JULY 1975 / $1

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THE ELECTRONIC AIR FORCE

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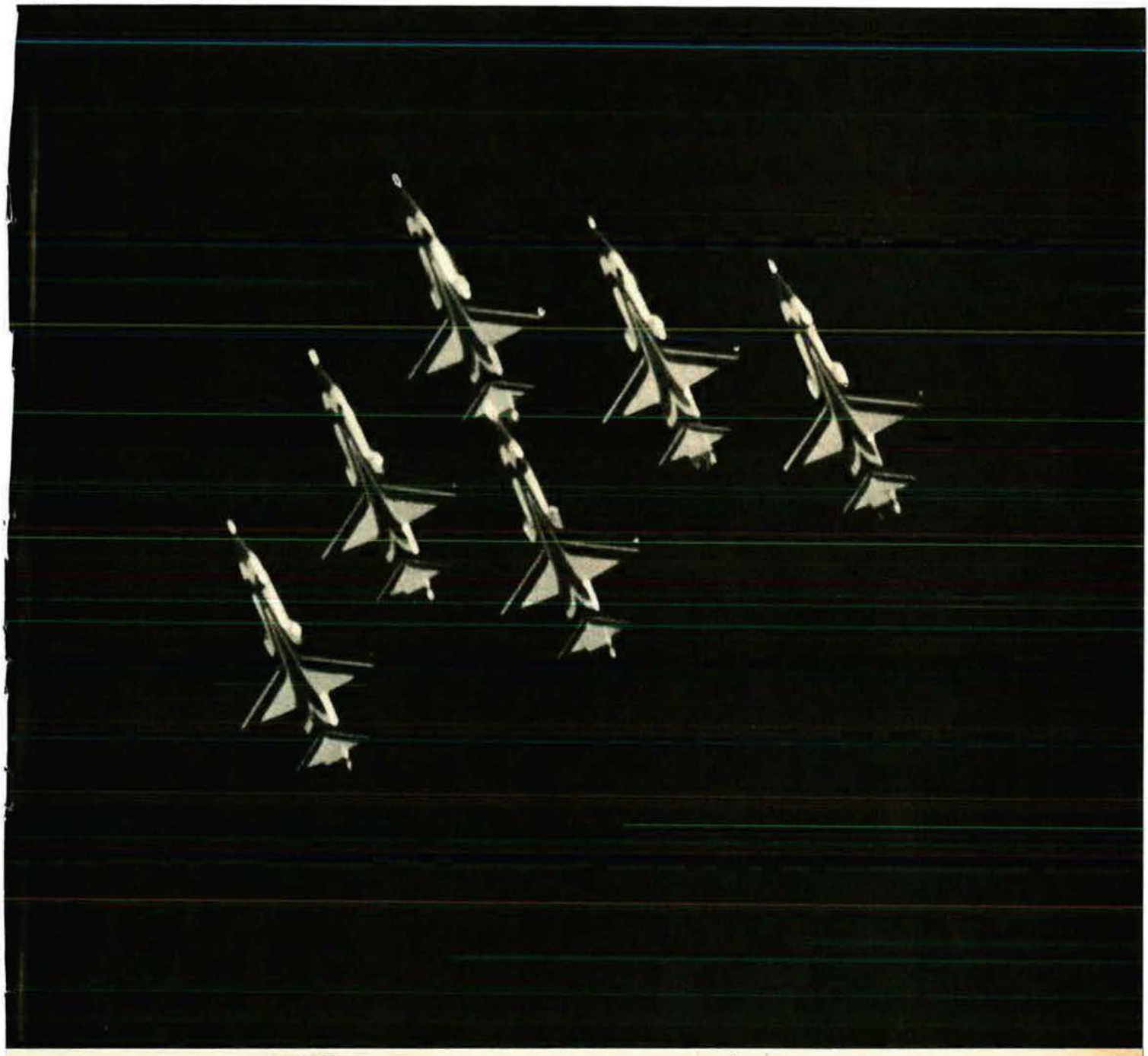

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AIR FORCE MAGAZINE
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This Month

ABOUT THE COVER

Shown in flight is USAF's E-3A AWACS (Airborne Warning and Control System), a modified Boeing 707-320B. TAC Commander Gen. Robert J. Dixon refers to this system (p. 44) as "a peacetime, crisis, wartime, management tool."

Departments

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The world has waited 43 years for this

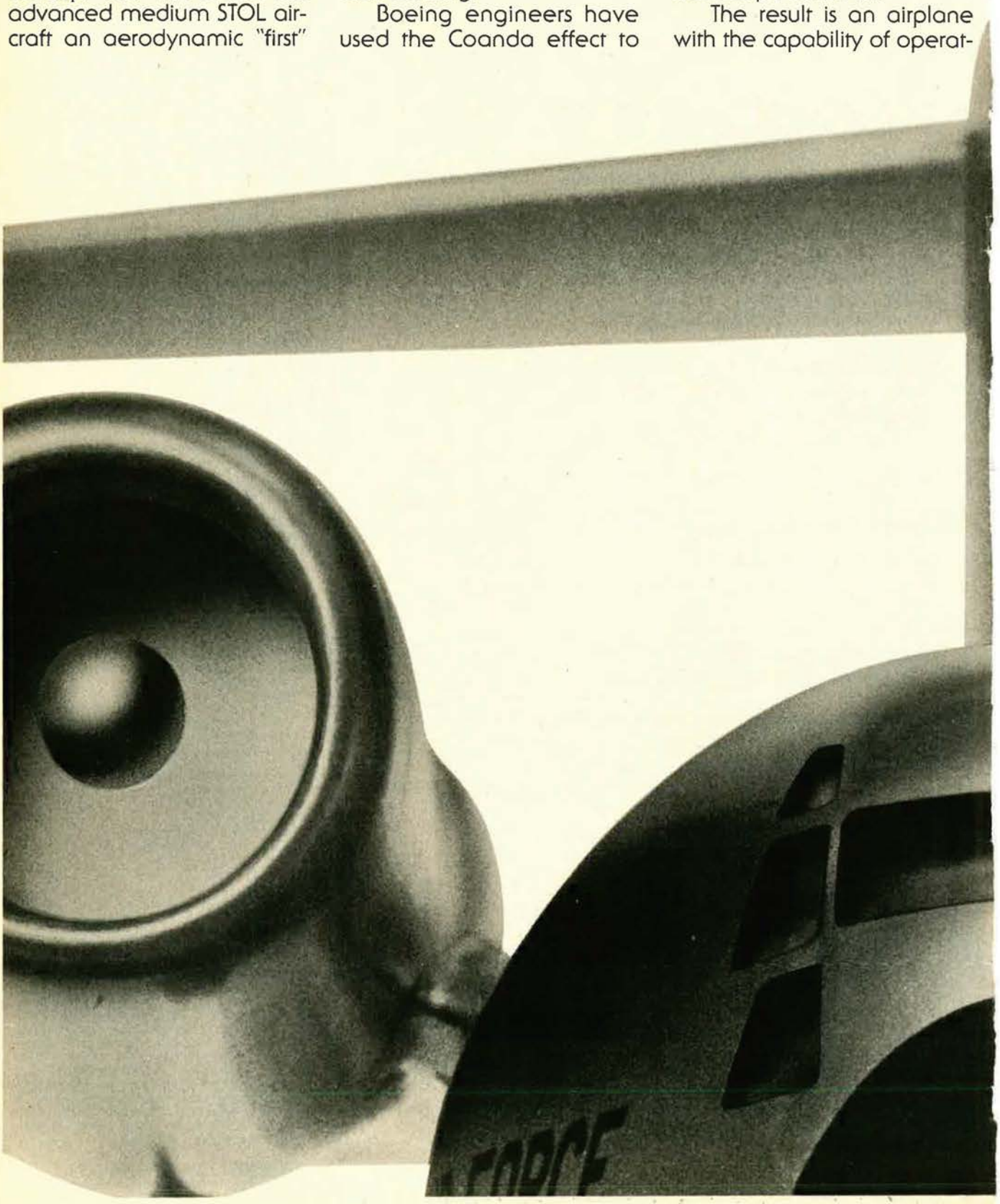
The Boeing YC-14 two-engine jet transport will fly in 1976.

The revolutionary, new concept that will make this advanced medium STOL aircraft an aerodynamic "first" was patented by Henri Coanda in 1932.

The Boeing adaptation of this idea is called upper surface blowing.

Boeing engineers have used the Coanda effect to create powered lift. Thrust from the aircraft's two engines is blown over the wing flaps and is directed downward for added, powered lift.

The result is an airplane with the capability of operat-



idea. It's worth waiting one more.

ing from an unimproved field less than half the length of those required by standard aircraft of comparable size.

The YC-14 can take off and land on a 2,000-foot field with a 27,000-pound payload. Carry 69,000 pounds to and from a 4,100-foot field. Cruise at 450 miles per hour and land at a lazy 100 miles per hour.

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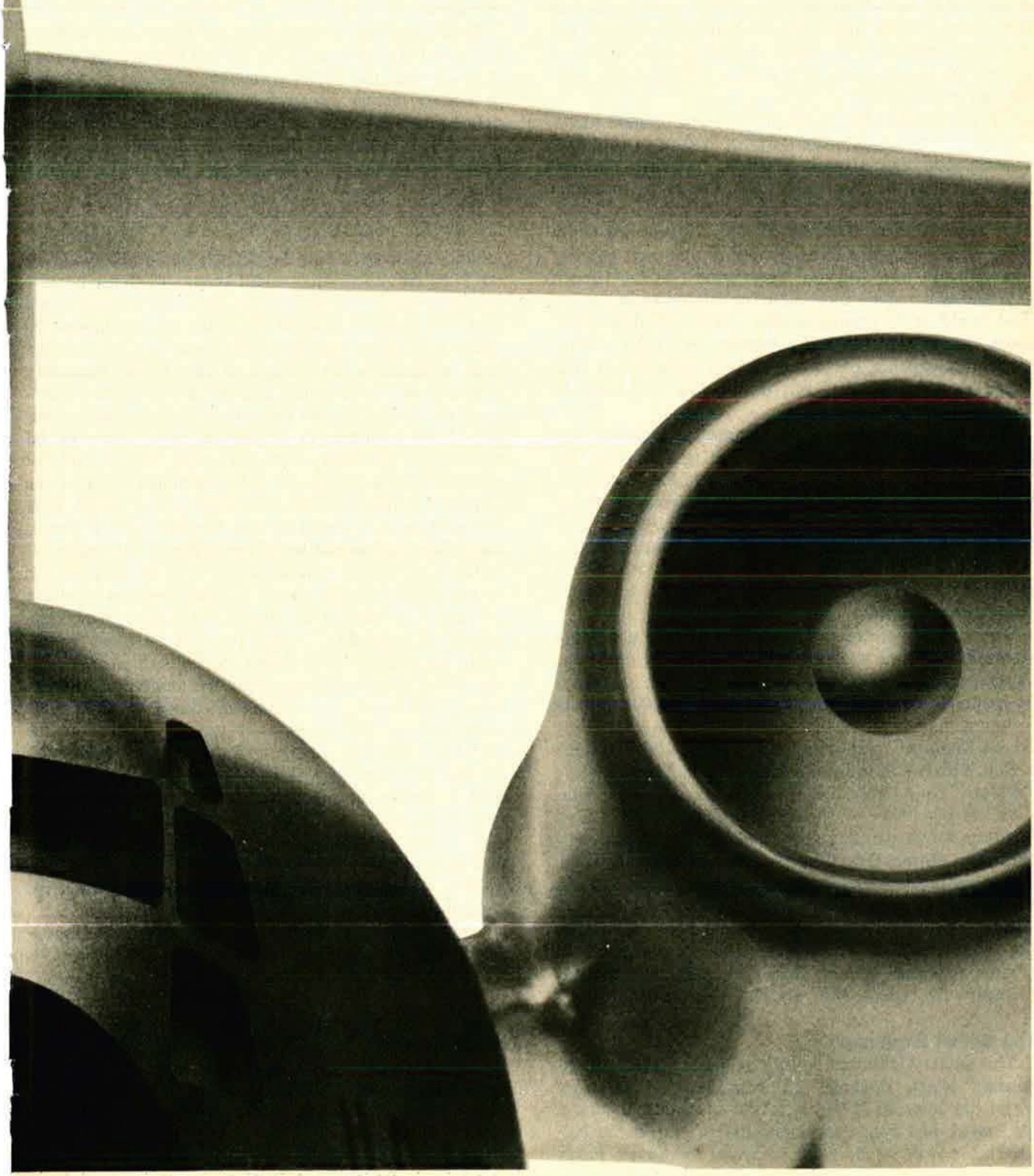
BOEING YC-14



A GUEST EDITORIAL

FOR AN ADEQUATE DEFENSE

By Eugene V. Rostow

THE best diplomatic signal the United States could give the world now would be a sharp increase in our defense program. It will take more than brave words and summit meetings to restore the stability of the world political system. That condition obtains only when our friends and our adversaries are equally convinced that American treaties and other commitments, which are the only cement of the system, radiate genuine deterrent power. At the moment, it is a little difficult to be convincing on that point.

