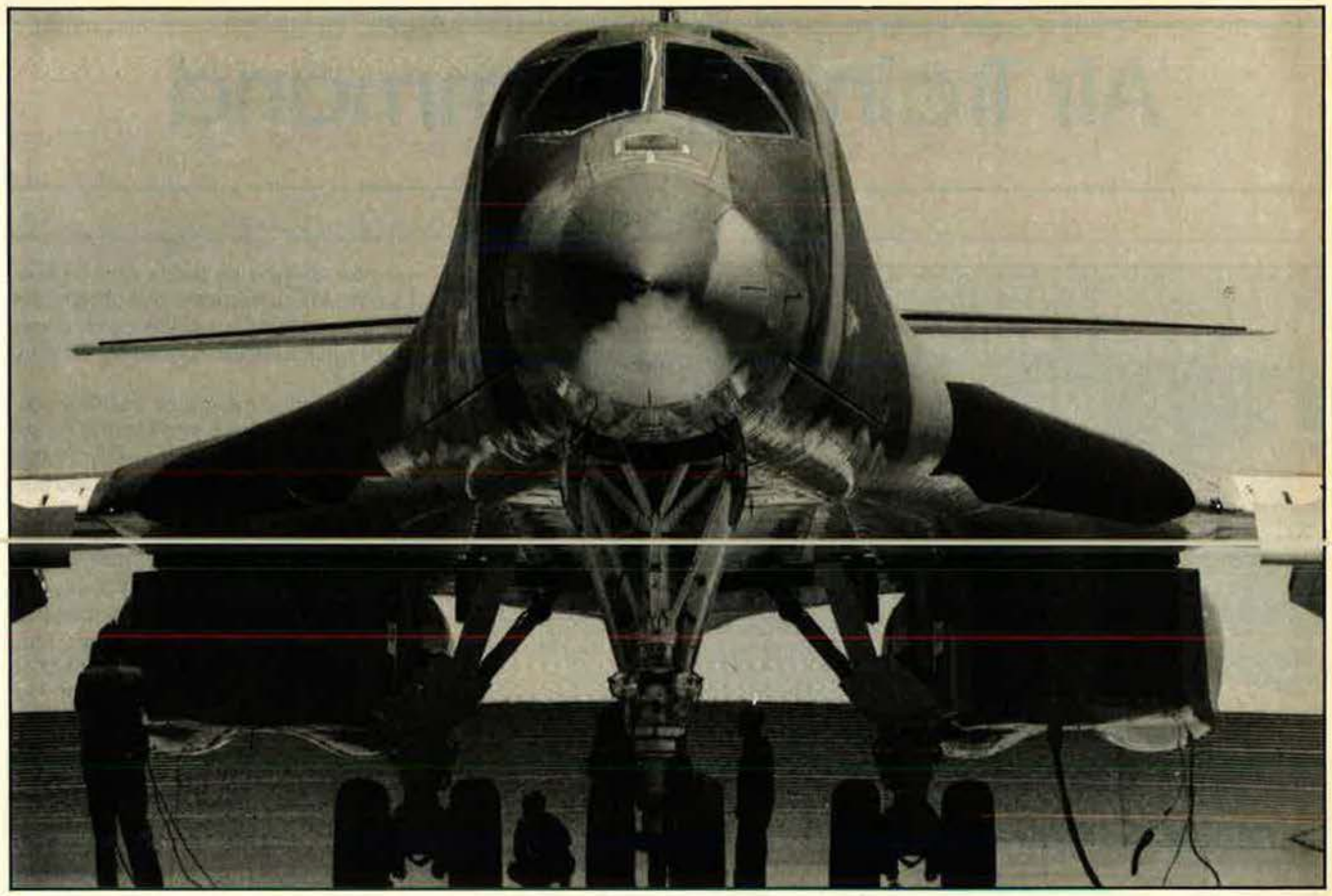
Formation of the new office will lead to increased availability and combat capability of newly developed systems when they are first deployed to the operational commands, not afterward. The organization will work with Air Force Logistics Command to develop joint command acquisition logistics policy.

Another change in the command structure was the realignment of AFSC laboratories, putting them under the applicable product divisions. None of the laboratories was physically relocated, however. The Air Force Wright Aeronautical Laboratories at Wright-Patterson AFB were realigned under collocated Aeronautical Systems Division. The Air Force Geophysics Laboratory, Hanscom AFB, Mass.; Rocket Propulsion Laboratory, Edwards AFB, Calif.; and the Weapons Laboratory, Kirtland AFB, N. M., are now part of the new Space Technology Center at Kirtland AFB, which reports to Space Division at Los Angeles.

Following are significant research and development or systems acquisition milestones recorded by AFSC during the past year:

- A B-1A bomber spent ten days at the Farnborough Air Show in England in September. It was flown to England nonstop from Edwards AFB, Calif. The B-1 was accompanied on the trip by a SAC KC-10. This B-1 will be modified in 1983 to become the testbed aircraft for the B-1B offensive and defensive avionics systems. The B-1B will begin replacing aging B-52s in late 1986 when the first unit is expected to be formed at Dyess AFB, Tex.
- The Air-Launched Cruise Missile became operational in mid-December, only five years after it was designated a high-priority strategic system. The ALCM attained operational capability at Griffiss AFB, N. Y., with SAC's 416th Bombardment Wing. The unit had maintained an alert capability with the missile since September 1981.
- A new generation of space technology came into being when the first Titan 34D/IUS (Inertial Upper Stage) launch vehicle carried the first Defense Satellite Communications System III satellite and the fifteenth DSCS II satellite into geosynchronous orbit.
- The Air Force awarded a multiyear contract worth up to $2.7 billion to McDonnell Douglas Corp. for forty-four advanced tanker/cargo (KC-10) aircraft for delivery from 1983 through 1987. Multiyear procurement is designed to save money by allowing manufacturers and suppliers to plan production on an uninterrupted basis and at an economic rate. Congress must authorize the funds each year. The multiyear contract will save an estimated $600 million in the KC-10 program.
- McDonnell Douglas also received a $31.6 million contract for a research

Full-scale mockup of USAF's T-46A next-generation trainer (NGT), being developed by AFSC and Fairchild Republic Co.



B-1 bomber being readied for trip from Edwards AFB, Calif., to last year's Farnborough International Air Show in England.

and development program on the C-17 transport design. Although there has been no decision to proceed beyond the technology effort to full-scale development, the contract preserves that option if it is later deemed appropriate.

• The Air Force Flight Test Center at Edwards AFB began a test-and-evaluation program of a deltawing version of the F-16 Fighting Falcon. The prototype aircraft, called the F-16 "XL" by its builder, General Dynamics, is an advanced version of the standard F-16 and is designed to provide a balance of excellent high- and low-speed flying qualities, shorter runway requirements, high penetration speeds, and significant increases in combat range and performance over the conventional F-16.

• The Advanced Fighter Technology Integration aircraft (AFTI/F-16) made its maiden flight last summer. The program is a joint effort involving the Air Force, Navy, and NASA. The core technology in the AFTI/F-16 is the new Digital Flight Control System with digital computers allowing an order-of-magnitude increase in capability over today's analog computers without added weight and volume.

• Fairchild Republic Co. was awarded a fixed-price incentive contract of more than $104 million for the design, development, fabrication, test, and delivery of two T-46A next-generation trainer (NGT) test aircraft by 1987. The contract includes options for fifty-four aircraft, interim contractor support, and technology modernization in the production phase. The NGT would replace the T-37, USAF's primary jet trainer for undergraduate pilot training since 1958. ■

AIR FORCE SYSTEMS COMMAND

Headquarters, Andrews AFB, Md.

Commander
Gen. Robert T. Marsh

- **Space Division**, Los Angeles AFS, Calif.
  - **Space and Missile Test Organization**, Vandenberg AFB, Calif.
  - **Air Force Space Technology Center**, Kirtland AFB, N. M.
- **Aeronautical Systems Division**, Wright-Patterson AFB, Ohio
- **Electronic Systems Division**, Hanscom AFB, Mass.
- **Aerospace Medical Division**, Brooks AFB, Tex.
- **Armament Division**, Eglin AFB, Fla.
  - **Air Force Contract Management Division**, Kirtland AFB, N. M.
- **Arnold Engineering Development Center**, Arnold AFS, Tenn.
- **Ballistic Missile Office**, Norton AFB, Calif.
- **Foreign Technology Division**, Wright-Patterson AFB, Ohio
- **Air Force Flight Test Center**, Edwards AFB, Calif.

Air Training Command

A MAJOR COMMAND

Basic trainees at the Air Force Military Training Center, Lackland AFB, Tex., learn about the M-16 rifle.

AS ITS name implies, Air Training Command's primary mission is training and education. This includes all initial Air Force flying, basic military (resident and field) technical training, and English language as well as professional military, undergraduate, graduate, and continuing education. From its headquarters at historic Randolph AFB, Tex., ATC is also responsible for Air Force recruiting and precommissioning programs through its Officer Training School and Air Force Reserve Officers Training Corps.

ATC is the free world's largest training-education complex, operating on an annual budget of $2.9 billion for all appropriations ($1.034 billion in operations and maintenance funds), with $3.8 billion in assets. It numbers more than 100,000 people, including permanent party, students, and civilian employees.

The command operates and controls fifteen installations. Six of these house technical training organizations, five provide undergraduate pilot training, and one—Mather AFB, Calif.—offers both basic and advanced navigator training. Lackland AFB, Tex., is the site of Air Force basic military training. Pilot instructor training is conducted at Randolph AFB, and the command's educational facilities are located principally at Maxwell AFB, Ala. Survival training is conducted in Washington state, Alaska, and Florida.

More than ninety-five percent of the 67,578 enlisted men and women who completed basic military training at Lackland AFB last year also received technical training in a variety of skills at one of ATC's technical training organizations. In all, the command's technical training centers and the USAF School of Health Care Sciences at Sheppard AFB, Tex., conducted more than 3,000 resident and nonresident courses, producing more than 149,593 graduates. Another 153,621 completed field training courses at ATC's ninety-two field training detachments and operating locations worldwide.

In addition, 5,644 airmen from seventy-two nations received professional military education, technical, or flying training through the Foreign Military Sales program in 1982 valued in excess of $190 million. Some 2,869 international students graduated from the Defense Language Institute's English Language Center at Lackland AFB.

In FY '82 ATC trained 1,957 pilots, 972 navigators, eighty-nine international pilots, and seventy-six international navigators. More than 280 women trained as pilots and navigators in ATC programs over the years are now serving on active duty; about eighty-five more are currently in flying training.

Interservice navigator training produced 255 US Navy and Marine Corps graduates in 1982, and nearly 11,000 Air Force crew members received survival training.

While flying approximately nineteen percent of the Air Force's total flying hours last year, ATC experienced fewer than five percent of USAF's Class A and B aircraft mishaps, a flying safety record of 0.46 mishaps per 100,000 flying hours. The command flies the T-41A, T-37B, T-38A, and T-43A aircraft.

ATC's Air University (AU) at Maxwell AFB, Ala., oversees a large and diverse group of specialized agencies. These include the Air Force Reserve Officers Training Corps (AFROTC), the Air Force Institute of Technology (AFIT), Squadron Officer School, Air Command and Staff College, Air War College, Air Force Senior NCO Academy, and the Leadership and Management Development Center. AU is also responsible for Civil Air Patrol, the Academic Instructor and Foreign Officer School, Extension Course Institute, and the Center for Aerospace Doctrine, Research and Education.

AFROTC, currently with 152 detachments serving more than 600 colleges and universities, commissioned 3,485 new lieutenants in 1982.

More than 2,000 individuals completed undergraduate, graduate, postgraduate, and other long course programs last year at AFIT residence schools at Wright-Patterson AFB, Ohio, and through AFIT programs conducted at civilian institutions, medical teaching facilities, and industrial firms. Another 20,421 completed AFIT professional continuing education (PCE) courses in residence and through nonresident seminars, on-site presentations, teleteach, correspondence, and through contracts with civilian institutions and agencies. Similar AU schools at Maxwell AFB and Gunter AFS, Ala., provided PCE courses to 4,787 students.

More than 3,100 officers completed resident professional military education (PME) classes at Maxwell AFB last year and 1,164 noncommissioned

officers graduated from the Senior NCO Academy. Thousands of officers and NCOs completed PME courses through nonresident seminar and correspondence programs.

Civil Air Patrol is the Air Force's civilian auxiliary. Headquartered at Maxwell AFB and under the command of AU, CAP has eight regional liaison offices and fifty-two wing, or state, offices. These provide advice and assistance to nearly 65,000 CAP members.

The Extension Course Institute, the world's largest correspondence school, provided nearly 400 professional, specialized, and career development courses worldwide to personnel from all branches of military service. During 1982, more than 300,000 students were enrolled in ECI courses and upwards of 185,000 completed course requirements.

The Air University's Center for Aerospace Doctrine Research and Education (CADRE) was established in January 1983 at Maxwell to assist in the development of Air Force doctrine, concepts, and strategy, and to research, formulate, analyze, test, and publish concepts. CADRE will also

Recruiting for Quality

United States Air Force Recruiting Service, headquartered at Randolph AFB, Tex., continued to recruit quality enlistees, a prime Air Force objective.

Air Force recruiters signed up more than 78,400 people during Fiscal Year 1982. Included were 67,538 with no prior service who entered basic military training at Lackland AFB. Some 93.7 percent of FY '82 recruits possessed high school diplomas, the highest percentage since the beginning of the All-Volunteer Force. Another 6,151 with prior military service were also recruited.

Also signed up were 1,660 health professionals and 3,171 college graduates for Officer Training School.

Recruiting Service is made up of a headquarters staff that assists and monitors the activities of five recruiting groups and thirty-five recruiting squadrons nationwide. Approximately 1,200 recruiting offices are staffed by some 2,000 recruiters assigned throughout the fifty states, Puerto Rico, and Guam. Because of the large numbers of US dependents living overseas, recruiters are also located in West Germany, England, Japan, and the Philippines.

About 500 new recruiters are needed each year to help meet Air Force personnel requirements. Career noncommissioned officers interested in learning more about this challenging duty should call CMSgt. Fred Negast, recruit-the-recruiter team chief, at AUTOVON 487-2812.

AIR TRAINING COMMAND

Headquarters, Randolph AFB, Tex.

Commander
Gen. Thomas M. Ryan, Jr.

Technical Training Center
Lowry AFB, Colo.

3220th Correction and Rehabilitation Squadron

Technical Training Center
Chanute AFB, Ill.

Technical Training Center
Keesler AFB, Miss.

Undergraduate Pilot Training

14th Flying Training Wing
Columbus AFB, Miss.

47th Flying Training Wing
Laughlin AFB, Tex.

64th Flying Training Wing
Reese AFB, Tex.

71st Flying Training Wing
Vance AFB, Okla.

80th Flying Training Wing
Sheppard AFB, Tex.

82d Flying Training Wing
Williams AFB, Ariz.

Foreign Military Training Affairs Group
Randolph AFB, Tex.

Navigator Training
323d Flying Training Wing
Mather AFB, Calif.

Officer Training School, USAF
Lackland AFB, Tex.

San Antonio Contracting Center

San Antonio Real Property Maintenance Agency

Technical Training Center
Sheppard AFB, Tex.

USAF School of Health Care Sciences

Air Force Military Training Center
Lackland AFB, Tex.

Basic Military Training School, USAF
USAF Technical Training School
Defense Language Institute English Language Center**

Community College of the Air Force*
Maxwell AFB, Ala.

3480th Technical Training Wing
Goodfellow AFB, Tex.

Pilot Instructor Training
12th Flying Training Wing
Randolph AFB, Tex.

ATC Specialized Direct Reporting Units

3302d Computer Services Squadron
Randolph AFB, Tex.
3303d Contracting Squadron
Randolph AFB, Tex.
3304th School Squadron (ATC NCO Academy)
Lackland AFB, Tex.
3305th School Squadron
Randolph AFB, Tex.
3306th Test and Evaluation Squadron
Edwards AFB, Calif.
3307th Test and Evaluation Squadron
Randolph AFB, Tex.
3314th Management Engineering Squadron
Randolph AFB, Tex.
3507th Airman Classification Squadron
Lackland AFB, Tex.
3588th Flying Training Squadron
Fort Rucker, Ala.
Occupational Measurement Center
Randolph AFB, Tex.

Air University
Maxwell AFB, Ala.

Air War College
Air Command and Staff College
Squadron Officer School
Leadership and Management Development Center
Academic Instructor and Foreign Officer School
Airpower Research Institute
Hq. Civil Air Patrol-USAF
Air Force Reserve Officer Training Corps
Air University Library

(at Gunter AFS, Ala.)
Logistics Management Center
Extension Course Institute
Senior NCO Academy

(at Wright-Patterson AFB, Ohio)
Air Force Institute of Technology

3636th Combat Crew Training Wing* (Survival)

Eielson AFB, Alaska*
Nellis AFB, Nev.*
3612th Combat Crew Training Squadron*
(Fairchild AFB, Wash.)
3613th Combat Crew Training Squadron*
(Homestead AFB, Fla.)
3614th Combat Crew Training Squadron*
(Fairchild AFB, Wash.)

USAF Recruiting Service
Randolph AFB, Tex.

Recruiting Groups

3501st—Hanscom AFB, Mass.
3503d—Robins AFB, Ga.
3504th—Lackland AFB, Tex.
3505th—Chanute AFB, Ill.
3506th—Mather AFB, Calif.

*Tenant Unit
**DoD Executive Agent

manage the new wargaming exercises. When operational, the Airpower Research Institute, AU Press, and the Air Force Wargaming Center will be a part of CADRE.

The Community College of the Air Force (CCAF), located at Maxwell and reporting directly to ATC headquarters, offers college-level education to enlisted men and women. As CCAF continued to grow, 1982 year-end registrations stood at approximately 160,000, with enrollments averaging 2,500 a month. Last year, CCAF awarded more than 4,600 Associate in Applied Science degrees to enlisted men and women.

In FY '82, 2,676 officers were commissioned at Officer Training School (OTS) at Lackland AFB, Tex. These included 187 former airmen who had completed engineering and computer science degrees under AFIT sponsorship through the Airman Education and Commissioning Program, and through the College Senior Engineering Program.

ATC is involved in three new programs. The first is the Euro-NATO Joint Jet Pilot Training (ENJJPT) program at Sheppard AFB, Tex. After years of negotiation and planning, the program became operational in October 1981. Designed to train NATO pilots jointly on a cost-shared basis, 130 international student pilots and 110 USAF pilots are scheduled to graduate from the program this year. The first ENJJPT class graduated in October 1982.

Student navigators polish skills at crew stations aboard a T-43 aircraft at Mather AFB, Calif. (Photo by Walt Weible)

The second, the T-46A program, is the acquisition of an aircraft to replace the T-37 primary trainer. First flight of the aircraft will be in FY '85, and student training is scheduled to begin in late FY '87.

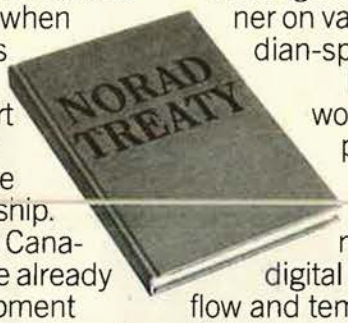
The third new program is Specialized Undergraduate Pilot Training (SUPT) that ATC plans to implement not later than FY '88. Under SUPT, all student pilots will receive common primary phase training to develop fundamental flying skills. Following the primary phase, students will enter one of two specialized basic phase training tracks: Fighter-Attack-Reconnaissance (FAR) or Tanker-Transport-Bomber (TTB).

ATC will continue to use the T-38 for the FAR track; however, a new trainer aircraft is required for the TTB track. An off-the-shelf, multiengine, business jet aircraft is the most likely candidate. ATC is implementing SUPT to improve graduate quality, but it also is expected to generate significant economies and extend the useful life of the T-38 beyond the year 2000. ■

An instructor pilot and his student preflighting a T-38 at Randolph AFB, Tex. The student, already a rated pilot, is undergoing instructor pilot training to serve at one of five UPT bases. (Photo by MSgt. Buster Kellum)

Defense development sharing: It brings close allies even closer together.

Combining the defense resources of American and Canadian industry is an effective way of stretching the resources of each country. And when you consider Canada's sophisticated facilities and state-of-the-art technology, you have the makings of a close and profitable relationship.



Since the U.S. and Canadian Governments are already committed to development sharing under the provisions of the NORAD Agreement, now is a good time for American military labs to discover Garrett Manufacturing Limited as a new technological ally.

Already a world leader in advanced technology, GML has all the necessary credentials to be a strong co-development partner on various U.S. and Canadian-sponsored programs.

For example, we're working on advanced process and packaging technology for custom hybrid microcircuits, as well as digital control, and electronic flow and temperature sensing for airborne environmental control systems. We're also developing RF communication systems up to 500 MHz, and cockpit peripheral vision systems utilizing laser light display.

As a military supplier for nearly 20 years, we've achieved an impressive service record. For example, GML is the dominant supplier of aircraft temperature control systems. Our custom thick/thin film hybrid microcircuits are on leading U.S. military aircraft, missiles, and communications systems. Our emergency locator beacons are used on military and commercial aircraft alike. And our VHF radios are being installed throughout Canada and in the third world.

For more information on all the resources we have to share, contact: Sales Manager, Garrett Manufacturing Limited, 255 Attwell Drive, Rexdale, Ontario, Canada M9W 5B8. Or call: (416) 675-1411.

GARRETT

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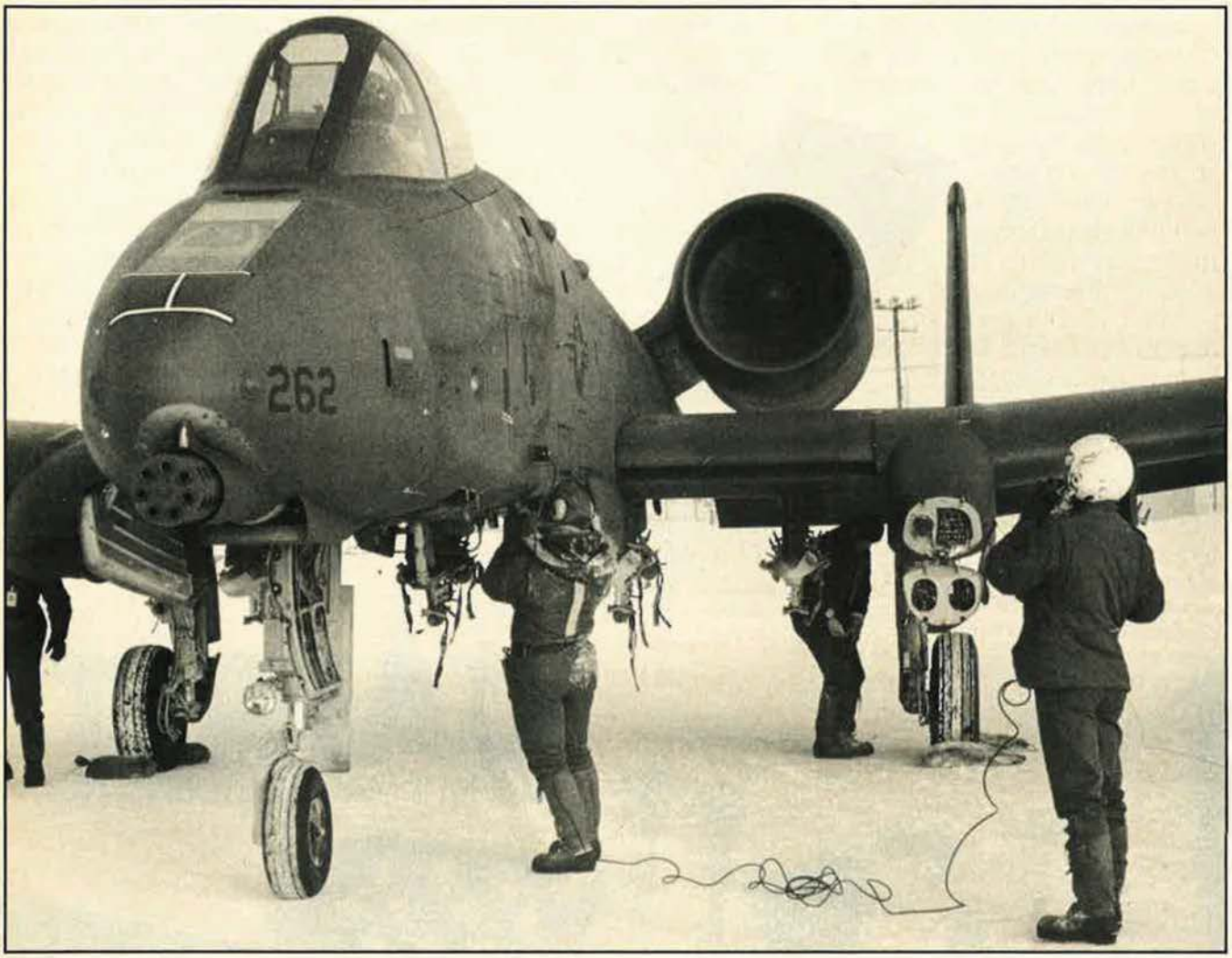
One of The Signal Companies

Alaskan Air Command

A MAJOR COMMAND



Maintenance technicians from the 343d Aircraft Generation, Equipment Maintenance, and Component Repair Squadrons, Eielson AFB, Alaska, preflight an A-10 prior to a Brim Frost 83 mission. (Photo by Sgt. Walt Johnson)

ALASKA's military significance and strategic location have long been recognized. At no other place on the globe are the US and USSR closer together. The two major land masses are separated by only forty-four nautical miles at the Bering Strait, while the islands of Big Diomede (USSR) and Little Diomede (US) are only two miles apart.

Alaska lies across the Great Circle routes connecting the Orient with Europe and North America, making Alaska an ideal location for deployment or refueling of aircraft flying polar routes. Air Force installations in Alaska are closer to the Orient and Europe than are many bases in the continental US.

Alaska is not always a land of ice and snow, yet harsh winters are a factor the men and women of AAC must contend with in fulfilling their mission.

AAC is charged with providing early warning of an air attack on the US and Canada, guarding the sovereignty of US airspace, and providing air-to-ground support of Alaskan-based ground forces.

Fulfilling these tasks are 9,227 people: 848 officers, 7,133 enlisted people, and 1,246 civilian employees.

At no previous time in recent Air Force history has a command totally modernized all of its primary weapon systems at one time. During 1982, AAC modernized its air defense force by transitioning from the F-4E Phantom II to the F-15 Eagle; converted one squadron of F-4s to A-10 Thunderbolt IIs to enhance its ground-support mission; and field-tested the Minimally Attended Radar, which in 1984 will replace the radars at the command's remote radar installations.

The AAC Commander also serves as Commander, Alaskan North American Aerospace Defense Command/ Aerospace Defense Command Region. As the senior military officer in Alaska, he is the coordinating authority for all joint military administrative and logistic matters in Alaska and is the military point of contact for the state.

In the event of a natural disaster, emergency, or hostilities other than air defense, or when directed by the

At Elmendorf AFB, SSgt. Kenneth Clark of the 21st Aircraft Generation Squadron secures an AIM-9 Sidewinder missile. (Photo by Sgt. Wendi Brown)

Joint Chiefs of Staff, the AAC Commander becomes the Commander, Joint Task Force (JTF) Alaska.

In addition to numerous command post exercises, the JTF concept of operations is field tested every other year during Brim Frost, a major joint Arctic training exercise.

In Brim Frost 83, in January and February, more than 16,000 active-duty, Guard, and Reserve personnel from all the military services and a battalion of Canada's Forces Mobile Command participated.

AAC people are assigned to three main bases, thirteen aircraft control and warning (AC&W) squadrons, and two forward operating bases. The main bases are Elmendorf AFB, adjacent to Anchorage; Eielson AFB, twenty-six miles southeast of Fairbanks; and Shemya AFB, near the tip of the Aleutian Islands chain.

The AC&W squadrons are located along the western periphery and interior of the state. Galena and King Salmon Airports are forward operating bases for alert F-15 Eagle aircraft from Elmendorf's 21st Tactical Fighter Wing. In addition, AAC provides administrative and logistic support for other command units at Shemya AFB and Clear AFS.

AAC is headquartered at Elmendorf AFB, home of the 21st TFW and 21st Combat Support Group. Assigned to the wing are the 43d Tactical Fighter Squadron, flying F-15s, and the 5021st Tactical Operations Squadron, flying the T-33 Shooting Star.

Major tenant units at Elmendorf include MAC's 616th Military Airlift Group and its 17th Tactical Airlift Squadron equipped with C-130Es; and the 71st Aerospace Rescue and Recovery Squadron equipped with HC-130s and HH-3 helicopters. Elmendorf is also home for the Air Force Arctic Broadcasting Squadron, providing radio programming for men and women at Eielson AFB and AAC's remote radar sites, as well as other military units in the state. Other tenants include the 1931st Communications Group and 6981st Electronic Security Squadron.

Eielson AFB is headquarters for the 343d Composite Wing and 343d Combat Support Group. The wing's 25th Tactical Air Support Squadron operates the command's O-2A aircraft, while the 18th Tactical Fighter Squadron flies A-10 Thunderbolt IIs. Both units are the primary air support for the Army's ground forces in Alaska.

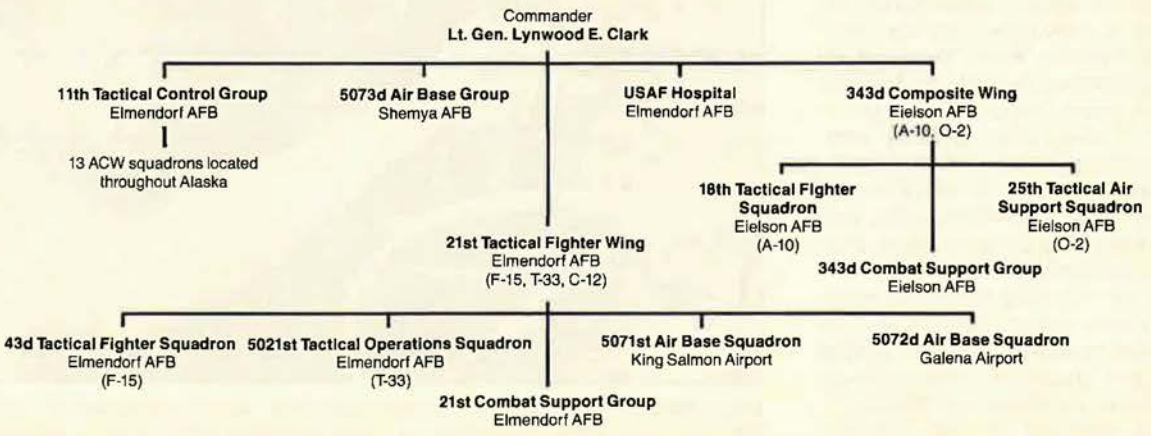
Towing an F-15 Eagle to the hot pit refueling area at Elmendorf AFB. The base is headquarters for Alaskan Air Command. (Photo by Sgt. Wendi Brown)

Eielson's largest tenant unit is SAC's 6th Strategic Wing, equipped with KC-135 Stratotankers and RC-135 aircraft.

AAC operates the Elmendorf Rescue Coordination Center. The RCC coordinates search and rescue efforts involving aircraft and people from all military services in the state, plus many civil agencies. During 1982, the RCC coordinated emergency assistance for 191 military and civilian persons in distress and was credited with saving seventy-one lives. Since its inception in October 1961, the RCC has recorded more than 3,652 saves and assisted more than 10,699 people. ■

ALASKAN AIR COMMAND

Headquarters, Elmendorf AFB, Alaska



Electronic Security Command

A MAJOR COMMAND

THE 12,000-member Electronic Security Command plays an important role in the Air Force's use of command control and communications countermeasures (C^3CM) as a warfighting strategy. This strategy has an offensive as well as defensive application.

On the offensive side, ESC analyzes and advises combat commanders on their electronic combat options that involve techniques to exploit, deceive, or disrupt enemy communications systems. The command's defensive role is to ensure the enemy cannot do the same to our communications.

The ESC Commander, Maj. Gen. Doyle E. Larson, notes that technological advances incorporated in modern weapon systems in recent years have introduced new vulnerabilities in communications, detection, and other electronic systems. The task of quickly finding the weaknesses in an enemy's electronic weaponry and exploiting them are critical to the decision-making processes of our combat commanders.

"We have not yet fully employed C^3CM strategies to attack hostile command and control capabilities," said General Larson. "These electronics can be disrupted or manipulated, seriously degrading the opponent's ability to maneuver, resupply, and coordinate his efforts. An otherwise supremely effective force could, quite conceivably, be reduced to a mass of confused, undirectable hardware—making easy targets for Air Force strike and interceptor aircraft."

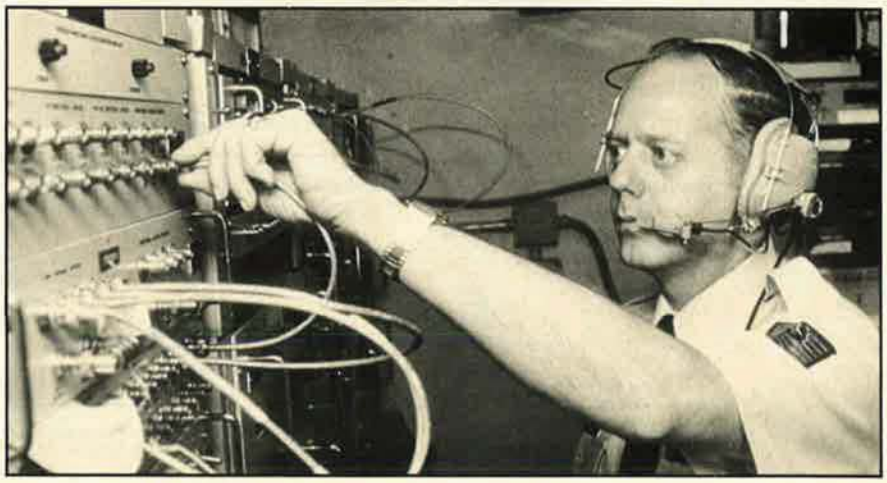
Since many USAF aircraft have also acquired an acute dependence on electronics, they have inherited similar weaknesses. ESC, through its communications security (COMSEC) units, monitors military communications to uncover poor security practices. An equal problem in voice communications is the "unintentional" electronic leak. COMSEC units also test Air Force equipment—from electric typewriters to the President's Air Force One—for stray electronic emissions. These errant signals can be monitored by anyone with the proper equipment, possibly compromising classified or sensitive information.

While working to monitor and stress Air Force electronic systems and communications for security shortcomings, ESC must also keep its wartime electronic combat procedures razor-sharp. Command units provide important support in such major theater exercises as PACAF's Cope Thunder and Team Spirit, AAC's Brim Frost, NATO's Cold Fire and Central Enterprise, and SAC's Global Shield.

TSgt. James R. Woods, a defensive command control and communications countermeasures technician, processes data to ensure security.

TSgt. David P. Pacek, MSgt. Phillip L. Ruth, and MSgt. Thomas Kleifges, ESC linguists, analyze assigned voice communications.

During these exercises, ESC provides a hostile electronic warfare (EW) environment that US forces would encounter in actual combat. This includes exposing our combat aircrews to electronic disruption techniques through the use of Comfy Sword equipment—mobile and self-contained jamming and deception vans.



MSgt. Walter R. Danner, an electronic operations technician, performs imput/output patching. Even while monitoring Air Force electronic systems and communications for security failures, ESC wartime procedures must be kept honed.

TAC emphasizes C³CM aircrew training during its Red/Blue/Green Flag exercises. Last year, the ESC detachment at Nellis AFB, Nev., worked with 5,800 aircrews during 17,600 sorties in training on signal security, communications jamming, and imitative communications deception. Further, the commanders of TAC and ESC consider this training so important that ESC detachments will soon grow to squadron size.

To prepare key senior officers to conduct electronic combat operations, ESC and TAC developed a C³CM battle manager's course. Conducted at the Tactical Air Warfare Center, Hurlburt Field, Fla., the first year's attendance attracted 150 senior participants, including Army and Navy commanders.

Closely supporting efforts of ESC field units are the Air Force Electronic Warfare Center (AFEWC) and the Air Force Cryptologic Support Center (AFCSC). Both, although subordinate to the command, are also primary managers of Air Force-wide programs. AFEWC is a primary source of EW/C³CM analysis and advice for the Air Force. Its members use high-speed computers to provide senior battle commanders with analytical reports on major exercises and on EW systems worldwide.

Besides providing engineering and logistics support in securing critical

Sgt. Marc A. Felton, an ESC computer systems operator, sorts card files. Without the prized enlisted force ESC's high technology would be useless.

ESC communications, AFCSC is responsible for the Air Force Communications Security (COMSEC) program.

On the COMSEC side, the command accounts for cryptographic documents, codes, call signs, and equipment that protect our communications systems; performs all necessary depot-level maintenance; and develops COMSEC multimedia education materials for intraservice distribution.

Related to the COMSEC program but wider in scope is the Air Force operations security program (OPSEC). Early in 1982, Hq. USAF assigned ESC the responsibility for supporting the OPSEC programs of all major commands and strengthening the OPSEC education program for the entire Air Force.

Also last year, ESC expanded its annual Comfy Olympics technical competition to sixteen operational and support specialties. In addition to recognizing top performers within ESC, the command and AFCC began the first Swindell Award Medallion competition for the top enlisted communications specialists who work in centers supporting ESC.

Comfy Olympics and other recognition programs spotlight and enhance the vital skills of the command's prized enlisted force, without which ESC's high technology tools would be useless. The success of ESC's mission continues to be dependent on the excellence of its people worldwide. ■

ELECTRONIC SECURITY COMMAND

Headquarters, San Antonio, Tex.

Commander
Maj. Gen. Doyle E. Larson

Electronic Security, Pacific
Hq. Hickam AFB, Hawaii
- 6903d Electronic Security Group, Osan AB, Korea
- 6920th Electronic Security Group, Misawa AB, Japan
- 6922d Electronic Security Squadron, Clark AB, Phillppines
- 6924th Electronic Security Squadron, Wheeler AFB, Hawaii
- 6990th Electronic Security Group, Kadena AB, Japan

Electronic Security, Strategic
Hq. Offutt AFB, Neb.
- 6949th Electronic Security Squadron, Offutt AFB, Neb.

Electronic Security, Alaska
Hq. Elmendorf AFB, Alaska
- 6981st Electronic Security Squadron, Elmendorf AFB, Alaska
- 6985th Electronic Security Squadron, Eielson AFB, Alaska

Electronic Security, Tactical
Hq. Langley AFB, Va.
- Det. 1, Eglin AFB, Fla.
- OL-HL, Hurlburt Field, Fla.
- Det. 2, Davis-Monthan AFB, Ariz.
- OL-TB, Bergstrom AFB, Tex.
- Det. 3, Nellis AFB, Nev.
- OL-TS, Shaw AFB, S.C.
- OL-TT, Tinker AFB, Okla.

Electronic Security, Europe
Hq. Ramstein AB, Germany
- 6910th Electronic Security Wing, Lindsey AS, Germany
- 6911th Electronic Security Squadron, Hahn AB, Germany
- 6912th Electronic Security Group, Tempelhof Airport, Berlin
- 6913th Electronic Security Squadron, Augsburg, Germany
- 6915th Electronic Security Squadron, Bad Aibling, Germany
- 6916th Electronic Security Squadron, Hellenikon AB, Greece
- 6917th Electronic Security Group, San Vito AS, Italy
- 6918th Electronic Security Squadron, Sembach AB, Germany
- 6931st Electronic Security Squadron, Iraklion AS, Crete, Greece
- 6950th Electronic Security Group, RAF Chicksands, UK
- 6952d Electronic Security Squadron, RAF Alconbury, UK
- 6988th Electronic Security Squadron, RAF Mildenhall, UK

DIRECT REPORTING UNITS

Air Force Electronic Warfare Center
Hq. San Antonio, Tex.
- **6940th Electronic Security Wing**, Hq. Fort George G. Meade, Md.
  - 6947th Electronic Security Squadron, Homestead AFB, Fla.
  - 6994th Electronic Security Squadron, Fort George G. Meade, Md.

Air Force Cryptologic Support Center
Hq. San Antonio, Tex.
- **6960th Electronic Security Wing**, Hq. San Antonio, Tex.
  - 6906th Electronic Security Squadron
  - 6948th Electronic Security Squadron
  - 6993d Electronic Security Squadron

Military Airlift Command

A MAJOR COMMAND

FROM headquarters at Scott AFB, Ill., the Military Airlift Command (MAC), a specified command, directs 92,000 active-duty military people and civilians as well as almost 1,000 aircraft at more than 350 locations in twenty-four countries. MAC-gained ANG and AFRES assets comprise 55,000 people and nearly 400 aircraft.

MAC operates fourteen bases in the United States and controls US facilities at Lajes in Portugal's Azores and at Rhein-Main AB, Germany. The command is the backbone of mobility for US fighting forces. While training for its wartime role, MAC simultaneously supports readiness of theater forces and projects the American spirit at home and abroad through many humanitarian actions.

MAC's major missions include deployment, employment, and redeployment of combat forces and their support equipment and logistical resupply. The command serves as the executive agent for DoD airlift, and moved more than 440,000 tons of cargo and more than 2,200,000 passengers in 1982.

MAC's active-duty forces constitute about one-fourth of the capability available to the command under full mobilization. When mobilized, the ANG and AFRES can provide tactical airlift with C-130 aircraft, and Reserve associate units provide half the aircrews and more than a third of the maintenance personnel for C-141 and C-5 aircraft. Additional airlift is also available through the Civil Reserve Air Fleet (CRAF) program to meet contingency and wartime requirements.

For more than thirty-one years, the CRAF program has constituted a highly successful and vital partnership between the civil air industry and DoD. The twenty-one participating commercial carriers stand ready to provide more than 300 passenger and cargo aircraft, or nearly half the airlift capability available to MAC during times of crisis or contingencies.

MAC planners continue to pursue better ways to use the CRAF Enhancement Program. One objective called for retrofitting new or existing wide-body passenger aircraft to gain additional oversized or bulk cargo airlift capability. The first aircraft delivered under this program was a new United DC-10-10CF, contracted for in August 1980 and delivered $1.6 million under budget on September 15, 1982. The MAC staff is also examining various leasing options designed to make the CRAF program more attractive to carriers and ensure the cargo capability required to meet today's national defense needs.

Several other initiatives are also under way to enhance the posture of our airlift forces.

A modification program has been instituted to strengthen the wings of the C-5 fleet and provide an additional 30,000 flying hours of aircraft service life. The first C-5 was delivered to the modification facility in January 1982, and all C-5s will be modified by mid-1987. The program also increases lift capability and will extend the life of the fleet well into the twenty-first century.

To increase near-term airlift, the Air Force began acquisition of fifty C-5B aircraft for MAC and forty-four more KC-10 aircraft to be assigned to SAC. The first C-5B aircraft is scheduled for delivery in December 1985.

The Air Force has also initiated a development program for the C-17 aircraft. The C-17 will increase MAC's long-range airlift capability, provide an outsize theater airlift capability, and serve as a replacement for aging C-130 and C-141 aircraft.

Aside from airlift, MAC manages a number of technical services and has undertaken management responsibilities for the Air Force's special operations forces.

In March, MAC consolidated its long-standing Aerospace Rescue and Recovery Service (ARRS) mission with that of worldwide Air Force special operations forces (SOF). A new numbered Air Force, the Twenty-third, was established to manage these missions.

ARRS provides combat rescue and special operations support and is responsible for civilian and military search and rescue. It also provides worldwide weather reconnaissance, air sampling, drone recovery, Space Shuttle support, and support for SAC missile sites.

ARRS flies the HC-130, WC-130, and WC-135 fixed-wing aircraft, as well as various HH-1, HH-3, HH-53, and UH-60A helicopters. Full-scale engineering and development of the HH-60D Nighthawk helicopter is scheduled this year, specifically designed for combat rescue.

As executive management agency for search and rescue (SAR) within the forty-eight continental United States, ARRS operates the Air Force Rescue Coordination Center at Scott AFB to provide humanitarian assistance by coordinating all inland SAR

A MAC C-141B StarLifter drop during Gallant Eagle, one of many exercises the command engaged in during the year. In 1982, MAC airlifted more than 440,000 tons of cargo and transported more than 2,200,000 passengers worldwide.

using ARRS, Civil Air Patrol, and other military and civilian assets. The AFRCC works closely with state and local agencies and solicits services of police and sheriff departments as well as the US Coast Guard. ARRS is credited with saving more than 20,000 lives during its thirty-six-year history.

ARRS also operates the US Mission Control Center for the Search and Rescue Satellite-Aided Tracking (SARSAT) system. SARSAT uses a low-flying satellite to "listen" for distress signals from aircraft and ships at sea. Currently in a testing stage, SARSAT, when fully operational, is expected to aid immeasurably in locating emergency transmitter signals coming from any point on the globe.

As part of the ARRS/SOF consolidation, the 2d Air Division was activated at Eglin Auxiliary Field #9, Hurlburt Field, Fla., to provide management of special operations forces. The air division will have command and control over Air Force SOF units in the US and administrative control and supervision of SOF units under the operational control of theater commanders.

Special operations include unconventional warfare, collective security, psychological operations, and civil affairs measures. SOF units fly MC-130 and AC-130 fixed-wing aircraft and UH-1N and HH-53 helicopters. Special operations forces will also receive the HH-60D Nighthawk helicopter. This addition will greatly enhance operational capability and deployment flexibility.

The Air Weather Service (AWS) provides staff and operational weather support for Air Force and Army units. AWS also supports the space program through six solar observing facilities. With ARRS, the Air Weather Service provides tropical storm and

OPERATIONAL AIRCRAFT ASSIGNED TO MAC

(As of March 1, 1983)

TYPE	NUMBER
T/UH-1F/P	26
UH-1N	59
HH-1H	22
UH-60A	9
C/HH-3	46
C/HH-53	29
C-5	77
C-6A	1
C-9A/C	23
C-12	5
CT-39	112
C-130	258
HC-130H/N/P	28
WC-130E/H	13
AC-130	10
MC-130	13
WC-135B (incl. C-135B/C)	13
C-137	5
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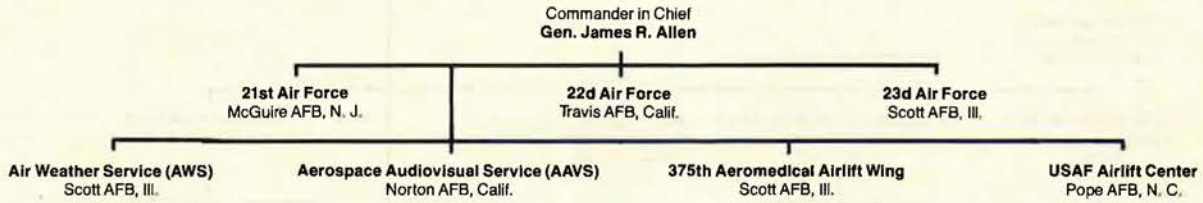
C-141	268
TOTAL	1,028

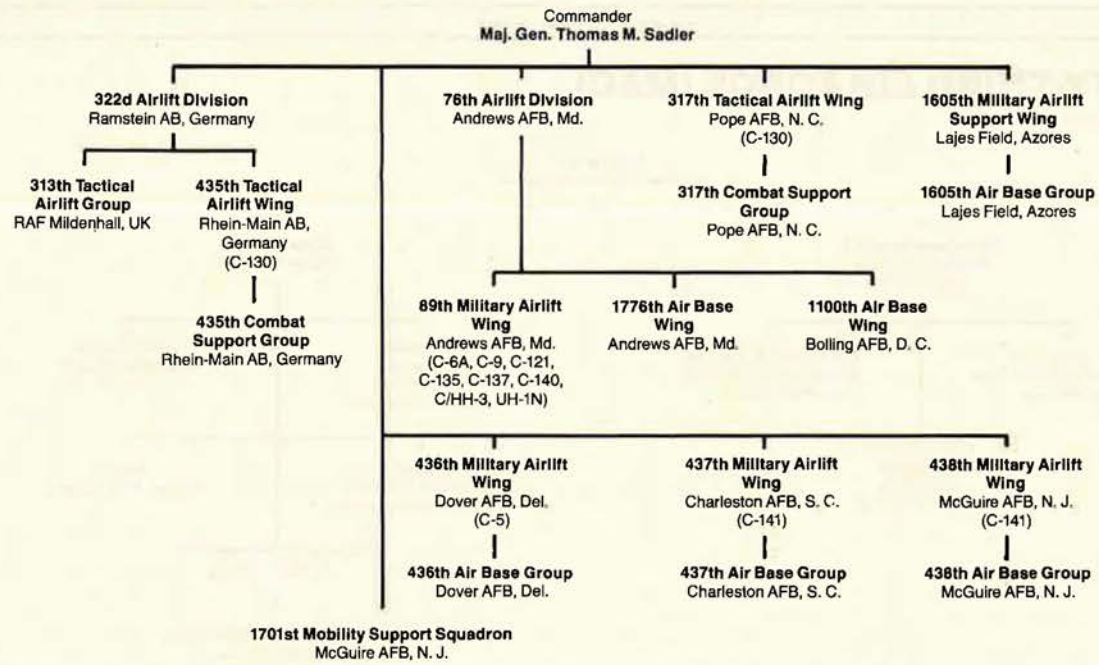
MILITARY AIRLIFT COMMAND

Headquarters, Scott AFB, Ill.



TWENTY-FIRST AIR FORCE (MAC)

Headquarters, McGuire AFB, N. J.



special weather reconnaissance.

The Aerospace Audiovisual Service (AAVS) headquartered at Norton AFB, Calif., is the Air Force's single management agency for combat and humanitarian audiovisual documentation. AAVS operates four squadrons and twenty-four smaller units around the world. These units provide motion picture, television, and still photographic coverage for all Air Force activities. In addition, AAVS produces intracommand training products, provides optical instrumentation and technical documentation of Air Force space and missile tests, and manages base audiovisual service centers and regional film libraries.

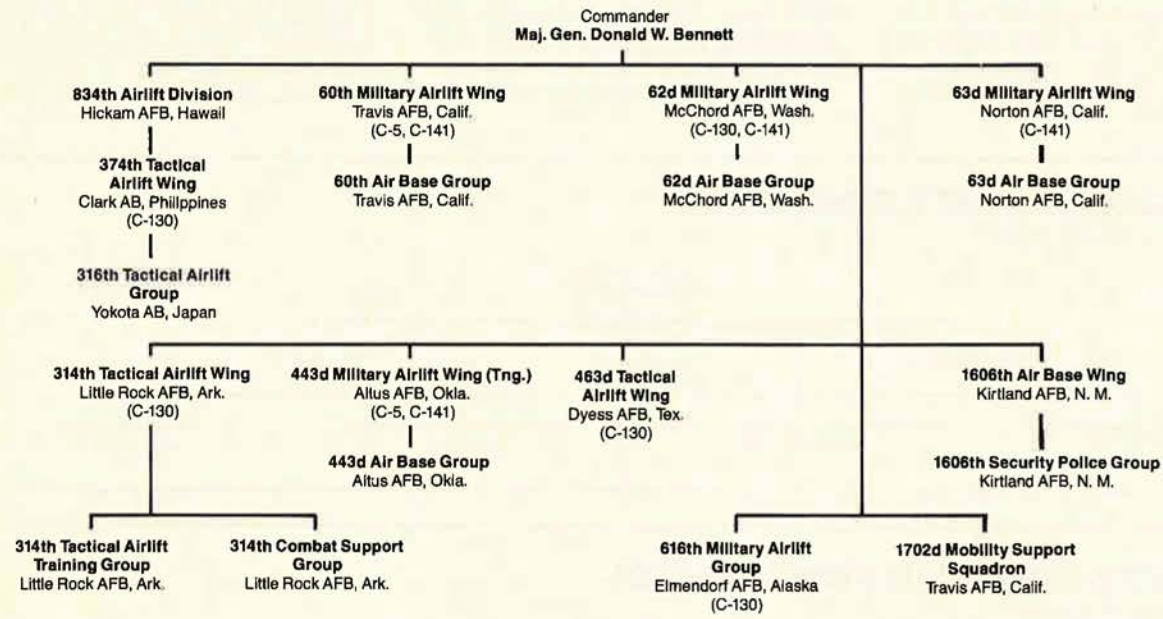
Aeromedical airlift is another important MAC mission. In 1982, MAC aircrews, nurses, and medical technicians provided aeromedical evacuation for more than 18,000 airmen, 10,000 sailors, 7,000 soldiers, 15,000 dependents of active-duty military members, 19,000 retired personnel and their dependents, and 1,000 others (civilians, foreign nationals, etc.). The 73,018 patients, a 6.6 percent increase over 1981, were moved on a total of 4,169 C-5, C-9A, C-130, and C-141 missions.

MAC's operational support CT-39 airlift fleet carried more than 72,000 passengers on time-sensitive government missions in 1982. Another airlift unit, the 89th Military Airlift Wing, continues to provide airlift for the President, other US government officials, and foreign dignitaries.

For purposes of deterrence, our nation needs a manifest capability to project military power rapidly to any area of the world where US vital interests may be challenged. ■

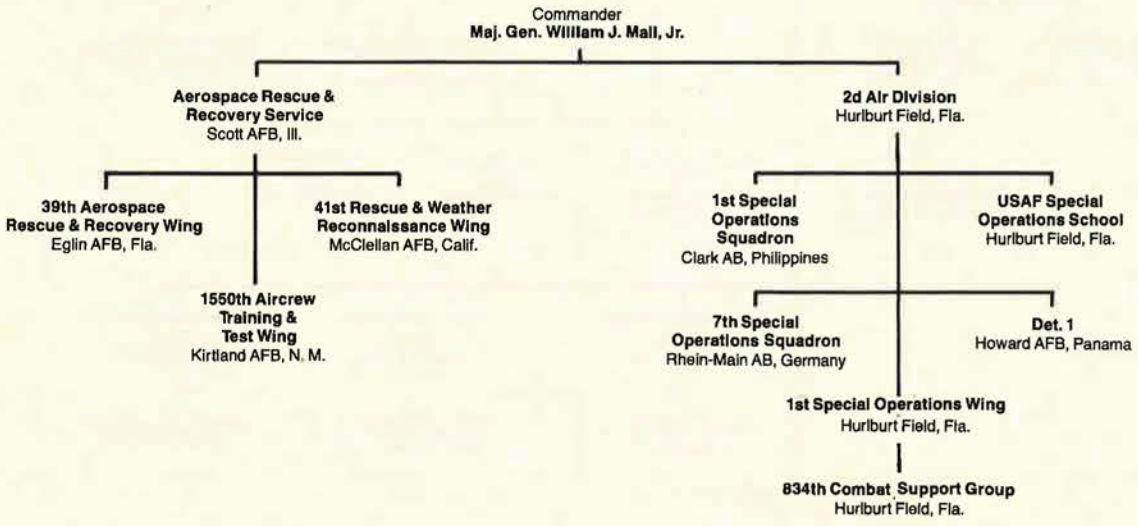
TWENTY-SECOND AIR FORCE (MAC)

Headquarters, Travis AFB, Calif.



TWENTY-THIRD AIR FORCE (MAC)

Headquarters, Scott AFB, Ill.



Answering the Challenge for Over 30 Years

(Fort Worth, Texas-1951). . . . The B-36 bomber jet-pod changeover program is well underway. Powerful gas turbine engines are being added to the aircraft by the U.S. Air Force.

Maintenance procedures for these engines will demand more sophistication, accuracy and reliability than ever required before. Measuring and monitoring the extreme heat produced by the new jet engines is to be a critical factor in their successful long term operation.

Providing a practical solution to this challenge is first priority for Howell Instruments, the newly-founded, pioneers of precision instrumentation for aircraft turbine engines.

Before the year was half over, Howell not only met this challenge, but had taken 106 orders for the revolutionary JETCAL®AnalyzerTrimmer destined for use by the Air Force.

Howell's JETCAL evolved into a multipurpose test/trim system that has determined high standards for aircraft engine maintenance throughout the world. The JETCAL also established a working philosophy that continues to spirit Howell's progress.

Over the last 30 years, Howell has designed many practical answers for military, commercial and private aviation by: investigating the customer's need; proposing the best answer; designing, developing and testing the product and supplying support in the field.

Today, Howell internationally manufactures and distributes a complete line of top-flight instrumentation. They have become a leading producer of turbine engine trimmers and testers boasting more airborne engine monitors in the sky than any other manufacturer.

Howell's PATTS™ (Programmable Automatic Test/Trim System) is currently in use by Air Force and Navy on the TF-30, T-56, F-100 and J-57. PATTS is producing savings in both trim time and fuel consumption by as much as 40%.

Growing numbers of aircraft are installing H900 solid-state indicators, that provide levels of accuracy characteristic only to Howell. Rigorous testing of the H900's has documented a mean time between failures of 6,000 hours.

Another example of Howell's capabilities is H337 Series Engine Test Set. This multipurpose set tests, trims and trouble-shoots several engines including the Pratt & Whitney PT6 or Twin Pak (T400 or PT6T-3), Lycoming LTS-101 and the Allison 250.

The Howell team welcomes challenges with the dedication and expertise necessary to meet your needs.

HOWELL®

HOWELL INSTRUMENTS INC.

3479 West Vickery Boulevard
Fort Worth, Texas 76107
817-336-7411

Pacific Air Forces

A MAJOR COMMAND

A weapons load crew from Kunsan AB's 8th Aircraft Generation Squadron loads bombs on an F-16 Fighting Falcon during a Cope Thunder exercise at Clark AB in the Philippines. Other US forces in the Pacific also participate. (Photo by SSgt. Steve Dry)

NOW in its thirty-sixth year of service, the mission of Pacific Air Forces continues to be to prepare for and conduct, when directed, combat air operations in the Pacific and Asian theaters.

As the air arm of Pacific Command, PACAF maintains security and defends US interests from the west coast of the Americas to the east coast of Africa and from the Arctic to the Antarctic. The area comprises more than half the earth's surface and is occupied by two billion people under more than thirty-five different flags. PACAF also works with air forces of friendly nations and supports other USAF commands operating in the Pacific area.

Force modernization, realistic training, and quality of life improvements were major PACAF initiatives in 1982. The 8th Tactical Fighter Wing at Kunsan AB, Korea, rounded out its two-squadron complement of F-16 Fighting Falcon aircraft. New facilities at Suwon AB built by the Republic of Korea for use by USAF became home for the 25th Tactical Fighter Squadron's A-10 Thunderbolt IIs. A-10s and F-16s now add an important armor-stopping punch to the Korean theater.

These latest aircraft join the PACAF tactical air team that includes three F-15 squadrons and an RF-4C reconnaissance squadron of the 18th Tactical Fighter Wing; an E-3A airborne warning and control detachment based at Kadena AB, Japan; F-4Es of the 51st Tactical Fighter Wing at Osan and Taegu Air Bases in Korea; and F-4s of the 3d Tactical Fighter Wing at Clark AB in the Republic of the Philippines. Japan and the US, reaffirming their commitment to the stability and security of Japan's northern region, announced plans to base an F-16 wing at Misawa AB beginning in 1985.

Forward air control capabilities will be increased this year when the 19th Tactical Air Support Squadron at Osan AB converts to OA-37 Dragonfly aircraft. The unit's OV-10 Broncos will be transferred to Wheeler AFB, Hawaii, replacing O-2 aircraft.

PACAF units stay in top combat form through realistic exercises. Team Spirit 83, the free world's largest joint combined training exercise, was held in Korea during February and March. This annual JCS exercise demonstrated PACAF's ability to augment assigned forces rapidly and to integrate combat operations with other US and Korean forces.

Cope Thunder, PACAF's equivalent to TAC's Red Flag, is a series of realistic tactical air warfare exercises conducted seven times annually on the Crow Valley Range near Clark AB. During Cope Thunder, USAF, US Navy, Marine, and Army forces from throughout the Pacific participate in a simulated combat environment.

The fiftieth Cope Thunder in December 1982 marked five and one-half years of operations and nearly 35,000 sorties flown.

Philippine and Royal New Zealand Air Force aircraft and, for the first time, Royal Thai Air Force units participated in 1982 Cope Thunders. Another first for the year was participa-

An F-16 pilot from the 35th Tactical Fighter Squadron gives thumbs up before a Cope Thunder mission. (Photo by SSgt. Steve Dry)

THE MAJOR UNITS OF PACIFIC AIR FORCES (PACAF)

UNIT	LOCATION	AIRCRAFT
326th Air Division	Wheeler AFB, Hawaii	OV-10
15th Air Base Wing	Hickam AFB, Hawaii	EC-135, T-33 (+ ANG F-4C)
FIFTH AIR FORCE HQ., YOKOTA AB, JAPAN		
314th Air Division	Osan AB, Korea	
8th Tactical Fighter Wing	Kunsan AB, Korea	F-16
51st Tactical Fighter Wing	Osan AB, Korea	F-4E, OA-37
497th Tactical Fighter Squadron	Taegu AB, Korea	F-4E
25th Tactical Fighter Squadron	Suwon AB, Korea	A-10
313th Air Division	Kadena AB, Japan	
18th Tactical Fighter Wing	Kadena AB, Japan	RF-4C, T-39, F-15, E-3A (TAC)
475th Air Base Wing	Yokota AB, Japan	T-39, UH-1
6112th Air Base Wing	Misawa AB, Japan	
6171st Air Base Squadron	Kwang Ju AB, Japan	
THIRTEENTH AIR FORCE HQ., CLARK AB, PHILIPPINES		
3d Tactical Fighter Wing	Clark AB, Philippines	MC-130, F-4E, F-4G, F-5, T-39, T-33

tion by a US Navy guided missile cruiser.

Combat Sage, also conducted in the Philippines, uses realistic combat scenarios to evaluate the effectiveness of air-to-air weapon systems. One hundred and thirty-five PACAF fighters participated in Combat Sage in 1982.

Cope North is a combined exercise series with the Japan Air Self-Defense Force. These exercises provide training in air defense, including command and control of airborne fighters practicing dissimilar aircraft combat tactics (DACT), and air-to-ground missions.

Last year brought increased emphasis on training involving Pacific air and naval components. Maritime scenarios designed to counter a growing Soviet naval and air threat are now incorporated into many PACAF exercises. They improve PACAF's capability to operate with the US Navy in reconnaissance, air defense, enemy seapower interdiction, and intelligence gathering.

In October 1982, Kadena AB units mobilized six F-15s—with sixty support people and their equipment in a KC-10 Extender—for a record-setting deployment to William Tell '82 in Florida. The aircraft flew 7,028 miles—a third of the way around the world—nonstop in less than fifteen hours. The fighters were refueled seven times. The 18th Tactical Fighter Wing won the 1982 William Tell air-to-air weapons meet conducted at Tyndall AFB, Fla., in October 1982, taking the General "Chappie" James trophy as overall winners, plus four other major honors.

It was also a banner year for "people" initiatives. PACAF greatly improved living and working facilities for its members and their families. For example, single members saw dormitories being replaced and upgraded. Efforts to prepare Osan AB in Korea for accompanied tours by 1990 continued with plans to expand support facilities and add to the 200 command-sponsored positions available there now.

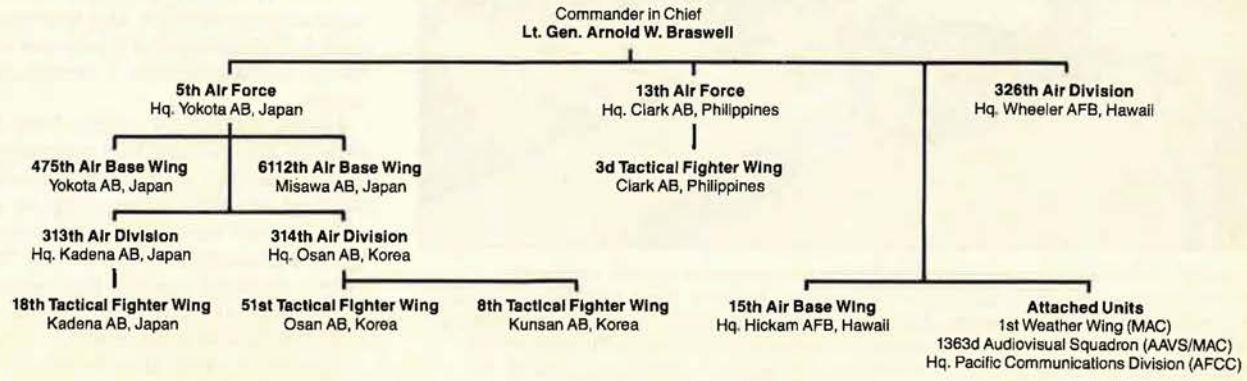
Pacific Air Forces' people, its foundation of readiness, decided to stay with the Air Force family in increasing numbers. For PACAF's enlisted force, the first-term retention rate was fifty-nine percent, second term eighty-nine percent, and career members stayed with the command at a ninety-eight percent rate—all better than overall Air Force figures.

Ninety-one percent of PACAF's pilots, ninety-two percent of navigators, and seventy-seven percent of support officers continued in service.

Force modernization improvements, realistic training programs, and attention to the needs of Air Force members and their families help ensure an Air Force in the Pacific able to defend US interests. ■

PACIFIC AIR FORCES

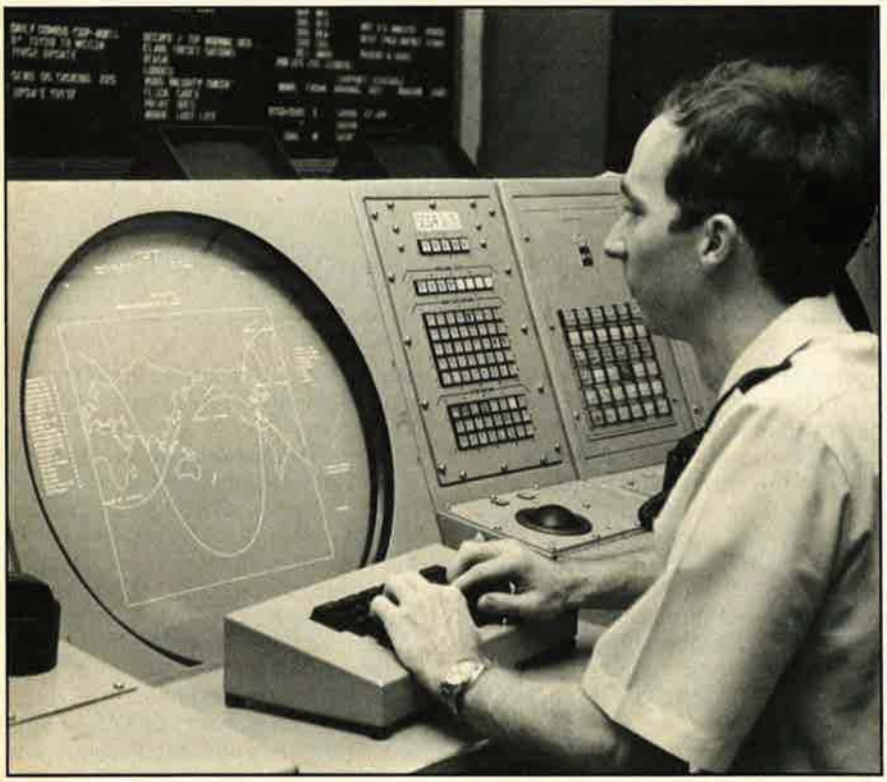
Headquarters, Hickam AFB, Hawaii



Space Command

A MAJOR COMMAND

THE establishment of Space Command (SPACECOM), the Air Force's newest major command, on September 1, 1982, marked a crucial milestone in the evolution of military space operations. The command will give the Air Force an organization to address the many challenges and to take advantage of the opportunities that space affords the military.



TOP: Space Command personnel at the Space Computation Center inside the NORAD Cheyenne Mountain Complex in Colorado, keeping track of satellites in earth orbit. (Photo by Sgt. Chris Casale) ABOVE: The Space Defense Operations Center is another facility in the Cheyenne Mountain Complex near Colorado Springs that is operated by Space Command, the Air Force's newest major command created to represent US interests in the military utilization of space. (Photo by SSgt. Sam Landis)

The Space Command motto, which is "Guardians of the High Frontier," symbolizes the importance of space to national security, and underscores our commitment to leadership in this expanding medium.

Space Command has been established to consolidate management of Air Force space operations and to link research and development with military requirements and operations. Our basic military objectives in space, as defined in Air Force doctrine, are:

- To maintain freedom of space;
- To increase effectiveness, readiness, and survivability of military forces;
- To protect the nation's resources from threats in, through, and from space; and
- To protect space from being used by our enemies as a sanctuary for aggressive systems.

With its headquarters in Colorado Springs, Colo., Space Command is headed by Gen. James V. Hartinger, who continues to serve as the Commander in Chief of the North American Aerospace Defense Command (NORAD). The Vice Commander of Space Command is also the Commander of the Air Force Systems Command's Space Division, located at Los Angeles AFS, Calif.

Several factors converged in 1982 that led the Air Force to determine that it was logical and necessary to establish an operational Space Command. These included the Soviet threat in space, our nation's increasing dependence on space systems, an ever-increasing national space resource commitment, and the need to take full advantage of the Space Shuttle to enhance man's presence in space.

Lastly, on July 4, 1982, President Reagan announced that an important goal of the US's space program was to strengthen national security. As a result, we now have a policy that underscores the need to move Air Force space systems out of the research and development community and into the operational world.

Space Command will include the following resources:

Personnel and Bases. When fully operational, Space Command will have about 7,000 Air Force military and civilian personnel and about 3,000 contractors worldwide. Space Command will have four bases: Thule and Sondrestrom in Greenland; Clear, Alaska; and Peterson AFB, Colo.

Satellites. Space Command currently has responsibility for two operational satellite systems—the infrared Satellite Early Warning System and the Defense Meteorological Satellite Program—and their associated ground-control and tracking networks.

Missile Warning and Space Surveillance Sensors. The command operates the worldwide missile warning and space surveillance network, consisting of twenty-four radar and optical sensor sites.

The 1st Space Wing. The 1st Space Wing was established at Peterson AFB on January 1, 1983, to manage units operating the satellite systems and the ground-based sensors throughout the world. The 1st Space Wing is responsible for the operational status, training, standardization, and evaluation of the twenty-four units.

The Space Communications Division. A Space Communications Division has been formed by the Air Force Communications Command to support the communications needs of Space Command and NORAD. The division operates and maintains communications for space surveillance and missile warning systems and the selected data processing and communications equipment for the Cheyenne Mountain Complex.

The Consolidated Space Operations Center (CSOC). The command will manage and operate the CSOC being built nine miles east of Peterson AFB. From this Center, Space Command will control operational spacecraft and will also plan, manage, and control all DoD Shuttle flights. Construction of the CSOC is scheduled to begin soon and, when operational, it will have more than 2,000 personnel, about half of whom will be Air Force personnel.

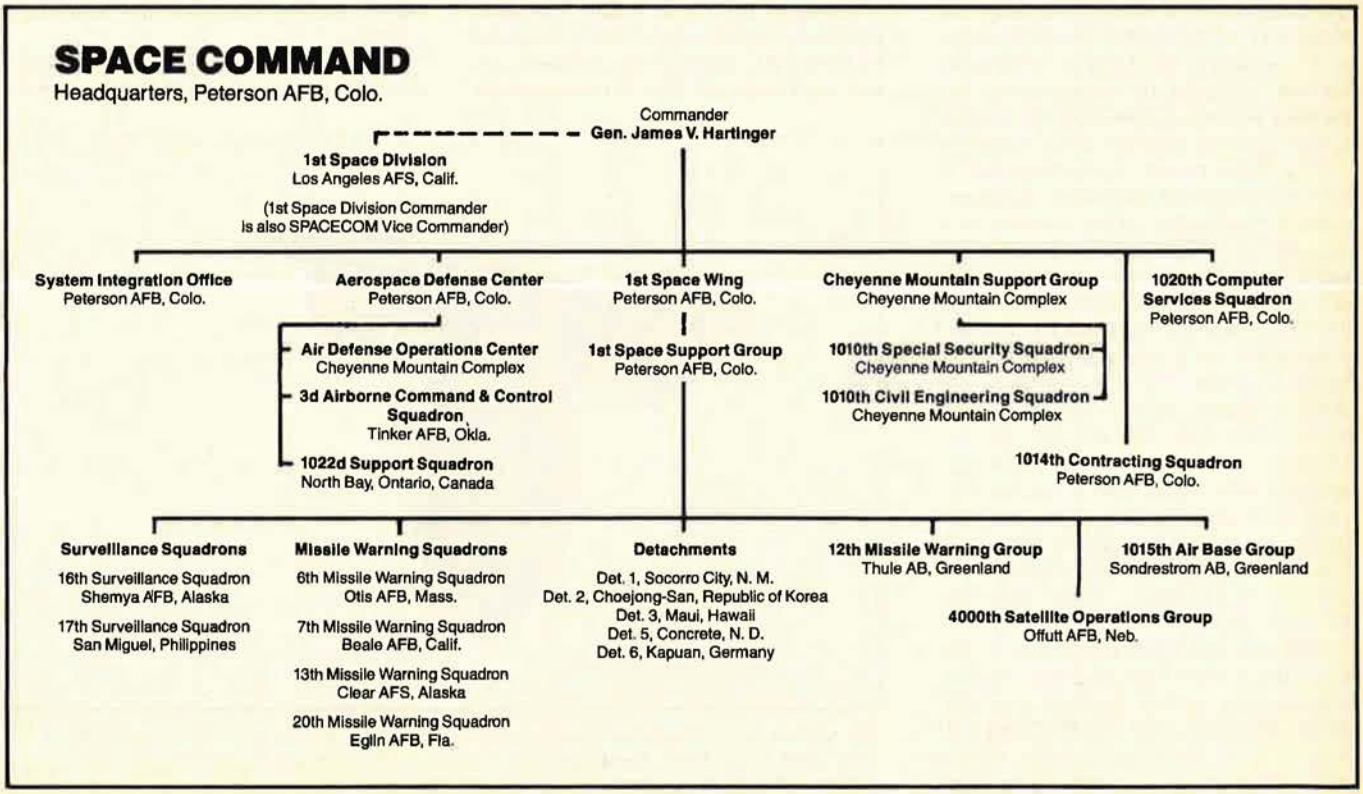
The Space Defense Operations Center (SPADOC). The three operational space tasks are performed in the SPADOC located in the Cheyenne Mountain Complex. This one-of-a-kind Space Command post is a fusion center where intelligence and operations come together. SPADOC also maintains the status of all national security and civil satellites.

On October 1, 1982, the Air Force established the Space Technology Center at Albuquerque, N. M., reporting to the commander at Space Division. The Center has responsibility for unique space technical disciplines. The Air Force now has a coherent processing of space systems—from basic technology at Albuquerque through research, development, acquisition, and launch by Space Division, and the on-orbit control, management, and protection by Space Command.

The Space Command agenda is far-reaching. In general, the Air Force has an operational command to manage, control, and protect operational space assets. Space Command is promoting a much closer relationship between the R&D community and the operational world and is providing a focus for centralized planning, consolidated requirements, and an operational advocate for Air Force space systems. In particular, Space Command will:

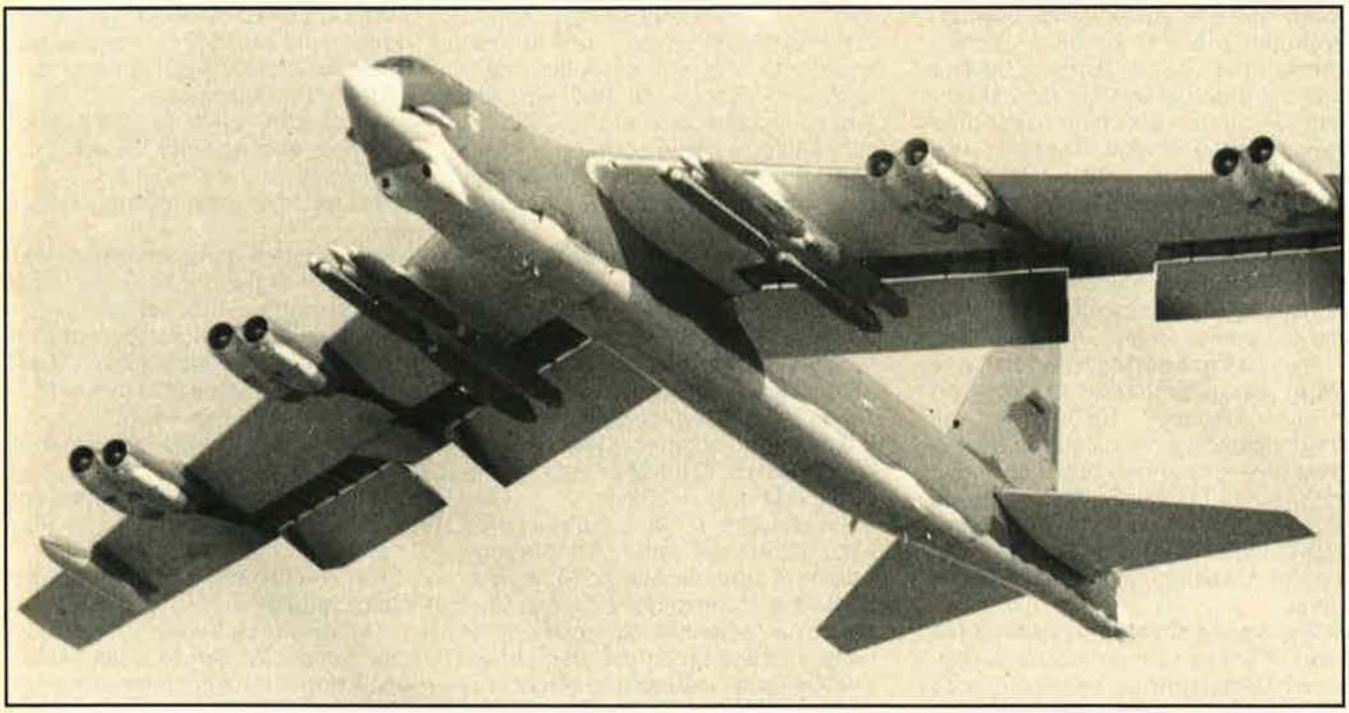
- Develop space doctrine and strategy;
- Promote a comprehensive documentation of the Soviet space threat;
- Strengthen the weakest link in the space system development cycle —the statement of operational needs;
- Incorporate space activities in Air Force and joint exercises;
- Advocate a sound survivability program;
- Promote and oversee space education, training, and career development; and
- Give clearer focus to the Air Force space medicine program.

The Air Force believes that the establishment of Space Command is occurring at the right time, in the right place, with the right people. Space Command is a giant step toward meeting the President's policy goal of strengthening national security. ■



Strategic Air Command

A MAJOR COMMAND



The mainstay of SAC's manned bomber force continues to be the B-52 Stratofortress, of which more than 300 are in the inventory. G versions of the bomber are currently being modified to carry the Air-Launched Cruise Missile.