There is a paradox in the state of our opinion about foreign policy. Despite the flurry of bad news in recent months, our basic security position is strong—stronger than has been the case since 1949. The rising pressures of Soviet expansion, and the logic of the nuclear weapon, have forced China, Western Europe, Japan, and many other countries under threat to realize that their security interests and our own are "indivisible," as the French say, and will remain indivisible for the indefinite future. The world is becoming smaller, more interdependent, more dangerous, and more bipolar. We shall remain altogether capable of protecting our interests in that world if we understand our position as it is, and do what is required to sustain it.

But we do not feel stronger. Quite the contrary. We are uncertain about our course, and are allowing our advantages to erode. Above all, we are bitterly divided, when we should be confronting our problems together with all the optimism, energy, and good sense which have always characterized American policy at its best.

How can it be that our position is quite good, objectively, while our subjective perception of it is so melancholy and defeatist?

The explanation for the paradox is that the prevailing American view of world politics, still reeling under the shock of Korea and Vietnam, and attracted as always by nostalgia for the mythical Golden Age of American isolation, has been deeply confused by the misleading Nixon-Kissinger vocabulary for talking about foreign policy. Mr. Nixon did not end the "Cold War," achieve "détente," and substitute "negotiation for confrontation." A condition of "détente" with the Soviet Union has been an unremitting goal of our foreign policy since President Roosevelt's time. It has not been reached. There has been no improvement in our relations with the Soviet Union, save in the realms of public relations and wishful thinking. Soviet policy is exactly what it has been since 1944 or 1945, except that its pressures are greater and more diverse than ever, and more difficult to deal with, because they are backed by more force.

The Soviet Expansion

The Soviet Union continues to pursue policies of expansion which threaten our vital interests in many ways: our interests in access to raw materials; in strategic, naval, and space communications; and in the balance of power itself, through Soviet or Soviet proxy threats to nations whose political independence is vital to our own security, and nations to whose future we are committed for even deeper reasons of history, kinship, and honor. They press steadily to envelop NATO and Japan, and seek to gain power in many other regions of the world.

Soviet policies of expansion are based on a military array which is growing at the rate of five percent a year, in real terms. The Soviet armament effort has no parallel in modern history. Meanwhile, our own expenditure for defense is declining in real terms, and in many categories amounts to unilateral disarmament. It has fallen to the lowest point since the period just before the Korean War.

It follows, at a minimum, that we should build up our military capabilities in order to avert a catastrophic military imbalance. But the defense budget proposed by the Ford Administration would keep our defense posture constant, if the rate of inflation turns out to be no more than ten percent, and all the other cost estimates on which the budget rests prove to be accurate. A static defense program is not enough, in view of the increasing pressures of Soviet policy, and the Soviet defense build-up. That build-up must be countered, if the basic security of the nation is to be assured, particularly by increases for the Navy, for our ready forces, and for research and development. The estimated costs of the increased capabilities recommended in the recent Task Force Statement issued by the Coalition for a Democratic Majority would be of the order of $10 billion.

The goal of our nuclear policy is to prevent the use or the credible threat to use nuclear weapons in world politics. The heart of the matter is the concept of "second-strike capability," which must at all times be beyond the shadow of a doubt. Second-strike capability cannot be measured by counting the number of ground-based, air-based, and submarine-based launchers on each side, or the number of missiles which can be MIRVed. The key issue is and will remain whether the Soviets can have any reasonable expectation of being able to destroy so large a number of our weapons by a first strike as to create doubt about our second-strike capacity, or our willingness to respond to a nuclear attack as necessary. That question is addressed to the total number of warheads on each side, and the respective capabilities of all Soviet and American launchers.

This is the basic flaw in the Ford-Brezhnev "agreement to make an agreement" announced in Vladivostok. That understanding was addressed to the number of launchers and the number of missiles that could be MIRVed on each side. It tells us nothing about the number of warheads each missile might carry, and the number, yield, capacity, accuracy, and range of the warheads themselves, however launched. The Soviet missiles that can be equipped with MIRVs have three to

Mr. Rostow is Sterling Professor of Law at Yale University and former Under Secretary of State for Political Affairs from 1966 to 1969. He is also chairman of the Foreign Policy Task Force of the Coalition for a Democratic Majority. This article summarizes the Task Force's report, made on April 2.

Other members of the Task Force included Henry Fowler, former Secretary of the Treasury; Max M. Kampelman, former counsel to Vice President Humphrey; John P. Roche, former special assistant to President Johnson; Norman Podhoretz, editor of Commentary; *Albert Shanker, president of the American Federation of Teachers; and Professors Jeane J. Kirkpatrick, Lucian W. Pye, and Paul Seabury.*

This article appeared in the May 12, 1975, issue of The Wall Street Journal, *and is reprinted here by permission of that paper and of the author.*

six times the payload of the corresponding American missiles. The result could be an ominous Soviet advantage in strategic warheads, and therefore uncertainty about the American second strike.

The Vladivostok guidelines would build a dam across half the river. It is this gap which persuaded the C.D.M.'s Task Force to support continued research and development expenditure for the B-1 bomber, intended to replace the aging B-52. SALT I did not deal with missiles delivered by bombers at all. And the Vladivostok communiqué speaks only of missiles delivered by "strategic" bombers. The Soviets are making an impressive "medium" bomber, capable of delivering missiles on many American and American-protected targets. We should therefore proceed with the B-1, pending an agreement that equitably and verifiably limits bombers and all other missile launchers.

The Soviets are building towards superiority in strategic forces, spending annually about twice as much on them as we do, while we have unilaterally frozen the level of our strategic forces.

The Secretary of State has asked, "What in the name of God is superiority? What do you do with it? How do you use it?" The Soviets can answer this question. They are squeezing their economy and their people for the sake of a military goal they believe has meaning today. It offers them the credible possibility of being able to make or to threaten selected strategic attacks against our military dispositions and our allies, while keeping enough warheads in reserve to discourage a reply on our side against either military or civilian targets. Who can deny that such a capability, if achieved, would give them, at a minimum, an immense advantage in the diplomacy of blackmail they have practiced for more than thirty years?

The Task Force Statement therefore urges research and development expenditures on several aspects of our strategic weapons program. These proposals go beyond those of the Administration, although they are modest when compared with the Soviet budget. Such action is indispensible if we are to insure that no American President should ever have to choose between yielding vital American interests or destroying the Soviet—and the American—people.

The Immediate Challenge

Critical as the problem of nuclear balance is, our greatest immediate challenge is to maintain an adequate US military potential in the nonnuclear field. Thus far, nuclear stalemate has given the Soviets the opportunity to inspire conventional wars and proxy wars—an opportunity which has become nearly a license with the decline since Korea of the will of the Western allies to insist on the enforcement of the United Nations Charter. The policy of deterrence must apply at the conventional as well as the nuclear level.

Comparing Soviet and American conventional military potential is a somber exercise. Soviet general-purpose forces are increasing steadily in strength and mobility, backed by formidable seapower and airlift capacity. The Soviet Union has fifty percent, and perhaps 100 percent, more men under arms than the United States, 3,400,000 (or about 4,000,000) for the Soviets to 2,200,000 for the United States, depending on whether one lists border guards and internal security units among the Soviet forces, and how one deals with the high ratio of support to combat troops in all American formations. The Soviet Union has four times as many tanks as the United States, and at least five times our tank production rate. They are ahead of us three to one in artillery tubes, two to one in heavy mortars and forty percent in tactical aircraft, which they are producing at double our own rate. Their air defenses are far greater both in home deployment and in mobile or transportable systems.

The Soviet Union's new blue-water Navy is expanding at an astonishing pace. They have almost as many surface ships as we do, and over three times as many submarines, other than ballistic missile submarines. Here again, their building programs are far, far greater than our own.

On net, the Task Force Statement concludes, "our conventional military resources are in many important respects inferior" to those of the Soviet Union. And our programs for revitalizing and restoring those resources are so modest "that we are falling further and further behind."

The statement does not recommend a crash program, seeking to catch up to the Soviets in every category, overnight. It does recommend an increase in expenditures, particularly for the Navy, for ready forces, and for certain critical weapons and weapons systems, designed "to maintain a prudent deterrent against aggression."

A Mood of Somnambulism

The most important problem of our foreign policy is that we and our allies seem to be in a mood of somnambulism similar to that which paralyzed France, Britain, and the United States during the thirties. If we and our allies had been able to wake up then, the Second World War, and all that flowed from it, could easily have been prevented. We and our allies have the capacity to prevent an even more terrible war today.

The United States should be the master, not the victim, of its fate. The dangers before us demand a great and concerted national effort—a sharp and dramatic turn in the direction of policy. That turn will require earnest political debate. But it will require something more—a resolve to face the issues, and undertake that debate.

Thus far, at least, resolve has been the missing factor in the politics of national defense. It is the key factor. ■

Airmail

SAC Is Ready

Gentlemen: [Edgar Ulsamer's] piece on SAC with Gen. Russell E. Dougherty, May issue, was superb.

As a Mobilization Assignee to SAC from its birthpains under Kenney and LeMay through the next quarter century, I could scarcely escape being a subjective reader. But what came through to me was this:

Riding on the shoulders of giants who built SAC on a solid, professional foundation, General Dougherty, whom I do not know, has demonstrated in your interview that SAC is in capable and imaginative hands, and that there is still probably no more *intelligent* organization anywhere.

You can take a bow for making the almost unintelligibly complex understandable to the uninitiate. Just one example: the timing considerations confronting a Soviet planner. And another: why Soviet subs cannot venture too close to California shores to crush March AFB bombers on the strip, thus tripping the warning alarm. Let's hope this does not place too optimistic a reliance on our ASW detectors.

On semantics, I like "fratricidal" for damaging one's own missiles in the strike area, but I think the troops would use a longer expression.

Past SAC commanders in chief have been notable for restraint in promising what SAC can do, where there is any element of doubt, while bristling with confidence that SAC can put its money where its mouth is, if called upon to do so by the man with the options in the White House. Gen. Russell E. Dougherty is manifestly in that tradition.

Beirne Lay, Jr.
Los Angeles, Calif.

Combat Skyspot

Gentlemen: Reference the article "Building a Better Bubble," by Contributing Editor Maj. Fred Meurer, in your April issue:

I would like to make an objective statement concerning his text of the Air Support Radar Team (ASRT) and his inference that "Combat Skyspot" was employed in SEA by TACS. I offer my comments in an effort to simply "state the facts" and in no way do I intend to discuss "past roles and missions" policies of Air Force agencies. However, due to the fact that I have been associated with Combat Skyspot for eight years in my daily duties, I feel I should offer brief comment in behalf of the hundreds of personnel who developed, employed, maintained, and operated this system/concept during the past twenty-five years.

Ground Directed Bombing (GDB) was originally used in Korea in 1950; however, Combat Skyspot in its present state was developed during 1965 by Strategic Air Command's 1st Combat Evaluation Group (1CEVG) at Barksdale AFB, La. This group of people modified SAC radar bomb scoring (RBS) equipment (used daily since 1948 to score simulated releases by DoD aircraft) to make it capable of directing aircraft at extended ranges to the precise release point over the target.