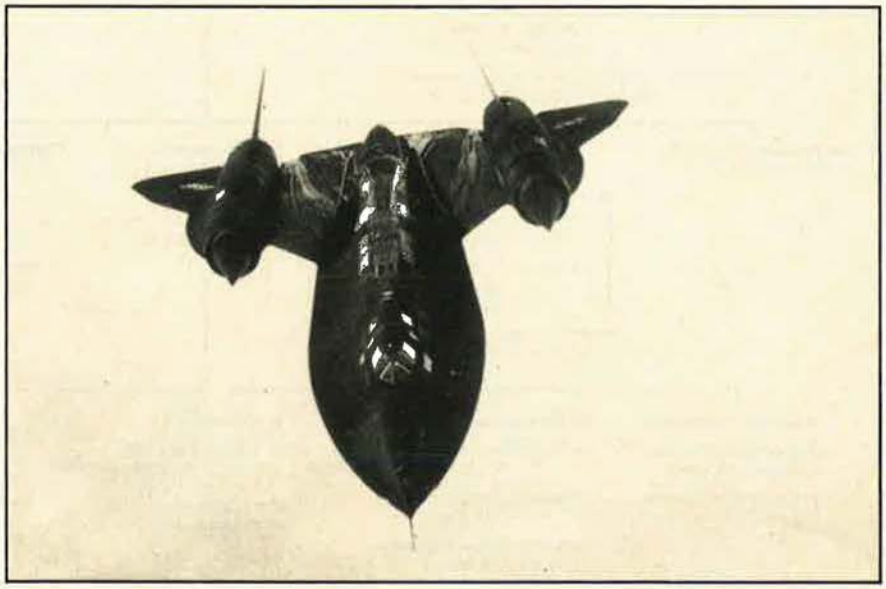
THE mission of Strategic Air Command (SAC) is to contribute to the deterrence of war, particularly nuclear war, by providing ready, flexible, and credible strategic offensive forces capable of responding decisively across a spectrum of threats to the nation's vital security interests.

The SAC force is composed of intercontinental ballistic missiles, manned bombers, aerial tankers, and other aircraft. SAC's ICBM force numbers 1,000 Minuteman missiles (450 Minuteman IIs and 550 Minuteman IIIs) and nearly fifty Titan IIs that are scheduled for gradual phaseout. The bomber-tanker force has about 300 B-52 Stratofortresses, fifty-six supersonic FB-111s, 615 KC-135 Stratotankers, and twelve KC-10 Extender aircraft with more to be added this year. With aerial refueling, the bomber force has global capability. Other aircraft in the SAC inventory include the SR-71, U-2, TR-1, T-38, RC-135, EC-135, and E-4.

SAC is a specified command made up entirely of Air Force people, reporting directly to the Secretary of Defense through the Joint Chiefs of Staff. The command has about 122,000 people at twenty-five SAC bases and twenty-eight other installations where SAC units are tenants.

Some of the force modernizations presently under way or being planned to help SAC perform its mission are the addition of the Air-Launched Cruise Missile (ALCM), the B-1B Bomber and new Advanced Technology Bomber, and the Peacekeeper missile.

The first operational ALCM squadron, flying B-52Gs, is at Griffiss AFB,



The world's most advanced strategic reconnaissance aircraft, the SR-71 has been a SAC asset since 1966. The Blackbird is capable of surveying more than 100,000 square miles of the earth's surface in one hour.

An FB-111 with auxiliary fuel tanks shortly after takeoff from Pease AFB, N. H. The swingwing bomber, which first entered the inventory in 1969, was designed to replace B-58 Hustlers and earlier versions of the B-52.

N. Y. Wurtsmith AFB, Mich., Grand Forks AFB, N. D., and Blytheville AFB, Ark., are scheduled to become ALCM-operational in the next two years. Eventually, as many as twenty of these small, aircraft-like missiles with highly accurate terrain-contour-matching guidance systems could be carried by a single B-52.

In addition, the Air Force and Navy have begun testing Harpoon missiles on B-52s as the sister services explore new avenues for coordinated defense of US sea-lanes.

SAC anticipates receiving its first operational B-1B aircraft in the summer of 1985, and achieving an operational capability of fifteen aircraft by September 1986.

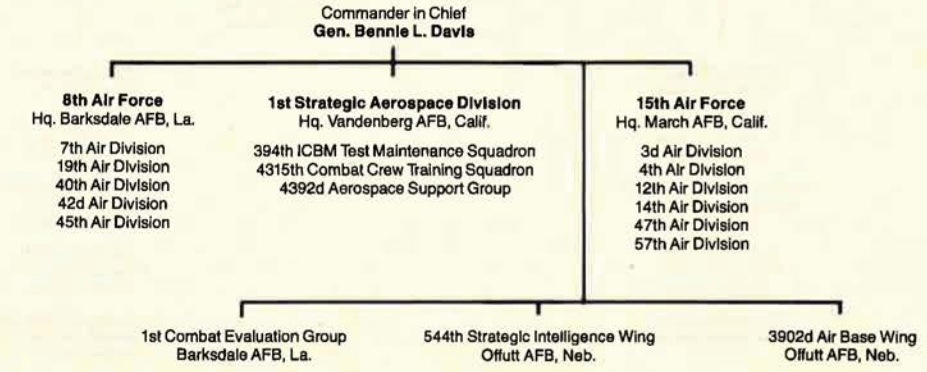
Laboratory testing of components for the Peacekeeper missile continued throughout the year. Funding for production of the Peacekeeper has been slowed by controversy over its permanent basing mode, but defense leaders remain confident that the Peacekeeper will modernize the land-based missile leg of the triad in the near future.

The command's reconnaissance capability was expanded with the activation of a permanent TR-1 unit in England.

SAC's tanker fleet was beefed up with the addition of KC-10 Extenders. The command has activated its second KC-10 unit, the 22d Air Refueling Wing, March AFB, Calif. The Extender demonstrated its long-range refueling and cargo-carrying capability throughout the year by supporting TAC and MAC deployments across both the Atlantic and Pacific. In one deployment, KC-10s helped ferry six F-15 Eagles and their support equipment and crews from Japan to Florida. The nonstop flight covered more than 7,000 nautical miles in less than fifteen hours.

STRATEGIC AIR COMMAND

Headquarters, Offutt AFB, Neb.



Modernization of the KC-135 fleet is continuing with the first KC-135R entering its flight-test program. Other KC-135s received quieter, more fuel-efficient engines from retired Boeing 707 commercial airliners.

As part of the President's strategic modernization program, the first Titan II missiles were deactivated at Davis-Monthan AFB, Ariz. This program is scheduled to result in the complete deactivation of the Titan II missiles by October 1987.

SAC tested and demonstrated its readiness throughout the year by participating in exercises including Global Shield, Busy Brewer, Team Spirit, Red Flag, Ocean Venture, Maple Flag, and Gallant Eagle.

The strategy of SAC hinges on the philosophy that the perceived threat of retaliation must be sufficient to deter aggression. As Gen. Bennie L. Davis, SAC Commander in Chief, put it: ". . . No sane man, military or civilian, wants war . . . but if war is forced upon us, we want the warfighting capability to set a price on our opponents' objectives that he cannot afford to pay. . . ." ■

EIGHTH AIR FORCE (SAC)

Headquarters, Barksdale AFB, La.

Commander
Lt. Gen. William T. Campbell

7th Air Division
Ramstein AB, Germany

306th Strategic Wing*
RAF Mildenhall, UK

11th Strategic Group
RAF Fairford, UK

17th Reconnaissance Wing
RAF Alconbury, UK

19th Air Division
Carswell AFB, Tex.

340th Air Refueling Group*
Altus AFB, Okla.
(KC-135)

351st Strategic Missile Wing
Whiteman AFB, Mo.
(Minuteman)

7th Bomb Wing
Carswell AFB, Tex.
(B-52/KC-135)

381st Strategic Missile Wing
McConnell AFB, Kan.
(Titan II)

384th Air Refueling Wing
McConnell AFB, Kan.
(KC-135)

308th Strategic Missile Wing*
Little Rock AFB, Ark.
(Titan II)

40th Air Division
Wurtsmith AFB, Mich.

379th Bomb Wing
Wurtsmith AFB, Mich.
(B-52/KC-135)

410th Bomb Wing
K. I. Sawyer AFB, Mich.
(B-52/KC-135)

416th Bomb Wing
Griffiss AFB, N. Y.
(B-52/KC-135)

42d Air Division
Blytheville AFB, Ark.

19th Bomb Wing*
Robins AFB, Ga.
(B-52/KC-135)

68th Aerial Refueling Group*
Seymour Johnson AFB, N. C.
(KC-135)

97th Bomb Wing
Blytheville AFB, Ark.
(B-52/KC-135)

2d Bomb Wing
Barksdale AFB, La.
(B-52/KC-10/KC-135)

305th Air Refueling Wing
Grissom AFB, Ind.
(KC-135)

45th Air Division
Pease AFB, N.H.

380th Bomb Wing
Plattsburgh AFB, N. Y.
(FB-111/KC-135)

509th Bomb Wing
Pease AFB, N. H.
(FB-111/KC-135)

42d Bomb Wing
Loring AFB, Me.
(B-52/KC-135)

*Tenant Units

FIFTEENTH AIR FORCE (SAC)

Headquarters, March AFB, Calif.

Commander
Lt. Gen. John J. Murphy

3d Air Division
Andersen AFB, Guam

43d Strategic Wing
Andersen AFB, Guam
(B-52)

376th Strategic Wing*
Kadena AB, Japan
(KC-135)

4th Air Division
F. E. Warren AFB, Wyo.

319th Bomb Wing
Grand Forks AFB, N. D.
(B-52/KC-135)

321st Strategic Missile Wing
Grand Forks AFB, N. D.
(Minuteman)

90th Strategic Missile Wing
F. E. Warren AFB, Wyo.
(Minuteman)

12th Air Division
Dyess AFB, Tex.

390th Strategic Missile Wing*
Davis-Monthan AFB, Ariz.
(Titan II)

22d Aerial Refueling Wing
March AFB, Calif.
(KC-10/KC-135)

96th Bomb Wing
Dyess AFB, Tex.
(B-52/KC-135)

55th Strategic Reconnaissance Wing
Offutt AFB, Neb.
(RC/KC-135)

14th Air Division
Beale AFB, Calif.

9th Strategic Reconnaissance Wing
Beale AFB, Calif.
(SR-71/U-2)

93d Bomb Wing
Castle AFB, Calif.
(B-52/KC-135)

307th Air Refueling Group
Travis AFB, Calif.
(KC-135)

47th Air Division
Fairchild AFB, Wash.

92d Bomb Wing
Fairchild AFB, Wash.
(B-52/KC-135)

341st Strategic Missile Wing
Malmstrom AFB, Mont.
(Minuteman)

320th Bomb Wing*
Mather AFB, Calif.
(B-52/KC-135)

6th Strategic Wing
Eielson AFB, Alaska
(RC-135)

57th Air Division
Minot AFB, N. D.

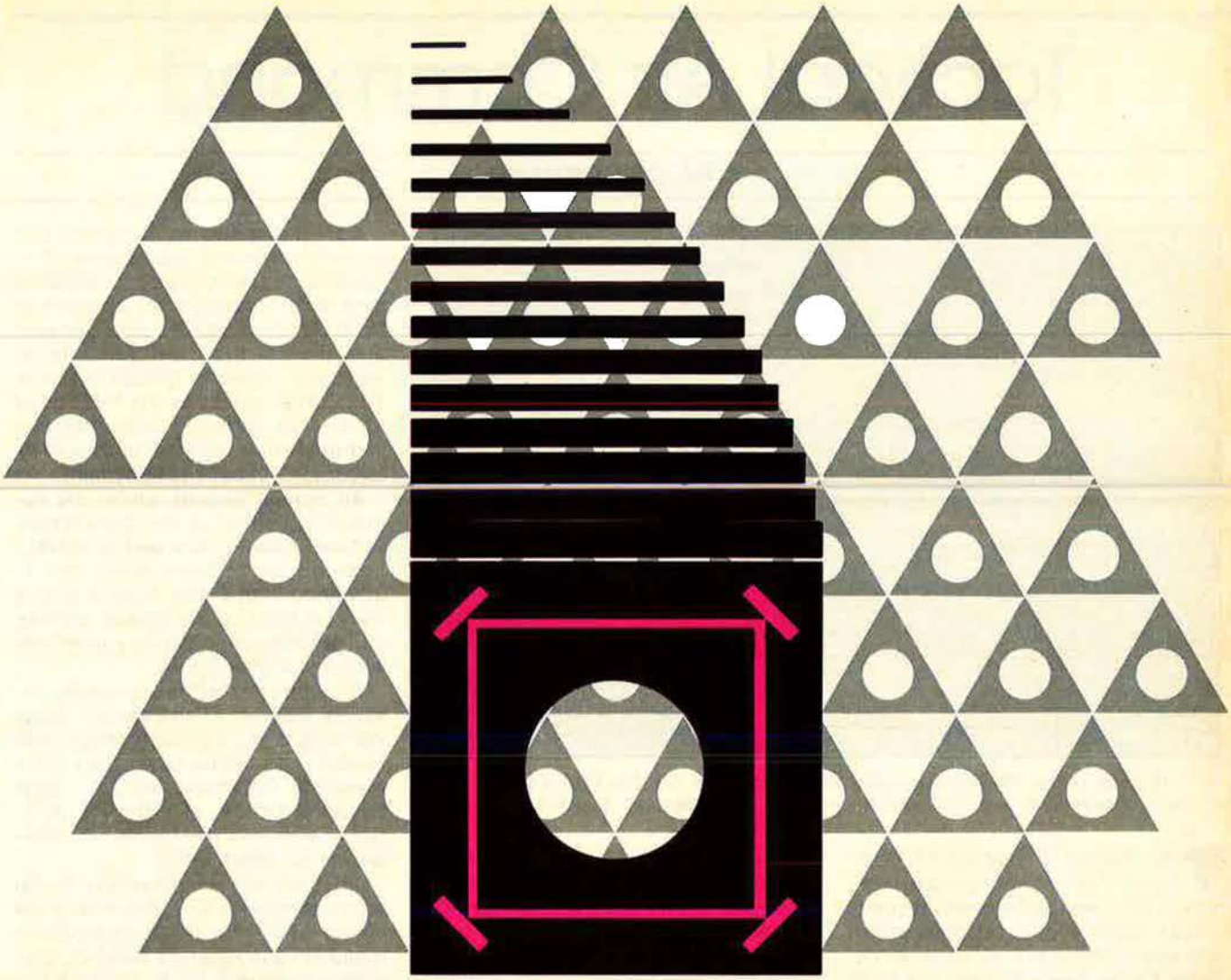
5th Bomb Wing
Minot AFB, N. D.
(B-52/KC-135)

91st Strategic Missile Wing
Minot AFB, N. D.
(Minuteman)

28th Bomb Wing
Ellsworth AFB, S. D.
(B-52/KC-135)

44th Strategic Missile Wing
Ellsworth AFB, S. D.
(Minuteman)

*Tenant Units



Litton's square RLG leapfrogs 10 years

The MRASM/Tomahawk II selection and contract spotlights Litton's astounding achievement in Ring Laser Gyro technology.

By addressing RLG accuracy versus size from a fundamental point of view, Litton scientists abandoned a 10-year triangle mindset. By using a square rather than a triangular configuration, mirror performance was enhanced and pathlength increased for a given volume. This concept, combined with Litton's superior mirror technology, provides unprecedented performance.

Accuracy achieved in flight proved the concept correct, and these gyros are now in production for military and commercial applications.

The square RLG is the latest in our long line of continuing successes which began in the early fifties when we pioneered Inertial Navigation for manned aircraft. Since then we have delivered over 17,000 inertial systems for aircraft, cruise missile, shipboard and land applications.

Litton success in the Inertial Navigation field has earned world-wide acclaim. It is a Litton inertial navigation system in the U.S. Government cruise missiles, the ALCM, SLCM, and GLCM, that contributes directly to their excellent performance.

For advanced technology and leadership you can look to Litton.

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Tactical Air Command

A MAJOR COMMAND

An F-15 Eagle of the 33d Tactical Fighter Wing, Eglin AFB, Fla. The F-15 is USAF's primary air-superiority fighter, of which more than 1,400 are to be acquired.

THE mission of Tactical Air Command (TAC) is to organize, train, equip, and maintain combat-ready forces capable of rapid deployment and employment, and strategic air defense forces ready to meet the challenges of peacetime air sovereignty and wartime air defense.

TAC's emphasis on realistic training for operational, maintenance, munitions, and support personnel is the key to its many successes. Units mobilize and deploy to both Stateside and overseas locations on a continuing basis, and they practice daily those combat skills necessary to destroy enemy air and ground forces.

TAC serves as the Air Force component of the US Readiness Command, the US Central Command, and the Atlantic Command. As AFRED, TAC performs tactical fighter, reconnaissance, command and control, and electronic combat operations during worldwide contingencies. In support of CENTCOM, TAC provides Rapid Deployment Force units for operations in Southwest Asia. When activated as US Air Forces Atlantic under the unified Atlantic Command, TAC conducts air operations anywhere within the LANTCOM area, which includes the North Atlantic and Caribbean.

TAC provides strategic air defense forces to the Commander in Chief, North American Aerospace Defense Command, and to CINCLANT for operations in Iceland. Air Defense TAC, with headquarters at Langley AFB, Va., maintains personnel, equipment, aircraft, and munitions to provide early warning, attack assessment, and damage limitation from airborne threats to North America.

TAC's active force consists of more than 113,000 people and almost 2,600 aircraft. When mobilized, 67,000 members of ANG and AFRES units will be assigned to the command. TAC forces are organized under two numbered air forces, plus ADTAC and five direct reporting units.

The Ninth Air Force, at Shaw AFB, S. C., has ten wings performing tactical fighter operations and training as well as reconnaissance and air control. Commander, Ninth Air Force, when serving as USCENTAF with the US Central Command, commands all US air forces of the Rapid Deployment Force.

The Twelfth Air Force at Bergstrom AFB, Tex., consists of four air divisions and thirteen wings performing tactical fighter operations and training, reconnaissance, tactical air control, and a wide range of electronic combat missions including "Wild Weasel" and support jamming.

ADTAC has five air divisions that provide command and control of interceptor squadrons and surveillance radars for strategic air defense of North America. ADTAC also oversees operation of the USAF Air Defense Weapons Center at Tyndall AFB, Fla. The Center serves as the focal point for aircrew, weapons controller, and instructor training in all phases of interceptor weapons employment.

Air Forces Iceland, under the operational control of the Commander in Chief Atlantic, is a part of ADTAC. Located at Keflavik NAS, AFI is equipped with F-4Es, E-3A Airborne Warning and Control System aircraft, and ground-based radar to guard Iceland against air attack.

A unique ADTAC responsibility involves support of the Distant Early Warning Line, a system of ground-based radar sites stretching from Alaska to Greenland. ADTAC's DEW Systems Office, at Peterson AFB, Colo., executes day-to-day responsibilities for this mission.

TAC's US Air Force Southern Air Division at Howard AFB, Panama, is the air arm of the joint US Southern Command in Latin America. USAFSO provides air defense of the Panama Canal, assists in training Latin American air forces, provides air support for combined training exercises with Latin American military forces, and operates search-and-rescue activities in the region.

The USAF Tactical Air Warfare Center, Eglin AFB, Fla., is responsible for all aspects of electronic combat activities and provides training and evaluation of C^{3}I assets through Blue Flag exercises. In addition, this multifaceted organization evaluates aircraft systems and aircrews deployed to Eglin for live firing of air-to-air missiles in the weapon system evaluation program.

The USAF Tactical Fighter Weapons Center, Nellis AFB, Nev., conducts advanced schooling and testing in tactical air concepts, doctrine, weapons, and tactics. The Center also evaluates equipment and munitions designed for tactical fighter operations. The US Air Force aerial demonstration squadron, the Thunderbirds, is a USAFTFWC unit. The Center is also responsible for all Red Flag activities, including all Aggressor forces.

Who is the bright light in Ring Laser Gyros?

Singer's Kearfott Division .....naturally.

In October 1981 Singer's Kearfott Division was awarded a contract for the design and development of a Ring Laser Gyro Inertial Sensor Assembly for the Medium Range Air-to-Surface Missile Tomahawk II (MRASM). This contract was awarded by the Joint Cruise Missiles Project, Washington, D.C.

We have combined thirty years in high accuracy inertial components and systems with more than 6 years of concentrated effort in RLG technology to build full-up RLG inertial navigators that have been flying in jet aircraft for more than two years. These systems consistently perform to better than 1 nmi/h.

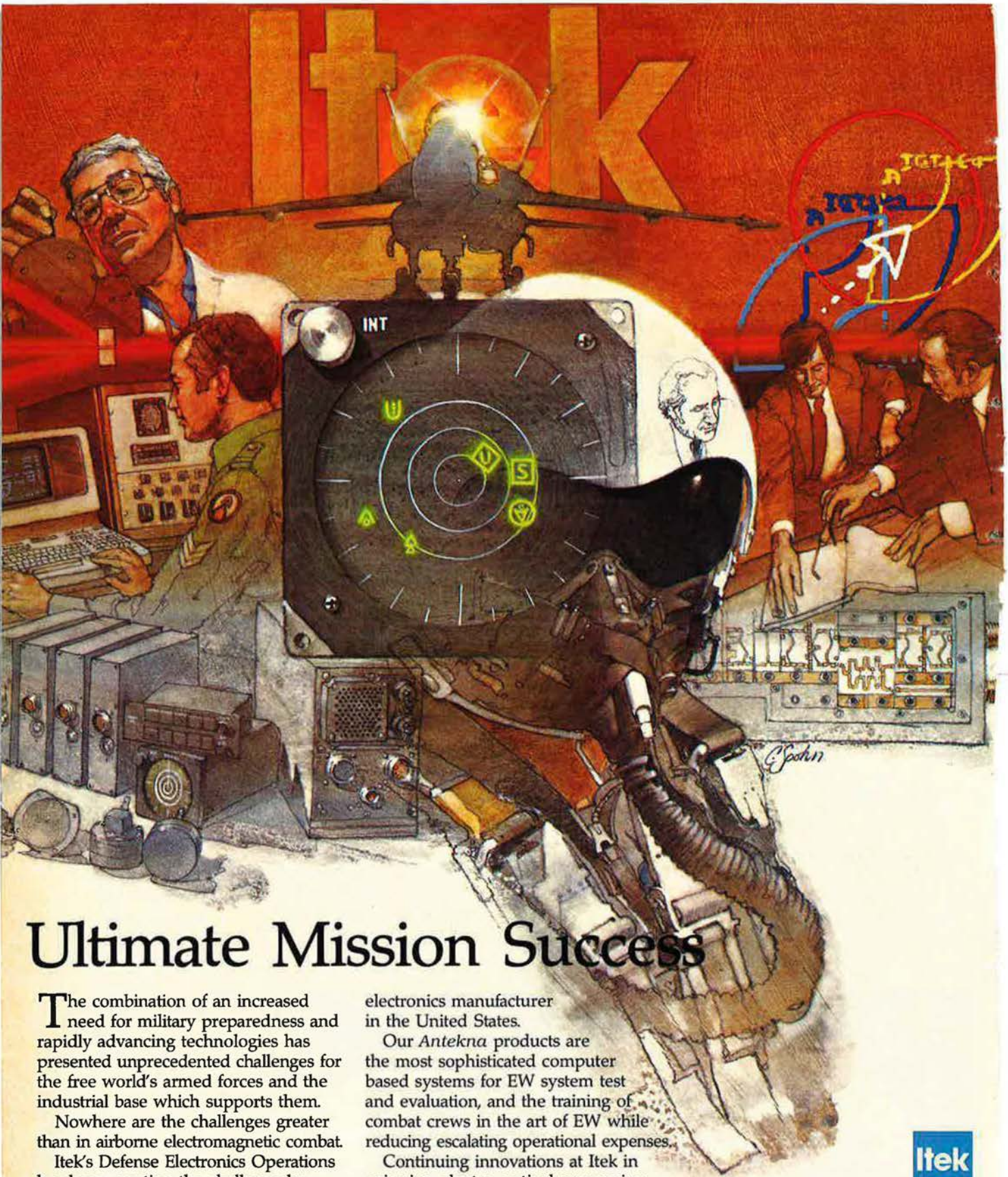
We have also dedicated facilities and resources to assure current and future customers that we have the capability to perform on schedule and on target.

The bright light in Ring Laser Gyros is Kearfott, a Division of The Singer Company ....naturally.

Kearfott

a division of The SINGER Company

THE SINGER COMPANY
KEARFOTT DIVISION
1150 MC BRIDE AVENUE
LITTLE FALLS, N. J. 07424



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Telephone: 408-732-2710

The 552d Airborne Warning and Control Wing, Tinker AFB, Okla., operates EC-135, EC-130E, EC-130H, and E-3A AWACS aircraft. The wing maintains squadrons at Tinker, Kadena AB, Japan, Keflavik NAS, Davis-Monthan AFB, Ariz., and Keesler AFB, Miss. The E-3A provides surveillance and warning, control of friendly fighters, and airborne battle management. The two versions of the C-130 provide airborne battlefield command and control and support jamming of enemy command control and communications networks. The EC-135s serve as flying command posts to control overseas deployments of tactical fighter aircraft.

To maintain its high state of readiness, TAC conducts training exercises and overseas deployments and participates in numerous joint exercises. During the last year, TAC units conducted twenty-four overseas deployments to ten countries, including Korea, Germany, Italy, and Egypt. TAC carries out a number of "flag" programs to provide combat training under realistic conditions. Key flag programs include:

- **Black Flag**—develops programs and concepts to ensure that aircraft maintenance units are trained and organized to operate at the tempo and scale required in wartime. This includes deployed operations, combat surge training, development of quick-turn expertise, and like programs designed to get the most from each piece of equipment.
- **Blue Flag**—provides real-time command control and communications training for battle-staff personnel in realistic NATO, Korean, and Southwest Asia scenarios.
- **Checkered Flag**—provides unit preparation for operations from overseas bases. Under Checkered Flag, every TAC fighter squadron is specifically assigned an overseas deployment base. Aircrews study and practice all facets of operations from these bases. Unit leaders visit their assigned bases yearly, and the units deploy to their overseas bases once every three years for realistic on-scene training.
- **Red Flag**—tactical fighter training in this very large, combined exercise gives aircrews training against simulated enemy ground and air opposition. As many as 250 aircraft fly up to 4,200 sorties during each six-week exercise.
- **Copper Flag**—this ADTAC equiv-

Unusual top view of the E-3A Sentry Airborne Warning and Control System aircraft with distinguishing radome.

DEPUTY COMMANDER FOR AIR DEFENSE (TAC)

Headquarters, Langley AFB, Va.

Commander, Tactical Air Command

Deputy Commander
Maj. Gen. J. L. Pickitt

- **21st Air Division** — Hq. Hancock Field, N. Y.
- **23d Air Division** — Hq. Tyndall AFB, Fla.
- **24th Air Division** — Hq. Malmstrom AFB, Mont.
- **25th Air Division** — Hq. McChord AFB, Wash.
- **26th Air Division** — Hq. Luke AFB, Ariz.
- **USAF Air Defense Weapons Center** — Hq. Tyndall AFB, Fla.
  - **325th Fighter Weapons Wing**
- **Air Forces Iceland** — Keflavik NAS, Iceland

TACTICAL AIR COMMAND

Headquarters, Langley AFB, Va.

Commander
Gen. W. L. Creech

- **9th Air Force**
  Hq. Shaw AFB, S.C.
  7 tactical fighter wings
  2 tactical training wings
  1 tactical air control wing
- **12th Air Force**
  Hq. Bergstrom AFB, Tex.
  4 air divisions
  7 tactical fighter wings
  4 tactical training wings
  1 tactical reconnaissance wing
  1 tactical air control wing
- **Air Defense, TAC**
  Hq. Langley AFB, Va.
  5 air divisions
  USAF Air Defense Weapons Center
  Air Forces Iceland
  Distant Early Warning (DEW) Line
- **USAF Southern Air Division**
  Hq. Howard AFB, Panama
  1 composite wing (O-2), Albrook AFS, Panama
  Inter-American Air Forces Academy
- **USAF Tactical Air Warfare Center**
  Hq. Eglin AFB, Fla.
  - **4441st Tactical Training Group (Blue Flag)**
    Eglin AFB, Fla.
  - **USAF Air-Ground Operations School**
    Hurlburt Field, Fla.
- **552d Airborne Warning & Control Wing**
  Tinker AFB, Okla.
  (E-3A, EC-135, EC-130)
- **USAF Tactical Fighter Weapons Center**
  Hq. Nellis AFB, Nev.
  - **554th Operations Support Wing**
    Nellis AFB, Nev.
    554th Range Group
  - **57th Fighter Weapons Wing**
    Nellis AFB, Nev.
    (F-15, F-16, F-111, A-10, F-4, F-5)
    USAF Fighter Weapons School
    Red Flag Training Group
    USAF Air Demonstration Squadron

alent of Red Flag is conducted at Tyndall AFB, Fla., to increase the readiness of strategic air defense forces. These exercises provide aircrew, weapons controller, and command and control training against enemy tactics and capabilities in scenarios covering the full range of attack and defensive options.

• **Green Flag**—focuses on coordinating and increasing the electronic combat capabilities of the tactical air forces. Under the direction of TAWC, Green Flag personnel develop EC tactics and then provide scenarios to test and evaluate current and proposed electronic combat systems. A large-scale Green Flag/Red Flag exercise is conducted annually on the Nellis AFB ranges to assure all EW tactics are kept current and realistic.

• **Silver Flag**—a training program that prepares TAC support personnel for their wartime roles in law enforcement, air base ground defense, civil engineering, and the medical services. For example, Silver Flag Alpha provides air base ground defense training to security police at Indian Springs AF Auxiliary Field, Nev., just north of Nellis AFB. These exercises are conducted to increase the readiness of TAC security police to defend an air base from external threats. Silver Flag Alpha began in the spring of 1982 and now trains some 200 TAC security police each month.

TAC highlights over the past year include introduction of the F-16 Fighting Falcon into the Air Force's aerial demonstration squadron, the Thunderbirds. Team members now operate under a dual-role concept—they continue to fly aerial demonstrations, while remaining combat capable as part of a line fighter squadron. Should a crisis situation develop, Thunderbird aircraft and personnel can be made immediately available to fly and fight with their combat-ready unit, the 430th Tactical Fighter Squadron of the 474th Tactical Fighter Wing.

The past year also saw Luke AFB, Ariz., receive the F-16 Fighting Falcon for Air Force and foreign military training. The German/American fighter training program at Luke AFB ended March 16 after twenty-five years of highly successful operations. The program phaseout was brought on by the GAF retirement of the F-104.

Shaw AFB has begun its conversion from a reconnaissance wing to a composite F-16 fighter/RF-4 reconnaissance wing in July 1982 and now is building its second squadron of F-16A aircraft. All but one squadron of Shaw's RF-4s were transferred to Bergstrom AFB, Tex.

TAC also announced the planned conversion of the five active ADTAC squadrons from the F-106 to the F-15 Eagle. The 48th Fighter Interceptor Squadron at Langley AFB has completed conversion and the 318th FIS at McChord AFB, Wash., will begin this summer. The air defense F-15 squadrons at Langley and McChord will also undertake the Air Force's antisatellite mission. ■

NINTH AIR FORCE (TAC)

Headquarters, Shaw AFB, S.C.

Commander
Lt. Gen. J. L. Piotrowski

- **1st Tactical Fighter Wing** — Langley AFB, Va. (F-15, EC-135, UH-1)
- **363d Tactical Fighter Wing** — Shaw AFB, S. C. (F-16, RF-4C)
- **507th Tactical Air Control Wing** — Shaw AFB, S. C. (O-2, CH-3)
- **23d Tactical Fighter Wing** — England AFB, La. (A-10)
- **4th Tactical Fighter Wing** — Seymour Johnson AFB, N. C. (F-4E)
- **56th Tactical Training Wing** — MacDill AFB, Fla. (F-16, UH-1)
- **354th Tactical Fighter Wing** — Myrtle Beach AFB, S. C. (A-10)
- **31st Tactical Training Wing** — Homestead AFB, Fla. (F-4D)
- **33d Tactical Fighter Wing** — Eglin AFB, Fla. (F-15)
- **347th Tactical Fighter Wing** — Moody AFB, Ga. (F-4E)

TWELFTH AIR FORCE (TAC)

Headquarters, Bergstrom AFB, Tex.

Commander
Lt. Gen. William R. Nelson

- **831st Air Division** — George AFB, Calif.
  - **35th Tactical Fighter Wing** — George AFB, Calif. (F-4E)
  - **37th Tactical Fighter Wing** — George AFB, Calif. (F-4/E/G)
- **832d Air Division** — Luke AFB, Ariz.
  - **58th Tactical Training Wing** — Luke AFB, Ariz. (F-16)
  - **405th Tactical Training Wing** — Luke AFB, Ariz. (F-15, F-5)
- **833d Air Division** — Holloman AFB, N. M.
  - **49th Tactical Fighter Wing** — Holloman AFB, N. M. (F-15)
  - **479th Tactical Training Wing** — Holloman AFB, N. M. (T-38)
- **836th Air Division** — Davis-Monthan AFB, Ariz.
  - **355th Tactical Training Wing** — Davis-Monthan AFB, Ariz. (A-10)
  - **602d Tactical Air Control Wing** — Davis-Monthan AFB, Ariz. (OA-37)
- **388th Tactical Fighter Wing** — Hill AFB, Utah (F-16)
- **27th Tactical Fighter Wing** — Cannon AFB, N. M. (F-111D)
- **366th Tactical Fighter Wing** — Mountain Home AFB, Idaho (F-111A, EF-111A)
- **474th Tactical Fighter Wing** — Nellis AFB, Nev. (F-16)
- **67th Tactical Reconnaissance Wing** — Bergstrom AFB, Tex. (RF-4C)

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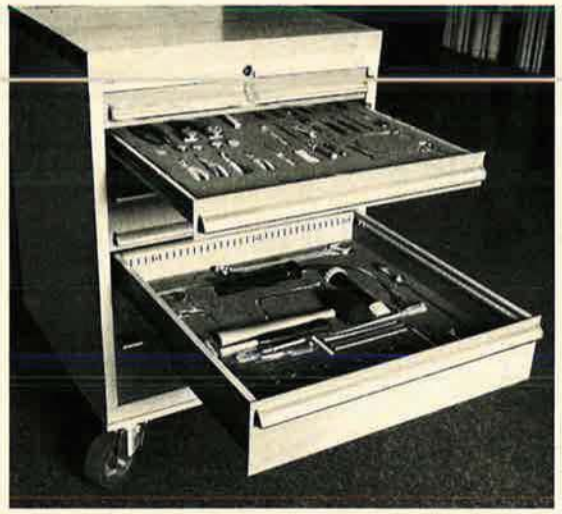

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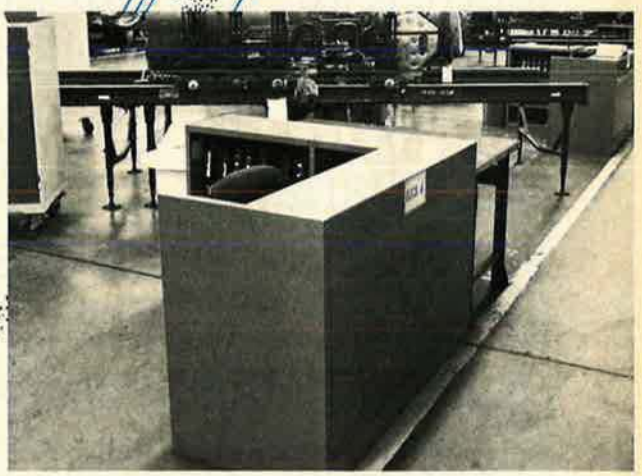

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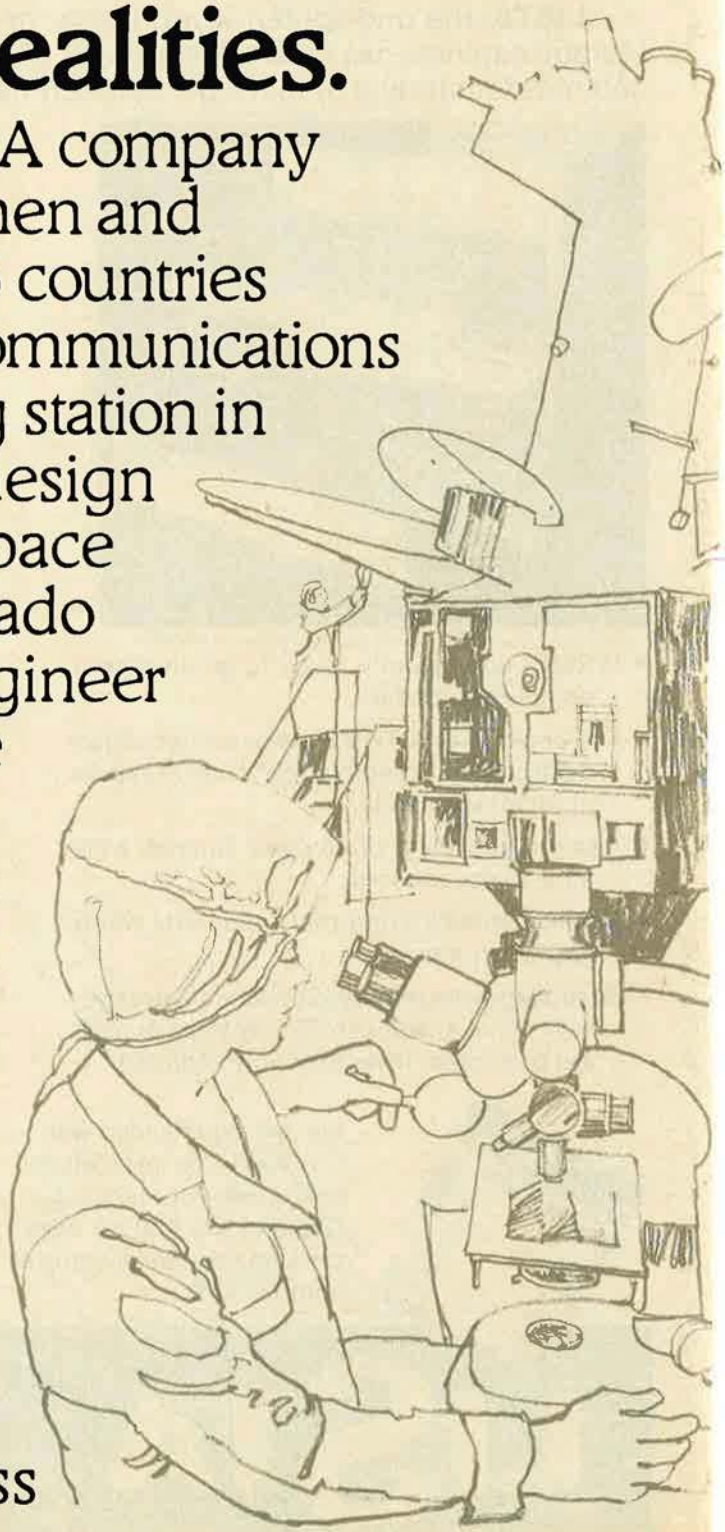

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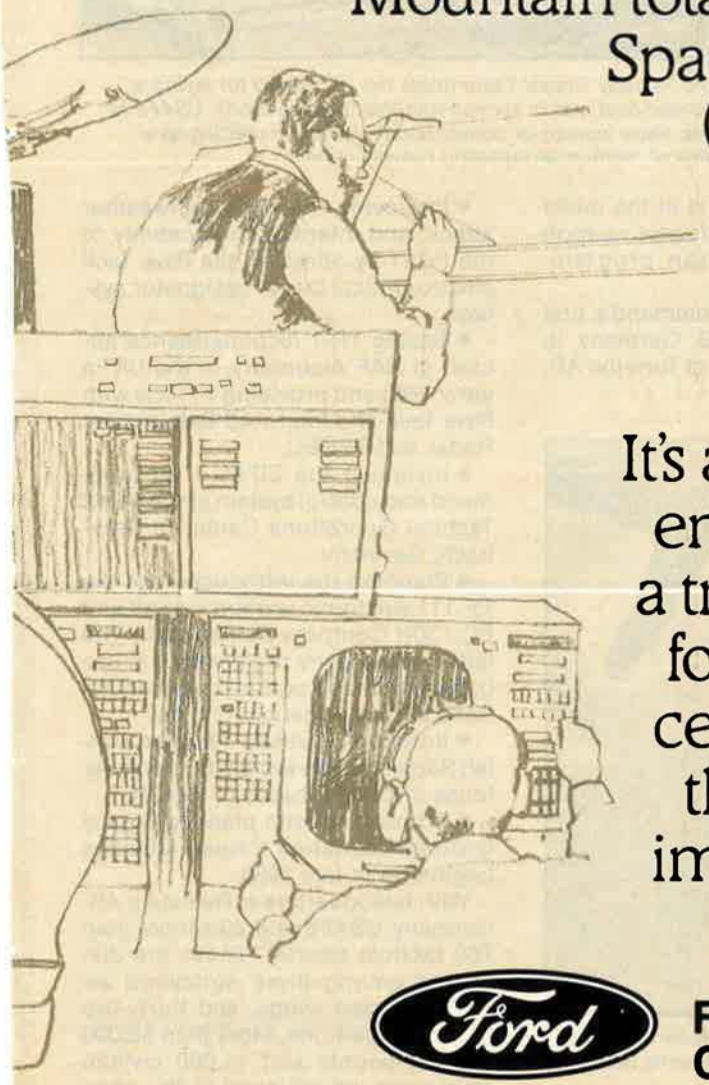

It's an attitude that has enabled us to establish a tradition of success for a quarter of a century; an attitude that does, in fact, make impossible dreams successful realities.

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Ford Aerospace & Communications Corporation

United States Air Forces in Europe

A MAJOR COMMAND

REALISTIC training plus modernization programs under way and on the drawing board in the US Air Forces in Europe (USAFE) underscore the command's continuing determination to improve its combat capability.

Outnumbered two to one by the Warsaw Pact air forces and facing major improvements in Soviet-built systems, USAFE takes its combat training seriously. Command aircrews regularly deploy to Spain, Italy, and Turkey to participate in weapons training. Air-to-air combat skills are honed at the Air Combat Maneuvering and Instrumentation Range in Decimomannu, Italy, while flying against the F-5 Aggressors simulating Soviet aircraft.

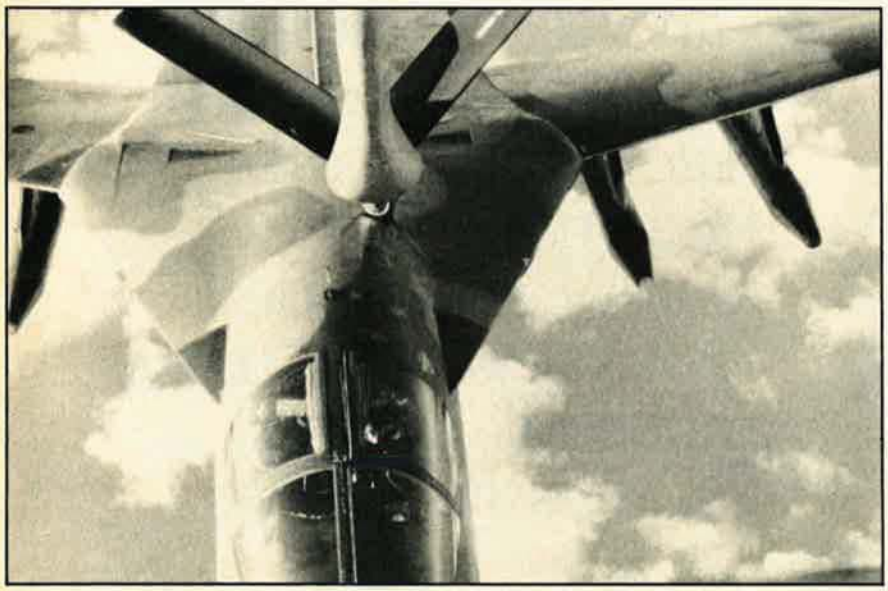
USAFE's entire combat force regularly trains in realistic local exercises and joins with allied aircrews in combined NATO exercises. During the Central Enterprise exercise in 1982, for instance, USAFE aircrews flew 1,330 sorties in three days with a ninety-four percent success rate. Aircrews also take part in Red Flag exercises and the NATO Tactical Leadership program.

The RAF Bentwaters Rapid Runway Repair Team holds the UK record for laying a fifty-four-foot by seventy-seven-foot mat in sixteen minutes, nine seconds. USAFE is testing the use of concrete slabs instead of conventional aluminum matting as a quicker and more economical method of repairing runway craters.

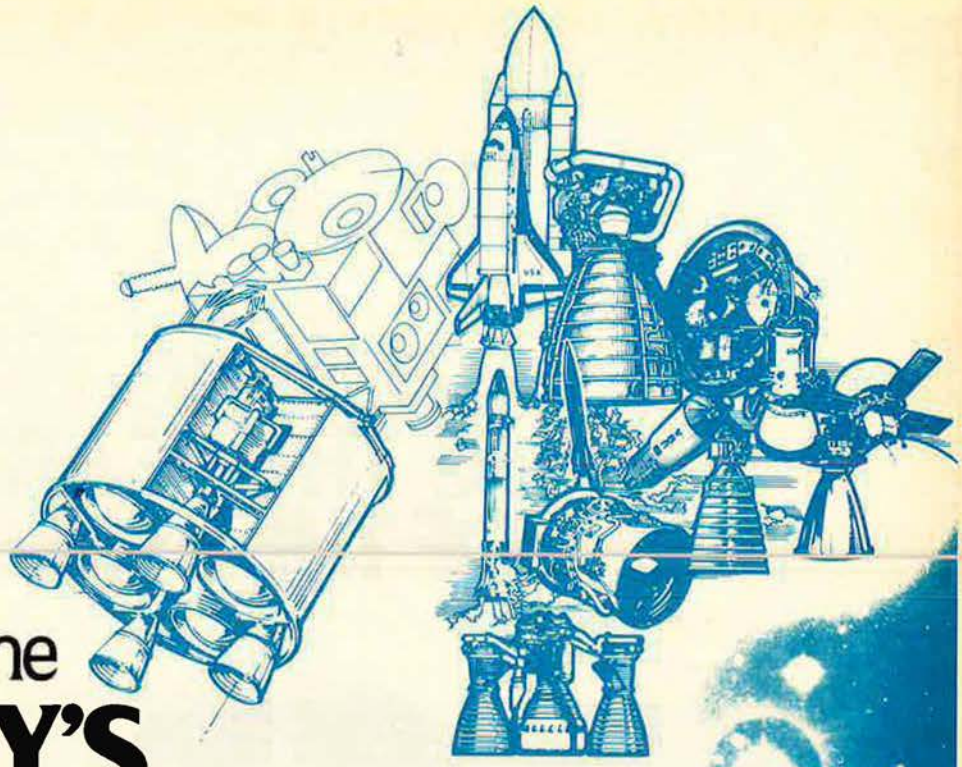
Meanwhile, USAFE is in the midst of a significant aircraft and weapon systems modernization program. These efforts include:

- Introducing the command's first F-16 wing at Hahn AB, Germany, in 1982 and basing F-16s at Torrejon AB, Spain, in 1983.
- Improving the night, all-weather attack, and interdiction capability of the F-111 by adopting the Pave Tack electro-optical target designator system.
- Basing TR-1 reconnaissance aircraft at RAF Alconbury in the UK in early 1983 and providing RF-4Cs with Pave Tack and Improved Sidelooking Radar and TEREC.
- Installing the EIFEL 1 air command and control system at the Allied Tactical Operations Center at Sembach, Germany.
- Planning the introduction of the EF-111 electronic warfare aircraft and EC-130H Compass Call aircraft. The latter would deny the enemy full use of his command control communications and intelligence (C^3I) net.
- Introducing in late 1983 the British Rapier missile system for point defense of USAFE bases in the UK.
- Proceeding with plans to deploy Ground-Launched Cruise Missiles beginning in late 1983.

With headquarters at Ramstein AB, Germany, USAFE operates more than 700 tactical aircraft. These are dispersed among three numbered air forces, fifteen wings, and thirty-five tactical squadrons. More than 58,000 military people and 11,000 civilian employees are assigned to the com-



An F-111E from the 20th Tactical Fighter Wing, RAF Upper Heyford, refuels above the North Sea. Most of the ninety-four E versions of the swingwing fighter serve with the 20th in the UK. (USAF photo by TSgt. Chris Christilaw)



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Avionics are the heart of the B-1B and the people at Boeing have the expertise and skill to do the job right. On every count, the B-1B is one of our country's best investments in peace.

BOEING

mand's operating area—more than 7,000,000 square miles from Norway to the Middle East.

USAFE's Commander in Chief, Gen. Billy M. Minter, also commands Allied Air Forces Central Europe. In wartime, he would command air units from the US, the United Kingdom, the Netherlands, Belgium, Canada, and West Germany.

During periods of increased world tension, USAFE and NATO would depend heavily on squadrons from the United States. More than 1,500 fighter aircraft would move to preassigned European bases within thirty days during a crisis. Thus, one of USAFE's top priorities is arranging for Collocated Operating Bases (COBs)—allied air fields for the augmenting forces to use in war. Seventy-three COBs have been identified.

Another continuing priority is the upgrading of USAFE's command control communications and intelligence capability—while expanding its ability to neutralize that of potential enemies.

Equally compelling is the need to provide protection against chemical warfare to offset the well-equipped and trained Soviet Union and Warsaw Pact military forces.

Recognizing the burgeoning threat from the East, USAFE Intelligence keeps a close watch on forces. Modern computers, enhanced communications, and hardened intelligence facilities mean that decision-makers are getting the right information at the right place and time.

To improve logistics, several new initiatives are under way. For example, aircraft support equipment is prepositioned with USAFE to avoid waiting for strategic airlift deliveries in wartime. Assets are stored at eighty-five different US and allied airfields in twelve NATO countries for use by augmenting forces from CONUS.

When established, the European distribution system will assure delivery of critical spare parts throughout Europe on small, turboprop cargo aircraft.

USAFE feels strongly that combat readiness begins and ends with people, and has made great strides in improving living, working, and recreation conditions throughout the command. Family Support Centers, for example, have been set up at three USAFE bases, and new chapel, high school, dormitory, and commissary facilities are being erected.

Modernization of services and facilities plus intensive, realistic training add up to an alert, combat-ready USAFE. ■

THE MAJOR OPERATING UNITS OF USAFE

Unit	*Location*	*Aircraft/Mission*
England		
10th Tactical Recon Wing	RAF Alconbury	RF-4, F-5, TR-1
20th Tactical Fighter Wing	RAF Upper Heyford	F-111
48th Tactical Fighter Wing	RAF Lakenheath	F-111
81st Tactical Fighter Wing	RAF Bentwaters/Woodbridge	A-10, MAC rescue HC-130, HH-53
501st Tactical Missile Wing	RAF Greenham Common	Support GLCM
513th Tactical Airlift Wing	RAF Mildenhall	MAC rotational C-130, SAC rotational KC-135
Det. 1, 10th Tactical Recon Wing	RAF Wethersfield	Support/civil engineer heavy repair squadron
7020th Air Base Group	RAF Fairford	SAC rotational KC-135
7274th Air Base Group	RAF Chicksands	Support and communications
Spain		
401st Tactical Fighter Wing	Torrejon AB	F-16
406th Tactical Fighter Tng. Wing	Zaragoza AB	Tactical range support, weapons training school, SAC rotational KC-135
Italy		
40th Tactical Group	Aviano AB	Rotational USAFE aircraft
487th Tactical Missile Wing	Comiso AS	Support GLCM
7275th Air Base Group	San Vito AS	Support and communications
Turkey		
Hq. TUSLOG	Ankara AS	Command and logistical management
39th Tactical Air Control Group	Incirlik AB	Rotational USAFE aircraft
7217th Air Base Group		
7241st Air Base Group	Izmir	Support of NATO units
Greece		
7206th Air Base Group	Hellenikon AB	Support and communications
7276th Air Base Group	Iraklion AS, Crete	Support and communications
The Netherlands		
32d Tactical Fighter Squadron	Camp New Amsterdam	F-15
Germany		
26th Tactical Recon Wing	Zweibrücken AB	RF-4
36th Tactical Fighter Wing	Bitburg AB	F-15
50th Tactical Fighter Wing	Hahn AB	F-16
52d Tactical Fighter Wing	Spangdahlem AB	F-4
86th Tactical Fighter Wing	Ramstein AB	F-4, MAC UH-1, T-39, C-140, C-12
600th Tactical Control Group	Hessisch-Oldendorf AS	Command control communications
601st Tactical Control Wing	Sembach AB	Command control communications, forward air control, OV-10, CH-53
7100th Air Base Group	Lindsey AS	Command control communications
7350th Air Base Group	Tempelhof Central Airport, Berlin	Support and communications
435th Tactical Airlift Wing (MAC)	Rhein-Main AB	MAC, C-9, C-130

UNITED STATES AIR FORCES IN EUROPE

Headquarters, Ramstein AB, Germany

Air Force Accounting and Finance Center

THE Air Force Accounting and Finance Center (AFAFC) at Lowry AFB, Colo., provides technical guidance and assistance to the worldwide network of about 110 Air Force Accounting and Finance Offices (AFOs). The Center provides accounting reports to Air Force managers, the Office of the Secretary of Defense, Congress, and other federal departments.

AFAFC also operates centralized functions to pay all military personnel as well as conducting billing, collecting, and trust-fund accounting for all DoD foreign military sales. In this regard, AFAFC develops and maintains systems to ensure that Air Force accounting and finance operations are efficient, smoothly integrate new technology, and comply with legislation.

The magnitude of AFAFC's mission is apparent when considering the number of people and amount of money involved in its operation. The Center's sixty officers, 175 enlisted people, and 2,100 civilians pay more than 1,200,000 USAF people, including the active force, Air Force Reserve, Air National Guard, retired members, and annuitants.

The Center accounts for all money appropriated to the Air Force by Congress and prepares reports on the use of these funds for financial managers throughout the government. AFAFC, through the Security Assistance Accounting Center (SAAC), also keeps the Pentagon and Congress informed on the financial status of the DoD Foreign Military Sales program and bills the countries to which sales are made.

In 1982, AFAFC established new programs, continued to improve the existing financial management system, and planned future actions to meet the needs of the Center's many customers. A few of the recent initiatives are:

- Installed the AMDAHL Computer in an interim action to upgrade existing processing capabilities. Action was also taken to obtain approval for new computers to double present capacity. The computers to be installed in September through October will satisfy requirements through FY '88.
- Preliminary test results of the Automated Travel Record/Accounting System indicate the new system provides better customer service, assures readable travel records, and provides greater protection against loss of important travel data. The new system provides on-line update and retrieval of individual travel records and the appropriate accounting records are updated at the same time the travel records are updated. An incremental Air Force-wide implementation is under way.
- Wage and tax statements (W-2 and W-2P) for active-duty, ANG, AFRES, retirees, and annuitants were centrally printed and distributed from the Center. The statements were produced on the laser printer at less cost and were far better in quality.
- Air Force retirees and annuitants now receive personalized customer service with the expansion of the retired pay technicians program. Technicians are now located at ninety bases in CONUS and overseas. Customers can update their records immediately.
- System testing of the new Joint Uniform Military Pay System (JUMPS) Data Collection System is almost completed. This project will place 115 minicomputers in the field to permit on-site transaction collection during the day, on-line transmission to AFAFC at night, and return of processed results to customers the following morning. Lowry AFB accounting and finance office was the first to receive the system with the installation phase continuing through 1985.
- Pursued adoption of the Flat Rate Per Diem procedures to eliminate many of the complicated procedures in the Joint Travel Regulations and delete requirements of many current receipts and statements. The project is currently being coordinated with the Air Staff and the Per Diem, Travel, and Transportation Allowance Committee.
- Improved the financial management of the $115 billion Foreign Military Sales Trust Fund program with an enhanced mechanized system providing more accurate and timely information.
- Established a Directorate of Program Development to manage the program development efforts of the Accounting and Finance Office of the Future (AFOOF), Departmental Online Accounting and Reporting System (DOLARS), Retiree/Annuitant Pay System (RAPS), and the Foreign Military Sales System (FMS). This will result in modernized systems to increase productivity and responsiveness.

While continually looking for ways to improve efficiency, productivity, and service to our customers—Air Force people—AFAFC takes pride in providing today's Air Force with the best in modern financial management. ■

AFAFC maintains 588,000 active-duty, 165,000 reserve, and 525,000 retiree and annuitant accounts on time and with a ninety-nine-plus percent accuracy record. (USAF photo by MSgt. Bill Boardman)

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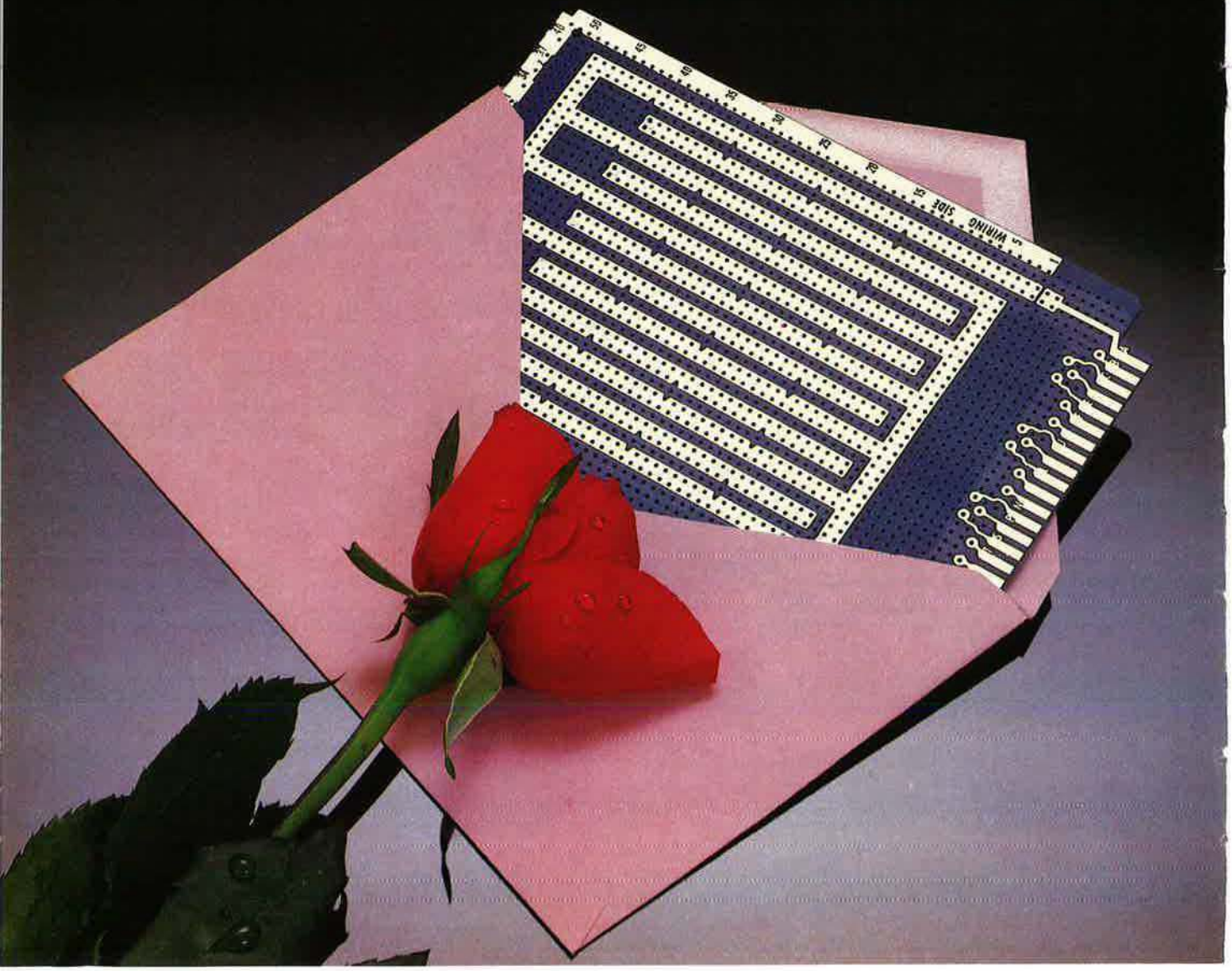


Air Force Audit Agency

THE Air Force Audit Agency (AFAA), a separate operating agency headquartered at Norton AFB, Calif., provides all levels of Air Force management with independent, objective, and constructive evaluations of the economy, effectiveness, and efficiency with which managerial responsibilities (financial, operations, and support) are carried out.

J. H. Stolarow, The Auditor General of the Air Force, reports to the Secretary of the Air Force and has direct access to the Chief of Staff. This enables AFAA to be independent of the activities and functions it audits. The Assistant Secretary of the Air Force (Financial Management) provides technical guidance and supervision on audit policy and management matters.

Col. Robert D. Reid, The Deputy Auditor General, is principal assistant to The Auditor General and also serves as the Commander, AFAA. Colonel Reid is stationed in the Pentagon, and acts for The Auditor General by performing those AFAA functions that cannot be economically performed by agency personnel located outside the Pentagon.

AFAA is comprised of three staff directorates (Operations, Plans, and Resource Management), and the following three line directorates:

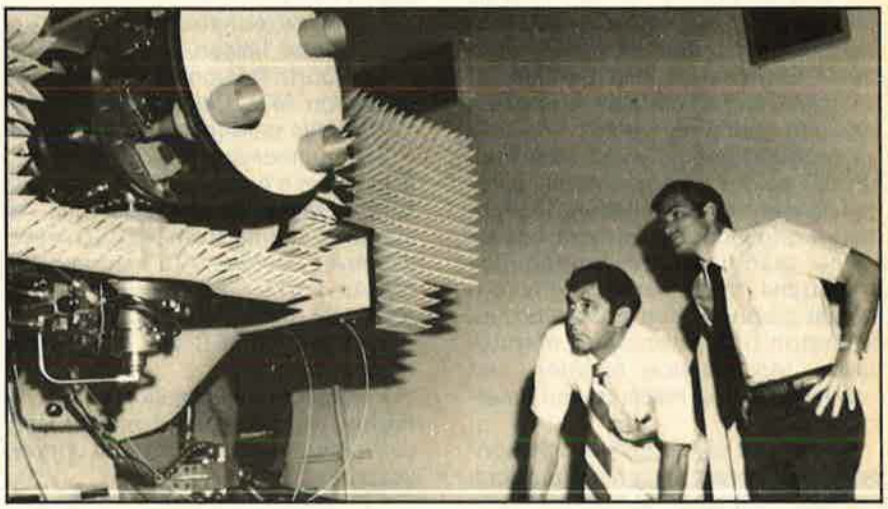
• **The Acquisition and Logistics Directorate,** located at Wright-Patterson AFB, Ohio, directs the development and management of audits relating to supply, maintenance, acquisition, and weapon systems. This directorate also manages and supervises installation-level audit work of eleven area audit offices located at Air Force Logistics Command and Air Force Systems Command installations.

• **The Forces and Support Management Directorate,** located at Norton AFB, Calif., directs the development and management of audits relating to personnel, nonappropriated fund instrumentalities, comptroller, automatic data processing, force readiness, and other support functions.

• **The Field Activities Directorate,** also at Norton AFB, manages installation-level audit work at sixty-seven area audit offices located on major Air Force installations. Supervision of the sixty-seven offices is exercised through five geographic region offices, which are located at Langley AFB, Va. (Eastern), Offutt AFB, Neb. (Central), McClellan AFB, Calif. (Western), Hickam AFB, Hawaii (Pacific), and Ramstein AB, Germany (European).

The agency has two basic procedures for reporting audit results to Air Force management. Audit reports containing the overall results of centrally directed audit efforts (*i.e.,* audits performed concurrently at several locations) are addressed to top major command and air staff management levels. Forty-six such reports were issued in FY '82. Reports of audit containing results of installation-level audits are addressed to local commanders. More than 1,400 installation-level reports were issued in FY '82.

The agency employs more than 1,000 people—approximately seventy-five percent of whom are civilians. Ninety-seven percent of the auditors have at least one college degree, forty percent also have graduate degrees, and forty-two percent are certified public accountants, internal auditors, or information system auditors. ■



Ron Fletcher and Alan Marshall, of the Eglin AFB Area Audit Office, examine missile test equipment at the Air Force Armament Laboratory.

Air Force Commissary Service

THE Air Force Commissary Service (AFCOMS) was activated in April 1976 and assumed operational control of all Air Force commissary stores in the following October. AFCOMS is a separate operating agency with headquarters at Kelly AFB, Tex. It's governed by a board of directors responsible to the Air Force Chief of Staff. The board is comprised of Air Force general officers and the Chief Master Sergeant of the Air Force. They provide direction to the AFCOMS Commander, Maj. Gen. George C. Lynch, for commissary operations and approve broad policies, plans, and programs.

General Lynch commands more than 8,000 civilian and 600 military men and women who operate 136 commissaries and 112 troop issue and subsistence functions in the US and overseas. Total sales in FY '82 were nearly $2.1 billion.

The commissaries are managed through fifteen Stateside complexes and two overseas regions—European and Pacific (including the Far East, Alaska, and Hawaii).

AFCOMS's primary mission is to support the troop issue and subsistence program; that is, it purchases and provides food for all authorized Air Force appropriated fund dining facilities. AFCOMS also works to reduce commissary operating costs, provide authorized patrons with food and household items at the lowest practical cost, and maintain a reli-

able, efficient management system. As required by law, it generates sufficient earnings through the surcharge program to pay for such operating expenses as paper bags, meat trays, utilities in CONUS, operating equipment, and construction costs.

Using surcharge dollars from 1976 to the present, thirty-five new Air Force commissaries have been constructed. Sixteen more in the US and ten overseas are under construction, being designed, or have been approved. New stores are bigger, more convenient, and energy efficient. Many feature full-service bakeries and delicatessens. Eighty-two existing stores have been renovated and eighty-one more renovation projects have been approved.

AFCOMS has a five-year plan to put scanning in nearly all of its CONUS stores and some facilities overseas. Scanning is the latest in patron-service technology. It uses low-energy laser beams to read universal product codes preprinted on food packaging. This reduces cashier errors, gives patrons a detailed receipt for their purchases, speeds up checkout, and provides a vital management information system. AFCOMS already has scanning in three Florida stores and is about to put scanning in Alaska, where cashier turnover is a problem.

AFCOMS continues to provide its patrons with an average of twenty-five percent savings on purchases by selling merchandise at cost. This is verified with local market-basket surveys twice each year. AFCOMS has an aggressive Patron Savings Program and is able to secure voluntary price reductions from vendors on both local and national levels. In 1981, the Patron Savings Program added more than $37.6 million to Air Force commissary shoppers' normal twenty-five percent savings. Shoppers also save more money using cents-off coupons. The face value of coupons redeemed in Air Force stores in 1982 was more than $13 million.

AFCOMS coordinates closely with the Air Force Auditor and the Office of Special Investigations to reduce potential for fraud, waste, and abuse. The command operates for the good of the commissary patron under the motto: "We Serve Where You Serve." ■

Air Force Engineering and Services Center

THE Air Force Engineering and Services Center (AFESC) is a focus for many worldwide engineering and services activities. AFESC has a dual function: a policy development role in support of the Directorate of Engineering and Services at Hq. USAF, and an assistance role as a separate operating agency.

Headquartered at Tyndall AFB, Fla., AFESC guides and assists all commands and their installations in eight daily worldwide concerns of the Air Force: readiness and contingency operations, facility energy, environmental planning, fire protection, installation operations and maintenance, food service, billeting, and civil-engineering research and development.

While most of AFESC's 925 personnel are stationed at its headquarters, the rest are located at four Air Force Regional Civil Engineering Offices and at numerous operating locations.

The Regional Civil Engineers in Atlanta, Dallas, and San Francisco provide Air Force, AFRES, and ANG units in their respective areas with expertise in military construction, housing design and construction, and environmental liaison and assistance. The fourth Regional Civil Engineer, at Norton AFB, Calif., is responsible for ballistic missile support facilities.

The flagship of the Air Force fire protection fleet, the P-15, packs two 430-hp diesel engines and weighs more than sixty-five tons.

The number-one priority at AFESC is building a better Air Force through service, research, and assistance. Assistance teams from AFESC travel wherever necessary to help improve the Air Force—from dining halls to electrical generators to runways.

Last year, AFESC and its traveling teams:

- Recommended policy to aim Air Force facilities toward energy self-sufficiency and security in coming years.
- Developed guidance to identify past hazardous waste disposal sites on Air Force installations.
- Influenced Air Force policy to program construction costs to balance risk and have adequate management reserves for unknown contingencies.
- Completed a two-year study of Air Force civil-engineering wartime manpower needs—the first of its kind to take a long-term look at the manpower requirements of a support area.
- Tested the feasibility of a management information system to improve operation of enlisted dining-hall facilities worldwide.
- Issued guidance concerning rapid runway repair procedures for bomb-damaged runways utilizing crushed stone and fiberglass-reinforced polyester covers.
- Developed a system to remove trichloroethylene and other volatile organics efficiently from contaminated groundwater.
- Evaluated airfield pavements at more than forty US and allied air bases as part of its program to provide expertise and guidance for the design, construction, and maintenance of all Air Force runways, taxiways, and other pavements.
- Continued a comprehensive worldwide corrosion prevention program, including field evaluations of selected base utility systems.
- Coordinated seventy-four deployments of base-engineer emergency force teams, as well as deploying more than 900 active and Reserve force engineering and services personnel in support of facility requirements, exercises, and foreign military sales programs.
- In cooperation with other DoD components, developed a purchase description for acquiring a new crash-rescue vehicle—the first DoD buy in fire vehicles.
- Developed a complex civil-engineering information management system in forty-six work days utilizing state-of-the-art program generation techniques with civilian engineering personnel.

AFESC continually develops initiatives to improve the daily operation of the Air Force. ■

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Air Force Inspection and Safety Center

THE Air Force Inspection and Safety Center (AFISC), Norton AFB, Calif., provides the Secretary of the Air Force, the Chief of Staff, and major command and separate operating agency commanders an assessment of Air Force fighting capability and resource management effectiveness. Maj. Gen. Gerald D. Larson commands AFISC and is also the Deputy Inspector General for Inspection and Safety, Hq. USAF.

AFISC has an assigned work force of 359 military and 140 civilian personnel, representing sixty-six Air Force specialties. It is divided into four directorates and three offices.

• **The Directorate of Inspection** determines operational readiness status within the major commands by monitoring their Operational Readiness Inspection (ORI) reports and by conducting Over-the-Shoulder Inspections of command IG teams during ORIs. The Directorate also evaluates the effectiveness and efficiency of USAF management systems through Functional Management Inspections (FMIs), System Acquisition Management Inspections (SAMIs), and Follow-up Inspections. In November, the Center hosted the 1982 USAF Worldwide Inspection Conference. This event was attended by major command, separate operating agency, and direct reporting unit inspectors general and directors of inspection.

• **The Directorate of Aerospace Safety** develops and monitors USAF mishap prevention programs in all areas of flight, ground, missile, and explosives safety. The Directorate also administers the mishap reporting system established by DoD and studies mishap trends to identify areas with a high payoff in prevention. The Center announced recently that 1982 was the best year ever in the area of flying safety.

• **The Directorate of Medical Inspection** plans and conducts an Air Force and Air Reserve Forces medical inspection program to ensure efficient and effective management of health-care resources. At the request of Congress in 1982, the Inspector General directed a comprehensive review and evaluation of the Air Force Health Care System to be conducted by the Directorate. A detailed report of this study was later presented to Congress.

• **The Directorate of Nuclear Surety** at Kirtland AFB, N. M., evaluates nuclear safety features and procedures for new or newly modified weapon systems. The Directorate also develops the safety rules that govern all operations with a particular weapon system. In conjunction with the USAF Nuclear Weapon System Safety Group, the Directorate completed during the past year the Initial Safety Study for the Peacekeeper (MX) missile.

• **The Office of the Assistant for Inquiries and Complaints** processes cases referred to the Air Force Inspector General for resolution and has functional responsibility for operation of the IG Computerized Complaints Data Collection System. This office serves as the focal point within the Air Force for determining the releasability under the Freedom of Information/Privacy Act of Investigations and Inquiries Requested, conducted as the result of involvement by the Inspector General.

• **The Office of Management Support** manages manpower, personnel, budget, and administrative services for the Center and monitors major command and Air Force inspection schedules and activities.

• **The Office of Data Automation** provides the commander and his staff with automated data processing and data systems support. ■

Air Force Intelligence Service

THE mission of the Air Force Intelligence Service is to provide intelligence services and information to Hq. USAF and Air Force commanders worldwide.

The National Security Act of 1947, as amended, authorizes the Air Force to collect, evaluate, correlate, and disseminate departmental intelligence. DoD directives call for the Air Force to provide an organization capable of furnishing adequate, timely, and reliable intelligence for Defense Department use.

In 1971, the Secretary of the Air Force directed the realignment of Air Staff operating and support functions to other organizations. As a means of continuing the original intelligence mission, the Air Force Intelligence Service was established on June 27, 1972, as a separate operating agency with headquarters in Washington, D. C., to provide specialized services to Hq. USAF and USAF commanders.

Air Force Intelligence Service supports Air Force planning and combat operations, responding to changing intelligence requirements. Its activities include:

• **Operational Intelligence Directorate** provides USAF with all-source intelligence affecting Air Force policies, resources, force deployment and employment, indications and warning, intelligence analysis of current operations, and special intelligence research. The Directorate provides experts on photo-research and evaluations; and ensures that the Secretary of the Air Force, the Chief of Staff, and key Air Staff officers receive the timely and accurate intelligence necessary to assess critical situations in world crises.

• **Target Intelligence Directorate** plans, coordinates, and exercises managerial control of target intelligence to include weaponeering, target analysis, force application, and missions planning; target materials; mapping, charting, and geodesy; and program monitor on service support and MC&G to the Defense Mapping Agency.

• **Security and Communications Management Directorate** oversees the worldwide Air Force Special Security Office and Special Activities Office and ensures compliance with security policies that cover special intelligence and intelligence telecommunications.

• **Intelligence Data Management Directorate** plans, coordinates, and exercises managerial control of worldwide Air Force intelligence data handling systems.

• **Attaché Affairs Directorate** supports the Defense Attaché System and monitors all matters concerning Air Force participation in that program.

• **Intelligence Reserve Forces Directorate** manages the Air Force In-

telligence Service's Intelligence Reserve program. Responsibilities include the recruitment, administration, readiness training, and operational utilization of more than 1,200 assigned and attached mobilization augmentees in support of active forces, peacetime requirements, and contingency missions. The Directorate also develops, reviews, and revises programs, plans, and operations documents affecting the Air Force Intelligence Service's Intelligence Reserve program.

• **Soviet Affairs Directorate** conducts the Air Force's Soviet Awareness Program, consisting of the "Soviet Military Thought and Studies in Communist Affairs" books series, *Soviet Press Selected Translations* periodical, internal publications, the Soviet Military Power Week, Soviet Awareness Team, and the Soviet Military Literature Research facility.

• **Evasion and Escape/Prisoner of War Matters Directorate** provides centralized management and cohesive direction to all aspects of intelligence support of evasion and escape/prisoner of war matters and serves as the action office for DoD code-of-conduct training.

• **Special Studies Division** provides all-source analysis, reporting, and intelligence on foreign concealment, camouflage, and deception activities.

• **Air Force Special Activities Center** provides centralized management over all the Air Force activities involved in the collection of information from human resources. Major subordinate units of the Center are located in Air Force European and Pacific commands.

Air Force Intelligence Service participates in a number of joint and Air Force training exercises each year to improve the readiness of active-duty and Air Force Reserve intelligence personnel. ■

Air Force Legal Services Center

AIR Force Legal Services Center (AFLSC), with headquarters in Washington, D. C., provides Air Force-wide legal services in military justice, claims for and against the Air Force, tort litigation, general litigation, labor law, preventive law, and legal aid.

The Center also handles all Air Force patents, copyrights, and other property matters, and is responsible for providing the trial officials for general or special courts-martial and reviewing trial results. The joint-service Federal Legal Information Through Electronics organization is managed by the Legal Services Center.

Maj. Gen. Thomas G. Bruton, The Judge Advocate General, serves in a dual role as the Commander of AFLSC, in addition to his duties as The Judge Advocate General of the Air Force. About 600 people are assigned to the Center, staffing legal offices in Washington, D. C., and at virtually every Air Force installation in the world.

Several divisions of AFLSC administer or manage a variety of military justice functions.

• **Court of Military Review** reviews all courts-martial resulting in dismissal, confinement of one year or more, or dishonorable/bad conduct discharges. Decisions made by the Court of Military Review are appealable to the US Court of Military Appeals. The Court of Military Review is located in Washington, D. C.

• **Military Justice Division** reviews those records of trial by general court-martial not required to be reviewed by the Court of Military Review. It advises The Judge Advocate General on petitions for new trial or for relief from conviction, and directs the travel of overseas witnesses required to appear in courts-martial in CONUS. The division prepares regulations, manuals, and policy letters relating to the administration of military justice. A particular service is the preparation of responses to high-level inquiries concerning military justice matters.

• **Defense Services Division** provides defense services to Air Force members appearing before the Court of Military Review and the US Court of Military Appeals.

• **Trial Judiciary Division** oversees seven judiciary circuits and three subordinate districts throughout the world. The Chief Judge of each circuit is responsible for supervising the military judges and court administrators of that circuit. All Air Force judges are assigned to Air Force Legal Services Center to ensure independence from local commanders.

• **Government Trial and Appellate Counsel Division** represents USAF before the Air Force Court of Military Review and the US Court of Military Appeals. This division also supervises the twenty-two full-time Circuit Trial Counsels who prosecute most general and some special courts-martial.

• **Special Assistant for Clemency and Rehabilitation Matters** recommends appropriate clemency actions including reduction in sentence, change in place of confinement, or substitution of administrative discharge for selected court-martial convictions. The Assistant responds to all congressional, executive, and individual correspondence dealing with confinement, clemency, and post-trial matters.

• **Claims and Tort Litigation Staff** performs both operational and management functions over claims and tort litigation arising from Air Force activities worldwide. It settles or recommends settlement of certain claims above the base level authority and provides litigation support to the Department of Justice in defending Air Force tort suits.

• **General Litigation Division** protects the Air Force interests in all domestic litigation except for copyright and patent cases, and cases arising under the Federal Tort Claims Act. These actions are concentrated in five areas: information, privacy, and personal torts; personnel matters (retirement, pay and allowance rights of Air Force military and civilian personnel including individual or class discrimination); contracts (litigation brought by contractors for money damages, injunctions against award of con-

Headquartered in Washington, D. C., AFLSC has representatives at almost every Air Force installation. Here, a Legal Services officer reviews text.

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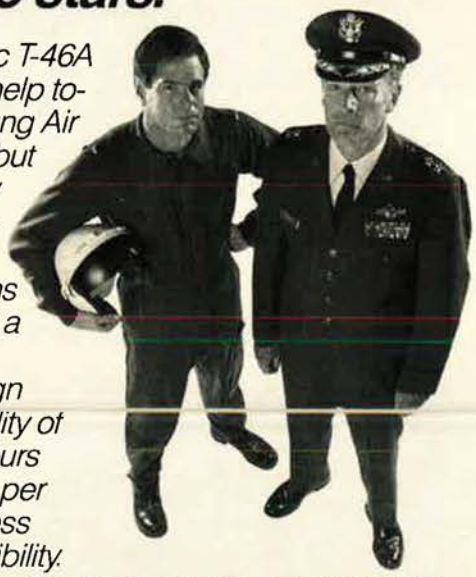

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AFLSC's Patents Division provides direction, control, and coordination of invention, patent copyright, trademark, trade secret, and rights in technical data matters for the Air Force.