After several months of testing and hundreds of reliable live impacts, the system proved feasible and was deployed to SEA. These systems were deployed from various SAC RBS sites and were maintained and operated by SAC personnel TDY over the past ten years and are still being maintained by the 1CEVG. 1CEVG is presently accomplishing the ground training programs and contingency use for this concept. When deployed, the operational control was under the forward area commander; however, the command and administrative control stayed under SAC's 1CEVG.

Combat Skyspot elements were awarded the Air Force outstanding unit award with valor and the Presidential Unit Citation for their accomplishments during the SEA conflict. The personnel who manned these systems were deployed from a SAC cadre of approximately 1,200 personnel located at thirteen fixed RBS detachments Stateside, plus additional support personnel. Some personnel had up to five 179-day TDY tours to Southeast Asia, and most are now stationed at our sites here in the States.

I personally feel Combat Skyspot's proven record is due to our hundreds of dedicated 303XX autotrack technicians throughout the Air Force. In most cases, these personnel had to maintain 1943 WW II vacuum tube radars to accomplish their twenty-four-hour, seven-days-a-week job for better than ten years. I have personally seen them work twenty-seven hours straight, grab a two-hour nap in the corner, and return to duty to place the bomb in the box.

I certainly do not mean to degrade Major Meurer's article. However, I believe my friends in both TAC and SAC will bear with me and appreciate my concern for this concept and would agree we give credit to those personnel who have earned it. It might be interesting to note—the last SAC ground personnel to leave South Vietnam in 1973 were 1CEVG Combat Skyspot personnel.

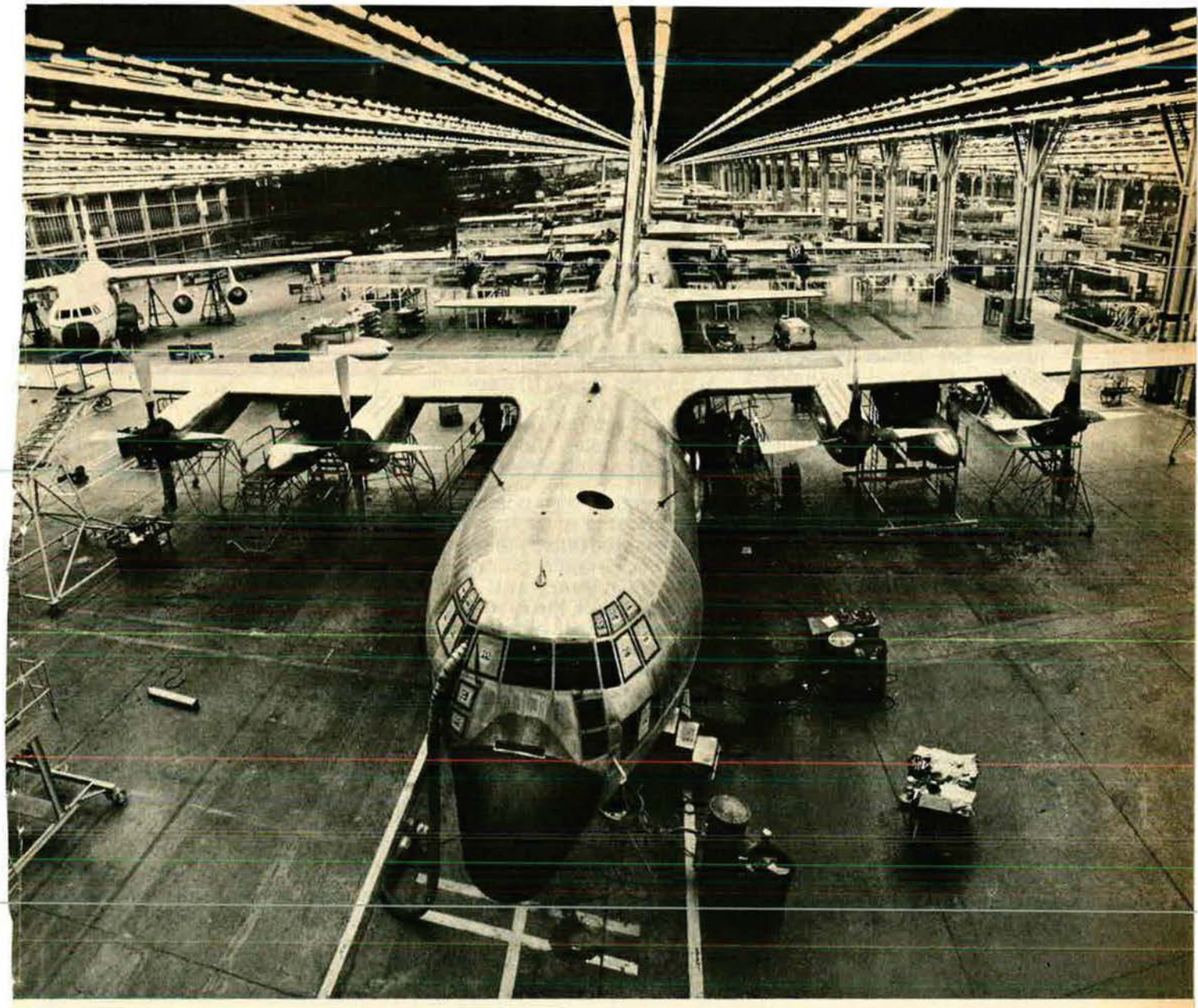
At the present time, SAC and TAC are working jointly on the procurement of new solid-state ground radars both for SAC's RBS sites and TAC's ASRTeams. I am confident that through our expertise we will be able to procure a new radar that will serve both our needs in daily training as well as future contingency needs for the tactical ASRT requirements of the proven concept of Combat Skyspot.

Col. James W. Crabb
Executive Officer
Hq. 1st Combat Evaluation Group (SAC)
Barksdale AFB, La.

• *We are glad to join Colonel Crabb in his tribute to the SAC people who operated and maintained Combat Skyspot in SEA. If the reference to Skyspot on p. 36 of the April issue was also interpreted by others as inferring that Skyspot was a TAC operation, we're sorry. No such inference was intended.*—THE EDITORS

IQ vs. Leadership

Gentlemen: In reference to the article entitled "USAF Graduate Degree



Hercules.
The airlifter whose time keeps coming.

Years ago the world needed an airlifter able to carry cargo such as fully assembled trucks and bulldozers. An airlifter strong enough to land and take off from short dirt, gravel, sand or snowy runways. An airlifter built for quick loading and unloading without ground-handling equipment. An airlifter able to haul 45,000 pound payloads for 2,800 statute miles.

Today the world needs that airlifter more than ever. Which is why ten nations ordered the Lockheed Hercules last year.

Why do countries keep selecting Hercules? Because Lockheed has 20 years experience working with countries that need great airlift, and it keeps making Hercules better and better. To begin with, the Hercules' airframe is classic in its functional simplicity. High wings let the fuselage almost hug the ground for fast loading. A huge rear cargo opening enables tractors to drive on and off. Sturdy landing gear handles the jolts of remote fields.

Inside, Hercules is almost new with avionics systems updated from nose to tail. All basic operating systems have been improved. The 1975 Hercs, for example, will have new radar, air conditioning and auxiliary power systems.

Hercules. The timeless airlifter, chosen by 37 nations.

Lockheed Hercules

NEW ANTI-ARMOR SYSTEM

Only the USAF A-10 provides the unique capabilities needed to defeat a massive armored thrust.

Each A-10, for example, will deliver up to 8 tons of ordnance per sortie to destroy enemy armor and to suppress hostile anti-aircraft missiles. With this typical payload—12 Rockeye anti-armor cluster dispensers, 6 TV-guided Maverick missiles, 2 laser-guided "smart" bombs, enough 30mm armor piercing ammunition for 11 attacks with its GAU-8 cannon—the A-10 can remain in the combat area for 1½ hours and still have sufficient fuel to return to base 100 nautical miles away.

In addition to this broad mix of weapons, the A-10 has 4 underwing stations reserved for electronic and IR countermeasures necessary to penetrate and evade enemy anti-aircraft missile defenses.

Add to this the A-10's survivability features—structural integrity, systems redundancy, fire suppressive fuel tanks and titanium cockpit armor.

The result: a new combat aircraft capable of providing responsive and lethal tank-killing support of friendly ground forces. **On every anti-armor mission, the A-10 will be there when needed with what is needed.**

FAIRCHILD
INDUSTRIES

A-10

Airmail

Deficit" in the April issue, I recently read a speech delivered by Lt. Gen. Ira C. Eaker, USAF (Ret.), entitled "Some Observations on Leadership," which I trust will provide some further thoughts on the pros and cons of this important subject. This particular speech was delivered as an address at the fifteenth anniversary celebration of Air University, March 17, 1961. [General Eaker also expressed similar ideas in his article, "The Military Professional," in the January–February 1975 issue of *Air University Review*.] Following is a portion of that speech which I feel is relevant:

"Marshal Saxe said a long time ago, 'Though the first quality a general should possess is courage, without which all others are of little value, the second is brains, and the third is good health.'

"So, let us have a look at brains, or intelligence, with relation to leadership. My historical and biographical studies of great leaders of the past, and my observation of the leaders I have known, do not indicate that a high IQ is the certain hallmark of a leader. I do believe that all are above the average of the group they lead; all are brilliant in some areas. Some have been quite stupid in some ways. At least one leader who achieved phenomenal success for a time was quite mad. I hasten to say that his name was Hitler, lest you think I refer to some of your commanders in the last war.

"Since I find so few leaders who were Ph.D.s, perhaps that is why I have been concerned of late at the current trend to turn over to scientists the selection of our weapons, and, indeed, the delineation of our tactics and strategy. It looks like this: If you want to go to the moon, call on the Ph.D.s; if, on the other hand, you want to keep the peace on earth, follow men more versed in the social sciences—those who know how to influence and control the emotions and the minds of men.

"And here, in this connection, is a thought I wish I had originated because I think it is basic and true. It came first, I think, from General Wavell, who said, 'The more mechanical becomes the weapons with which we fight, the less mechanical must be the spirit which controls them.' "

Capt. James N. Drane, USAFR
Edina, Mo.

A Pox on "TWP"

Gentlemen: My thanks for the plug in April's "The Wayward Press," which just came to my attention.

But my newspaper is the Houston *Post*—and not the nonexistent "Boston" *Post*.

O wayward press.

Don Morris
Houston, Tex.

Gentlemen: I note that "The Wayward Press" department in the April edition of AIR FORCE Magazine has taken to task the Anchorage, Alaska, *Daily Times* for a copy-reader's oversight in showing General Abrams as Army Chief of Staff. This certainly was an error. I am certain, however, that it was not an intentional one.

It was my privilege, during a four-year tour at Headquarters Alaskan Air Command, to observe the outstanding rapport between the *Daily Times* and the military community in Alaska. No newspaper anywhere ever gave the military more support and understanding.

The *Daily Times* Publisher, Mr. Robert Atwood, and its Managing Editor, Mr. William Tobin, are two of AFA's strongest supporters and great friends of the military.

Lt. Col. Phillip D. Clark
APO New York

Black Knights of Iceland

Gentlemen: Please add one F-4C squadron to ADC's active-duty list *(p. 58, May '75 issue)*. "The Black Knights" of Keflavik, Iceland, have been ADC's finest since June 1973.

1st Lt. Nino Baldachi
57th Fighter Interceptor Sqdn.
FPO New York

First to Bite the Bullet

Gentlemen: The commissary issue is becoming more distressing to me as it comes under fire from all sides. The General Accounting Office wants to eliminate commissaries in large metropolitan areas where they are needed most! The higher cost of living in these areas, for which military families receive no compensation, makes their need greater than in other areas to a family budget. The Defense Department and others have made the statement that military pay is now comparable to civilian pay, and, therefore, commissary benefits are not necessary.