The Preventive Law and Legal Assistance Office supervises the worldwide Air Force preventive law and legal assistance program through which installation legal offices assist Air Force members with their legal affairs. In 1982, about 500,000 clients were advised in about 1,100,000 different personal civil matters. ■

Air Force Manpower and Personnel Center

THE Air Force Manpower and Personnel Center (AFMPC) manages "people" programs affecting the lives of more than half a million Air Force men and women. The AFMPC mission is concisely stated in the Center's motto: "Responsive to the Mission—Sensitive to the People." AFMPC's mission is to help ensure readiness to put superior combat and combat support forces in the right places at the right times.

Highly trained, motivated, and dedicated people are essential to readiness, and AFMPC's primary mission is to support Air Force combat forces and staff agencies. Yet, within that objective, AFMPC personnel are responsive to the personal and career needs of individual Air Force people.

AFMPC is a separate operating agency, located at Randolph AFB, Tex. The Commander also serves as Assistant DCS, Manpower and Personnel for Military Personnel, Hq. USAF.

AFMPC is organized into directorates, assistants for specialized functions, and specialized offices. For many Air Force people, AFMPC is synonymous with assignments and promotions, yet its responsibilities cover a broad range of activities in personnel management and maintaining the quality of Air Force life.

The Center manages the assignments of all personnel in the grade of colonel and below. Officers and NCOs from various career fields work closely with personnel specialists to balance Air Force requirements with individual career progression.

Selection boards hosted by the Center range from promotion boards for officers and senior and chief master sergeants to such career development boards as the Air Force Institute of Technology and professional military education, and such recognition programs as the Twelve Outstanding Airmen of the Year.

Enlisted promotion programs administered by AFMPC include the Weighted Airman Promotion System (WAPS) and the Stripes for Exceptional Performers program. Center personnel are making a concerted effort to improve personnel quality, developing more than fifty initiatives, including the Commanders Enlisted Management Roster, to help commanders manage their people.

AFMPC's role in the lives of Air Force people extends to retraining, reenlistment, separations, retirements, survivor assistance, mortuary affairs, awards and decorations, physical fitness, dress and personal appearance, the Air Force Social Actions and Suggestion programs, Air Force Assistance Fund and Aid Society operations, and voting assistance. The Center works closely with Air Force Recruiting Service and Air Training Command to acquire and train the numbers and types of people the Air Force needs.

Retaining quality people is one of the Center's most important tasks. Numerous compensation and retention initiatives were conceived or supported by reports, analyses, and field visits by Center personnel. Such initiatives as Command Days, focusing on command-unique personnel issues, and Personnel Management Team visits to bases worldwide have greatly contributed to a better understanding of those issues. AFMPC also operates the worldwide Retention Hotline. Ten overseas regional hotlines use a biweekly script prepared at the Center.

The Center is the focal point for morale, welfare, and recreation activities such as open messes, libraries, sports and youth programs, arts, crafts, hobbies, and child-care centers. This is the second year of "Life. Be In It."—a program designed to increase participation in a wide range of leisure and recreational activities.

The entire personnel network is linked together in a worldwide, soon-to-be-modernized computer system, providing current information on almost every personnel action, twenty-four hours a day. The Center recently procured mobile, minicomputer personnel support vans (PERSCO) to provide essential computer support to units deployed on contingency operations.

The Office of Civilian Personnel Operations and the Air Force Management Engineering Agency are administratively assigned to AFMPC, although these activities receive technical guidance and direction from the Air Staff. ■

Air Force Medical Service Center

THE Air Force Medical Service Center (AFMSC) is a separate operating agency with headquarters at Brooks AFB, Tex. The Center was established July 1, 1978, and became operational on October 1 of that year. The AFMSC Commander also serves as Deputy Surgeon General for Operations.

AFMSC assists the Air Force Surgeon General in developing policies and practices concerning routine and emergency health care in peace and war. The Center acts as the Air Force Surgeon General's agent for implementing health-care policies, studies, and management and administrative research.

AFMSC has two directorates, with the Health Care Support Directorate the larger of the two. It develops plans and procedures to ensure that needed medical facilities are available; that required medical supplies and material are provided; that patient affairs, including medical records and statistics, are properly managed; and that information management systems are developed and implemented.

The other directorate, Professional Services Directorate, is involved in programs associated with the practice of medicine in the Air Force, including clinical, flight, and preventive medicine, and professional specialties associated with these areas.

This Directorate is also responsible for the USAF Radioisotope Committee that coordinates all administrative and regulatory aspects of licensing, possession, use, storage, handling, and disposal of all radioactive material in the Air Force. This committee also acts as the Air Force point of contact with the United States Nuclear Regulatory Commission on licensing matters.

AFMSC assists the Air Force Surgeon General in developing policies and practices for routine and emergency health care in peace and war.

Within the Professional Service Directorate is the Consumer Health Education Division, which works primarily in three areas of health education: community, outpatient, and inpatient.

AFMSC is directly involved on a daily basis with the Air Force Surgeon General, other Air Staff directorates, major commands, and other federal agencies. A continuing interchange is required as policy and practices for medical support are developed and implemented. ■

Air Force Office of Security Police

THE Air Force Office of Security Police (AFOSP) at Kirtland AFB, N. M., was established as a separate operating agency on September 1, 1979. The Commander, Brig. Gen. P. Neal Scheidel, also serves as the Air Force Chief of Security Police. In both capacities, he is responsible to The Inspector General, Hq. USAF.

A staff of thirty-four officers, twenty-four enlisted, and seventeen civilians is assigned to Kirtland; an additional forty-five people are part of the Air Force Security Clearance Office, an operating location in Washington, D. C.

AFOSP develops the operational policy, criteria, and standards for security of Air Force resources and classified information and monitors implementation. AFOSP oversees Air Force IG-approved programs, including: the security of operational combat resources (aircraft, missiles, nuclear and nonnuclear munitions); presidential aircraft security; protection of vital C^3 facilities; air base defense; management of security police personnel and training; systems and equipment programs; information, personnel, industrial, and wartime information security programs; maintenance of law and order; prisoner rehabilitation and corrections programs; vehicle traffic management; and the military working dog program.

AFOSP accomplishments during the past year include:

Air Base Ground Defense is becoming the primary wartime mission of the security police. AFOSP is maintaining an aggressive approach to the development of a ground defense program that will enhance air base survivability and contribute to sortie generation. Ground defense doctrine was redesigned to implement the distributed area concept of defense, and the acquisition of specialized equipment has been programmed. A critical defense mission of the security police is the protection of the dispersed Ground-Launched Cruise Missile (GLCM). The first GLCM flight has been deployed in field conditions for its final defense procedures test.

General Scheidel was appointed to serve as Vice Chairman of the recently formed Air Force Steering Committee on DoD Cooperation with Civilian Law Enforcement Agencies.

AFOSP sponsored the second annual Worldwide Security Police Combat Competition, "Peacekeeper Challenge," designed to test and evaluate security police in their wartime and peacetime tasks. The RAF Regiment, AFRES, ANG, and the major commands participated in the week-long competition.

A program was also developed by AFOSP to enhance security of Priority B, C, and nonpriority resources at high-threat bases in CONUS and overseas.

Automation of personnel security data continued to remain a high priority. Integration of civilian records into the Automated Security Clearance Approval System (ASCAS) became a reality. When reconciliation of automated and manual records is completed, civilian security data will automatically flow through ASCAS, as has been the case for military personnel.

AFOSP initiated a complete rejuvenation of the Industrial Security Program. This action resulted in closer rapport with the Defense Investigative Service (DIS), other military departments, and various governmental agencies.

AFOSP secured the appointment of the first Air Force Security Police Automatic Data Processing Manager and developed the first Air Force Standard Security Police Automation System, consisting of microcomputers interfaced with base-level equipment and a worldwide network. ■

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Air Force Office of Special Investigations

THE Air Force Office of Special Investigations (AFOSI), which celebrated its thirty-fifth anniversary on August 1, 1982, has the primary mission of providing major investigative services to Air Force commanders.

More than 2,600 AFOSI special agents, Reservists, and support personnel, stationed at almost every Air Force installation in the world, gather the facts that Air Force commanders need to take judicial or administrative action in cases of fraudulent or criminal activity.

Seasoned AFOSI special agents are specialists in forensic sciences, technical services, polygraph, fraud and criminal investigations, counterintelligence, antiterrorist operations, and personal protective services. AFOSI newcomers are highly qualified volunteers who attend a twelve-week basic course conducted at the US Air Force Special Investigations Academy at Bolling AFB, D. C., where AFOSI is headquartered.

Commanded by Brig. Gen. Richard S. Beyea, Jr., AFOSI aggressively pursues programs to identify potential fraudulent and criminal activity.

More than fifty-five percent of AFOSI's efforts are devoted to criminal investigations, with the most frequent involving drug abuse. Others include investigations of crimes against the Air Force, its members, or their property, ranging from housebreaking to homicide. Agents use a variety of special investigative techniques, including polygraph tests, forensic hypnosis, and forensic science.

About thirty percent of AFOSI's activities deal with fraud. These violations of public trust involve Air Force contracting, appropriated and nonappropriated funds, computer system misuse, pay and allowance matters, acquiring and disposing of Air Force property, and major administrative irregularities.

Because of the potential for computer-related crimes in the Air Force, AFOSI is developing a new Computer Crime Investigative Assistance Program. AFOSI is also expanding methods of using computers as investigative tools.

As a result of AFOSI probes into fraudulent and criminal activities, the Air Force recouped $9.5 million in recoveries and fines during 1982. This included recovering $6.6 million in government supplies, equipment, and restitutions, and $2.9 million in fines resulting from judicial and nonjudicial actions.

The AFOSI counterintelligence mission is designed to counter threats to Air Force security posed by hostile intelligence services and terrorist groups. The command accomplishes this by managing offensive and defensive activities to detect, neutralize, and destroy the effectiveness of hostile intelligence services. This includes investigating espionage, providing personal protective services to senior Air Force and other US officials, and supervising an extensive antiterrorist program.

The incidents of terrorist activities directed against Air Force people declined in 1982. This may have been the result, in part, of timely actions taken by AFOSI in initiating a wide range of offensive and defensive measures.

AFOSI is increasing its wartime readiness posture by participating in Joint Chiefs of Staff and major command exercises to ensure that its special agents are prepared to support combat commanders.

AFOSI exists solely to serve Air Force commanders and better enable them to accomplish their assigned missions. ■

TSgt. Bob Madsen works with a video console in reviewing evidence used in trials resulting from AFOSI investigations. Video products also include training tapes.

Air Force Operational Test and Evaluation Center

THE Air Force Operational Test and Evaluation Center is headquartered at Kirtland AFB, N. M. Maj. Gen. Richard W. Phillips, Jr., is its Commander. The Center recently added the term "operational" to its former name to describe its function more accurately. The recent dispersal evaluation of the Ground-Launched Cruise Missile (GLCM) system is an example of that function.

Three days after Christmas 1982, an Air Force convoy of forty-two vehicles left the US Army's Dugway Proving Ground, Utah. Three and a half days and almost a thousand miles later, the convoy, containing a GLCM flight of two launch-control centers, four transporter-erector-launchers, and various support vehicles, arrived at McChord AFB, Wash.

From McChord, the flight moved to adjacent Fort Lewis and spent the next seven days operating in the field

under simulated wartime conditions. Aggressor forces probed the unit's perimeters. Tactical reconnaissance aircraft flew recce missions trying to discover the unit's locations, which were changed often. Camouflage techniques and camp establishment/breakdown/relocation contributed to the learning experience as well as to the testing of equipment and procedures.

The dispersal evaluation was one of about seventy-five such tests and evaluations in which the Center is involved at any given time. It was typical in that the system was a preproduction prototype being tested in the environment in which it will function when operational (*e.g.*, the climate of northwest Washington is similar to that found in Europe where the GLCM will be deployed).

In conducting such evaluations, the Center accomplishes its mission of planning, executing, and reporting on the operational test and evaluation of new Air Force systems as they flow through the acquisition process. The Center provides that vital link between developer and user by independently assessing and reporting how well a system will meet stated operational requirements.

The GLCM test was also typical in that key team management positions were filled by Center personnel; the remainder of the test team came primarily from TAC and USAFE units. Those individuals, with the experience gained during the test, will become the cadre of trained personnel to establish the first operational units. ATC and AFLC personnel also participated so that training and logistical requirements could be assessed firsthand. Training syllabuses and logistic procedures can then be designed to meet those requirements.

Just as operational testing runs the gamut from aircraft to missiles to communications to space systems, so do the backgrounds of the personnel assigned to accomplish it. Technical backgrounds and prior experience are common denominators of the personnel permanently assigned to the five major directorates within the headquarters, its four detachments (at Kapaun AS, Germany; Eglin AFB, Fla.; Nellis AFB, Nev.; and Edwards AFB, Calif.), and approximately twenty-eight operating locations throughout the world.

The headquarters structure supports the test teams that comprise the Center's operating force. Because its test teams are composed mainly of personnel from the operating commands, the Center's authorized strength is limited to 638 for FY '83.

Reports of testing, such as those produced as a result of the GLCM evaluation, provide decision-makers a realistic assessment of operational capability of the system. The Center's unique role in the acquisition of new Air Force systems is to ensure that those systems meet the operational need and contribute to the readiness, effectiveness, and sustainability of our fighting forces. ■

The Operational Test and Evaluation Center began testing a reengined Stratotanker—designated the KC-135R—at McConnell AFB, Kan., this past April. The aircraft's elongated nose contains a test instrumentation package. (USAF photo)

Air Force Service Information and News Center

THE Air Force Service Information and News Center (AFSINC) has its headquarters at Kelly AFB, Tex. This separate operating agency, commanded by Col. Roger L. Williams, informs Air Force members, their families, and the public about Air Force missions, aerospace systems, people, and activities.

AFSINC was activated June 1, 1978. The Air Force Hometown News Center, formerly at Tinker AFB, Okla., joined the Center in June 1979; and the Army Hometown News Center, previously at Kansas City, Mo., joined in October 1980. The Center's Armed Forces Radio and Television Division became a directorate in 1980. In 1981, the Orientation Group, United States Air Force, was assigned to the Center for support purposes.

During 1982, the Center produced and provided an array of information services. Print and broadcast media products were provided directly to Air Force personnel, civilian employees, commanders and their public affairs specialists, and news media worldwide. AFSINC, responsible to the Department of the Air Force through the Director of Public Affairs for the Office of the Secretary of the Air Force, has four directorates—Internal Information, Army and Air Force Hometown News, Armed Forces Radio and Television, and Administration and Resources.

• **The Directorate of Internal Information** is responsible for the Air Force's internal information program. It provides products and services to keep Air Force people informed about Air Force, Department of Defense, and national policies, decisions, and actions.

Printed products include *Airman* magazine, the Air Force Policy Letter for Commanders, Air Force News Service for base newspapers, fact sheets on Air Force subjects, biographies of general officers, and Take-home News for family communication. Audiovisual products include *Air Force Now* films, the Lithograph series, and Air Force Weekly overseas radio programs.

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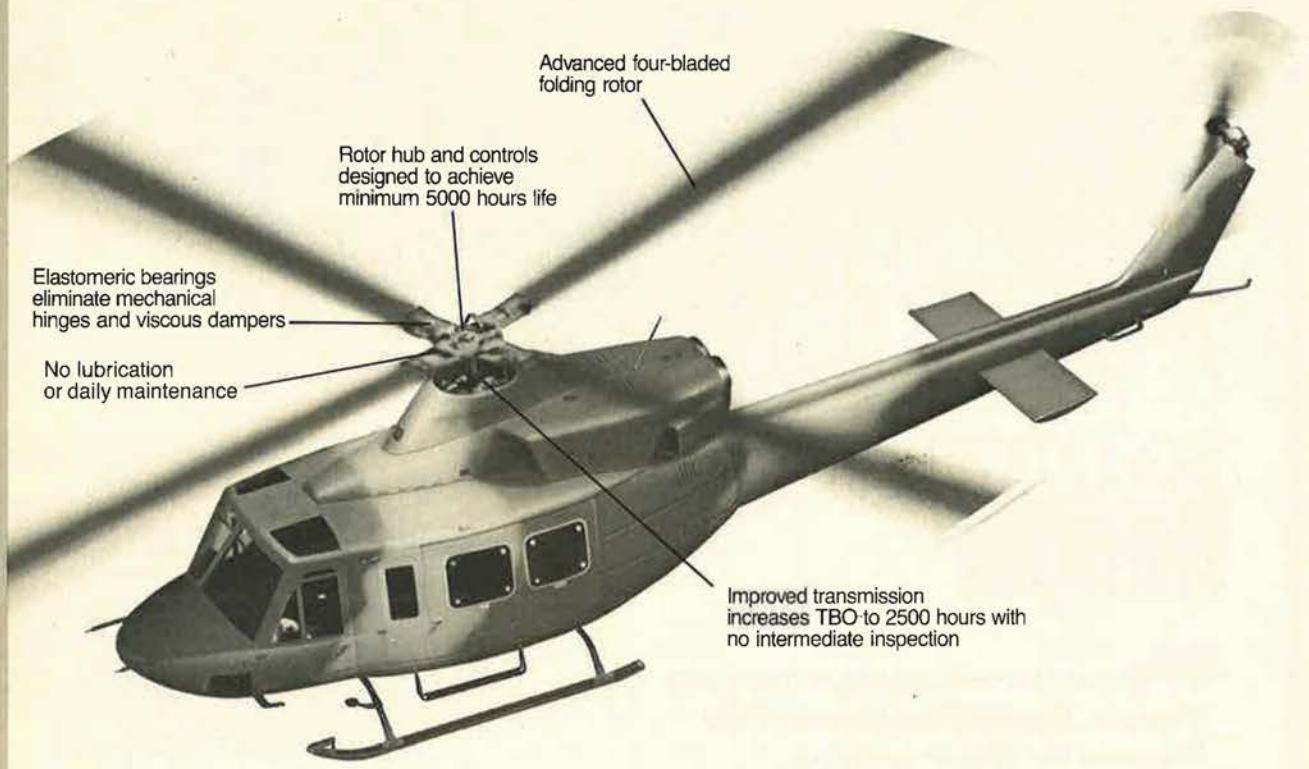

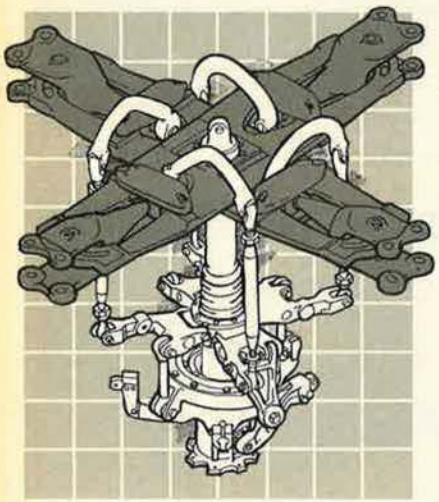

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Force Hometown News provides news of the achievements and activities of individual soldiers and airmen to their hometown newspapers and broadcast media. An Army television team and an Air Force radio branch produce broadcast interviews for their respective services. These are furnished to commercial radio and television stations. Together with feature articles accompanied by photos, the Directorate's products give well-rounded personal coverage in service members' home communities.

• **The Directorate of Armed Forces Radio and Television** manages and operationally controls all Air Force broadcast outlets in Europe, Alaska, Greenland, the Middle East, and the Pacific area. The Directorate coordinates with DoD and other military departments on matters of joint interest and is also the point of contact for Air Force activities seeking counsel on armed forces radio and television matters.

• **The Directorate of Administration and Resources** handles the Center's administrative matters. It also is responsible for reproduction of the Center's information products through local base and commercial printing. These products, along with material provided by DoD's American Forces Information Service, are distributed worldwide. The Directorate manages the Center's worldwide resources, including personnel, manpower, logistics, and a multimillion dollar budget. It also provides budgetary and administrative support to the Orientation Group, US Air Force; the Center's Air Force Reserve personnel program; and the regional public affairs offices in Chicago, Los Angeles, and New York.

As of January 31, 1983, the Center was authorized 696 military and 174 civilian personnel for a total strength of 870. ■

Air Force Academy

THE Air Force Academy's mission is to turn highly qualified people into officers with the knowledge, character, motivation, courage, and discipline necessary to lead the Air Force effectively.

The Academy accomplishes this mission through development of the whole person. Today, that challenge must be accomplished by focusing on the development of young men and women who will serve more than half of their careers in the twenty-first century. The Academy experience is divided into four broad areas: military studies, academics, athletics, and moral and ethical development.

Military development is central to the Academy experience and distinguishes it from other institutions of higher learning. Four primary areas are stressed: professional military studies, theoretical and applied leadership experiences, aviation science and airmanship programs, and military training. The intent is to provide cadets the necessary knowledge, skills, values, and behavior patterns.

In 1981–82, the Academy instituted an expanded military studies program to give cadets a better understanding of the historical lessons of conflict and their application to modern airpower. General officers, statesmen, and other national figures come to the Academy to participate in this program and give their presentations on military-related subjects.

Cadets were kept in touch with the operation and mission of the Air Force and exposed to the entire Air Force community through Stateside field trips and Operation Air Force. This latter program sends more than a thousand cadets each summer to bases worldwide where they spend two weeks gaining firsthand experience in the operational Air Force and an understanding of officer-noncommissioned officer relations.

Also motivating cadets to learn about the Air Force's mission is the Airmanship program, which includes flying sailplanes and light aircraft, parachuting, and navigation training. The program is being expanded in 1983 to provide more parachute training and soaring. Under its soar-for-all program, the Academy is acquiring new powered sailplanes to afford every third class (sophomore) cadet the opportunity to solo in a sailplane.

Academically, the Academy is recognized as one of the finest colleges in the nation. The program allows cadets to acquire a broad education in basic and engineering sciences, social sciences, and humanities. Cadets can choose from twenty-three majors, and more than half select science and engineering.

In 1982, the cadet summer research program provided for eighty-four first class (senior) cadets to spend six weeks at various Air Force and DoD research facilities around the world. Participants applied the knowledge

Academy cadets undergoing and supervising basic parachute training serve as an example of the "leadership laboratory" that prepares cadets for Air Force careers. (USAF photo)

gained in the classroom to such Air Force programs as changes to astronauts' immunity systems in space and the effects of the aurora borealis (Northern Lights) on radio and radar signals.

Five cadets delivered a cadet research payload to the Kennedy Space Center last fall on behalf of the more than 400 cadets who participated in the "Scenic Fast" program during the past five years. The cadet payload was scheduled to be carried aboard the *Challenger* Space Shuttle's maiden flight in 1983.

Academy athletic programs continued in 1982 to stress physical fitness, intercollegiate excellence, and leadership development in a competitive environment. The highlight of the athletic year was the performance of the Falcon football team. Completing its third season in the Western Athletic Conference, the team compiled an 8–5 season. It was a season of firsts, including winning the Commander in Chief's Trophy for the first time with victories over Army and Navy, and beating Notre Dame and WAC Champion Brigham Young. The Falcons capped the year with their first bowl appearance since 1971, and came from behind to defeat Vanderbilt in the Hall of Fame Bowl in Birmingham, Ala., the Academy's first bowl victory ever.

The Academy's admissions program was significantly revamped in 1982, shifting from passive to active recruiting by developing a National Recruiting Plan. Some 1,800 Academy liaison officers around the country were tasked to seek out the best qualified cadet candidates in junior and senior high schools to meet a new goal of 1,000 graduates each year, of which seventy percent would be pilot-qualified.

In retention, several policy changes and programs of the past few years are beginning to reach goals. The most successful change was made in 1981, when the active-duty obligation point was moved from the beginning of the first class year to that of the second class year. The Classes of 1983 and 1984 were the first to be affected by this change and their retention rate has improved by five and six percent, respectively. The "Stop Out" program implemented in 1980 allows selected cadets who are considering resigning to leave for up to a year to reevaluate their career goals. Fifty-three cadets "stopped out" in 1981, and thirty-seven of them rejoined the Cadet Wing this year.

The objective of the Academy remains to provide the Air Force with officers who have the education, training, and motivation to fulfill Air Force careers. ■

Air Force Technical Applications Center

THE Air Force Technical Applications Center (AFTAC) operates and maintains the US Atomic Energy Detection System (AEDS). The AEDS is a worldwide system with operations in more than thirty-five countries. AFTAC efforts involve comprehensive research-and-development programs designed to increase the understanding of the complex technical problems associated with the detection and identification of nuclear events in the atmosphere, underground, and in space.

AFTAC is DoD's watchdog for nuclear activity on a worldwide basis. Here, a technician checks calibration of equipment used in detecting and identifying such events.

The Center provides inputs to DoD policies regarding nuclear arms-control issues and contributes to the nation's ability to monitor international agreements in these areas.

The concept of the AEDS was originated by senior government leaders, including Gen. Hoyt S. Vandenberg and Adm. Lewis Strauss, after World War II, when it became apparent that other nations would develop a nuclear weapons capability and that it was in the best interest of the US to be aware of these developments.

A committee of experts subsequently endorsed the concept of a detection system and, in September 1947, Gen. Dwight D. Eisenhower directed the Army Air Forces "to detect atomic explosions anywhere in the world." The mission continued to be undertaken by the Air Force when it became a separate service and proved its value when an AFTAC sensor aboard a B-29 aircraft flying between Alaska and Japan detected debris from the first Russian atomic test in September 1949.

During subsequent years, new detection systems were developed and older systems improved. When the Limited Test Ban Treaty was signed in 1963, the primary role of monitoring certain provisions of the treaty was assigned to AFTAC. The treaty prohibited testing nuclear weapons in the atmosphere, underwater, or in space. It also prohibited the venting of nuclear debris from underground tests.

Some 1,380 men and women are assigned to AFTAC to operate and maintain the AEDS system. Personnel assigned to the AFTAC Headquarters at Patrick AFB, Fla., perform normal staff functions, and provide for management, technical evaluation, and reporting of data. Located in the headquarters, the Satellite, Electromagnetic Pulse, Hydroacoustic, and Seismic Data Terminals receive real-time data twenty-four-hours a day. The data terminals are operated by 130 officers and airmen.

AFTAC has one squadron each located at McClellan AFB, Calif.; Wheeler AFB, Hawaii; and Lindsey AS, Germany. There are also nineteen detachments, six operating sites, and more than fifty equipment locations around the globe. The squadrons in Germany and Hawaii provide administrative, logistic, and other support to subordinate activities in their areas.

The role of the California squadron is more complex. The unit supports a Central Laboratory, an air-sampling operation, and operates a Logistics Depot providing specialized support for the AEDS network. The Central Laboratory is an analytical facility employing a large variety of modern instrumentation to support the AEDS mission. Because much of AFTAC's equipment and instrumentation are

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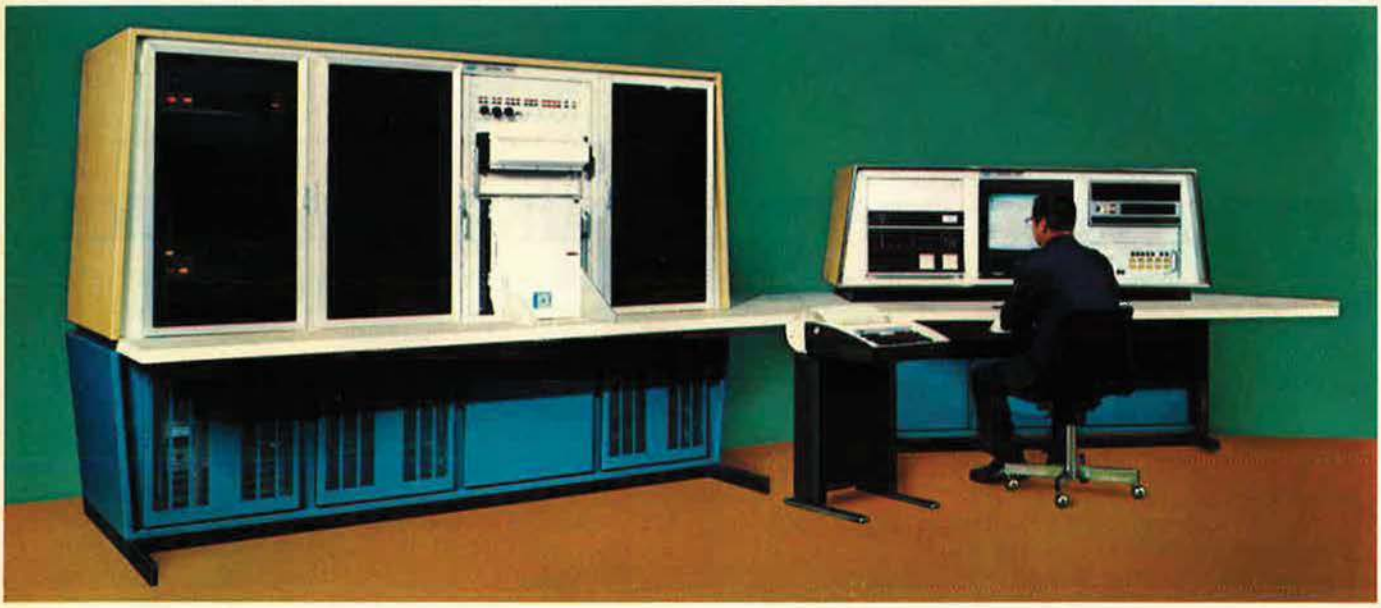

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only applicable to that mission, the depot at McClellan acts as a distribution facility for these unique items. The depot prepositions assets for AEDS systems, supplies parts for depot-level maintenance, and provides normal base-level support.

AFTAC possesses a wide range of technical expertise including people with graduate degrees in chemistry, physics, nuclear engineering, and electronics engineering. Complementing this capability is an experienced operational force supported by a handpicked group of technicians. According to the Commander, Col. Robert A. Meisenheimer, "AFTAC personnel represent the absolute finest and most professional people in the military today. They are completely dedicated to their job; they do that job in a superior manner and I am extremely proud of each and every one of them." ■

Albert F. Simpson Historical Research Center

THE Albert F. Simpson Historical Research Center is the repository for Air Force historical documents. The Center's collection, begun in Washington during World War II, moved in 1949 to Maxwell AFB, Ala. It consists today of 45,000,000 pages devoted to the history of the service, and represents the largest and most valuable collection of documents on US military aviation in the world.

Named in 1972 for Dr. Albert F. Simpson, the Air Force Historian from 1946 to 1969, the Center was established on July 1, 1979, as a direct reporting unit. It is collocated with the Air University and provides research facilities for professional military education students, the faculty, and visiting scholars. More than eighty-five percent of the Center's pre-1955 holdings are declassified. The entire collection is recorded on 16-mm microfilm, with microfilm copies deposited at the National Archives and Record Service, Washington, D. C., and at the Office of Air Force History, Bolling AFB, D. C.

Center holdings consist largely of periodic unit histories prepared by the major commands, numbered air forces, and other service organizations. These histories provide comprehensive coverage of Air Force activities beginning in 1942, when the President authorized the program. Extensive primary source material is attached to the histories, greatly enhancing their value.

Special collections complement the unit histories. Among them are historical monographs; end-of-tour reports; joint and combined command documents; aircraft record cards; and materials from the US Army, British Air Ministry, and the German Air Force. The Center also houses the personal papers of key retired Air Force leaders and transcripts of their oral history interviews. About 6,000 documents of all types are accessioned annually.

In 1980 the Center adopted automatic data processing as a finding aid and began to enter abstracts of the documents into a computer. The Inferential Retrieval Index System, or IRIS, will become operational in 1983. The collection will eventually become accessible on computer terminals throughout the Air Force.

Materials at the Center are used for professional military education, research by civilian scholars, and the development of Air Force plans, programs, analyses, legal cases, and investigations. Information obtained from Center records appears in orientation programs, public information releases, unit reunions, Air Force responses to inquiries from Congress and other government agencies, research papers, books, television and movie scripts, and many other products.

The Center is organized into four divisions:

- **Reference.** Maintains documents and microfilm, answers inquiries about holdings, produces bibliographies, and provides other services to users.
- **Research.** Writes books and papers, traces lineage of Air Force units, prepares listing of active Air Force organizations, determines aerial victory and combat credits, and performs other research and teaching services.
- **Oral History.** Conducts oral history interviews, monitors the USAF end-of-tour report program, and collects personal papers.
- **Technical Services.** Accessions, catalogs, and indexes documents, develops automatic data processing and microfilming for the Center, and coordinates system applications for the Air Force history program. ■

All of the historical documents at the Simpson Historical Research Center have been microfilmed, with duplicate films deposited at the National Archives and the Office of Air Force History. Here, a technician reviews film for flaws.

Air Force Reserve

WHILE fulfilling its mission to train for mobilization, the Air Force Reserve (AFRES) also realized several important changes during the past year. Changes in command leadership, further modernization of the AFRES aircraft fleet, unit activations and realignments to meet expanded mission requirements, diversified training in support of Total Force commitments, and major manning increases were among the most significant developments.

In November, Maj. Gen. Sloan R. Gill, former Fourth Air Force Commander, became Chief of Air Force Reserve and Commander of AFRES. Maj. Gen. James E. McAdoo, formerly Commander of Fourteenth Air Force, was selected as AFRES Vice Commander. CMSgt. Henry J. Scott, previously first sergeant of the 439th Combat Support Group, Westover AFB, Mass., became Senior Enlisted Advisor.

AFRES aircraft inventory modernization included delivery of the command's first "factory-fresh" C-130H Hercules to the 94th Tactical Airlift Wing, Dobbins AFB, Ga., replacing C-7 Caribous. The wing's 357th Tactical Airlift Squadron, Maxwell AFB, Ala., will convert from sixteen C-7s to eight C-130Es in late 1983.

At Westover, the 337th TAS, a unit of the 439th TAW, converted from C-130Bs to C-130Es. The wing's 731st TAS, among the Air Force's last tactical airlift units operating the C-123 Provider, acquired C-130Bs as it became part of the newly formed 901st Tactical Airlift Group at Peterson AFB, Colo. In September, a 731st TAS aircrew marked the end of an era, completing the final C-123 drop mission in support of Army basic airborne training at Fort Benning, Ga. The Reserve has performed this mission with various aircraft since 1956.

The C-123-equipped 906th TAG, Rickenbacker ANGB, Ohio, was inactivated. Moving to Wright-Patterson AFB, Ohio, it was reactivated as the 906th Tactical Fighter Group with F-4 Phantom IIs. Similarly, the 442d TAW, Richards-Gebaur AFB, Mo., became the 442d TFG, converting from C-130Es to A-10 Thunderbolt II aircraft.

Elsewhere, the 926th TFG, NAS New Orleans, converted from the A-37 Dragonfly to A-10s. At Hill AFB, Utah, the 508th TFG was inactivated and the 419th Tactical Fighter Wing activated. Plans call for the wing's 466th Tactical Fighter Squadron to exchange its eighteen F-105 Thunderchiefs for eighteen F-16 Fighting Falcons in early 1984, with six additional F-16s joining the wing at a later date.

Expanding its "associate" aerial refueling program with Strategic Air Command in the KC-10A Extender, AFRES activated the 79th Air Refueling Squadron at March AFB, Calif., in September. As in the 78th Air Refueling Squadron established at Barksdale AFB in 1981, Reservists will comprise fifty percent of the crews of the KC-10s belonging to collocated SAC units. The associate KC-10 and three AFRES KC-135 Stratotanker-equipped units located at March and Mather AFBs in California and Grissom AFB, Ind., are elements of the 452d Air Refueling Wing, headquartered at March.

Changes in combat-sustaining units saw the activation of airlift control elements in AFRES airlift wings at Dobbins; Kelly AFB, Tex.; Westover; General Billy Mitchell Field, Wis.; Andrews AFB, Md.; and McChord AFB, Wash. Also, Dobbins and Westover were the first to receive surplus C-130 fuselages as aerial port training aids. Additional "hulks," from the Military Aircraft Storage and Disposition Center, Davis-Monthan AFB, Ariz., are destined for other AFRES units, reducing commitments of operational aircraft for aerial port training.

Posturing for Reserve readiness and base services saw the establishment of new RIBs units at Charleston AFB, S. C., and at McGuire AFB, N. J. Also, new Reserve engineering squadrons were activated at Duke Field, Fla., and Robins AFB, Ga., the latter being the first such Air Force Logistics Command-gained unit in AFRES.

A doubling of AFRES medical manning during the next five years will find Reservists representing twenty percent of the Air Force's total wartime medical personnel resource. The build started with activation of the 605-member 11th USAF Contingency Hospital unit at Wilford Hall USAF Medical Center, Lackland AFB, Tex., with satellite detachments at Kirtland AFB, N. M.; Carswell AFB, Tex.; Barksdale; and Homestead AFB, Fla. Planned for October 1983 activation is a 250-bed unit headquartered at David Grant USAFMEDCEN, Travis AFB, Calif., with detachments at March, Mather, Davis-Monthan, and Fairchild AFB, Wash. Reservists assigned to the contingency hospital units will replace active-force personnel required to deploy temporarily to other locations.

To maintain readiness, Air Force Reservists participated in fifty joint forces, gaining command, and AFRES-sponsored exercises during the past year, also performing various peacetime missions as by-products of training.

Condor CRTE, a major combat rescue training exercise hosted by the Reserve's 403d Rescue and Weather Reconnaissance Wing last May, tested search and rescue techniques of active and reserve forces. The two-week exercise also employed surface-to-air missile simulators, aerial refueling, and close air fighter support in realistic battlefield conditions. Last summer's fighter competition near Savannah, Ga., evaluated the combat readiness of Tenth Air Force units. AFRES elements in Quick Thrust, also conducted near Savannah, realized further joint training with other reserve and active forces.

Other exercises involving AFRES airlift units included: Reforger—strategic and tactical airlift to and within West Germany; Cold Fire—some 28,000 tons of supplies and equipment moved in conjunction with Military Sealift Command operations in Western Europe by Reserve C-130s deployed to Belgium; Brim Frost—C-130 missions in Alaska; inter- and intratheater airlift for Team Spirit in the Pacific; and the large-scale Gallant Eagle joint forces training exercise in California.

AFRES fighter units comprise ten percent of USAF's tactical fighter

FROM DRU TO SOA . . .

During the year reported on in this Air Force Almanac issue, the Air Force Reserve (AFRES) was a direct reporting unit (DRU). One of its operational elements was the Air Reserve Personnel Center, Denver, Colo. In mid-April, however, as this issue was being readied for press, AIR FORCE Magazine learned that as of May 1, both AFRES and ARPC will become separate operating agencies (SOAs).

AIR FORCE RESERVE FLYING WINGS AND ASSIGNED UNITS

Air Force	Wing Hq.	Group	Squadron	Type Aircraft	Location	Gaining Command
		920th WRG	815th WRS	WC-130H	Keesler AFB, Miss.	MAC
	349th MAW (Assoc)		301st MAS (Assoc)	C-5A	Travis AFB, Calif.	MAC
			312th MAS (Assoc)	C-5A	Travis AFB, Calif.	MAC
			708th MAS (Assoc)	C-141B	Travis AFB, Calif.	MAC
			710th MAS (Assoc)	C-141B	Travis AFB, Calif.	MAC
	403d RWRW		305th ARRS	HC-130H/N, HH-3E	Selfridge ANGB, Mich.	MAC
			301st ARRS	HC-130H/N, HH-3E	Homestead AFB, Fla.	MAC
			303d ARRS	HC-130H	March AFB, Calif.	MAC
Fourth Air Force			304th ARRS	UH-1N, HH-1H	Portland IAP, Ore.	MAC
(Hq. McClellan AFB, Calif.)	433d TAW		68th TAS	C-130B	Kelly AFB, Tex.	MAC
		901st TAG	731st TAS	C-130B	Peterson AFB, Colo.	MAC
Brig. Gen. Robert G. Mortensen, Commander		934th TAG	96th TAS	C-130A	Minneapolis-St. Paul IAP, Minn.*	MAC
	440th TAW		95th TAS	C-130A	Gen. Billy Mitchell Field, Wis.*	MAC
		927th TAG	63d TAS	C-130A	Selfridge ANGB, Mich.	MAC
		928th TAG	64th TAS	C-130A	O'Hare IAP, Ill.*	MAC
	445th MAW (Assoc)		728th MAS (Assoc)	C-141B	Norton AFB, Calif.	MAC
			729th MAS (Assoc)	C-141B	Norton AFB, Calif.	MAC
			730th MAS (Assoc)	C-141B	Norton AFB, Calif.	MAC
	446th MAW (Assoc)		97th MAS (Assoc)	C-141B	McChord AFB, Wash.	MAC
			313th MAS (Assoc)	C-141B	McChord AFB, Wash.	MAC
			302d SOS	CH-3E	Luke AFB, Ariz.	TAC
		919th SOG	711th SOS	AC-130A	Eglin AFB, Fla. (Aux. 3)	TAC
	301st TFW		457th TFS	F-4D	Carswell AFB, Tex.	TAC
		924th TFG	704th TFS	F-4D	Bergstrom AFB, Tex.	TAC
	419th TFW		466th TFS	F-105D/F	Hill AFB, Utah	TAC
Tenth Air Force		507th TFG	465th TFS	F-4D	Tinker AFB, Okla.	TAC
(Hq. Bergstrom AFB, Tex.)	434th TFW		45th TFS	A-10A	Grissom AFB, Ind.	TAC
		442d TFG	303d TFS	A-10A	Richards-Gebaur AFB, Mo.*	TAC
		917th TFG	47th TFS	A-10A	Barksdale AFB, La.	TAC
Maj. Gen. John E. Taylor, Jr., Commander		926th TFG	706th TFS	A-10A	New Orleans NAS, La.*	TAC
	452d AREFW (H)		336th AREFS (H)	KC-135	March AFB, Calif.	SAC
			78th AREFS (H) (Assoc)	KC-10A	Barksdale AFB, La.	SAC
			79th AREFS (H) (Assoc)	KC-10A	March AFB, Calif.	SAC
		931st AREFG (H)	72d AREFS (H)	KC-135	Grissom AFB, Ind.	SAC
		940th AREFG (H)	314th AREFS (H)	KC-135	Mather AFB, Calif.	SAC
	482d TFW		93d TFS	F-4C	Homestead AFB, Fla.	TAC
		906th TFG	99th TFS	F-4D	Wright-Patterson AFB, Ohio	TAC
		932d AAG (Assoc)	73d AAS (Assoc)	C-9A	Scott AFB, Ill.	MAC
	94th TAW		700th TAS	C-130H	Dobbins AFB, Ga.*	MAC
		908th TAG	357th TAS	C-7A	Maxwell AFB, Ala.	MAC
		907th TAG	356th TAS	C-130A, C-123K[1]	Rickenbacker ANGB, Ohio	MAC
	315th MAW (Assoc)		300th MAS (Assoc)	C-141B	Charleston AFB, S. C.	MAC
			701st MAS (Assoc)	C-141B	Charleston AFB, S. C.	MAC
Fourteenth Air Force			707th MAS (Assoc)	C-141B	Charleston AFB, S. C.	MAC
(Hq. Dobbins AFB, Ga.)	439th TAW		337th TAS	C-130F	Westover AFB, Mass.*	MAC
		914th TAG	328th TAS	C-130A	Niagara Falls IAP, N. Y.*	MAC
		911th TAG	758th TAS	C-130A	Greater Pittsburgh IAP, Pa.*	MAC
Brig. Gen. Alan G. Sharp, Commander	459th TAW		756th TAS	C-130B	Andrews AFB, Md.	MAC
		913th TAG	327th TAS	C-130B	Willow Grove ARF, Pa.*	MAC
		910th TAG	757th TAS	C-130B	Youngstown MAP, Ohio*	MAC
	512th MAW (Assoc)		326th MAS (Assoc)	C-5A	Dover AFB, Del.	MAC
			709th MAS (Assoc)	C-5A	Dover AFB, Del.	MAC
	514th MAW (Assoc)		335th MAS (Assoc)	C-141B	McGuire AFB, N. J.	MAC
			702d MAS (Assoc)	C-141B	McGuire AFB, N. J.	MAC
			732d MAS (Assoc)	C-141B	McGuire AFB, N. J.	MAC

AAG (Assoc)	Aeromedical Airlift Group (Assoc)	SOG	Special Operations Group
AREFW (H)	Air Refueling Wing (Heavy)	TAW	Tactical Airlift Wing
ARF	Air Reserve Facility	TFW	Tactical Fighter Wing
ARFF	Air Reserve Forces Facility	WRG	Weather Reconnaissance Group
MAW (Assoc)	Military Airlift Wing (Associate)	*	Indicates AFRES base
RWRW	Rescue and Weather Reconnaissance Wing	1	AFRES will retain 4 C-123Ks for aerial spray mission

squadrons. In 1982, these units flew more than 36,000 hours in varied training missions, including participation in Red Flag and its Canadian equivalent, Maple Flag; the multifaceted Ocean Venture exercises in the Caribbean; Gunsmoke, the Air Force tactical gunnery and bombing competition; and deployments to Italy and Turkey.

Augmenting MAC's global airlift mission, AFRES strategic associate and tactical airlift units logged approximately 152,000 flying hours in Fiscal Year 1982—air-dropping or air landing some 500,000 people and nearly 100,000 tons of cargo. Operations included rotations shared with the Air National Guard at Howard AFB, Panama, to meet US airlift requirements in Latin America. In the United States, associate aeromedical evacuation crews with their MAC counterparts flew 1,333 live "aeromed" missions, carrying more than 43,000 patients.

In support of other MAC missions, the Reserve's four aerospace rescue and recovery squadrons saved eighty-one people. Flying WC-130s, the command's 920th Weather Reconnaissance Group, "Storm Trackers," Keesler AFB, Miss., spent nearly 945 flying hours conducting weather surveillance activities, including tracking seven major storms. Domestic entomological control programs found Reserve crews spraying 400,000 acres to help eradicate harmful insects. Four specially equipped AFRES C-123s provide all of the Air Force's aerial spray capability.

Alongside their SAC counterparts, AFRES KC-10 associate and KC-135 crews flew more than 2,000 missions during the past year, refueling more than 5,000 airborne receiver aircraft. Tasking included augmentation of the European Tanker Task Force. The effort represented four percent of the Air Force's aerial refueling capability.

AFRES's thirty-four Air Force Communications Command-gained units provided vital communications support, both in CONUS and overseas, while six Air Force Logistics Command-gained combat logistics support squadrons continued to train in aircraft battle-damage repair, including maintenance, supply, and transportation activities. AFRES security police took part in nearly all exercises, also furnishing day-to-day "real-world" security for Air Force resources.

Results of productive training also brought the command recognition. At MAC's annual Volant Rodeo tactical airdrop competition, Westover's 439th TAW earned awards as top competitor in the short field landing and joint inspection categories; the 303d ARRS, March AFB, Calif., led all US teams in SAREX, the joint US-Canadian search and rescue competition; and the 452d AREFW received the highest rating among active and reserve tanker units in a SAC combat evaluation. For the second time since 1980, an aircrew from the 701st Military Airlift Squadron, Charleston AFB, S. C., garnered the Air Force Association's "Outstanding Air Force Reserve Flight Crew of the Year" award, with AFA's "Outstanding Air Force Reserve Wing of the Year" award going to the 403d RWRW at Selfridge ANGB, Mich.

People remained the command's chief concern. Notwithstanding projected increases in the medical area, Reserve manning exceeded its goal for the sixth straight year as more than 10,000 persons with prior military service and 3,000 more without joined the ranks. At year's end, about 7,400 Air Reserve Technicians (ARTs), almost 3,900 non-ART civilians, and slightly more than 700 full-time military personnel comprised the command's day-to-day work force. Unit-assigned and individual program Reservists totaled more than 63,000.

AFRES field units continued to be directly managed by three numbered air forces: Fourth Air Force, McClellan AFB, Calif.; Tenth Air Force, Bergstrom AFB, Tex.; and Fourteenth Air Force at Dobbins AFB, Ga., with Headquarters Air Force Reserve at Robins AFB, Ga., providing overall management of the unit program and the command's fleet of more than 450 aircraft.

Personnel and administrative support for manning and mobilizing the Air Reserve Forces is provided by the Air Reserve Personnel Center (ARPC) in Denver. Newly designated a Separate Operating Agency, the Center furnishes a myriad of services for some 225,000 members of the Air National Guard and Air Force Reserve.

To ensure its readiness, ARPC has continued to employ and test a variety of automated systems to speed the mobilization process. A key program element involves computer tapes maintained by the Center being converted to Western Union mailgrams calling Reservists to active duty in a crisis. A related program using bar codes and computerized "readers" enables ARPC to keep track of its 400,000 master personnel records on Air Guardsmen and Reservists.

Base-level personnel support is the responsibility of ARPC's Consolidated Reserve Personnel Office (CRPO), which directly serves members of the Individual Ready Reserve and Individual Mobilization Augmentees (IMAs). A major accomplishment of the CRPO last year was the expansion of the Base Individual Mobilization Augmentee Administrator (BIMAA) Program. BIMAA places reserve personnel specialists in active force consolidated base personnel offices to help ensure proper training and full utilization of IMA skills. Among its customer services, ARPC provides toll-free telephone inquiry service, individualized career counseling, and improved control and accounting methods for furnishing Reservists information on their participation. ■

Training for rescue in the desert. Last year, AFRES's four aerospace rescue and recovery squadrons were credited with saving eighty-one lives.

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Air National Guard

South Carolina's 169th Tactical Fighter Group is the first ANG unit to be equipped with new F-16 Fighting Falcons.

WITH both a state and a federal mission, the Air National Guard (ANG) is unique among the world's reserve military air forces. This two-fold mission requires the Air Guard to provide trained and equipped units to augment the active force during times of crisis, national emergencies, or war, and also to provide a disciplined force to protect life and property during natural disasters, civil disorders, or other emergencies.

Air Guard units in a nonmobilized status are commanded by the governors of the fifty states, the Commonwealth of Puerto Rico, the Territories of the Virgin Islands and of Guam, and the Commanding General for the District of Columbia. All units in a state are responsible to the governor, who is represented in the state or territory chain of command by the Adjutant General.

ANG units may be called for federal service by the President to enforce federal authority, suppress insurrection, or repel invasion. ANG units may also be ordered to active duty by Congress. During peacetime, all Air Guard units are assigned to "gaining" Air Force major commands. The major commands establish unit training standards, provide advisory assistance, and evaluate unit training, safety, and readiness programs.

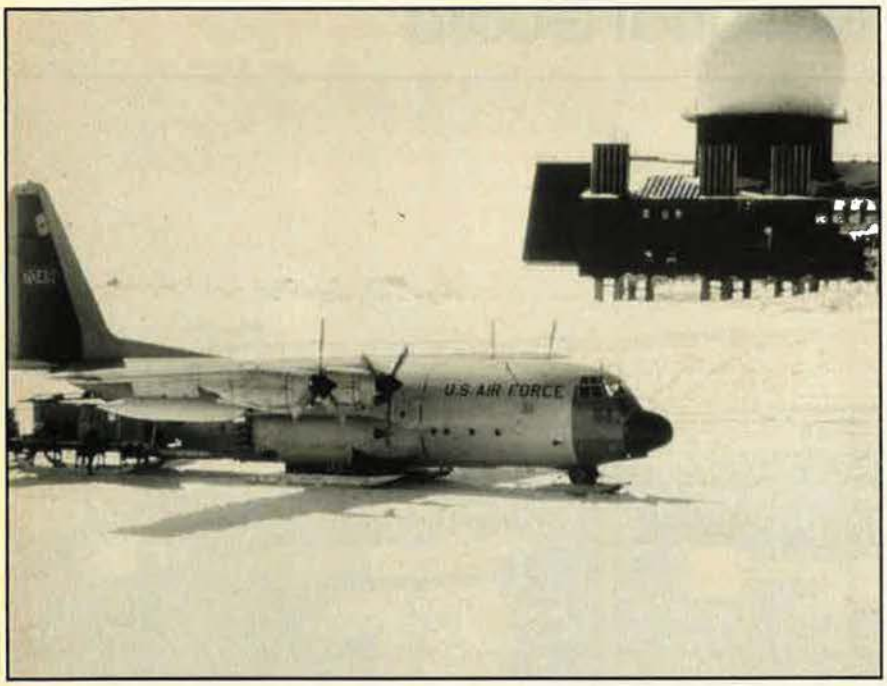
More than 101,000 Guard people support a force of twenty-four wings, sixty-seven groups, ninety-one flying squadrons, and 242 independent nonflying mission units. The flying squadrons operate nineteen different types of aircraft, representing seventeen percent of the USAF Total Force.

The ANG is modernizing its units consistent with Air Force requirements. This year, South Carolina's 169th Tactical Fighter Group was the first ANG unit to convert to the new F-16 Fighting Falcon. New C-130Hs will continue to enter the force and provide enhanced tactical airlift support. KC-135 tankers are being modified with new JT3D-3B engines to provide increased operational and logistical capabilities.

Currently, the ANG provides sixty-six percent of the Air Force's fighter-interceptor force, fifty-four percent of the tactical reconnaissance force, thirty-two percent of tactical air support, thirty-two percent of tactical airlift, twenty-six percent of the tactical fighters, twenty-six percent of the electronic combat capability, seventeen percent of the air refueling tankers, and fifteen percent of the rescue and recovery capability.

In addition, two ANG A-7, two RF-4C, and one EC-130 flying units are members of the USCENTAF forces. Four Guard combat communications units and an air traffic control flight also support this mission.

During 1982, ANG units scored well in various competitions. Competing against active-duty, Guard, and Canadian units, the California Guard's 144th Fighter Interceptor Wing won



New York's 109th Tactical Airlift Group is an ANG unit that flies the only ski-equipped C-130s in the Air Force. Here, supplies ticketed for a Greenland ice cap radar station are unloaded from the Hercules.

the overall top maintenance team award during William Tell 82. At Photo Derby 82, a US Navy reconnaissance competition, the Idaho Guard's 124th Tactical Reconnaissance Group was named best overall unit in competition with Guard, Navy, and US Marine Corps units. In the Air Force Communications Command 1982 E&I "Shootout," the 214th E&I Squadron, Louisiana ANG, New Orleans, took first place over two active Air Force and three other Air Guard teams. The Ohio Guard's 251st Combat Communications Group, Springfield, won the USAF McClelland Award, the first time an ANG unit has ever been recognized as the outstanding communications-electronics unit in the Total Air Force.

In FY '82, ANG units provided sixty-five percent of Ninth Air Force and seventy-five percent of Twelfth Air Force requirements for close air support, and they continued to participate in Red Flag and numbered Air Force exercises.

The ANG flew 411,168 hours worldwide in 1982 and achieved a flying accident rate of 1.9 accidents per 100,000 flying hours.

For twenty-nine years, the ANG has had an air-defense alert mission. KC-135 refueling units also perform an around-the-clock alert mission and continue to participate in operational missions supporting the European Tanker Task Force in the UK and the Pacific Tanker Task Force in Guam.

ANG C-130s provide airlift support for the US Southern Command in Panama (Volant Oak) on a rotational basis, perform Distant Early Warning Line and Arctic ice cap resupply missions, and aid the US Forest Service with modular airborne firefighting capabilities. All Air Guard A-7 units share a continuous rotational commitment in Panama, called Coronet Cove, which provides close air support in joint training programs with the US Army.

Civil Engineering flights continue to provide engineering and firefighting forces trained and equipped to deploy on short notice in support of active Air Force installations and ANG sites, as well as participate in JCS exercises. A Red Horse civil engineering squadron provides self-sufficient, deployable engineering teams to perform heavy repair and maintenance on air bases and remote sites. Also, a composite services force (PRIME RIBS) is being organized to provide food service, billeting, and mortuary affairs support at deployment locations.

There are more than 20,000 Air Guard people in 224 communications, electronic, and meteorological units. ANG E&I units provide fifty-five percent of the Air Force's electronic installation capability. They install, repair, and restore communications, navigational aids, and air traffic control equipment. ANG communications units provide seventy percent of USAF's capability in combat communications and tactical air traffic control services. Guard tactical control units comprise fifty-five percent of USAF's weapon systems control capability.

Two new Air Guard tactical radar units were activated in 1981 and 1982, the 111th Tactical Control Flight in Phoenix, Ariz., and the 114th TCF in University Park, Pa. Both units have been equipped with the new USAF TPB-1C tactical radar system.

Thirty-nine ANG weather flights provide weather support to Army National Guard and Army Reserve divisions and brigades, as well as to the USAF Tactical Weather System.

Ninety percent of ANG medical units performed their annual training in active-duty Air Force hospitals and clinics during FY '82. Individual critical manning assistance, a total of 2,816 man-days, was also provided to selected Air Force hospitals and clinics in the areas of anesthesiology, surgery, dentistry, optometry, obstetrics, gynecology, and radiology, as well as operating room nurses and enlisted medical specialties. Air Guard physicians, dentists, and nurses participated in two Medical Red Flag Exercises during FY '82.

Since 1976, the Air National Guard has participated in thirty-eight overseas deployments, gaining realistic training in locations where the units may be called on to fight. Realistic training is also being accomplished through joint exercises in which the Air Guard has provided a majority of the combat communications and tactical control forces, in addition to participation by flying units and their attached medical elements.

The ANG is truly a community force of local families. Seventy-one percent of Air Guard men and women are married and have some 200,000 dependents. In concert with active Air Force emphasis on the family, local unit chaplains and other staff agencies are developing family support programs to provide better family stability when the unit is mobilized.

Deployments, exercises, and direct support to the Air Force on a day-to-day basis give Air National Guard people the constant training needed to maintain a high level of readiness at minimum expense to the American taxpayer. ■

THE AIR NATIONAL GUARD BY MAJOR COMMAND ASSIGNMENT

(As of April 1, 1983)

STRATEGIC AIR COMMAND

KC-135 Stratotanker

101st Air Refueling Wing	Bangor, Me.
126th Air Refueling Wing	Chicago, Ill.
141st Air Refueling Wing	Fairchild AFB, Wash.
171st Air Refueling Wing	Pittsburgh, Pa.
128th Air Refueling Group	Gen. Billy Mitchell Field, Wis.
134th Air Refueling Group	Knoxville, Tenn.
151st Air Refueling Group	Salt Lake City, Utah
157th Air Refueling Group	Pease AFB, N. H.
160th Air Refueling Group	Rickenbacker ANG Base, Ohio
161st Air Refueling Group	Phoenix, Ariz.
170th Air Refueling Group	McGuire AFB, N. J.
189th Air Refueling Group	Little Rock AFB, Ark.
190th Air Refueling Group	Forbes Field, Kan.

MILITARY AIRLIFT COMMAND

C-130 Hercules

118th Tactical Airlift Wing	Nashville, Tenn.
133d Tactical Airlift Wing	Minneapolis/St. Paul, Minn.
136th Tactical Airlift Wing	Dallas NAS, Tex.
137th Tactical Airlift Wing	Oklahoma City, Okla.
146th Tactical Airlift Wing	Van Nuys, Calif.
109th Tactical Airlift Group	Schenectady, N. Y.
130th Tactical Airlift Group	Charleston, W. Va.
135th Tactical Airlift Group	Baltimore, Md.
139th Tactical Airlift Group	St. Joseph, Mo.
143d Tactical Airlift Group	Quonset Point, R. I.
145th Tactical Airlift Group	Charlotte, N. C.
153d Tactical Airlift Group	Cheyenne, Wyo.
164th Tactical Airlift Group	Memphis, Tenn.
165th Tactical Airlift Group	Savannah, Ga.
166th Tactical Airlift Group	Wilmington, Del.
167th Tactical Airlift Group	Martinsburg, W. Va.
172d Tactical Airlift Group	Jackson, Miss.
176th Tactical Airlift Group	Anchorage, Alaska
179th Tactical Airlift Group	Mansfield, Ohio

HC-130 Hercules/HH-3 Jolly Green Giant

106th Aerospace Rescue & Recovery Group	Suffolk Co. Airport, N. Y.
129th Aerospace Rescue & Recovery Group	Moffett NAS, Calif.

PACIFIC AIR FORCES

F-4C Phantom

154th Composite Group	Hickam AFB, Hawaii

TACTICAL AIR COMMAND

A-7D Corsair II

121st Tactical Fighter Wing	Rickenbacker ANG Base, Ohio
127th Tactical Fighter Wing	Selfridge ANG Base, Mich.
132d Tactical Fighter Wing	Des Moines, Iowa
140th Tactical Fighter Wing	Buckley ANG Base, Colo.
112th Tactical Fighter Group	Pittsburgh, Pa.
114th Tactical Fighter Group	Sioux Falls, S. D.
138th Tactical Fighter Group	Tulsa, Okla.
150th Tactical Fighter Group	Kirtland AFB, N. M.
156th Tactical Fighter Group	San Juan, Puerto Rico
162d Tactical Fighter Group**	Tucson, Ariz.
178th Tactical Fighter Group	Springfield, Ohio
180th Tactical Fighter Group	Toledo, Ohio
185th Tactical Fighter Group	Sioux City, Iowa
192d Tactical Fighter Group	Richmond, Va.

*No longer a major active Air Force base.
**Replacement Training Unit (RTU).

A-10 Thunderbolt II

128th Tactical Fighter Wing	Truax Field, Wis.
174th Tactical Fighter Wing	Syracuse, N. Y.
103d Tactical Fighter Group	Windsor Locks, Conn.
104th Tactical Fighter Group	Westfield, Mass.
175th Tactical Fighter Group	Baltimore, Md.

F-16 Fighting Falcon

169th Tactical Fighter Group	McEntire ANG Base, S. C.

OA-37B Dragonfly

110th Tactical Air Support Group	Battle Creek ANG Base, Mich.
111th Tactical Air Support Group	Willow Grove NAS, Pa.
182d Tactical Air Support Group	Peoria, Ill.

F-4C Phantom

122d Tactical Fighter Wing	Fort Wayne, Ind.
131st Tactical Fighter Wing	St. Louis, Mo.
149th Tactical Fighter Group	Kelly AFB, Tex.
159th Tactical Fighter Group	New Orleans NAS, La.
181st Tactical Fighter Group	Terre Haute, Ind.
188th Tactical Fighter Group	Fort Smith, Ark.

F-4D Phantom

108th Tactical Fighter Wing	McGuire AFB, N. J.
113th Tactical Fighter Wing	Andrews AFB, Md.
116th Tactical Fighter Wing	Dobbins AFB, Ga.
158th Tactical Fighter Group	Burlington, Vt.
163d Tactical Fighter Group	March AFB, Calif.
183d Tactical Fighter Group	Springfield, Ill.
184th Tactical Fighter Group**	McConnell AFB, Kan.

RF-4C Phantom

117th Tactical Reconnaissance Wing	Birmingham, Ala.
123d Tactical Reconnaissance Wing	Louisville, Ky.
124th Tactical Reconnaissance Group	Boise, Idaho
148th Tactical Reconnaissance Group	Duluth, Minn.
152d Tactical Reconnaissance Group	Reno, Nev.
155th Tactical Reconnaissance Group	Lincoln, Neb.
186th Tactical Reconnaissance Group	Meridian, Miss.
187th Tactical Reconnaissance Group	Montgomery, Ala.

O-2A Super Skymaster

105th Tactical Air Support Group	White Plains, N. Y.

EC-130E

193d Electronic Combat Group	Harrisburg, Pa.

AIR DEFENSE UNITS

F-106 Delta Dart

102d Fighter Interceptor Wing	Otis ANG Base, Mass.*
144th Fighter Interceptor Wing	Fresno, Calif.
120th Fighter Interceptor Group	Great Falls, Mont.
125th Fighter Interceptor Group	Jacksonville, Fla.
177th Fighter Interceptor Group	Atlantic City, N. J.

F-4C/D Phantom

107th Fighter Interceptor Group	Niagara Falls, N. Y.
119th Fighter Interceptor Group	Fargo, N. D.
142d Fighter Interceptor Group	Portland, Ore.
147th Fighter Interceptor Group	Ellington AFB, Tex.*
191st Fighter Interceptor Group	Selfridge ANG Base, Mich.

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EDITED BY JOHN W. R. TAYLOR, EDITOR, JANE'S ALL THE WORLD'S AIRCRAFT

Bombers

B-1B

This long-range high subsonic version of the original B-1 has been selected as USAF's next-generation multi-role bomber. It will be a heavy gross weight aircraft, powered by four 30,000 lb thrust class augmented General Electric turbofan engines. While smaller than the B-52, it will carry a considerably greater weapons load because of improved engine performance and advanced aerodynamic technology. Its weapons bays will provide the flexibility to carry long- and short-range nuclear air-to-surface missiles, nuclear or conventional gravity bombs, mines, other weapons, or fuel, as required by the assigned mission, giving the B-1B the ability to attack imprecisely located and fixed targets.

Two major factors increase significantly the prelaunch survivability of the B-1B over that of USAF's B-52s. Firstly, the use of a variable-geometry, or swingwing, configuration enables the aircraft to become airborne more quickly, using much shorter runways, without compromising high subsonic operation or efficient low-level penetration. Secondly, the new aircraft is designed to operate from less sophisticated airfields, with shorter runways, thus reducing the possibility of a successful surprise enemy missile attack, as the B-1B force would be dispersed throughout the country.

The B-1B will be equipped with electronic jamming equipment, infrared countermeasures, radar location and warning systems, and other devices necessary to defeat enemy defensive systems. To facilitate very low-level penetration of sophisticated enemy defenses, it will have a terrain-following radar system that will allow it to follow "the nap of the earth" at near supersonic speeds. This ability will make it extremely difficult for enemy defensive radar systems to track the B-1B, as hills, mountains, towers, buildings, and even trees will clutter the radar screen. Flying low at high speeds also negates the effectiveness of enemy interceptors, because it will be difficult to acquire and track B-1Bs flying close to the ground. This will enable the B-1B to penetrate sophisticated enemy defenses well into the 1990s and to operate within less heavily defended areas into the next century.

Outwardly, the B-1B will be generally similar to the B-1 prototype No. 4. The major changes will be internal in nature. Structurally, the B-1B will be strengthened to increase the gross takeoff weight from 395,000 lb to 477,000 lb. Plans include provisions to carry weapons externally (up to 14 air-launched cruise missiles along the fuselage); provisions to modify the forward weapons bays to permit internal carriage of cruise missiles and additional fuel; adding radar absorption materials to reduce further the aircraft's radar cross-section (the radar signature is already significantly less than that of the B-52); and use of ejection seats instead of the original crew ejection capsule (this change was incorporated into the fourth B-1 prototype). Finally, the variable engine inlets that gave the original B-1 a Mach 2 speed capability are being replaced by fixed inlets, optimized for the B-1B's high subsonic, low-altitude penetration mission.

Both offensive and defensive electronics systems are much improved over the B-1. The offensive avionics include modern forward-looking and terrain-following radars, an extremely accurate inertial navigation system, the Air Force Satellite Communications System, and much of the new Offensive Avionics System (OAS) package being installed in B-52Gs and Hs (strategic Doppler radar and radar altimeter). The defensive avionics package is built around the ALQ-161 electronic countermeasures (ECM) system with an extended frequency coverage. This flexible, reprogrammable system automatically detects and analyzes radars illuminating the aircraft. A central computer then selects an appropriate countermeasure and applies the best ECM technique at precisely the right time, with the right power and optimal angle to protect the aircraft from the probing radar. The defensive avionics package also includes a tail warning function using the ALQ-161 system and such expendables as chaff and flares.

The Air Force will use three aircraft for B-1B test and evaluation, including the second B-1 prototype (last flown in February 1979), the fourth B-1 prototype (which was flying until April 1981), and the first production B-1B. Seven aircraft are being procured in the current fiscal year. A request to procure ten B-1Bs is included in the FY '84 budget proposals. The first B-1B is scheduled for delivery in December 1984, with all 100 production models delivered by mid-1988.

Contractor: Rockwell International, North American Aircraft Operations.

Power Plant: four General Electric F101-GE-102 turbofan engines; each 30,000 lb thrust class.

Accommodation: four: pilot, copilot, and two systems operators (offensive and defensive). Provision for two instructors.

Dimensions: span spread 136 ft 8½ in, fully swept 78 ft 2½ in, length 147 ft, height 34 ft.

Weight: max operating weight 477,000 lb.

Performance: max speed high subsonic (supersonic at altitude); range, unrefueled, intercontinental.

Armament: nuclear/non-nuclear, 125,000 lb.

B-52 Stratofortress

Although well into its third decade of operational service, the B-52 Stratofortress still constitutes the major piloted element of SAC. Three hundred and sixteen aircraft remain operational, and are capable of delivering a wide range of weapons, including conventional and nuclear bombs, and nuclear-tipped air-to-surface short-range attack missiles. Apart from its primary strategic mission, the B-52 can be deployed in four conventional roles: show of force; area denial; precision strikes; and defense suppression. Other missions in recent years have included sea-surveillance flights in cooperation with the US Navy and support for NATO exercises.

Since first entering USAF service in 1955, the B-52 has undergone numerous improvement programs in order to satisfy prevailing defense requirements. Versions still operational are: **B-52D,** total of 170 built with J57-P-29W turbojet engines, with delivery from December 1956. Eighty Ds were refurbished in 1975–77 to extend their service life: 75 continue in operational use, but it is proposed to retire all B-52Ds at the end of FY '83. **B-52G** introduced important changes including a redesigned wing containing integral fuel tankage, fixed underwing tanks, a new tail fin of reduced height and broader chord, and a remotely controlled tail turret which al-

B-1A

B-52G Stratofortress

lowed the gunner to be repositioned with the rest of the crew; deliveries began in February 1959 and 193 were built. **B-52H,** the final version, switched to TF33 turbofan engines, giving an increased range of more than 10,000 miles, and has improved defensive armament, including a Vulcan multibarrel tail gun; 102 were built, with deliveries starting in May 1961.

Under a major USAF program initiated in 1971, 281 B-52Gs and Hs were modified to carry 20 AGM-69A Short-Range Attack Missiles (SRAM), six under each wing and eight in the bomb bay. Additionally, all Gs and Hs have been equipped with an AN/ASQ-151 Electro-optical Viewing System (EVS), using forward-looking infrared (FLIR) and low-light-level TV sensors to improve low-level flight capability. Under USAF improvement programs, initiated in 1974, about 270 Gs and Hs are being progressively updated with Phase VI avionics. This includes ALQ-122 SNOE (Smart Noise Operation Equipment) countermeasures and AN/ALQ-155(V) advanced ECM; an AFSATCOM kit permitting worldwide communication via satellite; a Dalmo Victor ALR-46 digital radar warning receiver; Westinghouse ALQ-153 pulse-Doppler tail warning radar; and ITT Avionics ALQ-172 jammers. Boeing is also producing an Offensive Avionics System (OAS) to upgrade the navigation and weapons delivery of the B-52G/H during low-level penetration missions. This is a digital-based, solid-state system, and includes Tercom (terrain comparison) guidance. The first use of the OAS to launch a live SRAM occurred in June 1981; the program is scheduled for completion by FY '89.

Because of the long range and updated penetration capabilities of their aircraft, two B-52H wings of the 57th Air Division at Minot and Grand Forks AFBs, N. D., have been assigned to the Strategic Projection Force to support the Rapid Deployment Joint Task Force by employing airpower over great distances on short notice. In addition, the B-52G is being adapted as carrier aircraft for the air-launched cruise missile (ALCM). Full-scale development of the relevant equipment, as an integral part of the cruise missile program, began in 1978. By the end of FY '84, USAF expects to deploy ALCMs on 90 on-line B-52Gs, each with 12 external cruise missiles. Starting in 1985, as B-1Bs enter service, it will modify its B-52Hs also to carry ALCMs, for service well into the 1990s. Those B-52Gs not scheduled for use as cruise missile carriers will replace B-52Ds in a conventional/maritime support role. (Data for B-52G, except where noted.)

Contractor: Boeing Military Airplane Company.
Power Plant: eight Pratt & Whitney J57-P-43WB turbojet engines, each 13,750 lb thrust.
Accommodation: two pilots, side by side, plus navigator, radar-navigator, ECM operator, and tail gunner.
Dimensions: span 185 ft 0 in, length 160 ft 11 in, height 40 ft 8 in.
Weights: G/H models gross more than 488,000 lb, D model grosses more than 450,000 lb.
Performance (approx): max speed at 20,000 ft 660 mph, service ceiling 55,000 ft, range more than 7,500 miles.
Armament: D/G models have four 0.50 caliber guns in tail turret; H model has 20-mm gun; up to 20 SRAM missiles can be carried on G/H models, plus nuclear free-fall bombs. G/H models are being adapted to carry 12 AGM-86B/C ALCMs externally, with internal provision for eight more, or SRAMs or other weapons.

FB-111A

FB-111A

A two-seat, medium-range, high-altitude strategic bomber version of the basic swingwing F-111, the **FB-111A** was developed originally to provide SAC with a replacement for some of its B-52C/F versions of the Stratofortress and B-58A Hustlers. It is also capable of supersonic speed at sea level. The first of 76 production aircraft flew in July 1968, and the initial delivery was made in October 1969 to the 340th Bomb Group. Operational units equipped with a total of 56 FB-111As are the 380th and 509th Bomb Wings.

Contractor: General Dynamics Corporation.
Power Plant: two Pratt & Whitney TF30-P-7 turbofan engines; each 20,350 lb thrust with afterburning.
Accommodation: two, side-by-side.
Dimensions: span spread 70 ft 0 in, fully swept 33 ft 11 in, length 73 ft 6 in, height 17 ft 1.4 in.
Weight (approx): gross 100,000 lb.
Performance: max speed at 36,000 ft Mach 2.5, service ceiling more than 60,000 ft, range 4,100 miles with external fuel.
Armament: up to four AGM-69A SRAM air-to-surface missiles on external pylons, plus two in the weapons bay, or six nuclear bombs, or combinations of these weapons; provision for up to 31,500 lb of conventional bombs.

Fighters

F-4 Phantom II

F-5E Tiger II

F-4 Phantom II

The F-4 is gradually being replaced by the F-15 in active USAF units, but many hundreds are still operational in the United States, Europe, the Pacific, and Iceland, and are replacing older aircraft in reserve units. Although designed in the mid-1950s, continuous updating has maintained the effectiveness of the F-4s, some of which are scheduled to receive a low-smoke engine modification and radar warning receiver update under the FY '84 budget proposals. First Phantom version supplied to USAF was the **F-4C,** a two-seat twin-engine all-weather tactical fighter with J79-GE-15 turbojet engines, dual controls, an inertial navigation system, and boom flight refueling. F-4Cs still equip Air National Guard and Air Force Reserve units. The **F-4D** was developed from the F-4C with major systems changes, including new weapon ranging and release computers to increase accuracy in air-to-air and air-to-surface weapon delivery. The **F-4E** is a multirole fighter capable of performing counterair, close-support, and interdiction missions. A 20-mm Vulcan multibarrel gun is fitted, together with an improved fire-control system, and an additional fuselage fuel tank. Leading-edge slats, to improve maneuverability, were retrofitted to all USAF F-4Es. In addition, from early 1973, some were fitted with Northrop's target-identification system electro-optical (TISEO) as an aid to positive long-range visual identification of airborne or ground targets. System improvements include the Pave Tack system, which provides a day/night adverse weather capability to acquire, track, and designate ground targets for laser, infrared, and electro-optically guided weapons; the Pave Spike day tracking/laser ordnance designator pod, for use with "smart" weapons; and a digital intercept computer that includes launch computations for USAF AIM-9 and AIM-7 missiles. The **F-4G** "Advanced Wild Weasel" is a modified F-4E with sophisticated electronic warfare equipment that enables it to detect, identify, and locate enemy radars, and to direct against them weapons for their destruction or suppression. Changing EW threats are covered by use of reprogrammable software. Primary armament includes Shrike (AGM-45) and Standard ARM (AGM-78), with optional availability of the CBU Rockeye area weapon for suppression purposes, and the AGM-65 Maverick. First F-4Gs entered service with 35th TFW at George AFB, Calif., in October 1978; modification of 96 aircraft had been completed by the beginning of 1981. Introduction of the ABM-88 HARM antiradiation missile in 1985 will increase the F-4G's lethality; accuracy will be enhanced when the precision location strike system (PLSS) is deployed. (Data for F-4E.)

Contractor: McDonnell Aircraft Company, Division of McDonnell Douglas Corporation.
Power Plant: two General Electric J79-GE-17A turbojets, each 17,900 lb thrust with afterburning.
Accommodation: pilot and weapon systems operator in tandem.
Dimensions: span 38 ft 7½ in, length 63 ft 0 in, height 16 ft 5½ in.
Weights: empty 30,328 lb, gross 61,795 lb.
Performance: max speed at 40,000 ft, Mach 2.0 class, range with typical tactical load 1,300 miles.
Armament: one 20-mm M-61A1 multibarrel gun; provision for up to four AIM-7E Sparrow, AGM-45A Shrike, or AIM-9 Sidewinder missiles on four underfuselage and four underwing mountings, or up to 16,000 lb external stores.

F-5E/F Tiger II

Developed as the successor to Northrop's F-5A export fighter, the Tiger II is intended primarily to provide America's allies with an uncomplicated air-superiority tactical fighter, which can be operated and maintained relatively inexpensively. The single-seat **F-5E,** first flown in August 1972, is basically a VFR day/night fighter with limited all-weather capability. Design emphasis is on maneuverability rather than high speed, notably through the use of maneuvering flaps. More than a thousand F-5Es and two-seat **F-5Fs** have been delivered to fifteen countries. TAC, assisted by ATC, trains pilots and technicians of user air forces. For this purpose, 20 F-5Es were supplied to USAF, beginning in April 1973, before deliveries to foreign governments began late that year. TAC also operates two "aggressor squadrons" of camouflaged F-5Es, simulating late-model MiG threat aircraft, in "Red Flag" exercises at Nellis AFB, Nev. Similar training is provided by F-5Es of the 527th Tactical Fighter Training Aggressor Squadron, USAFE, at RAF Alconbury, England; and by PACAF's 26th Tactical Fighter Training Squadron, located at Clark AB, Philippines. (Data for F-5E.)

Contractor: Northrop Corporation, Aircraft Division.
Power Plant: two General Electric J85-GE-21B turbojet engines; each 5,000 lb thrust with afterburning.
Accommodation: pilot only.

Dimensions: span 26 ft 8 in, length 47 ft 4¾ in, height 13 ft 4 in.
Weights: empty 9,723 lb, gross 24,722 lb.
Performance (at 13,350 lb): max level speed at 36,000 ft Mach 1.64, service ceiling 51,800 ft, range with max fuel, with reserve fuel for 20 min max endurance at S/L (with external tanks retained) 1,543 miles.
Armament: two AIM-9 Sidewinder missiles on wingtip launchers; two M-39A2 20-mm cannon in nose, with 280 rounds per gun (one 20-mm in F-5F); up to 7,000 lb of mixed ordnance on four underwing attachments and one underfuselage station. Optional armament and equipment includes AGM-65 Maverick, laser-guided bombs, centerline multiple ejector rack, and (F-5F only) a laser designator.