This I find very difficult to believe. I should like them to name civilian jobs that demand the hours or working conditions of a military job, or the ever-present possibility of relocating on short notice, with or without one's family.

How many civilian jobs can ask at any time for an employee to put his very life on the line? Not to mention that a soldier cannot simply say "I quit!" when he has had all he can take. He must live up to his commitment to his country. It seems a pity his country cannot seem to live up to its commitments to him. Instead, we constantly find ourselves to be the first to have to "bite the bullet" and take cuts in benefits that attempt to compensate for military demands on family living.

An O.W.C. in Texas

China Theater Award

Gentlemen: The May issue of AIR FORCE Magazine includes an item in the "Aerospace World" column concerning the award of the China War Memorial Badge and Ribbon. This was exciting news to me because for years I have been unsuccessful in trying to obtain the Badge. I wrote to the Chinese Air Attaché, Lt. Col. Fei Tang, here in Washington and the US Air Attaché, Taiwan, but there has been no response.

I am a bit confused, however, with the statement that the award ". . . was never granted . . ." and also, that the authority was "Circular 166." I have a certificate issued by my unit, Headquarters 51st Fighter Group, Fourteenth Air Force, citing authority, Circular 188, Headquarters, US Forces China Theater, 1945, which indicates I am entitled to wear this award—if I can ever get it.

It was good to read about the China Theater. Perhaps this may gin up some articles or war stories about this forgotten theater at the end of the line on the other side of the Hump.

Lawrence H. Boteler
McLean, Va.

And WOW!

Gentlemen: As an ex-ATC Hummer driver and squadron mate of Capt. Danny Piper, I truly enjoyed "The Trail of the T-37," in the April issue. However, with more hours of Hum-

Airmail

mer time than I will admit to, I question the "facts and figures" published in the article. Even in the early sixties, with less time on the engines and airframe, it was a cold day at sea level when a Squeak could hum along level at 340 knots indicated. To cruise at 340 KIAS . . . WOW! A speed of 382 KIAS was the redline speed at sea level! At 20,000 feet that would exceed the limiting Mach! Further, a range of 870 miles would require a sustained assist from a friendly 150-plus knot jet stream.

Come on, Danny. The Tweety Bird hasn't changed that much in the past nine years. Let's keep these strap-hangers honest. The Tweet is a super trainer, but not that super.

In any event, keep up the good work. Your magazine does a tremendous service to the USAF and the United States.

Maj. Robert W. Sweginnis
Xenia, Ohio

• *Let the word go forth that the "facts and figures" on the T-37 were* not *provided by Capt. Danny Piper or his coauthor, Capt. Dan McCauley. We took them from one of the standard volumes of data on military aircraft. Thanks to Major Sweginnis, and our apologies to Captains Piper and McCauley.*— THE EDITORS

SAC in England

Gentlemen: I am researching a book which would be a history of SAC activity in the United Kingdom from the late forties to the mid sixties. I am anxious to contact any SAC personnel who saw duty in England during those years with a view to including personal reminiscences and experiences of the period.

Colin R. Smith
46, Waters Drive
Staines
Middlesex TW18 4RJ
England

UNIT REUNIONS

Airlifters
The 7th annual Airlift Reunion will be held September 26–28 at the New Orleans Marriott Hotel, New Orleans, La. For details please write

7th Annual Airlift Reunion
Box 1176
Jacksonville, Ark. 72076

Combat Pilots Association
The second annual reunion-conference (Group Grope II) of the Combat Pilots Association will be held October 24–26, in Phoenix, Ariz. Contact

Blue Leader
Combat Pilots Association
P. O. Box 91253
L. A. International Airport
Los Angeles, Calif. 90009
Phone: (213) 822-1755

Little Rock Air Guard
A 50th anniversary reunion of the Little Rock Air Guard (154th Aero Squadron), will be held Sunday, October 26, at Little Rock AFB, Ark. Contact

Commander
154th Tac Recon Squadron
P. O. Box 1211
Jacksonsville, Ark. 72076

Pampa Army Air Field
The 3d annual reunion of personnel stationed at Pampa Army Air Field during WW II will be held August 8–10. For information and reservations contact

Pampa AAF Reunion Assoc.
P. O. Box 2015
Pampa, Tex. 79065
Phone: (806) 669-7668

No. 1 Air Commandos
The No. 1 Air Commandos (later the 1st Air Commando Group) 1943–45, is holding a reunion at the Sheraton Hotel, Philadelphia, Pa., July 31–August 2. Make reservations directly with the hotel but please also notify

Bob Moist
2516 Las Casas Way
Rancho Cordova, Calif. 95670
Phone: (916) 363-4415

8th Air Force
The 1st reunion of the 8th Air Force will be held at Miami Beach, Fla., October 10–12. For details send number and location of your unit to

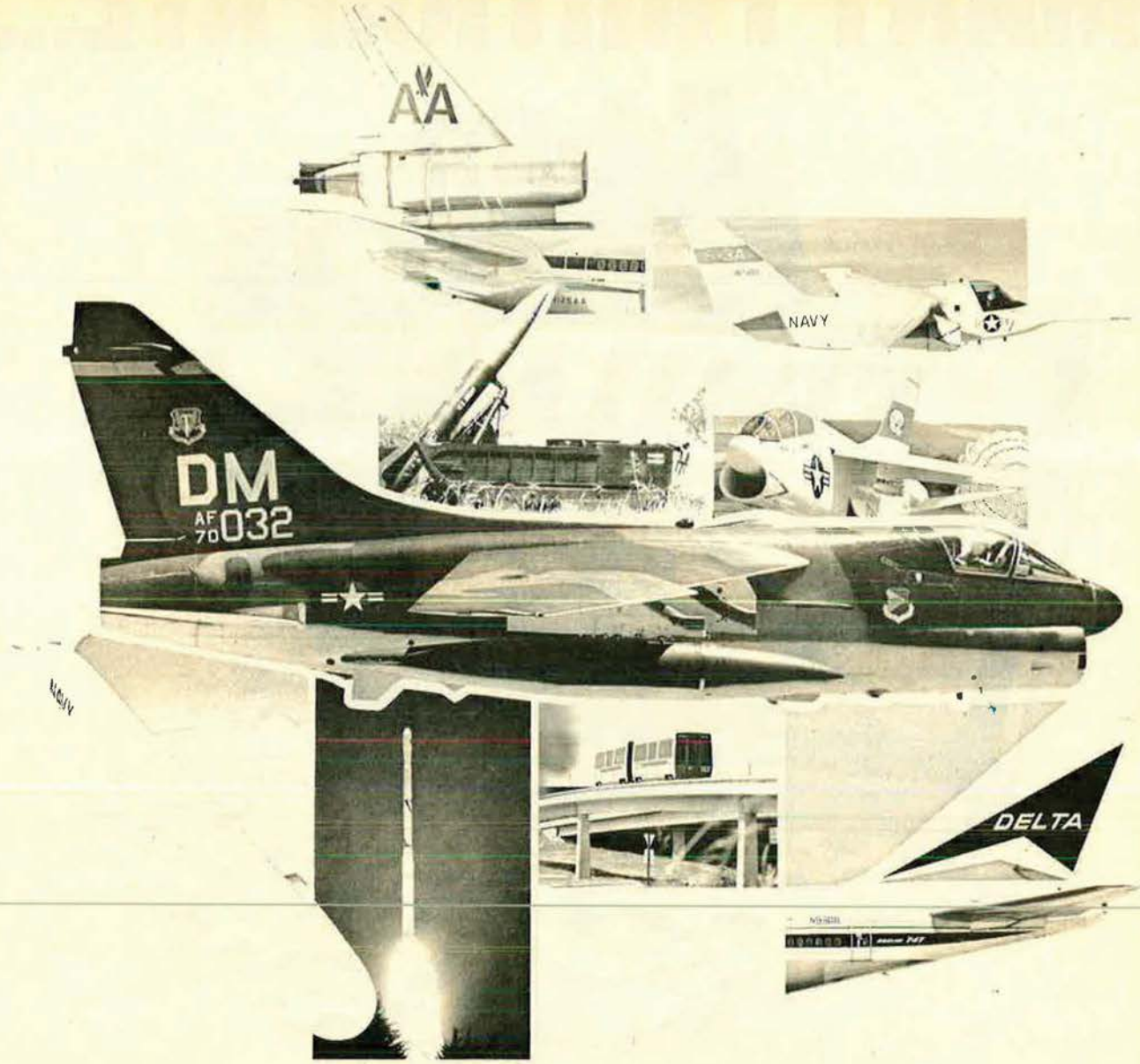
Lt. Col. John H. Woolnough, USAF (Ret.)
7752 Harbour Blvd.
Miramar, Fla. 33023
Phone: (305) 961-1410

58th Air Service Group
The 28th annual reunion of Hq. and Hq. Squadron, 58th Air Service Group, 5th Air Force, veterans—Australia to Japan—will be held Labor Day Weekend in Albuquerque, N. M. All former members are urged to join in the reunion. Contact former Group Chaplain

Beauford A. Norris
12130 Glen Canyon Rd., N. E.
Albuquerque, N. M. 87111

452d Bomb Group (H)
The 1st reunion of the 452d Bomb Group (H) and attached units at Deopham Green, England, WW II, will be held October 10–12. Please contact

Rom Blaylock
2103 Center Ave.
New Bern, N. C. 28560



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Airpower in the News

By Claude Witze
SENIOR EDITOR, AIR FORCE MAGAZINE

The Real Common Cause

Washington, D. C., May 28

The annual debate over the defense budget got under way in Congress last week, fittingly on the eve of Memorial Day, and the initial news indicated that Uncle Sam is riding calmer waters than he expected. The first votes in the House of Representatives indicate there is no change coming in our military policy despite recent reverses in Indochina.

In fact, the opposite probably is true. It is another case, in which our adversaries, or potential adversaries, may be the best friends we've got. Those freshmen Democrats, who had the Pentagon worried early in the year, seem to stand alone at the ramparts. They not only failed to win support from House veterans; they lost some.

Last year, Rep. Thomas P. O'Neill of Massachusetts, the majority leader, joined with Rep. Ronald V. Dellums of California to demand a cut of 100,000 in our troops abroad. Their suggestion lost, 240 to 163. This year, Mr. Dellums reduced his demand to a cut of 70,000 men. Mr. O'Neill not only refused to cosponsor the amendment; he voted against it, and it lost, 311 to 95. In our "news analysis," that's progress.

The impact of each factor cannot be measured, but the conduct of the defense critics in recent weeks may have been counterproductive. A month ago, in this space, we recounted the outrage perpetrated by the American Friends Service Committee, which spread a tortured and highly inaccurate rundown on the B-1 bomber across the nation on April 15. The effect appears negative, as it should have been.

More recently, on May 7, a group of twenty-six organizations, almost all of them in favor of unilateral disarmament, called a press conference to denounce the B-1. The American Friends were involved again, but the show seems to have been organized by Common Cause and the Americans for Democratic Action. Other participants in the coalition ranged all the way from SANE to the Federation of American Scientists, a few church and union groups, and the Friends of the Earth.

Rep. Les Aspin of Wisconsin, one of their sympathizers in Congress who happens to be a member of the Armed Services Committee, was asked to find a hearing room in the Rayburn House Office Building where the press conference could be held. It appears he called a staff employee of Armed Services, said he needed the space for "friends," and was assigned a third-floor room that normally is the special preserve of the Investigations Subcommittee of the House Armed Services Committee.

Now, you must recall, Common Cause, ringleader in this attack on the B-1 project, is the reform outfit that led the fight early in 1975 for the ouster of F. Edward Hébert as Chairman of the House Armed Services Committee. Indeed, Common Cause openly claims credit for having Mr. Hébert deposed by the 94th Congress. It just happens that the Louisiana Democrat still is Chairman of the Investigations Subcommittee.

On the morning of May 7, as TV cameramen were lugging their equipment into Mr. Hébert's hearing room, the chairman appeared. The ensuing exchange cannot be reproduced in a magazine found on coffee tables in Air Force homes. The operation was halted at once. In fact, the television crews were thrown out and the door was locked.

A member of Mr. Hébert's staff reports that an arrogant individual, representing the coalition that scheduled the press conference, stormed through the halls screaming that the hearing room belonged to the public and he had a right to use it. He refused to identify himself or which organization he worked for. He viewed as incredible the fact that the room is under the jurisdiction of F. Edward Hébert, that there are security factors involved (the premises are checked with regularity by the FBI because secret meetings are held there) and that the chairman would not tolerate its use by a group of dissidents.

After a period of turmoil, the press conference to denounce the B-1 was relocated in the office of Rep. George E. Brown, Jr. (D-Calif.), in Room 2342, across the hall from Mr. Hébert's office. Mr. Brown is a member of the Agriculture and Science and Technology Committees of the House.

One of his major claims to fame, according to the *Congressional Directory*, is that he was the recipient of the "Economy Minded Congressman of the Year Award from Art Hoppe of the San Francisco *Chronicle* in 1966 for consistently voting against all Pentagon appropriations during the years when US armed forces were stationed in Vietnam." His office was a good resting place for the Common Cause press conference. The B-1 project appears to have gained support in the House.

The May 7 press conference did get a modicum of publicity. At least some of the newspapers knew about the circumstances that led to a shift in the scene to Mr. Brown's office. There were reporters who called Mr. Hébert's office and asked questions about it. They were given the facts. There is no evidence any of these facts have appeared in print, until now. To the press, it appears, this clumsy performance by Common Cause does not fit the definition of news.

Common Cause and its twenty-five affiliates who favor unilateral disarmament—they claim they represent more than 2,000,000 citizens—almost studiously ignore the origins of the defense requirement. This year's authorization reports of both the House and Senate Armed Services Committees speak of matters unknown to Common Cause.

On the House side, the committee, now headed by Rep. Melvin Price (D-Ill.), says the US "would be courting disaster if it imagined that progress in nuclear arms limitation and control can be achieved by allowing the situation to develop of unbalance in power, of disequilibrium in strength. That situation will develop to our disadvantage if we do not take heed of what the Soviets are doing, and if we do not look sharply to our own defenses.

"Nuclear power deters nuclear war only if it is a

credible deterrent; and credibility depends on whether a potential adversary believes we are as good as (if not better than) he, as capable, as determined. . . . The Soviets have chosen the path of expansion. . . . There can be no argument about the Soviet momentum and direction. They are steadily building their war machine, steadily expanding their land- and sea-based missile forces. They are on the way to becoming a leading maritime power. . . . They are spending proportionately more than we in such major categories as research and development, procurement, general purpose forces, and strategic nuclear forces." And, taking aim at one of the real issues in 1975, the report says:

"The security of the nation is increasingly put at risk if members of Congress and the public continue to look upon the defense budget as a vast, virtually unlimited source of funds for diversion to social and economic programs. The fact is that the defense share of total federal spending is on the decline as outlays mount in the civil agencies."

Then, from the Senate side, there is another warning that the trend can result in a shift of the military balance against the US. This committee, chaired by Sen. John C. Stennis (D-Miss.), points out that in ten years Russia has increased its military manpower by 750,000 to almost 4,000,000. The US has cut its military manpower by 585,000 to about 2,100,000. Russia has maintained about the same number of major ships and submarines. We have reduced ours by about one-third. The Soviet Union has, in the last year, maintained a level number of tactical aircraft. The US has reduced its force by seventeen percent. Russia also is closing the technological gap, catching up with the US.

Both reports this year cover a period of fifteen months. This was made necessary by budget reforms adopted last year, and the shift of the start of the fiscal year from July 1 to October 1.

In its report, the House committee proposed a cut of $3.7 billion from the Pentagon's request for $29.9 billion, most of it for weapons procurement and research and development. The Senate committee favored a slash of $5.4 billion. Included in the cuts is $1.3 billion requested for aid to South Vietnam and $300 million requested to provide a stockpile of weapons for sale to other countries, such as Israel. With allowance for these factors, the committees have come up with proposed cuts substantially less than the $4.5 billion reduction imposed by Congress last year. It is inflation, in fact, that continues to cut the Defense Department's buying power to a greater degree than legislation.

One of the major differences between the two reports is in their decisions on strategic systems. In the House group, the B-1 bomber received full committee support. The request was for $948.5 million. The Senate committee favored a cut of $222.3 million for the USAF project, arguing that the decision to start production has not been made and may not be made. The House committee disagreed and said the plane is warranted "when one considers the existing and projected Soviet bomber capability." Another difference appeared in the evaluation of the Navy's Trident submarine system. The Senate committee deleted only funding sought for the Trident II missile. The House committee, on the other hand, imposed a cut of $45 million, as opposed to the Senate's $4 million.

There was another substantial disagreement on USAF's airborne radar warning and control system, called AWACS. The request was for a total of $520.5 million. It won full approval in the Senate committee. On the House side, the proposal was cut in half, to $260.25 million. This would cut the six-plane program to three, and even this funding, the report says, is conditional. USAF is required, under the terms of the House bill, to demonstrate that the electronic equipment can withstand jamming.

In addition, the committee is upset over reports that our NATO allies may buy the planes for about half what they cost USAF. The Pentagon is ordered by the committee to "take no action toward the consummation of any agreement with any foreign government relative to the sale of AWACS until the expiration of thirty days after a full report of the terms and conditions proposed for such sale have been reported to the Committees on Armed Services of the Senate and House of Representatives."

Also of interest to USAF is the fact that both committees recommended deferment of the purchase of three E-4A Airborne Command Posts. The request,

TWO AUTHORIZATION BILLS VOTED

By June 6, both the House and the Senate had approved defense authorization bills, after turning away a long list of amendments that would have cut back on the Pentagon's key programs. There was general agreement that the news of the past several weeks, particularly of setbacks in Indochina, helped persuade many members of Congress that this is a poor time to economize on preparedness.

The arms-procurement authorization bill passed by the House on May 20 provides $26.5 billion for Fiscal 1976, plus $5.5 billion for the transition period between Fiscal 1976 and the legal start of a new year, October 1, 1976. The total is $32 billion, representing a smaller cut than that imposed by Congress last year and about seventeen percent more than voted at that time. The House vote was 333 to 63.

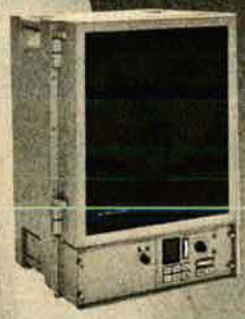
On the Senate side, the vote was 77 to 6, taken on June 6. The bill provides $25 billion for Fiscal 1976 and $5.2 billion for the transition period. The total is $30.2 billion. The two bills now go into conference, for agreement on their differences. The differences are minor.

On the House side, the Air Force faced a serious challenge to its AWACS program. The bill in that chamber favors a cut in funding to reduce a request for six aircraft to three. The Senate made no cut in AWACS. The House also favored a deletion of three aircraft in the airborne command post program. The Senate did not.

Other House action favored deletion of all procurement funds for the Sidewinder missile and a slash of $480 million in funds for research and development over the fifteen-month period. On the other hand, the House added funds for twenty-four A-7Ds not requested for USAF. It approved full funding for the B-1 bomber.

In the Senate, attempts to delete funding for continued development of the B-1 bomber and for an additional fifty Minuteman missiles were easily defeated. Advance procurement funds for Fiscal 1976 were cut $77 million and another $31 million for the transition period. The A-10 aircraft program suffered another $11 million reduction and $22 million from F-15 funding. The request for research and development was lowered by a total of $590 million for the two budget periods.

One for All and Four for One



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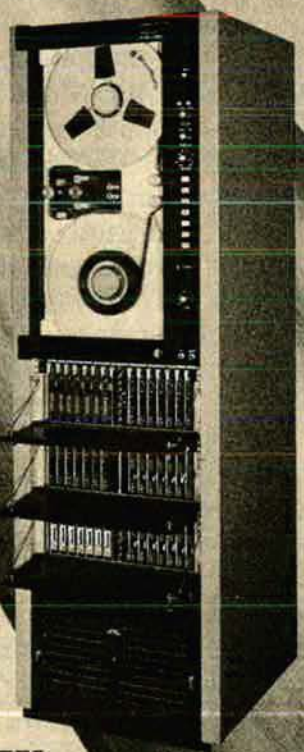

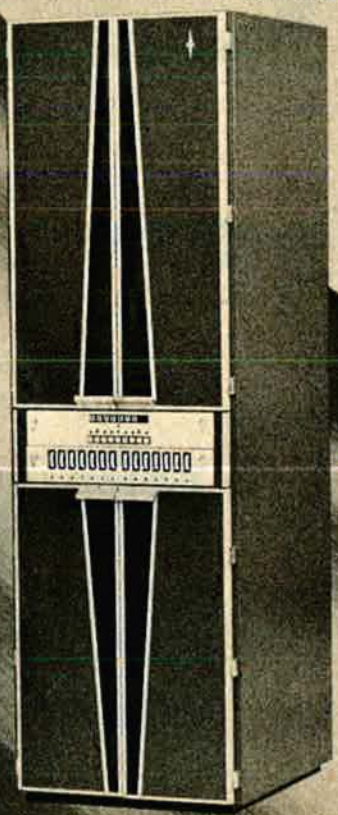

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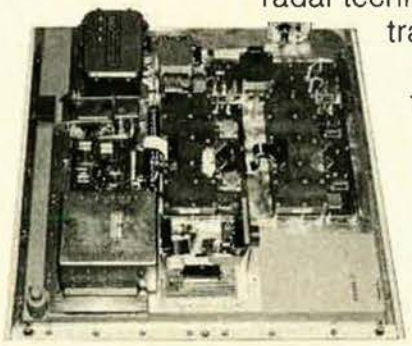

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Airpower in the News

denied, was for $185.8 million. The Senate committee report says the decision was made by the Pentagon. The House report says the Defense Department has the project under review and that there are serious cost problems.

A project that won solid support in both committees was the request for $109.7 million to improve the accuracy and yield of ICBM warheads. In the Senate group, this required rejection of a recommendation from its own Subcommittee on Research and Development, which favored deletion of the item. The subcommittee argued that missile improvement would be destabilizing to the balance of power. The House committee approved the funding with no comment. The full Senate committee viewed the missile improvement effort as "the most compelling incentive for Soviet restraint in the technological exploitation of its numerically superior strategic forces and for a genuine effort to conclude a stabilizing SALT II agreement."

The SALT II talks also are a factor in the argument over the B-1 bomber. This was brought out in the House floor debate on May 19. Representative Hébert pointed out that Russia had fought hard to stop the B-1 project during SALT I negotiations. He added:

"In the agreement reached in the SALT talks, we do not find any mention of the word 'bomber.' We only find ICBMs, and things of that nature—the missiles. Now we are in the second phase of the SALT talks, and do the members know the language we find in it today? Bombers. Bombers. What are the bombers they are talking about? They are talking about the B-1, and they want that B-1 included in the limitation of our firearms so as to reduce it and bring it in. Then they say nothing about eliminating it. Why, Moscow can read the papers and hear the statements of some individuals in this country. They are depending on this Congress to kill it. That is what they are doing."

On the floor of the House, Mr. Hébert's view was supported by his fellow Louisianan, Joe D. Waggonner, and opposed by two New Yorkers, Thomas J. Downey and Otis Pike. Near the close of the debate, a congressional veteran, whose voice is rarely heard on such issues, took the floor. He is Rep. Joe Skubitz of Kansas, who has been in the House since 1962. Mr. Skubitz, who comes from middle America and is sixty-nine years old, made a little speech worth quoting here:

"I am not an expert on military affairs, but I have sat here and listened to the so-called experts for forty-five minutes now. All I want to say is that I have listened to my good friend from New York and the other gentleman from New York who are for this amendment, and the gentleman from Louisiana and the other gentleman from Louisiana who are opposed to it, and I have reached one conclusion, and that is that even if the gentlemen from Louisiana are wrong, then I have lost $20 billion, but if the gentlemen from New York are wrong, I could lose a country."