F-15 Eagle

Since the mid-'70s, the original single-seat **F-15A** and two-seat **F-15B** have progressively replaced the F-4 as USAF's primary air-superiority aircraft. From June 1979, they have been followed by the single-seat **F-15C** and two-seat **F-15D,** which have 2,000 lb of additional internal fuel and provision for carrying conformal fuel tanks known as FAST Packs. Developed specially for the F-15, FAST Packs can accommodate reconnaissance sensors, radar detection and jamming equipment, a laser designator, and low-light-level TV and cameras, in addition to fuel. FAST Packs have been ordered to ensure optimum effectiveness of F-15s assigned to the Rapid Deployment Force. In addition, these aircraft are being equipped with BRU-26A/A six-station bomb racks, permitting multiple bomb drops at supersonic speed. Since the middle of 1980, F-15C/Ds have been fitted with a programmable signal processor and expanded computer to enhance radar capability and flexibility. Planned production of all models totals 1,472 aircraft for USAF, plus the 20 R&D models, by the early 1990s. Orders to date total 756 for operational use by USAF, with an additional 48 requested in the FY '84 budget proposals, and 72 to be proposed in FY '85. F-15s are in operational service with TAC's 1st TFW at Langley AFB, Va., 49th TFW at Holloman AFB, N. M., and 33d TFW at Eglin AFB, Fla.; USAFE's 36th TFW at Bitburg AB, Germany, and 32d TFS at Camp New Amsterdam, the Netherlands; and PACAF's 18th TFW at Kadena AB, Okinawa, Japan. The 48th Fighter Interceptor Squadron at Langley AFB, Va., has completed conversion as the first US air defense squadron to receive the Eagle. F-15 pilot training is accomplished at Luke AFB, Ariz., in both single-seat and two-seat Eagles. Specialized equipment in the F-15 includes a lightweight Hughes radar system for long-range detection and tracking of small high-speed objects operating at all heights down to treetop level, and for ensuring effective weapons delivery, with a head-up display for close-in dogfights. The IFF system embodies a Hazeltine interrogator to inform the pilot if an aircraft seen visually or on radar is friendly; an inertial navigation system is fitted.

In April 1981, a USAF F-15 equipped with a Martin Marietta ATLIS II automatic tracking and laser illumination system pod and associated internal modifications began a fifteen-month 150-flight test program as part of the Integrated Flight Fire Control (IFFC)/Firefly III program. The optical sensor/tracker pod enables air-to-air weapons to be fired accurately at simulated targets while the F-15 maneuvers at high offset angles, for the first time in the case of a USAF fighter. An industry-sponsored derivative all-weather version with improved air-to-ground capability, the **Enhanced Eagle,** is being evaluated by USAF as a possible next-generation dual air-to-air and deep interdiction fighter. Eight world time-to-height records were set by the specially prepared F-15 **Streak Eagle** in early 1975, of which six remain unbeaten, including climb to 20,000 m (65,616 ft) in 2 min 2.94 sec. (Data for F-15C.)
Contractor: McDonnell Aircraft Company, Division of McDonnell Douglas Corporation.
Power Plant: two Pratt & Whitney F100-PW-100 turbofan engines; each approx 23,930 lb thrust.
Accommodation: pilot only.
Dimensions: span 42 ft 9¾ in, length 63 ft 9 in, height 18 ft 5½ in.
Weights: empty 27,300 lb; gross F-15A 56,000 lb; F-15C 68,000 lb.
Performance: max speed Mach 2.5, combat ceiling 65,000 ft, ferry range, without external fuel tanks, more than 2,878 miles.
Armament: one internally mounted M-61A1 20-mm multibarrel cannon; four AIM-9L Sidewinder and four AIM-7F Sparrow air-to-air missiles carried externally. Provision for carrying up to 16,000 lb of ordnance on weapon stations.

F-16 Fighting Falcon

Advanced technologies incorporated in the F-16 Fighting Falcon make it one of the most maneuverable fighters ever built. The advances include: decreased structural weight through the use of composites; decreased drag resulting from reduced static stability margin; fly-by-wire flight controls with side stick force controller; high *g* tolerance/high visibility cockpit with a 30-degree reclined seat and single-piece bubble canopy; blended wing-body aerodynamics with forebody strakes; and automatically variable wing leading-edge flaps. The F-16 is powered by a single afterburning turbofan engine. All digital avionics are integrated through a digital multiplex system, to reduce permanent wiring as well as to take advantage of the versatility of modern high-speed computers. Other equipment includes a multimode radar with clutter-free look-down capability, advanced radar warning receiver, a head-up display, internal chaff or flare dispensers, and a 500-round 20-mm internal gun. The aircraft also has provisions for ECM. To date, USAF has initiated procurement of 725 F-16s and advance buy of 360 additional F-16s under a multiyear contract for 120 aircraft per year through 1985. The total planned purchase of F-16s has been increased (from 1,388 to 2,165) to support USAF efforts to build toward a force structure that increases the number of tactical wings. The F-16 was developed to replace F-4 aircraft in the active force, and to modernize the Air Reserve Forces. The first F-16 to enter operational service was delivered to USAF's 388th TFW at Hill AFB, Utah, in January 1979. TAC had in early 1983 a total of 490 F-16s in its inventory. Three squadrons joined USAFE's 50th TFW at Hahn AB in West Germany last year, followed by activation of the 363d TFW at Shaw AFB, S. C. Earlier, USAF activated the 56th TTW at MacDill AFB, Fla. (TAC), the 474th TFW at Nellis AFB, Nev. (TAC), and 8th TFW at Kunsan AB, Korea (PACAF). The 169th TFG at McEntire ANGB, S. C., is converting from the A-7D to the F-16 this year, the first ANG unit to receive the new fighter. In addition, under coproduction arrangements, four NATO allies (Belgium, Denmark, the Netherlands, and Norway) placed initial orders for 348 F-16s, with substantial follow-on orders either made or planned. The first European aircraft flew in December 1978 and was accepted by Belgium in January 1979. Deliveries have also been made to Israel, which has purchased 75 F-16s and has plans to buy more, and Egypt, Pakistan, Korea, and Venezuela. A forward-looking plan for the F-16, known as the Multinational Staged Improvement Program (MSIP), was implemented by USAF in February 1980. This assures the aircraft's capability to accept future systems now under development, thereby minimizing retrofit costs. As a first stage, all F-16s delivered since November 1981 have built-in structural and wiring provisions and systems architecture that will expand the single-seater's multirole flexibility to perform precision strike, night attack, and beyond-visual-range interception missions. Future systems improvements will include installation of AMRAAM air-to-air missiles and LANTIRN nav/attack system. Initial operational capability is scheduled for December 1984, under the designations **F-16C** (single-seat) and **F-16D** (two-seat). A sophisticated research version, **AFTI F-16,** is being used to test and evaluate advanced flight control systems at Edwards AFB. In late 1980, General Dynamics initiated company-sponsored development of a new version of the F-16, designated **F-16XL,** to enhance its air-to-surface capabilities while still maintaining air-superiority characteristics. The major difference between the F-16XL and the basic F-16 is its significantly enhanced aerodynamic configuration, with a unique "cranked arrow" wing planform, which allows improved range, military load, penetration speed, and maneuverability. Flight demonstration testing of the first (single-seat) prototype started in July 1982, followed by the first flight of a second (two-seat) prototype in October 1982. USAF is currently evaluating this version as a possible next-gen-

F-15 Eagle

F-16 Fighting Falcon

eration dual air-to-air and deep interdiction fighter. The Air Force Thunderbird Air Demonstration Squadron has reequipped with the standard F-16 for the 1983 season. (Data for F-16A.)

Contractor: General Dynamics Corporation.

Power Plant: one Pratt & Whitney F100-PW-200(3) turbofan engine; approximately 25,000 lb thrust with afterburning.

Accommodation: pilot only.

Dimensions: span 32 ft 10 in, length overall 49 ft 5.9 in, height 16 ft 8½ in.

Weights: empty 15,586 lb; gross with external loads 35,400 lb.

Performance: max speed Mach 2 class, service ceiling more than 50,000 ft, ferry range more than 2,000 miles.

Armament: one M-61A1 20-mm multibarrel cannon, with 500 rounds, mounted in fuselage; externally mounted infrared missiles; seven other external stores stations for fuel tanks and air-to-air and air-to-surface munitions.

F-105 Thunderchief

F-105 Thunderchief

The **F-105D** single-seat, all-weather fighter-bomber and two-seat **F-105F** will disappear from service next year when AF Reserve's 466th TFS, at Hill AFB, Utah, converts to F-16s. (Data for F-105D.)

Contractor: Fairchild Republic Division of Fairchild Industries.

Power Plant: one Pratt & Whitney J75-P-19W turbojet engine; 26,500 lb thrust with afterburning and water injection.

Accommodation: pilot only.

Dimensions: span 34 ft 11¼ in, length 67 ft 0¼ in, height 19 ft 8 in.

Weights: empty 27,500 lb, gross 52,546 lb.

Performance: max speed at 38,000 ft Mach 2.1, service ceiling 52,000 ft, max range more than 1,842 miles.

Armament: one General Electric 20-mm Vulcan multibarrel gun and more than 14,000 lb of stores under fuselage and wings.

F-106 Delta Dart

F-106 Delta Dart

The F-106 all-weather fighter was developed in the mid-1950s. Constant updating enabled USAF to maintain its effectiveness, and nine squadrons still serve with active Air Force and ANG units. Force modernization plans call for their gradual reequipment, and three squadrons will convert to F-15s and F-4s in FY '84. The two production versions are the **F-106A** single-seat interceptor, and the **F-106B,** a tandem two-seat dual-purpose combat trainer. (Data for F-106A.)

Contractor: Convair Division of General Dynamics.

Power Plant: one Pratt & Whitney J75-P-17 turbojet engine; 24,500 lb thrust with afterburning.

Accommodation: pilot only.

Dimensions: span 38 ft 3½ in, length 70 ft 8¾ in, height 20 ft 3⅓ in.

Weights (approx): empty 25,300 lb, gross 42,400 lb.

Performance (approx): max speed at 40,000 ft Mach 2.0, service ceiling 65,000 ft, range 1,200 miles.

Armament: one AIR-2A Genie unguided nuclear-warhead rocket; four AIM-4F/G Falcon air-to-air missiles carried internally; and a 20-mm cannon on most F-106As.

F-111

F-111

Four versions of this pioneer variable-geometry tactical fighter are currently in service with USAF. Initial **F-111A** aircraft, delivered to a training unit in July 1967, were development models. Deliveries of production aircraft to the first operational wing began in October 1967. A total of 141 production F-111As was built; this version served with distinction in SEA in 1972–73 and currently equips the 366th TFW. The A was superseded in production by the **F-111E,** a version with modified air intakes that improved engine performance above Mach 2.2. Ninety-four were built, and most of these serve with the 20th TFW, based at RAF Upper Heyford in the UK in support of NATO. The replacement of current analog bombing and navigation systems with digital equipment is planned for 1987. This will enable F-111A/E aircraft to handle modern guided munitions and advanced sensors, as well as future systems such as Navstar and JTIDS. The **F-111D** was designed with advanced avionics, offering improvements in navigation and air-to-air weapon delivery. Ninety-six were built and equip the 27th TFW at Cannon AFB, N. M. The **F-111F,** of which 106 were built, has uprated turbofans. Equipping the 48th TFW at RAF Lakenheath, this version is now modified to carry in its weapons bay the Pave Tack system, which provides a day/night capability to acquire, track, and designate ground targets for laser, infrared, and electro-optically guided weapons.

Production of the F-111 was completed in 1976. Its EW capabilities are being updated with the ALQ-131 ECM pod system. In addition, last year, a Grumman/Norden Pave Mover battlefield surveillance radar was installed in a belly pod on an F-111A. Initial flight testing involved location of surface targets and directing attack on them. Subsequent tests were to evaluate the capability of directing surface-to-surface weapons equipped with guided submunitions under the DARPA Assault Breaker program. The **EF-111A,** an ECM conversion of the F-111A, is in production by Grumman *(see page 152).* SAC has a strategic bomber version of the F-111, designated **FB-111A** *(see page 148).* The Royal Australian Air Force acquired 24 **F-111Cs** for strike duties, four of which have since been modified for tactical reconnaissance.

Contractor: General Dynamics Corporation.

Power Plant: F-111A/E; two Pratt & Whitney TF30-P-3 turbofan engines; each 18,500 lb thrust with afterburning. F-111D: two TF30-P-9 turbofan engines; each 19,600 lb thrust with afterburning. F-111F: two TF30-P-100 turbofan engines; each approx 25,100 lb thrust with afterburning.

Accommodation: crew of two side-by-side in escape module.

Dimensions: span spread 63 ft 0 in, fully swept 31 ft 11.4 in, length 73 ft 6 in, height 17 ft 1.4 in.

Weights (F-111F): empty 47,481 lb, gross 100,000 lb.

Performance (F-111F): max speed at S/L Mach 1.2, max speed at altitude Mach 2.5, service ceiling more than 59,000 ft, range with max internal fuel more than 2,925 miles.

Armament: one 20-mm M-61A1 multibarrel cannon and two nuclear bombs in internal weapon bay; four swiveling wing pylons carrying total external load of up to 25,000 lb of bombs, rockets, missiles, or fuel tanks.

Attack and Observation Aircraft

A-7 Corsair II

A-7D/K Corsair II

The **A-7D** Corsair II is a single-seat, subsonic tactical fighter, 459 of which were delivered to USAF between 1968 and 1976. The 354th TFW, first operational unit equipped with A-7Ds, demonstrated the outstanding target kill capability of the type in Southeast Asia. Accuracy is achieved with the aid of a continuous-solution navigation and weapon-delivery system, including all-weather radar bomb delivery. Additionally, 383 A-7Ds were modified to carry a Pave Penny laser target designation pod.

Since 1973, A-7Ds, including all those operated formerly by the active AF, have been delivered to ANG units in eleven states and Puerto Rico. To facilitate transition training, 30 two-seat **A-7Ks** have been funded. One is assigned to each of the ANG's 14 A-7D units, and 16 to the 162d Tactical Fighter Training Group in Tucson, Ariz. First production A-7K entered service in April 1981. The aircraft's combat capability is retained. (Data for A-7D.)

Contractor: Vought Corporation, subsidiary of the LTV Corporation.

Power Plant: one Allison TF41-A-1 non-afterburning turbofan engine: 14,500 lb thrust.

Accommodation: pilot only.

Dimensions: span 38 ft 9 in, length 46 ft 1½ in, height 16 ft 0¾ in.

Weights: empty 19,781 lb, gross 42,000 lb.

Performance: max speed at S/L 698 mph, ferry range with external tanks 2,871 miles.

Armament: one M-61A1 20-mm multibarrel gun; up to 15,000 lb of air-to-air or air-to-surface missiles, bombs, rockets, or gun pods on six underwing and two fuselage attachments; Pave Penny AN/AAS-35 laser target designation pod installed on 383 aircraft.

A-10 Thunderbolt II

A-10 Thunderbolt II

Designed specifically for the close air support (CAS) mission, the A-10 offers a combination of large military load, long loiter, and wide combat radius. It can carry up to 16,000 lb of mixed ordnance with partial fuel, or 12,086 lb with full internal fuel. The 30-mm GAU-8/A gun can fire 2,100 or 4,200 rds/min. and provides a cost-effective weapon with which to defeat the whole array of ground targets encountered in the CAS role, including tanks. The A-10 achieves its survivability through a combination of high maneuverability and design features that make it a "hard" aircraft. Equipment includes a head-up display, laser seeker, target penetration aids, and associated equipment for Maverick missiles.

Funding was terminated in 1982, after 707 A-10s had been ordered. The first operational squadron was activated at Myrtle Beach AFB, S. C., in June 1977, and achieved operational capability in October. In early 1978,

the 354th TFW began operating A-10s equipped with the Pave Penny laser target designation pod, now approved as standard equipment for the aircraft. Future A-10 enhancements are expected to include installation of the Martin Marietta LANTIRN fire control pod to improve night/adverse weather capability and, possibly, EL (electroluminescent) lighting to improve pilot vision during night-time missions. In addition, funding is being requested in the FY '84 budget proposals for an inertial navigation system (INS) for the A-10.

Six squadrons of A-10s have been deployed at RAF Bentwaters and Woodbridge in the UK; the 18th TFS is now located at Eielson AFB, Alaska, and the 25th TFS at Suwon AB, Korea. A-10 equipment of five ANG and four Air Force Reserve tactical fighter squadrons will be completed this year with the conversion of the last unit, the 303d TFS (AFRES).

Contractor: Fairchild Republic Company, Division of Fairchild Industries.
Power Plant: two General Electric TF34-GE-100 turbofan engines; each approx 9,065 lb thrust.
Accommodation: pilot only.
Dimensions: span 57 ft 6 in, length 53 ft 4 in, height 14 ft 8 in.
Weights: empty 24,959 lb, max gross 50,000 lb.
Performance: combat speed at S/L, clean 439 mph; range with 9,500 lb of weapons and 1.8 hr loiter, 20 min reserve, 288 miles.
Armament: one 30-mm GAU-8/A gun; eight underwing hard points and three under fuselage for up to 16,000 lb of ordnance, including various types of free-fall or guided bombs, gun pods, or 6 AGM-65 Maverick missiles, and jammer pods. Chaff and flares carried internally to counter radar or infrared directed threats. The centerline pylon and the two flanking fuselage pylons cannot be occupied simultaneously.

AC-130A/H

AC-130As serve with the Air Force Reserve's 711th SOS at Eglin AFB, Fla. **AC-130Hs** continue in active service with TAC's 1st Special Operations Wing. AC-130As are equipped with two 40-mm cannon, two 20-mm Vulcan cannon, and two 7.62-mm Miniguns. AC-130Hs are similar, except that one 40-mm cannon is replaced with a 105-mm howitzer. Both models are equipped with sensors and target acquisition systems, including forward-looking infrared and low-light-level TV. AC-130Hs are equipped for inflight refueling.

Contractor: Greenville (Texas) Division of E-Systems, Inc. Other data basically as for C-130 *(page 154)*.

O-2A

A total of 346 specially equipped variants of the "push-and-pull" Cessna 337 Skymaster was ordered by USAF from 1966, originally to replace the Cessna O-1 in the forward air controller role in Vietnam. Though OA-37s and OV-10s are replacing O-2s, a few of these aircraft are still in use in active and ANG units. Specialized equipment and electronics in the O-2A permit control of air strikes, visual reconnaissance, target identification and marking, ground-air coordination, and damage assessment.

Contractor: Cessna Aircraft Company.
Power Plant: two Continental IO-360-C/D piston engines; each 210 hp.
Accommodation: pilot and observer side-by-side; one passenger optional.
Dimensions: span 38 ft 2 in, length 29 ft 9 in, height 9 ft 2 in.
Weights: empty 2,848 lb, gross 5,400 lb.
Performance: max speed at S/L 199 mph, service ceiling 19,300 ft, range 1,060 miles.
Armament: four underwing pylons can carry light ordnance, including a 7.62-mm Minigun pack.

OA-37B Dragonfly

A-37B Dragonfly ground support aircraft withdrawn from operational service with AFRES are being adapted for forward air control duty, replacing O-2As in some ANG squadrons and the 16 OV-10s of PACAF's 19th Tactical Air Support Squadron, Osan AB, South Korea. There are some OA-37Bs in the TAC inventory.

Contractor: Cessna Aircraft Company.
Power Plant: two General Electric J85-GE-17A turbojet engines; each 2,850 lb thrust.
Accommodation: two, side-by-side.
Dimensions: span over tip-tanks 35 ft 10½ in, length excluding fuel probe 28 ft 3¼ in, height 8 ft 10½ in.
Weights: empty 6,211 lb, gross 14,000 lb.
Performance: max level speed at 16,000 ft 507 mph, service ceiling 41,765 ft, range with max payload, including 4,100 lb ordnance, 460 miles.
Armament: one GAU-2B/A 7.62-mm Minigun installed in forward fuselage, four pylons under each wing able to carry various combinations of rockets and bombs.

OV-10A Bronco

This counterinsurgency combat aircraft, first flown in August 1967, was acquired by USAF for use in the forward air control role, and for limited quick-response ground support pending the arrival of tactical fighters. One hundred and fifty-seven were delivered to USAF before production of the OV-10A for the US services ended in April 1969. Some are replacing older O-2As, the latest unit to reequip being the 22d Tactical Air Support Squadron at Wheeler AFB, Hawaii. Versions are also in service with USN, US Marine Corps, and foreign air forces.

Contractor: Rockwell International Corporation, Aircraft Operations.
Power Plant: two Garrett T76-G-416/417 turboprop engines; each 715 hp.
Accommodation: two, in tandem.
Dimensions: span 40 ft 0 in, length 41 ft 7 in, height 15 ft 2 in.
Weights: empty 6,893 lb, overload gross weight 14,444 lb.
Performance: max speed at S/L, without weapons, 281 mph; service ceiling 24,000 ft; combat radius with max weapon load, no loiter, 228 miles.
Armament: four fixed forward-firing M-60C 7.62-mm machine-guns; four external weapon attachment points under short sponsons, for up to 2,400 lb of rockets, bombs, etc; fifth point, capacity 1,200 lb, under center fuselage. Provision for carrying one Sidewinder missile on each wing and, by use of a wing pylon kit, various stores, including rocket and flare pods, and free-fall ordnance. Max weapon load 3,600 lb.

AC-130

O-2A

OA-37B Dragonfly

OV-10A Bronco

Reconnaissance and Special-Duty Aircraft

SR-71A/C Blackbird

Fastest, highest-flying production aircraft yet built, the multisensored **SR-71A** Blackbird is deployed at the 9th Strategic Reconnaissance Wing, Beale AFB, Calif.; its mission is to support national or strategic requirements and to support theater commanders in peacetime and during limited conflict. Equipment carried ranges from simple battlefield surveillance systems to systems capable of specialized coverage of up to 100,000 sq miles of territory in one hour. In July 1976, flown by three USAF crews, SR-71As set an absolute world speed record of 2,193.167 mph over a 15/25 km straight course, a speed of 2,092.294 mph around a 1,000-km closed circuit; and a sustained altitude of 85,069 ft in horizontal flight. Another SR-71A flew from New York to London, England, in 1 hr 54 min 56.4 sec in September 1974, at an average speed of 1,806.987 mph. The prototype flew for the first time in December 1964, and delivery of production aircraft began in January 1966. The **SR-71C** is a two-seat training version, with elevated rear cockpit.

Contractor: Lockheed Corporation.
Power Plant: two Pratt & Whitney JT11D-20B(J58) turbojet engines; each 34,000 lb thrust with afterburning.
Accommodation: crew of two in tandem.
Dimensions: span 55 ft 7 in, length 107 ft 5 in, height 18 ft 6 in.
Weights (estimated): empty 60,000 lb, gross 170,000 lb.
Performance (estimated): max speed at 78,750 ft more than Mach 3, operational ceiling above 80,000 ft, range at Mach 3.0 (1,980 mph) at 78,750 ft 2,982 miles.
Armament: none.

U-2 and TR-1

Production of the basic U-2 began in the late 1950s. It is essentially a powered glider, with high aspect ratio wing and lightweight structure, evolved to carry out clandestine strategic reconnaissance for long periods at very high altitudes over non-allied nations. Fifty-five are believed to have been built, including 2 prototypes, 48 single-seat **U-2A** versions, and 5 two-seat **U-2Ds.** The J57-P-37A turbojet of the U-2A was replaced by a more powerful J75-P-13, adapted to run on low-volatility fuel, in the U-2B. Versions such as the **U-2CT** tandem-cockpit trainer, **U-2EPX** (electronics patrol experimental), **WU-2** weather reconnaissance model, and **HASPU-2** (high-altitude sampling program) are conversions of basic models. All have similar dimensions except for the **U-2R,** which has much increased span and length. This is now the primary version, with eight remaining in first-line service and a further two ordered in FY '83.

A derivative of the U-2R, the **TR-1A,** is a single-seat

SR-71 Blackbird

U-2R

tactical reconnaissance aircraft designed for high-altitude standoff surveillance missions, primarily in Europe. Initial funding was provided in the FY '79 budget. A total of ten was requested through FY '82, a further four aircraft ordered in FY '83, and five requested in the FY '84 budget proposals. It is expected that 35 will be acquired eventually by USAF, including two two-seat **TR-1Bs.** Each will be equipped with electronic sensors to provide continuously available, day or night, all-weather surveillance of the battle area, or potential battle area, in direct support of US and allied ground and air forces during peace, crises, and war situations. Currently planned equipment includes modern ECM, an advanced synthetic aperture radar system (ASARS) for standoff imagery, and communications intelligence sensors, or the Precision Location Strike System (PLSS) for use against enemy radar emitters. Although PLSS is a strike system, it is inherently capable of elint data collection. Ten of the planned total of 35 TR-1s are to be allocated to the PLSS role. The first TR-1A flew on August 1, 1981, and pilot training at Beale AFB began later that year. The first of 18 TR-1s planned to be stationed at RAF Alconbury in the UK arrived in February of this year. Although operating in Europe, they will remain under the jurisdiction of SAC rather than USAFE.

Air Force U-2s have performed important nonmilitary missions, including flights for the Department of Agriculture land management and crop estimate programs; photographic work in connection with flood, hurricane, and tornado damage; data gathering for a geothermal energy program; and search missions for missing boats and aircraft. (Data for TR-1A.)

Contractor: Lockheed Corporation.

Power Plant: one Pratt & Whitney J75-P-13B turbojet engine; 17,000 lb thrust.

Dimensions: span 103 ft 0 in, length 63 ft 0 in, height 16 ft 0 in.

Weight: gross 40,000 lb.

Performance: max cruising speed at over 70,000 ft more than 430 mph, operational ceiling 90,000 ft, range more than 3,000 miles.

Armament: none.

RF-4C

Developed to replace the day-only RF-101, the **RF-4C** is an unarmed multisensor version of the F-4C Phantom II, designed for day/night, all-weather reconnaissance operations. The first production model flew in May 1964, and 505 were built before manufacture ended in December 1973. They are operated by six TAC, USAFE, and PACAF tactical reconnaissance squadrons; and by seven squadrons of the ANG. The RF-4 was the first tactical aircraft equipped with a forward-looking radar capable of simultaneous terrain-following and low-altitude navigation. The basic aircraft is configured with conventional optical cameras for day operations, and infrared (IR) sensors for night. Both the radar and the camera systems are housed in a modified nose, which increases the length of the aircraft by 33 in compared with the fighter version. USAF is currently replacing the original IR sensor with the higher-resolution AAD-5 set. Eleven RF-4Cs (with 17 planned) are equipped with side-looking airborne radar (SLAR) for all-weather standoff battlefield surveillance, and 24 with a tactical electronic reconnaissance (TEREC) sensor for locating electronic emitters. Current modifications include the ARN-101 digital avionics system for improved navigation accuracy and greater reconnaissance capability; the Pave Tack IR pod for improved target locating by day, night, or in marginal weather; and data link transmission of SLAR and TEREC intelligence in near real-time to enhance timeliness of information to tactical decision-makers. (Data similar to F-4.)

RF-4C

RC-135V

EF-111A

EC-130E/H

The **EC-130E** electronic surveillance version of the C-130E Hercules was developed for USAF as an airborne battlefield command and control center to replace the ANG EC-121. Major exterior modifications include large blade antennas under each outer wing and above the dorsal fin, with a smaller horizontal blade antenna on each side of the rear fuselage. Bullet-shape canisters outboard of each underwing antenna and at the extreme tail of the aircraft house trailing-wire antennas that extend several hundred feet behind the EC-130E in flight. Equipment includes the ABCCC/USC-15 airborne battlefield command and control center capsule, which fits into the cargo hold. The capsule accommodates 12–16 personnel and incorporates 20 different radios, plus secure teletype and voice communications capability, and automatic radio relay.

Less is known about the Compass Call **EC-130H,** which works with ground mobile C^{3}CM systems to jam enemy command control and communications systems. It was scheduled to enter service during 1982.

Both EC-130 versions are operated by the 552d Airborne Warning and Control Wing, Tinker AFB, Okla. (Data similar to C-130.)

EC-135, etc.

Several aircraft in the KC-135 Stratotanker series were modified for specialized missions during production or at a later date. Basically similar to the KC-135A but with 18,000 lb thrust TF33 turbofans, the EC-135C (originally designated KC-135B) is equipped as an airborne command post in support of SAC's airborne alert role, and is fitted with extensive communications equipment. As part of the strategic C^3 modernization program, a number of improvements and modifications are under way, including the hardening of the EC-135 against nuclear effects and the development of systems with antijam features. FY '84 budget proposals include a request for a higher-powered 100kW airborne transmitter for the EC-135. EC-135Cs can be refueled by SAC tankers. Fourteen were built and have been adapted to provide control of Minuteman ICBMs. At least one SAC EC-135C is airborne at all times, accommodating a flight crew of 5, a general officer, and a staff of 18. TAC provides overseas deployment control of tactical fighters with the **EC-135K.** Versions of the C-135 Stratolifter series used for reconnaissance include turbofan **RC-135Vs,** equipped also for electronic reconnaissance with SAC; **RC-135Ss** and **RC-135Us. WC-135Bs,** converted C-135Bs, are used by MAC for long-range weather reconnaissance missions. In addition, a highly instrumented version, designated **NKC-135** ALL (Airborne Laser Laboratory), is being utilized by USAF as a test-bed in support of the HEL (High Energy Laser) research program. The primary objective is to acquire technology data on laser operations that might have combat potential in the airborne environment.

In order to minimize the cost of retrofitting the special-purpose -135s with more efficient turbofan engines, USAF is installing refurbished Pratt & Whitney JT3D-3Bs taken from Boeing 707-100B aircraft, purchased as surplus from commercial air carriers. The first reengined aircraft was redelivered in January last year. The program is continuing. (Data basically as C-135, page 155.)

EF-111A

The EF-111A is a conversion of the basic General Dynamics F-111A airframe fitted with mainly off-the-shelf components that enable it to accomplish important defense suppression missions in worldwide support of US tactical strike forces. Its ALQ-99E primary jammer is a modification of the Navy ALQ-99, and is carried internally. Other equipment includes self-protection systems from the F/FB-111 (ALQ-137/ALR-62), and USAF is investigating a modular addition to the ALQ-131 jammer pod that would enable it to be carried underwing to provide additional radar surveillance and complementary support jamming. The crew capsule is revised, and a new vertical stabilizer is required to house ALQ-99E receivers.

Forty-two EF-111As are being produced for missions that will include barrier surveillance jamming, suppression of surface-to-air missile threats during close air support operations, and escort jamming for deep strike missions. Flight testing began in March 1977, continuing through December 1979, to ensure that system effectiveness and reliability/maintainability had been achieved. Production aircraft are deployed initially with the 388th Electronic Combat Squadron, established at Mountain Home AFB, Idaho, in FY '82. Initial operational capability is scheduled for November of this year. Second operational location will be at RAF Upper Heyford in the UK.

Contractor: Grumman Aerospace Corporation.

Power Plant: two Pratt & Whitney TF30-P-3 turbofan engines, each 18,500 lb thrust with afterburning.

Accommodation: crew of two, side-by-side in escape module.

Dimensions: span spread 63 ft 0 in, fully swept 31 ft 11.4 in, length 76 ft 0 in, height 20 ft 0 in.

Weights: empty 55,275 lb, gross 89,000 lb.

Performance: max combat speed 1,377 mph, service ceiling with afterburning at combat weight 45,000 ft,

combat radius with reserves 230–929 miles, according to mission.
Armament: none.

E-3 Sentry (AWACS)

AWACS was conceived essentially as a mobile, flexible, survivable, and jamming-resistant surveillance and command control and communications (C^3) system, capable of all-weather, long-range, high- or low-level surveillance of all air vehicles, manned or unmanned, above all kinds of terrain. A modified Boeing 707-320B carries an extensive complement of mission avionics, including computer, radar, IFF, communications, display, and navigation systems. The unique capability of AWACS is provided by its Westinghouse Electric Corporation look-down radar, which makes possible all-altitude surveillance over land or water, thus correcting a serious deficiency in earlier surveillance systems.

USAF indicated an initial requirement for 34 AWACS aircraft. Deliveries of the basic version, designated **E-3A** Sentry, began in March 1977, when the first aircraft was handed over to TAC's 552d Airborne Warning and Control Wing at Tinker AFB, Okla. Twenty-eight aircraft have been delivered to date, and the 34th is expected to be completed by 1985. However, the FY '84 budget proposals include a request for long-lead funding to cover procurement of an additional 12 Sentrys through FY '88, at the rate of three a year from FY '85, to supplement surveillance coverage for NORAD. Eighteen further E-3As are being acquired by NATO to upgrade the command and control of its air defense forces.

In December 1976, Westinghouse was contracted to develop a maritime surveillance capability that could be incorporated retrospectively in the radar of all operational E-3As. Aircraft from production system 22 embody this maritime mission capability, including the NATO models. A new US/NATO standard configuration was introduced from the 25th USAF Sentry, delivered in December 1981. In this, the standard 13 available communication links of the E-3A are replaced by the newly developed joint tactical information distribution system (JTIDS) that operates over a single secure communications channel to prevent enemy "eavesdropping." Data processing capability is also improved. USAF redesignated aircraft built to this standard **E-3C.** The first 24 E-3As will be retrofitted with JTIDS from September 1984 and will become **E-3Bs.** NATO Sentrys will continue to be designated E-3A. All versions of AWACS can support a variety of tactical and/or air defense missions with no change in configuration.

E-3As have had a role in US continental air defense since January 1979, when NORAD personnel began augmenting TAC E-3A flight crews on all operational NORAD missions by the 552d AWACW from Tinker AFB. Overseas detachments of the 552d include the 960th and 961st AWAC Support Squadrons based respectively at Keflavik, Iceland, and Kadena AB, Okinawa, and the recently activated 962d AWAC Support Squadron at Elmendorf AFB, Alaska. Deployments have been made to the Middle East, the Mediterranean area, and Europe.
Contractor: Boeing Aerospace Company.
Power Plant: four Pratt & Whitney TF33-PW-100/100A turbofan engines; each 21,000 lb thrust.
Accommodation: operational crew of 17, including 13 AWACS specialists.
Dimensions: span 145 ft 9 in, length 152 ft 11 in, height 41 ft 9 in.
Weight: gross 325,000 lb.
Performance: max speed 530 mph, service ceiling above 29,000 ft, endurance 6 hr on station 1,000 miles from base.

E-4A/B

SAC is the Air Force single resource manager for the E-4 airborne command post aircraft, the main operating base for which is Offutt AFB, Neb. Three **E-4As,** modified Boeing 747 aircraft, were built initially to support the National Emergency Airborne Command Post (NEACP), and provided an interim capability by utilizing existing EC-135 command control and communications (C^3) equipment. The fully-developed **E-4B** Advanced Airborne Command Post will eventually support both the NEACP and SAC Airborne Command Post missions. It is hardened against the effects of nuclear explosions, including electromagnetic pulse, equipped for in-flight refueling, contains a new 1,200kVA electrical system designed to support advanced electronics, and has a wide variety of new communications equipment. This includes a more powerful LF/VLF system, improved satellite communications system, and communications processing equipment. These systems have antijam features and will support operations in a nuclear environment over extended ranges. Further funding is requested in the FY '84 budget proposals for the development of improved data processing capability and more survivable satellite connectivity. The first E-4B entered service with SAC in January 1980, and the first operational mission was flown in March that year. In mid-1980, Boeing Aerospace, together with E-Systems, Inc, was contracted to modify one E-4A to B standard, with options to modify the other two; these options have been exercised, and both aircraft are scheduled for redelivery by January 1985. Two additional E-4Bs are planned, completing the required total of six aircraft.
Contractor: Boeing Aerospace Company.
Power Plant: four General Electric CF6-50E turbofan engines, each 52,500 lb thrust.
Dimensions: span 195 ft 8 in, length 231 ft 4 in, height 63 ft 5 in.
Weight: max ramp weight 803,000 lb.
Performance: unrefueled endurance in excess of 12 hours.

WC-130E/H

Modified C-130 Hercules transports, designated WC-130E and H, are equipped for weather reconnaissance duties, including penetration of tropical storms to obtain data for forecasting of storm movements. They are assigned to the 41st Rescue and Weather Reconnaissance Wing of MAC's Aerospace Rescue and Recovery Service and the 815th WRS of the Air Force Reserve. (Data similar to C-130.)

E-3A Sentry (AWACS)

E-4A

Transports and Tankers

C-5 Galaxy

Largest aircraft in service anywhere in the world, the **C-5A** Galaxy flew for the first time in June 1968. Deliveries to MAC began in December 1969, and all 81 aircraft had been received by May 1973. Each is capable of airlifting loads up to 204,900 lb, such as two M-60 tanks or three CH-47 Chinook helicopters, over transoceanic ranges, and with an in-flight refueling capability. Under a major modification program, Lockheed is producing kits of components to extend the service life of the C-5As' wings by 30,000 flight hours, without load restrictions. These kits replace only the five main load-carrying wing boxes, to which other existing components are transferred. The use of 7175-T73511 aluminum alloy provides greater strength and resistance to corrosion. Flight testing of a prototype installation was completed successfully during 1980, the converted C-5A being redelivered to USAF early in 1981. Installation of production kits began last year, and all 77 aircraft in the inventory should be modified by FY '87.

To meet an urgent need for additional heavy airlift capacity, USAF will acquire 50 **C-5Bs,** generally similar to the C-5A but embodying all the improvements that have been introduced since completion of the 81st production C-5A. These include the strengthened wings, General Electric TF39-GE-1C turbofans, and updated avionics, including Bendix color weather radar and Delco triple INS. Planned initial procurement calls for one aircraft in FY '83, four in FY '84, and ten in FY '85. Delivery will begin in 1986. (Data for C-5A.)
Contractor Lockheed-Georgia Company.
Power Plant: four General Electric TF39-GE-1C turbofan engines; each 43,000 lb thrust (conversion from -1A to -1C currently under way).
Accommodation: crew of five, rest area for 15 (relief crew, etc); 73 troops and 36 standard 463L pallets or assorted vehicles, or additional 270 troops.
Dimensions: span 222 ft 9 in, length 247 ft 10 in, height 65 ft 1 in.
Weights: empty 372,500 lb, gross (for 2.25*g*) 769,000 lb.
Performance: max speed at 25,000 ft 571 mph, service ceiling (at 615,000 lb) 34,000 ft, range with 144,000 lb payload 3,450 miles.

C-5A Galaxy

C-7A Caribou

The 16 Canadian-built C-7A all-weather STOL utility transports operated by the 357th TAS from Maxwell AFB, Ala., are being replaced by eight C-130Es this year.
Contractor: The de Havilland Aircraft of Canada Ltd.
Power Plant: two Pratt & Whitney R-2000-7M2 piston engines; each 1,450 hp.
Accommodation: crew of two or three; 31 troops, 25 paratroops, or 14 litters and 11 other persons.
Dimensions: span 95 ft 8 in, length 74 ft 11 in, height 31 ft 9 in.
Weights: empty 18,335 lb, gross 28,500 lb.
Performance: max speed at 6,000 ft 216 mph, service ceiling 27,100 ft, range 200 to 1,175 miles.

C-7A Caribou

C-9A Nightingale and VC-9C

Derived from the DC-9 Srs 30 commercial airliner, the C-9A is an aeromedical airlift transport, in service since August 1968. Modifications include a special-care com-

C-9A Nightingale

C-12A

C-17s (artist's concept)

C-123K Provider

partment with separate atmospheric and ventilation controls. Delivery of 21 to MAC's 375th Aeromedical Airlift Wing was completed by February 1973. The Nightingale also performs overseas theater aeromedical evacuation missions in Europe. Three specially configured **VC-9Cs** were delivered to the 89th Military Airlift Wing at Andrews AFB, Md., in 1975 for Presidential and other US governmental duties. (Data for C-9A.)

Contractor: Douglas Aircraft Company, Division of McDonnell Douglas Corporation.

Power Plant: two Pratt & Whitney JT8D-9 turbofan engines; each 14,500 lb thrust.

Accommodation: crew of two; 30 to 40 litter patients, more than 40 ambulatory patients, or a combination of both, plus five medical staff.