Mr. Skubitz spoke for the kind of a Cause that should be Common. ■

Aerospace World

News, Views & Comments

By William P. Schlitz
ASSISTANT MANAGING EDITOR, AIR FORCE MAGAZINE

Washington, D. C., June 6

With "jettison" tests of the Air Launched Cruise Missile (ALCM) this summer, USAF is moving closer to a strong new addition to the nation's strategic deterrent force.

The proposed arsenal of such nuclear-tipped weapons is visualized as presenting an almost insurmountable problem to an enemy attempting to defend against them.

Since each ALCM would have to be countered independently, a fleet of them launched at targets could saturate the defenses. The missile is being developed to be carried by both the B-52 and B-1. The former could carry twelve on its wings and eight internally; those on the wings could be outfitted with auxiliary fuel tanks for greater range. Operational B-1s, on the other hand, would tote twenty-four, all internally.

Once launched, ALCMs would use a combination of inertial and terrain-comparison guidance, with an on-board computer comparing preprogrammed geographical features on the weapons' flight plans with what is actually "seen" during their flight to target.

The ALCM will be fourteen feet long, about two feet in cross section, and weigh in at 2,400 pounds. It will be powered by a turbojet engine. The weapons will be characterized by small radar cross section and low-altitude flight capability.

Under development by Boeing Aerospace Co., the ALCM will be compatible with the launch and support equipment of USAF's Short Range Attack Missile (SRAM), currently being deployed aboard SAC's B-52 fleet. "B-52s and B-1s could readily carry a mix of ALCMs and SRAMs to meet a variety of mission requirements," officials said.

Work on the ALCM is being coordinated with the US Navy's development of a sea-launched cruise missile. While missile airframe needs of the two services differ, guidance, propulsion, and payload are the same, providing potential savings for both USAF and USN.

The ALCM program is under the direction of Col. O. H. Tallman, Air Force Aeronautical Systems Division, Wright-Patterson AFB, Ohio. Williams Research Corp., Walled Lake, Mich., is contributing the missile's propulsion units, and McDonnell Douglas and E-Systems are in competition for the selection this coming fall as guidance contractor for the Boeing-developed missile.

☆

The Navy in May named McDonnell Douglas Corp. and Northrop Corp. as the team to develop the new Navy Air Combat Fighter, designated the F-18. General Electric Co. will develop the plane's engine.

The companies involved were awarded short-term sustaining contracts to continue engineering design studies and other work pending a decision by the Secretary of Defense—and congressional approval—to undertake the aircraft's full-scale development.

In that event, the first installment of $110 million in the FY '76 budget would fund R&D aircraft and associated engines.

Approval of the F-18 program would lead to procurement of a minimum of 600 aircraft; cost estimates have been predicated on a buy of 800 F-18s, DoD officials said.

As visualized, the F-18 "would be fully carrier suitable" and capable of Mach 1.5, with a radius of action of 400 nm and combat ceiling in excess of 45,000 feet.

☆

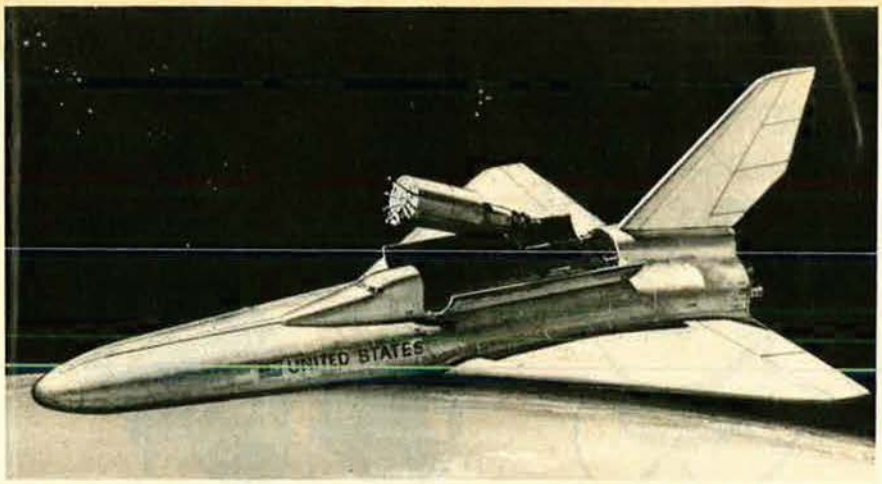
The military consortium of four Western European countries—Norway, the Netherlands, Denmark, and Belgium—has agreed to purchase the US's F-16 fighter.

The plane is being built to replace the F-104 Starfighters in Europe. The Air Force plans to purchase 650 F-16s now and perhaps as many as 1,200 by the 1980s to augment the F-15.

With the four European nations buying F-16s, other countries are expected to opt for the new fighter as well, setting the stage for one of the biggest sales of a single weapon system in history.

General Dynamics developed the

Air Force Secretary John L. McLucas (right) presents the National Space Club's 1974 Robert Goddard Memorial Essay Contest award to Air Force Capt. James E. Oberg at ceremonies in Washington, D. C. Captain Oberg's thesis demonstrated from open sources that the USSR abandoned its try to beat the US to a moon landing and now claims the competition never existed. AFA member Captain Oberg also received a $500 check from NSC.



Artist's concept of a Single-Stage-to-Orbit spacecraft that would take off and land conventionally. NASA has chosen Boeing Aerospace Co. to undertake preliminary studies toward development of such a craft.

F-16, while its engines—which also power the F-15—are built by United Technologies' Pratt & Whitney Division.

Under the agreement, components aggregating about forty percent of the value of the 350-plane European purchase will be manufactured there, as well as ten percent of the components designated for the US's F-16s. Additionally, fifteen percent of the parts going into other allies' purchases of the F-16 would be produced in Europe.

The deal will provide a boost in the billions of dollars for the US's aerospace industry, and also contribute to the long-sought-after standardization of NATO's air forces.

☆

Four years ago, in the October 1971 issue, AIR FORCE Magazine asked this poetic question:

The Pointy-Headed Navigator

He knows the world is big and round,
And on its surface seas abound,
And in the seas, land may be found.
He is a navigator.
There is no greater.

To far-off fields he shepherds MAC
And obscure targets finds for TAC
And penetration routes for SAC.
He is a calculator.
There is no greater.

When will he be, like old Lysander,
An operational commander?

The answer came this spring when, for the first time in Air Force history, a nonpilot was chosen to command a bomb squadron.

Lt. Col. Charles W. Richey, Jr., now commands the 328th Bomb Squadron, 93d Bombardment Wing, Castle AFB, Calif. He's a navigator with twelve years of experience in B-52s and fifty-seven combat missions under his belt.

Colonel Richey's unit, SAC's largest and most active bomb squadron, has the dual mission of maintaining combat readiness while crewmen also serve as instructors for Castle's combat crew training mission. The 328th is equipped with B-52Gs and Hs.

Until President Ford signed a bill in December 1974, navigators and other nonpilots were forbidden by law from commanding flying units.

☆

In an ominous demonstration of naval muscle, the Soviet Union this past spring deployed 250 combat vessels in what were termed the largest peacetime global maneuvers in history.

Modern warships of the emerging maritime power steamed throughout the waters of the Pacific, Atlantic, and Indian Oceans, the Caribbean and Mediterranean Seas, and off Norway in apparently coordinated exercises.

Screening the major Soviet fleets was a force of submarines, while long-range strike, reconnaissance, and antisubmarine aircraft provided surface operations with an aerial umbrella (it is believed that recently orbited Cosmos satellites were tested in a recce/surveillance role during the exercises).

The Russian Navy is built around four fleets: Northern, Black Sea, Baltic, and Pacific. USSR's Navy is unique in the world in that it has forged close ties with the civil maritime fleet in matters of intelligence-gathering and other activities.

According to the Pentagon, the worldwide deployment included *Kara* and *Kresta II*-class cruisers and *Kashin, Krivak, Kilden,* and *Kanin*-class destroyers, "the newest and most heavily armed surface ships in the Soviet naval inventory."

It is also believed that the Soviet Union in recent years has concentrated on a build-up of its amphibious-assault forces, as well as shipborne firepower to back them up.

In addition to its helicopter aircraft carriers, the USSR has completed construction of a much larger, canted-deck carrier, the *Kiev,* which can accommodate V/STOL aircraft as well as helicopters. A second carrier of this type is now under construction. All indications point to a reorientation of the Soviet Navy from a force primarily designed for interdiction of the sea lanes and defense of the homeland to one that combines those functions with projection of Soviet power overseas.

SOVIETS SET NEW TIME-TO-CLIMB RECORD, RECLAIM TWO OTHERS

The USSR claims to have recaptured two time-to-climb records recently set by USAF's F-15 Eagle *(see March* AIR FORCE *Magazine, p. 16, and this issue, p. 32).*

The Soviet Union said that also on May 17 a record of 251.3 seconds was established for a climb to 35,000 meters (114,829 feet). No previous mark had been set for a climb to that altitude.

All three flights were made in an E-266N aircraft, a version of the MiG-25 Foxbat. The records that the Soviets claim to have retaken are: 25,000 meters (82,021 feet), 154.2 seconds (pilot A. Fedotov); 30,000 meters (98,425 feet), 189.7 seconds (pilot P. Ostapenko). The 35,000-meter climb was flown by Fedotov. Flight data has been submitted to the Fédération Aéronautique Internationale (FAI), but had not been verified by press time.

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In May, the USSR received permission to use port facilities in Libya, providing another bastion on the Mediterranean.

☆

The Blanchard Trophy, symbolic of the best missile wing in the Strategic Air Command, is now on display at McConnell AFB, Kan., after the 381st Strategic Missile Wing dominated the 1975 SAC Missile Combat Competition at Vandenberg AFB, Calif., in April.

The 381st was one of three Titan II wings matched against six Minuteman units in the six-day 1975 Olympic Arena meet.

The McConnell wing won six other trophies. It had the best crew overall, the best Titan crew, best operations, the best Titan propulsion team, and the best Titan Security Police team.

AFA's Titan Operations award also went to the 381st, while the 44th SMW, Ellsworth AFB, S. D., won AFA's Minuteman Operations prize.

Placing second to McConnell overall, the 44th won trophies as the best Minuteman wing and best Minuteman crew. It also won the Air Force Logistics Command award for Minuteman logistics, and its Electronic Lab team tied with the 90th SMW representative from F. E. Warren AFB, Wyo., as best Minuteman E-Lab team.

F. E. Warren's 90th SMW had the best Minuteman maintenance team and the top Minuteman electromechanical team.

Other winners were the 321st SMW, Grand Forks AFB, N. D. (best Minuteman targeting team, best Minuteman Security Police team, and best Security Police team overall), and the 308th SMW, Little Rock AFB, Ark. (best maintenance team, best Titan guidance team, and best Titan electronics team). The 308th also won AFLC's Titan logistics award, while the 341st SMW, Malmstrom AFB, Mont., took honors as the best Minuteman handling team.

The 390th SMW, Davis-Monthan AFB, Ariz., had the best single crew exercise, the best Titan reentry vehicle team, and the best Titan vertical alignment team.

Secretary of the Air Force John L. McLucas presented the Blanchard Trophy to the McConnell wing, and Gen. Curtis E. LeMay, USAF (Ret.), former Air Force Chief of Staff and SAC Commander in Chief, awarded the Minuteman trophy to the Ellsworth unit. Gen. Russell E. Dougherty, CINCSAC, presented the best Titan wing trophy to McConnell's 381st.

This was the first year SAC Security Police teams competed in the missile competition. SAC officials pointed out that the average age of missile combat crewmen participating this year (twenty-five) was the youngest in history.

First in SAC's recent missile competition was the 381st Strategic Missile Wing, McConnell AFB, Kan. The team posted nearly perfect scores. See item above for details.

Milt Caniff drew these sketches of Steve Canyon's fictional wife, Summer, and her namesake, Summer Bartholomew. The latter, the new Miss USA, was born in 1951 at Castle AFB Hospital while her dad was on active duty with the Air Force. A girl-next-door type from Merced, Calif., the twenty-three-year-old beauty hopes one day to meet her own Steve Canyon.

☆

At this writing, Soviet cosmonauts were aboard orbiting Salyut-4 space station and continuing a series of experiments begun by their predecessors, the crew of Soyuz-17. That crew set a Soviet record of thirty days in space.

Whether the mission would overlap the planned July linkup of Apollo-Soyuz was not known.

The two-man crew of Soyuz-18 (also the designation of last April's aborted mission) reported that launch, rendezvous, and docking had all gone smoothly. Docking and boarding, Soviet officials said, had been accomplished in total darkness.

Launched last December, Salyut-4 was manned in January and February. This latest mission marks the first known time in the Soviet space program that successive crews have visited an orbiting installation.

The two cosmonauts—Lt. Col. Pyotr I. Klimuk and engineer Vitaly I. Sevastyanov—are both space veterans.

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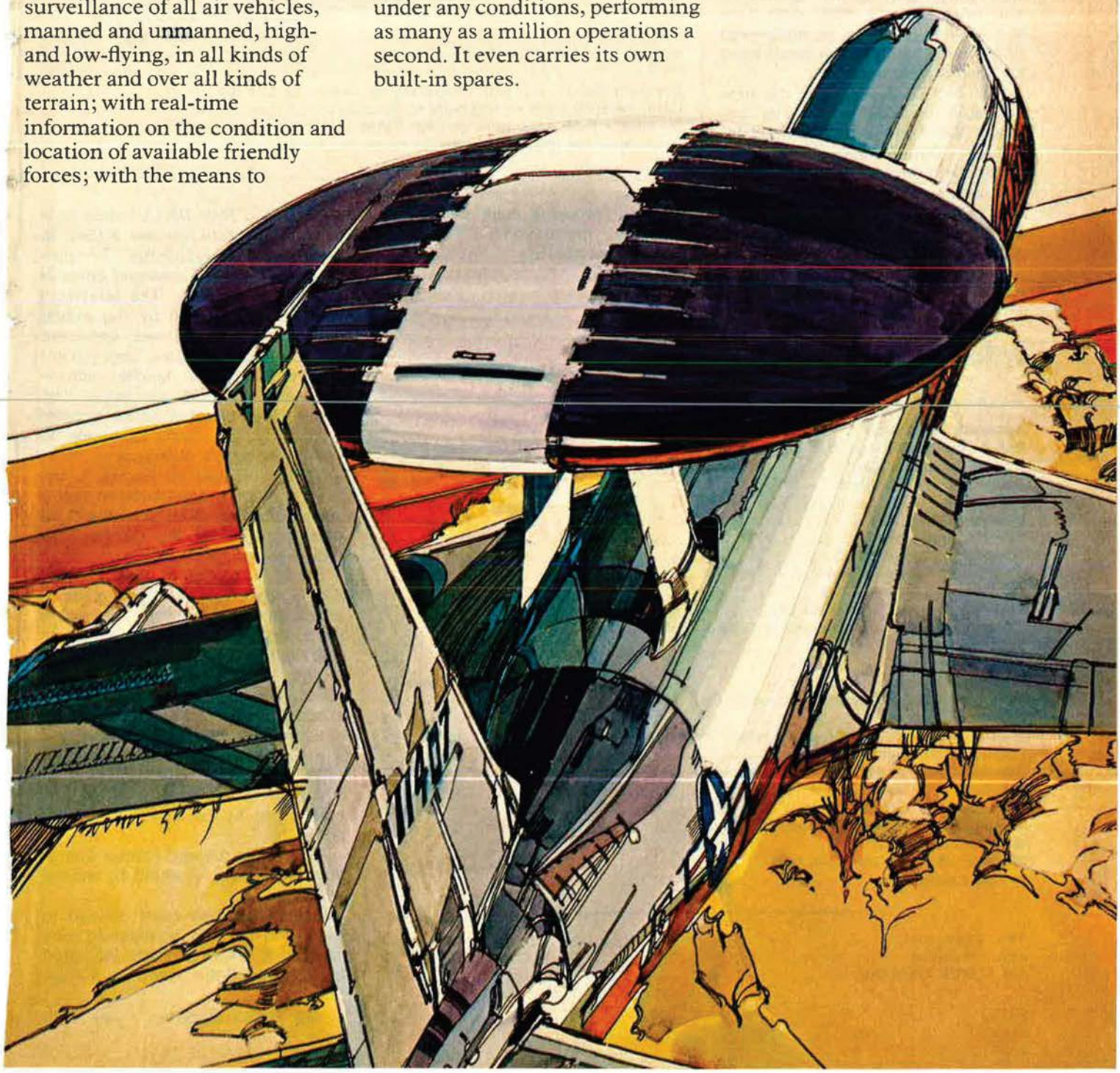

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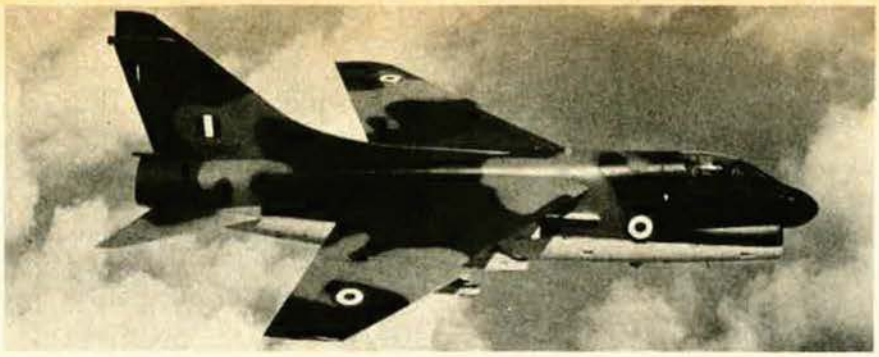

The A-7H Corsair, top, built specifically for Greece by LTV Aerospace Corp., recently made its first flight in the skies over Texas. Above, Northrop's F-5E supersonic tactical fighter joined the operational inventory of the Royal Malaysian Air Force this spring.

ing their resources for July's joint Apollo-Soyuz mission, the largest and most powerful communications satellite ever built is being shifted in orbit to provide support.

The two-story-high NASA Applications Technology Satellite-6 (ATS-6) began a six-week journey in mid-May from its position just west of the Galapagos Islands in the Pacific to a new location above Lake Victoria in East Africa.

From there, ATS-6 will help track the Apollo and Soyuz spacecraft and relay TV and other data from the orbiting vehicles to earth—the first time a satellite has been used for such a purpose.

Use of ATS-6 will triple the time available for communications between the Apollo and ground controllers. During docked portions of the nine-day mission, Soyuz will also communicate via ATS-6.

With the Apollo-Soyuz relay assignment successfully concluded, ATS-6 will then be ready to take on another imposing task called the Satellite Instructional Television Experiment (SITE).

SITE is a joint NASA-Indian government venture to use ATS-6 to beam daily educational TV programs to 5,000 villages and cities in seven Indian states. The television segments, produced by the Indian government, will stress improved agricultural techniques, family planning and hygiene, teacher education, and occupational skills. The single video channel will be accompanied by two audio channels to handle language differences.

To be initiated on August 1, the SITE project is scheduled to last a year. Following SITE, ATS-6 will be repositioned over the US for continued experimentation.

Since its launch in May of 1974, ATS-6 has engaged in a number of educational programs involving broadcasts to rural communities in Appalachia, the Rocky Mountain region, and Alaska, among other tasks. The satellite also has been able to chalk up several communications firsts. Among them:

- First aircraft-to-ship message relay.
- First direct control of an aircraft flight by an ocean air traffic controller.
- First search-and-rescue operation (simulated) directed by means of satellite.

ATS-6 has also been utilized to track and perform communications control of NASA's newly launched GEOS-3 geodetic satellite, a step

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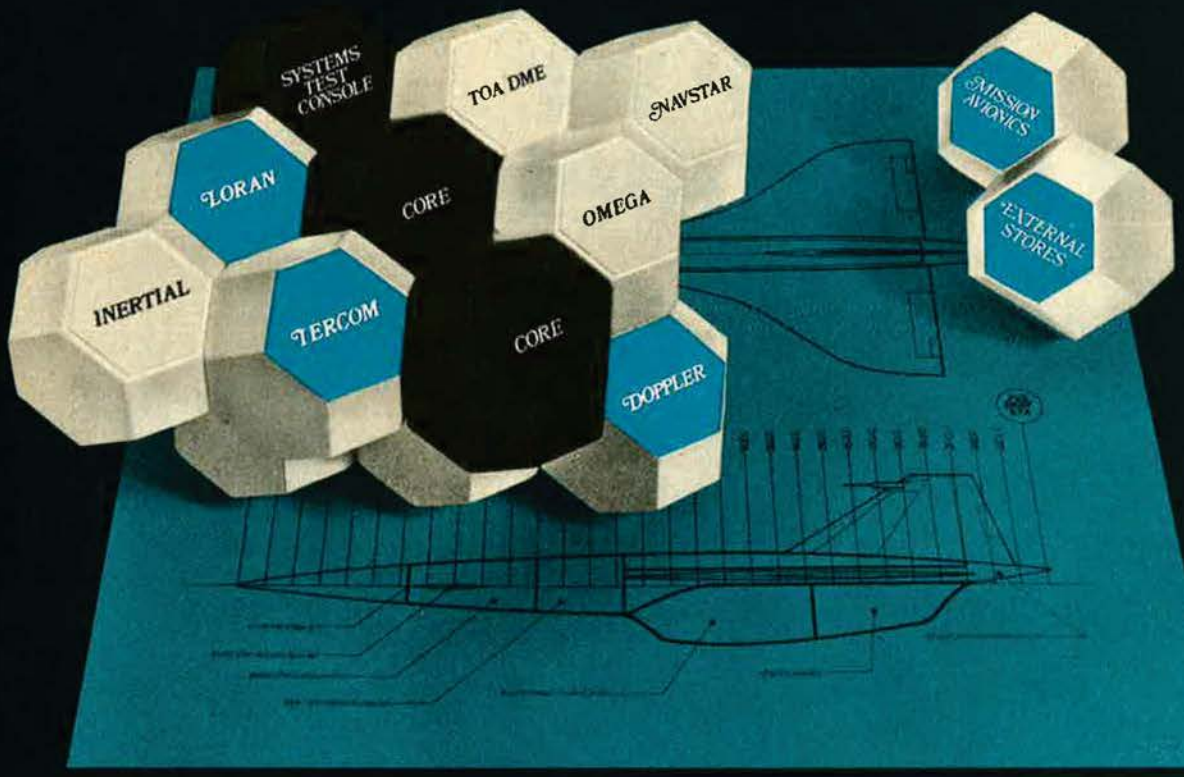

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Dr. William L. Ramsey is the newly elected president of the Aerospace Education Foundation, an AFA affiliate. He is District Director, Milwaukee Area Technical College.

During a recent visit to the Safeguard Ballistic Missile Defense Center at NORAD's Combat Operations Center, Cheyenne Mountain, Colo., were, from left, USAF Chief of Staff Gen. David C. Jones; Defense Secretary James R. Schlesinger; Canadian Forces Lt. Gen. R. C. Stovel, NORAD Deputy CINC; and USAF Gen. L. C. Clay, Jr., NORAD Commander in Chief.

the military for such activities as familiarization flight training, intercept practice, and air combat maneuvers.

Where practicable, FAA said, present flight-training airspace will be converted to what the agency will label MOAs, for Military Operations Areas. Moreover, FAA plans to keep the size and number of the MOAs to that actually needed for training. The services are being asked to share established MOAs to save airspace.

Alert areas and intensive student jet training space will be designated MOAs as well, FAA said.

Nonparticipating VFR (visual flight rules) traffic will be allowed through MOAs, and FAA plans an extensive information program to inform pilots about MOAs and activities taking place within them. If FAA can provide separation service, IFR (instrument flight rules) traffic would be cleared through MOAs, or barring that, routed over or around.

☆

NEWS NOTES—Initiated in June 1975 by **the Air Force Historical Foundation,** Bolling AFB, D. C., a

that may eventually lead from a totally ground-based—and limited—tracking system to a Tracking and Data Relay Satellite System (T&DRSS) that is currently under study for operation in the late 1970s.