Dimensions: span 93 ft 5 in, length 119 ft 3½ in, height 27 ft 6 in.

Weight: gross 108,000 lb.

Performance: max cruising speed at 25,000 ft 565 mph, ceiling 35,000 ft, range more than 2,000 miles.

C-12A

Thirty military versions of the Beechcraft Super King Air 200 were delivered to USAF under the designation C-12A. Their role is to support attaché and military assistance advisory missions throughout the world. MAC uses two C-12As to train aircrews and to supplement support airlift.

Contractor: Beech Aircraft Corporation.

Power Plant: two Pratt & Whitney Aircraft of Canada PT6A-38 turboprop engines; each 750 shp.

Accommodation: crew of two; up to 8 passengers or 4,764 lb of cargo.

Dimensions: span 54 ft 6 in, length 43 ft 9 in, height 15 ft 0 in.

Weight: gross 12,500 lb.

Performance: max speed at 14,000 ft 299 mph, service ceiling 31,000 ft, range at max cruising speed 1,824 miles.

C-17

The FY '83 defense appropriations include $60 million for continued development of the C-17 cargo transport, with further sums requested in FY '84–85. McDonnell Douglas had been named prime contractor for what was then known as the CX program in August 1981, but this did not represent an Air Force commitment to build, as alternative ways of overcoming the present shortfall in airlift capability were under consideration. Instead, the modestly paced R&D program is intended to cover those C-17 technologies that would also benefit other airlift programs while preserving the option to proceed to full-scale engineering development of the C-17, leading to a 1990 IOC, if appropriate. Technologies being investigated include flaps on a swept supercritical wing, winglets tailored to supercritical wing design, and an engine fan and redirected flow thrust reverser.

Utilizing technology developed for the earlier YC-15 advanced medium STOL transport prototypes, the C-17 was designed as a long-range, heavy-lift, air-refuelable cargo transport able to provide intertheater and intratheater airlift of outsize loads, including the M1 tank, directly into airfields in potential combat areas. Such loads can be carried at present only by the C-5 Galaxy, but the C-17 would also offer a short-field performance provided currently only by the C-130 Hercules. Operation would be possible from runways only 3,000 ft long and 60 ft wide. On the ground, the C-17 would be able to make a 180° turn in only 82 ft. A fully loaded aircraft, using thrust reversal, would be able to reverse up a one in 50 gradient.

Contractor: McDonnell Douglas Corporation.

Power Plant: four Pratt & Whitney PW2037 turbofan engines; each 37,000 lb thrust.

Accommodation: normal flight crew of two, plus loadmaster. Provision for a variety of military airlift roles.

Dimensions: span 165 ft 0 in, length 174 ft 2 in, height 55 ft 3 in.

Weight: gross 570,000 lb.

Performance (estimated): cruising speed at high altitude Mach 0.775, typical range with 172,200 lb payload 2,765 miles.

C-18A

The designation C-18A has been given to eight former American Airlines Boeing 707-323C transports acquired for service with USAF. (Data similar to C-137.)

C-123 Provider

The **C-123K** is the only version of the C-123 transport still in the USAF inventory. It is operated only by the 731st TAS of the AF Reserve, from Westover AFB, Mass., and is due to be retired this year. Recent assignments have included the spraying of 400,000 acres in the US in insect control programs.

Contractor: The Fairchild Engine and Airplane Corporation.

Power Plant: two Pratt & Whitney R-2800-99W piston engines; each 2,500 hp; and two General Electric J85-GE-17 turbojet engines, each 2,850 lb thrust.

Accommodation: crew of three; 58 troops, 50 litters, or 21,000 lb of cargo.

Dimensions: span 110 ft 0 in, length 76 ft 4 in, height 34 ft 6 in.

Weights: empty 35,366 lb, gross 60,000 lb.

Performance: max speed at 10,000 ft 228 mph, service ceiling above 21,000 ft, range with 15,000 lb payload 1,035 miles.

C-130 Hercules

Although it was first ordered for USAF 30 years ago, the C-130 remains in production, with basic and specialized versions continuing to perform a diversity of roles worldwide, including airlift support, DEW Line and Arctic icecap resupply, aeromedical missions, and firefighting duties for the US Forest Service. The initial production model was the **C-130A,** first flown in April 1955, with 3,750 ehp Allison T56-A-11 or -9 turboprops; 219 were ordered, and deliveries began in December 1956. Two **DC-130As** (originally GC-130As) were built as drone launchers/directors for ARDC (now AFSC), carrying up to four drones on underwing pylons. All special equipment was removable, permitting the aircraft to be used as freighters, assault transports, or ambulances, as required. The **C-130B** introduced 4,050 ehp Allison T56-A-7 turboprops; the first of 134 entered USAF service in April 1959. Six C-130Bs were modified in 1961 for air-snatch recovery of classified USAF satellites by the 6593d Test Squadron at Hickam AFB. Twelve **C-130Ds** were modified C-130As for use in the Arctic, with wheel-ski landing gear, increased fuel capacity, and provision for JATO. The **C-130E** is an extended-range development of the C-130B, with large underwing fuel tanks; 389 were ordered for MAC and TAC with deliveries beginning in April 1962. Fifteen were modified to **MC-130E** standard, for use in low-level deep-penetration Combat Talon tactical missions by the 1st, 7th, and 8th Special Operations Squadrons based in the Philippines, West Germany, and Florida, respectively. This version, which is being supplemented by about a dozen **MC-130Hs** in FY '83–88, has terrain-following radar, precision navigation/airdrop, inflight refueling, and self-protection systems. Basically similar to the E, the **C-130H** series has uprated T56-A-15 turboprop engines, a redesigned outer wing, and other minor improvements; delivery began in April 1975. C-130s are currently active in USAF regular, Reserve, and ANG airlift squadrons, with the latter's older models being gradually replaced by newer versions. Variants include **HC-130H/N/P** for the Aerospace Rescue and Recovery Service and for ARRS units of the ANG and Reserve, and the **AC-130A/H** and **WC-130E/H,** described separately.

Contractor: Lockheed-Georgia Company.

Power Plant: four Allison T56-A-15 turboprop engines; each 4,508 ehp.

Accommodation: crew of five; up to 92 troops or 6 standard freight pallets, etc.

Dimensions: span 132 ft 7 in, length 97 ft 9 in, height 38 ft 3 in.

Weights: empty 75,743 lb, gross 175,000 lb.

Performance: max speed 386 mph, service ceiling above 25,000 ft, range with 15,000 lb payload 2,100 miles.

C-130E Hercules

HC-130

Constituting a major element of the Aerospace Rescue and Recovery Service, 43 extended-range C-130s, designated **HC-130H,** were ordered in 1963 with uprated T56-A-15 engines and specialized search and rescue equipment for the recovery of aircrews and retrieval of space hardware. This includes advanced direction-finding equipment, and air-to-air recovery (ATAR) systems. Initial flight was made in December 1964. Crew complement is ten to twelve. Twenty HC-130Hs have been modified into **HC-130Ps** for the combat rescue mission, and are capable of refueling helicopters in flight. Four were modified into **JHC-130Hs,** with added equipment for aerial recovery of reentering space capsules. Under a USAF contract dated December 1974, another HC-130H was modified by LAS to **DC-130H** standard, with four pylons each capable of carrying a 10,000 lb new-generation RPV. Fifteen **HC-130Ns,** a newer search and rescue version of the HC-130P with advanced direction-finding equipment, were ordered in 1969; these aircraft also are capable of refueling helicopters in flight. (Other data similar to C-130.)

C-131

Thirty-three C-131 twin-engine transports, with an average age of more than 27 years, remain in service with the ANG for support airlift

KC-135 Stratotanker

As single manager of all USAF KC-135 tankers, SAC supports its own strategic bombardment and reconnaissance aircraft, and the cargo and tactical aircraft of other Air Force commands, the US Navy and Marines, and other nations. The **KC-135A** airframe is basically similar to that of the Boeing 707 airliner. As a result, the aircraft's high-speed, high-altitude capabilities enable it to be used also as a long-range passenger and/or cargo transport. A total of 732 was built, of which the first flew in August 1956; about 615 remain operational, including those currently assigned to three Air Force Reserve units, on full alert status, and to thirteen ANG units, performing a twenty-four-hour alert mission and participating in operational support missions for the European Tanker Task Force in the UK. Variants include the **KC-135Q,** adapted to refuel Lockheed SR-71s; and **KC-135T** for special reconnaissance. The lower wing skins of all aircraft are being replaced, to extend flying life by 27,000 hours, thereby enabling the aircraft to remain operational well past the year 2000. This in turn justified the retrofitting of modern technology engines, and selection of the 22,000 lb thrust General Electric/SNECMA CFM56 for retrofit on nearly half of the KC-135A fleet was announced in 1980. The first re-engined aircraft, redesignated **KC-135R,** made its first flight in August 1982. Modification of 18 has been authorized, with funding for 17 more planned for FY '83, a further 30 proposed for FY '84, and 65 for FY '85. The KC-135R program also includes modification of electrical, hydraulic, performance and fuel management, and flight control systems. In parallel, it was decided to buy a number of commercial 707s, forced into retirement because of federal noise and pollution regulations, and to use their JT3D turbofans for -135 series reengining (see EC-135 entry). The first 18 JT3D-engined aircraft are special mission -135s, but they are being followed by 88 ANG KC-135s. This is seen as a cost-effective alternative to fitting CFM56 engines in the entire fleet, although Congress continues to support use of the more fuel-efficient CFM56. Aeronautical Systems Division's 4950th Test Wing, at Wright-Patterson AFB, Ohio, has installed tail-mounted floodlights on six KC-135As, with the aim of increasing boom operator visibility during the night-time aerial refueling of F-16s. As part of the KC-135 Improved Aerial Refueling Systems program, it was anticipated that similar retrofitting of the entire KC-135 force would be authorized. (Data for KC-135A.)

Contractor: Boeing Military Airplane Company.
Power Plant: four Pratt & Whitney J57-P-59W turbojet engines; each 13,750 lb thrust.
Accommodation: crew of four or five; up to 80 passengers.
Dimensions: span 130 ft 10 in, length 136 ft 3 in, height 38 ft 4 in.
Weights: empty 98,466 lb, gross 297,000 lb.
Performance: max speed at 30,000 ft 585 mph, service ceiling 50,000 ft, range with 120,000 lb of transfer fuel 1,150 miles, ferry mission 9,200 miles.

C-135 Stratolifter

A few basic C-135 transports, without the KC's refueling equipment, remain operational with MAC. They were ordered originally to serve as interim jet passenger/cargo transports, pending delivery of C-141s. Three converted KC-135s were followed by 45 production Stratolifters in two versions: the **C-135A** with J57-P-59W turbojet engines, and **C-135B** with Pratt & Whitney TF33-P-5 turbofans. Eleven Bs were retrofitted with revised interior for VIP transportation; others became **WC-135B** and **RC-135E/M.** Data similar to KC-135, except:

Dimensions: length 134 ft 6 in.
Weights (C-135B): operating weight empty 102,300 lb, gross 275,500 lb.
Accommodation: 126 troops; 44 litters and 54 sitting casualties; or 87,100 lb of cargo.
Performance (C-135B): max speed 600 mph, range with 54,000 lb payload 4,625 miles.

C-137

Five specially modified Boeing 707 transports are operated by MAC's 89th Military Airlift Wing from Andrews AFB, Md., for VIP duties. Best known is "Air Force One," a **C-137C** for use by the President. It is basically a 707-320B with a special VIP interior. A second C-137C is also operated, together with three smaller 707-120s, originally designated VC-137As but later modified to **C-137B** standard by the installation of turbofan engines.
Contractor: The Boeing Company.
Power Plant: four Pratt & Whitney JT3D-3 turbofan engines; each 18,000 lb. thrust.
Dimensions: C-137B span 130 ft 10 in, length 144 ft 6 in, height 42 ft 0 in; C-137C span 145 ft 9 in, length 152 ft 11 in, height 42 ft 5 in.
Weights: C-137B gross 258,000 lb; C-137C gross 322,000 lb.
Performance (C-137C): max speed 627 mph, service ceiling 42,000 ft, range about 7,000 miles.

C-140 JetStar

Deliveries of the C-140 JetStar began in late 1961. Four **C-140As** are used currently by Air Force Communications Command (AFCC) to evaluate landing systems, navigational aids, radar approach control equipment, and controllers and tower operators. Six **C-140B** transport versions are in service with the 89th Military Airlift Wing of MAC, operating from Andrews AFB, Md. Five **C-140Bs** are used in USAFE for operational support airlift.
Contractor: Lockheed-Georgia Company.
Power Plant: four Pratt & Whitney J60-P-5A turbojet engines; each 3,000 lb. thrust.
Accommodation: C-140A crew of five; C-140B crew of three and 8 passengers.
Dimensions: span 54 ft 5 in, length 60 ft 5 in, height 20 ft 5 in.
Weight: gross 40,920 lb.
Performance: max cruising speed at 20,000 ft 550 mph, ceiling above 45,000 ft, range with reserves 2,280 miles.

C-141 StarLifter

With an all-weather landing system standard, the **C-141A** began squadron operations with MAC in April 1965, and was soon making virtually daily flights to Southeast Asia. Two hundred and eighty-five were built, some of which were modified to carry Minuteman ICBMs, with local structural strengthening to accommodate this 86,207 lb load. Operational experience showed that the cargo compartment was often fully packed without the aircraft's maximum payload capability being reached. In order to realize the C-141's full potential, USAF funded modification of the entire force of 270 (now 268) aircraft to **C-141B** standard, with the fuselage lengthened by 23 ft 4 in, and with added in-flight refueling capability. The YC-141B prototype made its maiden flight in March 1977. First production C-141B was delivered to USAF in December 1979, and the final modified StarLifter was redelivered in June last year, ahead of schedule and below projected cost. This provides the equivalent of 90 additional C-141A aircraft. (Data for C-141B.)
Contractor: Lockheed-Georgia Company.
Power Plant: four Pratt & Whitney TF33-P-7 turbofan engines; each 21,000 lb thrust.
Accommodation: crew of five; cargo on 13 standard 463L pallets, instead of the 10 carried by the C-141A. Alternative freight, vehicle, or passenger payloads.
Dimensions: span 159 ft 11 in, length 168 ft 3½ in, height 39 ft 3 in.
Weights: operating 148,800 lb, max payload 90,200 lb, gross 343,000 lb.
Performance: max cruising speed 566 mph, range with max payload 1,970 miles.

KC-10A Extender

Conceived to meet specific USAF requirements for an Advanced Tanker/Cargo Aircraft (ATCA), the KC-10 is based on the commercial DC-10 Series 30CF, modified to include body bladder fuel cells in the lower cargo compartments, a boom operator's station, an aerial refueling boom, a refueling receptable, and military avionics. In its primary role of increasing US air mobility, a single KC-10A is able to combine the tasks of tanker and cargo aircraft by refueling fighters and simultaneously carrying the fighters' support equipment and support personnel on overseas missions. It can refuel strategic transports such as the C-5 and C-141, nearly doubling, for example, the nonstop range of a fully loaded C-5. It can refuel strategic offensive and reconnaissance aircraft during long-range conventional operations; and it can augment cargo-carrying capability on a selected basis.

KC-135 Stratotanker with F-15

C-137

C-140 JetStar

C-141 StarLifter

KC-10A Extender

The range of refueling equipment installed enables the KC-10A to service USN, USMC, and NATO aircraft, as well as older types of fighters still operated by ANG and Reserve units. In terms of active deployment, the KC-10A's refueling capabilities and long range will, in most situations, dispense with the need for forward bases, while also leaving vital fuel supplies in the theater of operations untouched. In addition, similarity to the civilian DC-10 has led to a unique system whereby the Extender can use commercial facilities for most maintenance. The manufacturer orders parts and handles heavy repairs; only routine and flight line maintenance is done by the Air Force.

The first KC-10A made its maiden flight in July 1980 and delivery of the first KC-10A to enter service took place in March 1981 to Barksdale AFB, La., for operation by SAC. Deliveries will total 20 by the end of this year, including the first four of 44 planned for procurement in FY '83–87.

Contractor: McDonnell Douglas Corporation.
Power Plant: three General Electric CF6-50C2 turbofan engines; each 52,500 lb st.
Accommodation: max cargo payload 169,529 lb.
Dimensions: span 165 ft 4.4 in, length 181 ft 7 in, height 58 ft 1 in.
Weight: gross 590,000 lb.
Performance: max speed at 42,000 ft 528 mph, service ceiling 42,000 ft, max range with max cargo 4,370 miles; or delivery of 193,000 lb of transfer fuel to a receiver 2,000 nm from its home base, and return.

T-33A Shooting Stars

Trainers

T-37B

T-38 Talon

CT-39 Sabreliner

T-41 Mescalero

T-43A

T-33A Shooting Star

Although derived from the Shooting Star jet fighter, which flew for the first time nearly forty years ago, about 200 T-33As remain in service for use in combat support missions and for proficiency and radar target evaluation training. A lengthened fuselage accommodates a second cockpit in tandem, with the canopy extended to cover both. Combat armament is replaced by an all-weather "navigational nose."

Contractor: Lockheed Aircraft Corporation.
Power Plant: one Allison J33-A-35 turbojet engine; 4,600 lb thrust.
Accommodation: crew of two, in tandem.
Dimensions: span 38 ft 10½ in, length 37 ft 9 in, height 11 ft 4 in.
Weights: empty 8,084 lb, gross 11,965 lb.
Performance: max speed at 25,000 ft 543 mph, service ceiling 47,500 ft.
Armament: two .50-caliber machine guns on some early aircraft only.

T-37B

USAF's first purpose-built jet trainer, the original T-37A was superseded in November 1959 by the T-37B, and all A models were converted subsequently to B standard. This version remains the standard two-seat primary trainer of Air Training Command. Well over a thousand T-37s were built, and versions are used by many foreign countries for their pilot training programs, as well as for military surveillance and low-level attack duties. (Data for T-37B.)

Contractor: Cessna Aircraft Company.
Power Plant: two Continental J69-T-25 turbojet engines; each 1,025 lb thrust.
Accommodation: two, side-by-side.
Dimensions: span 33 ft 9.3 in, length 29 ft 3 in, height 9 ft 2.3 in.
Weights: empty, 3,870 lb. gross 6,600 lb.
Performance: max speed at 25,000 ft 426 mph, service ceiling 35,100 ft, range at 360 mph, standard tankage 870 miles.

T-38 Talon

This lightweight twin-jet advanced trainer, which was in continuous production from 1956 to 1972, is almost identical in structure to the F-5A tactical fighter. The first T-38 flew in April 1959, and production models entered operational service in March 1961. Of the total 1,187 T-38s built, more than 1,100 were delivered to USAF and about 900 remain in service throughout the Air Force. Most are used by ATC; others fly with the 479th Tactical Training Wing at Holloman AFB, N. M., and SAC.

Contractor: Northrop Corporation.
Power Plant: two General Electric J85-GE-5 turbojet engines; each 2,680 lb thrust dry, 3,850 lb thrust with afterburning.
Accommodation: student and instructor, in tandem.
Dimensions: span 25 ft 3 in, length 46 ft 4½ in, height 12 ft 10½ in.
Weights: empty 7,164 lb. gross 12,093 lb.
Performance: max level speed at 36,000 ft more than Mach 1.23 (812 mph), ceiling above 55,000 ft, range, with reserves, 1,093 miles.

CT-39 Sabreliner

Built as a private venture to meet USAF requirements for a combat-readiness trainer and operational support aircraft, the prototype Sabreliner first flew in September 1958, powered by two General Electric J85 turbojets. Subsequent production models utilized by USAF are **CT-39A/B** basic utility and training aircraft with J60 turbojet engines, of which 143 were delivered. Of those still in the inventory, 113 are assigned to MAC for airlift support. Others are in service with PACAF, USAFE, and AFSC, and with AFCC facility checking squadrons which use two Sabreliners, together with four C-140As, to evaluate communications and navigation aids at Air Force bases.

Contractor: Sabreliner Division of Rockwell International Corporation.
Power Plant: two Pratt & Whitney J60-P-3 turbojet engines; each 3,000 lb thrust.
Accommodation: crew of two; 4 to 7 passengers.
Dimensions: span 44 ft 5 in, length 43 ft 9 in, height 16 ft 0 in.
Weights: empty 9,300 lb, gross 17,760 lb.
Performance: max speed at 36,000 ft 595 mph, service ceiling 39,000 ft, range 1,950 miles.

T-41 Mescalero

Acquired by USAF as a trainer under the designation **T-41A,** the standard Cessna Model 172 light aircraft is used in a preliminary flight screening program for USAF pilot candidates. An initial order for 170 aircraft in 1964 was supplemented by a further 34 in July 1967. More powerful **T-41Cs,** based on the Cessna Model R172E, are used for cadet flight training at the USAF Academy. (Data for T-41A.)

Contractor: Cessna Aircraft Company.
Power Plant: one Continental O-300-C piston engine; 145 hp.
Accommodation: crew of two, side-by-side.
Dimensions: span 35 ft 10 in, length 26 ft 11 in, height 8 ft 9½ in.
Weights: empty 1,285 lb. gross 2,300 lb.
Performance: max speed at S/L 139 mph, service ceiling 13,100 ft, range 720 miles.

T-43A

Derived from the commercial Boeing Model 737-200, the T-43A navigation trainer made its first flight in April 1973. It was developed as a replacement for the piston-engine T-29, and is equipped with the same on-board avionics as the most advanced USAF operational aircraft, including celestial, radar, and inertial navigation systems, LORAN, and other radio systems. Deliveries of the 19 aircraft ordered for ATC were completed in July 1974 and 15 remain in the ATC inventory; the other 4 are assigned to the ANG.

Contractor: Boeing Aerospace Company.
Power Plant: two Pratt & Whitney JT8D-9 turbofan engines, each 14,500 lb thrust.
Accommodation: crew of two, 12 students, 4 advanced students, and 3 instructors.
Dimensions: span 93 ft 0 in, length 100 ft 0 in, height 37 ft 0 in.
Weight: gross 115,500 lb.
Performance: econ cruising speed at 35,000 ft Mach 0.7, operational range 2,995 miles.

T-46A

In July 1982 it was announced that Fairchild Republic Company had been selected to build USAF's next-generation trainer (NGT), since designated T-46A. The initial contract covers design, development, construction, and

testing of two prototypes, and the supply of two static test airframes, plus an option for the first 54 production T-46As out of a planned procurement of 650 aircraft.

Intended as a primary trainer to replace the T-37, the T-46A retains the twin-engine and side-by-side seating features of its predecessor, but adds pressurization, increased range, and greatly improved adverse weather capability, which will decrease significantly the number of training flights lost through weather factors. The combination of pressurization and the greater thrust of the engines will also enable the aircraft to utilize training airspace up to 35,000 ft, thereby reducing problems caused by growing commercial and private air activity. Operational cost savings will result from the use of more fuel-efficient engines, and from technological improvements to be incorporated in the airframe, avionics, and power plant. First flight is scheduled for Summer 1985.

Contractor: Fairchild Republic Company.

Power Plant: two Garrett F109-GA-100 turbofan engines; each 1,330 lb thrust.

Accommodation: pupil and instructor, side-by-side.

Dimensions: span 36 ft 11¾ in, length 29 ft 6 in, height 9 ft 8¾ in.

Weights: empty 4,725 lb, gross 6,571 lb.

Performance: max level speed at 35,000 ft 497 mph, service ceiling 46,000 ft, range with max fuel 1,392 miles.

UV-18B

The UV-18B is a military version of the DHC-6 Twin Otter STOL utility transport. Two were procured for use as parachute jump training aircraft at the Air Force Academy.

Contractor: The de Havilland Aircraft of Canada Ltd.

Power Plant: two Pratt & Whitney Aircraft of Canada PT6A-27 turboprop engines; each 652 ehp.

Accommodation: crew of two, and up to 20 passengers.

Dimensions: span 65 ft 0 in, length 51 ft 9 in, height 19 ft 6 in.

Weight: gross 12,500 lb.

Performance: max cruising speed 210 mph, service ceiling 26,700 ft, range with 2,500 lb payload 806 miles.

T-46A

Helicopters

TH/UH-1F, UH-1P, and HH-1H

Basically a military version of the Bell Model 204, the **UH-1F** was developed to take part in a design competition for a missile site support helicopter. USAF ordered 146, of which the first flew in February 1964. Deliveries began, to the 4486th Test Squadron, in September of the same year, and were completed in 1967. A few UH-1Fs were modified to **UH-1Ps** for classified psychological missions in Vietnam. **TH-1F** is a version of the UH-1F used for instrument operations training. In November 1970 USAF ordered 30 larger 12/15-seat **HH-1Hs,** based on the Model 205, for local base rescue duties. Deliveries were completed in 1973. All four models continue in service.

Electroluminescent lighting has been installed in a UH-1, and an HH-53 (described later), used for low-level night rescue missions, under a program to develop improved pilot night vision aids. (Data for UH-1F.)

Contractor: Bell Helicopter Textron.

Power Plant: one General Electric T58-GE-3 turboshaft engine; 1,272 shp (derated to 1,100 shp).

Accommodation: one pilot and 10 passengers; or two crew and 2,000 lb of cargo.

Dimensions: rotor diameter 48 ft 0 in, length of fuselage 39 ft 7½ in, height 14 ft 8 in.

Weight: gross 9,000 lb.

Performance: max speed 136 mph, service ceiling at mission gross weight 13,450 ft, max range, no allowances, at mission gross weight 347 miles.

UH-1N

The UH-1N is a twin-engine version of the UH-1 utility helicopter. Initial orders on behalf of the US services included 79 for USAF, most of which remain in the inventory. Deliveries began in 1970.

Contractor: Bell Helicopter Textron.

Power Plant: Pratt & Whitney (Canada) T400-CP-400 Turbo "Twin-Pac," consisting of two PT6 turboshaft engines coupled to a combining gearbox with a single output shaft; flat-rated to 1,290 shp.

Accommodation: pilot and 14 passengers or cargo; or external load of 4,000 lb.

Dimensions: rotor diameter (with tracking tips) 48 ft 2¼ in, length of fuselage 42 ft 4¾ in, height 14 ft 10¼ in.

Weight: gross and mission weight 11,200 lb.

Performance: max cruising speed at S/L 115 mph, service ceiling 15,000 ft, max range, no reserves, 248 miles.

Armament (optional): two General Electric 7.62-mm Miniguns or two 40-mm grenade launchers; two seven-tube 2.75-in rocket launchers.

CH-3E

This twin-engine amphibious transport helicopter, based on the US Navy's SH-3A, incorporates important design changes which permit speedier cargo handling and ease of maintenance, with built-in equipment for the removal and replacement of all major components in remote areas. The initial version was the CH-3C. Introduction of uprated engines led to the designation CH-3E in February 1966, applicable to both 42 new production aircraft and 41 reengined CH-3Cs, of which 50 were adapted subsequently as HH-3Es *(see below).*

Contractor: Sikorsky Aircraft, Division of United Technologies Corporation.

Power Plant: two General Electric T58-GE-5 turboshaft engines; each 1,500 shp.

Accommodation: crew of two or three; 25 fully equipped troops, 15 litters, or 5,000 lb of cargo.

Dimensions: rotor diameter 62 ft 0 in, length of fuselage 57 ft 3 in, height 18 ft 1 in.

Weights: empty 13,255 lb, gross 22,050 lb.

Performance: max speed at S/L 162 mph, service ceiling 11,100 ft, max range, with 10% reserve, 465 miles.

Armament: General Electric 7.62-mm machine gun.

HH-3E Jolly Green Giant

Modified version of the CH-3E evolved for USAF's Aerospace Rescue and Recovery Service, originally to facilitate penetration deep into North Vietnam on rescue missions. Additional equipment includes self-sealing fuel tanks, armor, defensive armament, a rescue hoist, and a retractable in-flight refueling probe. HH-3s are also assigned to ARRS units of the Reserve and ANG. The five HH-3Es operated from Eglin AFB, Fla., by the 55th Aerospace Rescue and Recovery Squadron are being replaced with UH-60A Black Hawks. (Data basically similar to CH-3E above.)

HH-53B

This twin-turbine heavy-lift helicopter was ordered in September 1966 for USAF's Aerospace Rescue and Recovery Service to supplement the HH-3E. The HH-53B carries the same general equipment as the Jolly Green Giant, including the in-flight refueling probe and all-weather avionics and armament, but is faster and larger. The first of eight flew in March 1967. Delivery began in June the same year, and after extensive use for rescue operations in Southeast Asia HH-53Bs continue in first-line service.

Contractor: Sikorsky Aircraft, Division of United Technologies Corporation.

Power Plant: two General Electric T64-GE-7 turboshaft engines; each 3,925 shp.

Accommodation: crew of five, basic accommodation for 38 combat-equipped troops or 24 litters and 4 attendants.

Dimensions: rotor diameter 72 ft 3 in, length of fuselage (without refueling probe) 67 ft 2 in, height 24 ft 11 in.

Weights: empty 23,125 lb, gross 42,000 lb.

Performance: max speed at S/L 186 mph, service ceiling 18,400 ft, max range, with 10% reserve, 540 miles.

HH-53C and CH-53C

The **HH-53C,** an improved version of the HH-53B, was first delivered to USAF in August 1968. With a maximum speed of 196 mph, it can transport 38 passengers or 18,500 lb of freight and has an external cargo hook of 20,000 lb capacity. Other data basically as for HH-53B above. A total of 72 HH-53B/Cs was built. Eight generally similar **CH-53Cs** are used to provide battlefield mobility for the Air Force mobile Tactical Air Control System.

HH-53H Pave Low III

Under USAF's Pave Low III program, nine HH-53Cs were modified for night and adverse weather operations, with the designation HH-53H. Equipment includes a stabilized FLIR installation mounted below the refueling boom, an inertial navigation system, a new Doppler navigation system, and the computer projected map display and radar from the A-7D, with the radar installed in an offset "thimble" fairing on the nose.

The first of the Pave Low aircraft was delivered to Pensacola in March 1979, and the last in 1980. These helicopters are part of USAF's Special Operations Forces.

UH-60A Black Hawk and HH-60D Night Hawk

Under a $36.6 million contract, Sikorsky Aircraft is modifying two standard US Army UH-60A Black Hawks into prototypes of a combat rescue helicopter designated **HH-60D** Night Hawk. If the modified aircraft satisfy USAF's HX requirement for a new-generation SAR helicopter able to conduct aircrew rescues deep behind enemy lines, in darkness or bad weather, and at treetop

UH-1Ns

CH-3E

CH-53C

UH-60A Black Hawks

level to avoid radar detection, up to 243 production Night Hawks could be ordered. Although the cabin of the basic UH-60A is large enough to make possible a variety of missions, without modification, the airframe is so compact that the helicopter can be airlifted over long ranges. Equipment specified for the HH-60D includes terrain-following/terrain-avoidance radar, an air-to-air refueling system, auxiliary internal and external fuel tanks, FLIR, and a rescue hoist. Avionics integration will be by IBM's Federal Systems Division.

Delivery of HH-60Ds, to replace ARRS HH-3s and HH-53s, could begin in mid-1986. Meanwhile, USAF has begun to receive nine **UH-60A** Black Hawks to initiate aircrew training and familiarization. These helicopters are in standard US Army configuration, including a rescue hoist, de-icing system, and winterization and air transportability kits. (Data, except armament, for standard UH-60A.)

Contractor: Sikorsky Aircraft, Division of United Technologies Corporation.

Power Plant: two General Electric T700-GE-700 turboshaft engines; each 1,560 shp.

Accommodation: crew of two or three; 11 troops, or four litters, or internal or external cargo.

Dimensions: rotor diameter 53 ft 8 in, length of fuselage 50 ft 0¾ in, height 16 ft 10 in.

Weights: empty 10,624 lb, gross 16,260–20,250 lb.

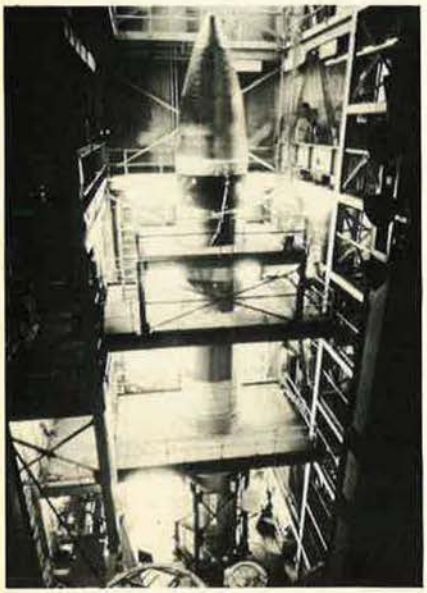
Performance: max speed 184 mph, service ceiling 19,000 ft, max range, with reserves, 373 miles (internal fuel), 1,380 miles (four external tanks).

Armament (HH-60D): 7.62-mm Miniguns and Stinger air-to-air missiles for self-defense.

Strategic Missiles

LGM-25C Titan II

LGM-30 Minuteman III



MGM-118A Peacekeeper (MX)

AGM-69 SRAMs

LGM-25C Titan II

Now 20 years old, this two-stage liquid-fueled ICBM is expensive to maintain and of decreasing value to the overall US strategic posture. Phaseout has begun, leaving 48 Titan IIs deployed in the six squadrons at Davis-Monthan AFB, Ariz., McConnell AFB, Kan., and Little Rock AFB, Ark., on February 1, 1983. Deactivation is scheduled for completion by 1987.

Titan II has a thermonuclear warhead with the largest yield of any carried by a US missile, and a launch reaction time of one minute from its fully hardened underground silo.

Contractor: Martin Marietta Aerospace.

Power Plant: first stage: Aerojet-General LR87 storable liquid-propellant engine; 430,000 lb thrust; second stage: Aerojet-General LR91 storable liquid-propellant engine; 100,000 lb thrust.

Guidance: inertial.

Warhead: thermonuclear, 9MT, in General Electric Mk 6 ablative reentry vehicle.

Dimensions: length 103 ft 0 in, max body diameter 10 ft 0 in.

Weight: launch weight 330,000 lb.

Performance: max speed 17,000 mph (approx), max range 6,300 miles.

LGM-30F/G Minuteman

This three-stage, solid-propellant, second-generation ICBM, though of similar range, is smaller and lighter than the liquid-propellant Titan and has a smaller payload. The operational missiles are housed in underground silos, for which an upgrade program was completed in 1980 to provide increased launch facility protection. The current versions are:

LGM-30F Minuteman II: similar in configuration to the original Minuteman I, Minuteman II has increased range and targeting coverage; also increased accuracy and payload capacity. Operational since 1965, it is based at Malmstrom AFB, Mont.; Ellsworth AFB, S. D.; and Whiteman AFB, Mo.

LGM-30G Minuteman III: new third-stage motor with fluid-injection thrust vector control gives longer range and, allied to MIRV capability, enables this version to place warheads on three targets with a high degree of accuracy. Minuteman III also increases the possibility of penetrating enemy defense systems. First test launch was made in 1968, and Minuteman III is operational at Minot AFB, N. D.; F. E. Warren AFB, Wyo.; Grand Forks AFB, N. D.; and Malmstrom AFB, Mont. A command data buffer system permits rapid missile retargeting.

The Minuteman force is made up of 450 Minuteman IIs and 550 Minuteman IIIs. Recent R&D has been aimed at providing improved command control and communications, and at development of the Mk 12A reentry vehicle, which increases the yield of the Minuteman III warhead, and refinements to improve accuracy. The Mk 12A was scheduled for deployment on 300 Minuteman IIIs by early this year.

Assembly and Checkout: Boeing Aerospace Company.

Power Plant: first stage: Thiokol M-55E solid-propellant motor; 210,000 lb thrust; second stage: Aerojet-General SR19-AJ-1 solid-propellant motor; 60,300 lb thrust; third stage: LGM-30F Hercules, Inc., solid-propellant motor; LGM-30G Thiokol SR73-AJ-1 solid-propellant motor; 34,400 lb thrust.

Guidance: Autonetics Division of Rockwell International inertial guidance system.

Warhead: LGM-30F single thermonuclear warhead in Avco Mk 11 reentry vehicle; LGM-30G three thermonuclear warheads, each 175 KT in a General Electric Mk 12 or 340 KT in a Mk 12A reentry vehicle.

Dimensions: length 59 ft 10 in, diameter of first stage 5 ft 6 in.

Weights: launch weight (approx) LGM-30F 73,000 lb, LGM-30G 78,000 lb.

Performance: speed at burnout more than 15,000 mph, highest point of trajectory approx 700 miles, range with max operational load LGM-30F more than 6,000 miles; LGM-30G more than 7,000 miles.

MGM-118A Peacekeeper (MX)

Because of the increased numbers, great size, and improved accuracy of Soviet warheads, the entire US ICBM force, as now configured, could be destroyed in a single attack using less than one-quarter of the current Soviet ICBM force. To counter this threat, USAF is developing the MX missile to survive a first strike by the Soviets and, in the words of Defense Secretary Caspar Weinberger, leave the US with the "retaliatory capability to inflict on them such damage that they would not make that first strike." The MX is a four-stage ICBM that carries ten independently targetable nuclear reentry vehicles. It has a greater range and targeting flexibility than Minuteman; its improved guidance system and greater resistance to nuclear effects ensure a much enhanced hard-target kill potential. These factors are expected to provide a decisive deterrent, earning MX its name of Peacekeeper.

Major problem has been to define a basing mode acceptable to Congress. Options, including some form of ballistic missile defense and extra silos to permit deceptive basing, have been considered. The mode preferred by USAF is the closely spaced basing system (CSB), in which the missiles would be deployed in superhard capsules about 1,800 ft apart. This is far enough to prevent one hostile warhead from destroying two capsules *(see January '83* AIR FORCE *Magazine for more details on CSB)*. It is planned to procure about 240 Peacekeeper missiles, but no more than 100 will be deployed at any one time, the remainder being spares and test systems. Funding of $6,636 million, including the production of 27 missiles, is proposed for FY '84, but little progress is likely until Congress has approved a militarily and politically acceptable basing mode.

Assembly and Test: Martin Marietta, Denver Aerospace.

Power Plant: first three stages solid-propellant, fourth stage storable liquid; by Thiokol, Aerojet, Hercules, and Rocketdyne, respectively.

Guidance: inertial, integration by Rockwell, IMU by Northrop.

Warheads: 10, each 350 KT, in General Electric Mk 12A reentry vehicles. Total throw-weight about 7,900 lb.

Dimensions: length 70 ft, diameter 7 ft 8 in.

Weight: 192,000 lb approx.

AGM-69 SRAM

This defense suppression and primary attack missile was deployed initially with the B-52Gs of SAC's 42d Heavy Bombardment Wing at Loring AFB, Me., in 1972. USAF contracts covering the production of 1,500 AGM-69As were authorized, and deliveries to equip 17 B-52 wings and two FB-111 wings at 18 SAC bases were completed in July 1975.

Armed with a nuclear warhead, the supersonic air-to-surface SRAM was designed to attack and neutralize enemy terminal defenses, such as surface-to-air missile sites. An inertial guidance system makes the missile impossible to jam. Each SAC B-52G/H can carry 20 AGM-69A SRAMs, twelve in three-round underwing clusters and eight on a rotary dispenser in the aft bomb-bay, together with up to four Mk 28 thermonuclear weapons. An FB-111A can carry four AGM-69As on swiveling underwing pylons and two internally. When carried externally, a tailcone, 22.2 in long, is added to the missile to reduce drag.

Contractor: Boeing Aerospace Company.

Power Plant: Lockheed Propulsion Company LPC-415 restartable solid-propellant two-pulse rocket engine.

Guidance: General Precision/Kearfott inertial system, permitting attack at high or low altitude, and dogleg courses.

Warhead: nuclear, of similar yield to that of single Minuteman III warhead.

Dimensions: length 14 ft 0 in, body diameter 1 ft 5½ in.