☆

In another satellite application, data from NASA earth resources survey satellites LANDSAT-1 and LANDSAT-2 have been used by state officials to assess damage and plan disaster relief in the wake of the flooding Mississippi River.

Data from the orbiting satellites first went to the Goddard Space Flight Center, Greenbelt, Md., to be processed into photo form. The film was then flown to NASA's National Space Technology Labs, Bay St. Louis, Miss., for analysis by federal and state experts to determine the extent of flooded areas and other factors.

Computer-produced flood maps were delivered to officials in Mississippi and Louisiana within thirty-six hours following passage of the satellites over the flooded areas.

☆

The Federal Aviation Administration has begun the delineation of airspace specifically for the use of

Aerospace World

$1,000 scholarship each year will go to a graduating AFROTC student who is continuing schooling toward "a master's degree in disciplines that meet the needs of the Air Force," said the organization's president, **Lt. Gen. John B. McPherson,** USAF (Ret.).

The **USAF Thunderbirds** are accepting applications through July 31 for **two demonstration pilots** and **a logistics officer** for next year's (Bicentennial) team. Eligibility criteria and application procedures are contained in **AFR 36-20.**

Dr. Michael I. Yarymovych has taken over the post of **Assistant Administrator for Laboratory and Field Coordination** of the **Energy Research and Development Administration** (ERDA). Since August 1973, Dr. Yarymovych served as Chief Scientist of the Air Force, following a long career in aerospace with private industry, NATO, and NASA.

On June 22, members of the **US Air Forces Escape and Evasion Society** were to present a bronze plaque to **underground workers** of the northern coast of Brittany who helped ninety-four American airmen escape to England in 1944.

Hanoi in April released the names of three American pilots it said were killed in action over North Vietnam: **USAF Capt. Ronald D. Perry, USAF Maj. Crosley J. Fitton, and USN Lt. Cmdr. Jesse Taylor, Jr.** The last two had already been listed presumed killed and KIA, respectively, by the Department of Defense. The **League of Families** of American Prisoners and Missing in Southeast Asia, which has set its annual meeting for July 18–20 in Washington, D. C., called for additional information about the other Americans whose fates are still unknown.

Dr. David R. Scott has been named **Director** of NASA's **Flight Research Center,** Edwards AFB, Calif. A retired Air Force colonel and AFA member, Dr. Scott flew on Gemini-8, Apollo-9, and was Spacecraft Commander of Apollo-15. He was appointed Deputy Director of FRC in August 1973. The former astronaut, who also has more than 5,300 hours flying time, was awarded **AFA's David C. Schilling Trophy** for 1971. ■

Maj. Fred Meurer

Maj. John Correll

After serving for ten months with AIR FORCE Magazine under AFIT's Education With Industry program, Maj. Fred Meurer, left, will now assume his new post as Editor of *Airman* Magazine. Prior to his EWI assignment, Major Meurer was Chief, Editorial Division, Command Services Unit of Hq. USAF Office of Information. An AFROTC Distinguished Military Graduate from Texas A&M University with a BA in journalism, Major Meurer has been a USAF information officer for sixteen years. He is on the list for promotion to lieutenant colonel. At *Airman,* Major Meurer will replace Maj. John Correll, right, who has been posted to the Air Command and Staff College, Maxwell AFB, Ala. Major Correll, who also gained experience at AIR FORCE Magazine under the EWI program, has served as Editor of *Airman* Magazine for the last three years. There he contributed many articles and is the author of a step-by-step guide to magazine article writing.

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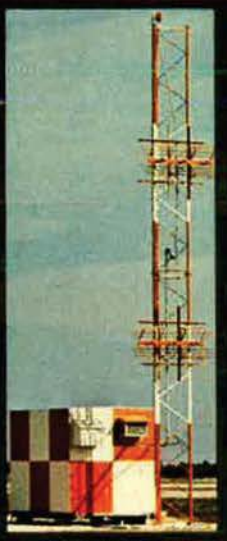

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AIR FORCE
JULY 1975 MAGAZINE

The Day The Eagle Streaked

BY MAJ. ROGER J. SMITH, USAF

On February 1, 1975, a US Air Force F-15 Eagle broke its eighth time-to-climb record in seventeen days, shattering all existing marks established by a US Navy F-4 Phantom and a Soviet MiG-25 Foxbat. The pilot who made the final assault on the records tells his story.

SATURDAY, February 1, 1975, dawns cold and clear in Grand Forks, N. D., contrary to the forecast of the previous evening. Weather forecasting in North Dakota is more a black art than a science. Weather often originates here. A typical forecast is, "Clear to partly cloudy with a chance of snow." That leaves a lot of room for change.

I'd set the alarm radio for 6:00 o'clock. When it begins playing country music, I lean across my wife to turn it down. Marilyn came up from Edwards AFB last Sunday. That was my fortieth birthday, and the day I had hoped we would set the 30,000-meter time-to-climb record so I could tell our kids that life really begins at forty. Instead, Maj. Dave Peterson, another of the Project Streak Eagle pilots, knocked off the 25,000-meter record that day, and it then was too late to try for 30,000. The rest of the week has been a series of frustrations.

Monday we had a shot at 30,000 meters, but the temperature at 36,000 feet, the acceleration altitude, was four degrees above the standard of minus 56.2 Celsius. The big Pratt & Whitney F100 fan engines that power the F-15 couldn't produce the acceleration required to set world class time-to-climb records at that temperature.

Also the fifty-five-degree climb angle shown by the flight simulation to be optimum for the final climb had not accounted for only fifty knots of tailwind, which would add total inertial energy for the conversion of speed into altitude.

So much for Monday. I didn't get to the 98,425 feet required for the 30,000-meter record. Two thousand feet short. Tuesday, Wednesday, and Thursday were devoted to installing a modified engine control and watching the bad weather. On Friday, we had a two-hour break in the weather, but the aircraft pitch trim control wouldn't work after engine start. By the time the mechanics and engineers sorted that one out, the weather was back.

Let me explain what we need for weather. Because we'll be shutting the engines down at the top of the climb and restarting coming back down, we want clear skies and ten miles of visibility at Grand Forks and Fargo—our landing alternate. We need standard temperature, or colder, at acceleration altitude and all the tailwind we can get out of the northwest since Fargo, our only alternate, is southeast of Grand Forks. This is no small order for North Dakota in winter.

Weather and Systems "Go"

Today is Saturday, February 1. At 6:00 a.m., I stumble into the bathroom to shave and wake up, before I call the weatherman. As I look out the window, I see stars and a setting moon. No clouds!

My subsequent call is not very encouraging. The weatherman says it might be clear now, but he'll stand on his original forecast of clear to partly cloudy with a chance of snow—at least until the sun comes up.

On Saturdays, we don't have people automatically report for work unless we think there is reason for optimism after the 6:00 a.m. weather check. The final weather check is in the radar van that tracks the flights and provides data to verify the records. It takes those folks about three hours to power up and run their preflight checks.

I try to call Jerry Callender, chief of the RCA radar crew. He has apparently already seen the moon and stars. No answer. I know these people well enough to know that Jerry is not sleeping elsewhere. Jerry and his crew have gone to work. I call the room of Sgt. Jim Flaggart, our

weather balloon team chief. No answer. His group is at work also.

Four more phone calls—to Pete Garrison, chief test pilot for McDonnell Aircraft and the voice of mission control; to Maj. Joe Higgs, Deputy Project Leader and coordinator of all base support; and to Majs. Dave Peterson and Mac Macfarlane, the other Air Force Project pilots.

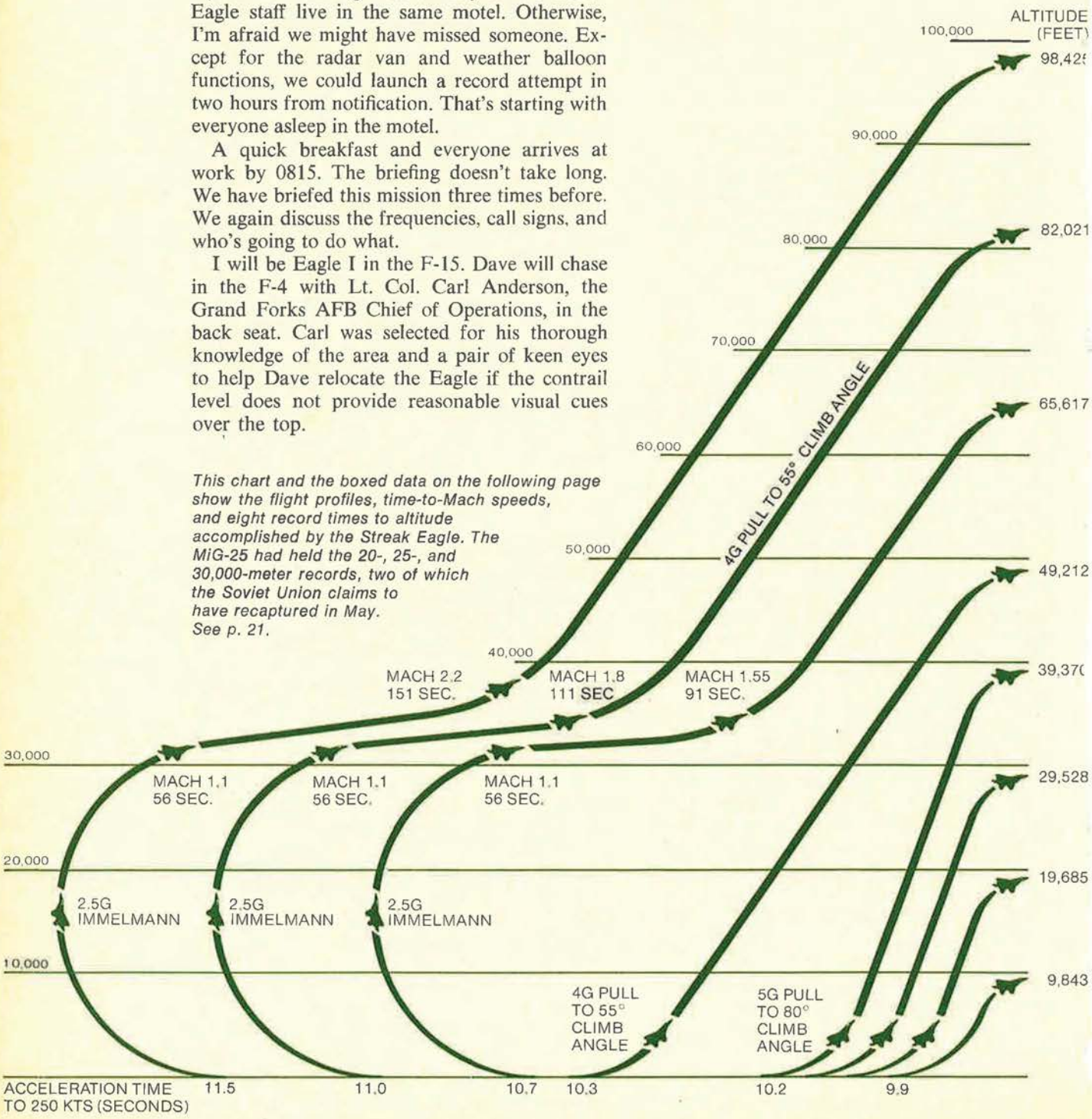
Dave will be flying safety chase today, and Mac will be operating the mobile control unit in a radio-equipped staff car. With the primary notification net working, I am again pleased with myself for insisting that all fifty of the Streak Eagle staff live in the same motel. Otherwise, I'm afraid we might have missed someone. Except for the radar van and weather balloon functions, we could launch a record attempt in two hours from notification. That's starting with everyone asleep in the motel.

A quick breakfast and everyone arrives at work by 0815. The briefing doesn't take long. We have briefed this mission three times before. We again discuss the frequencies, call signs, and who's going to do what.

I will be Eagle I in the F-15. Dave will chase in the F-4 with Lt. Col. Carl Anderson, the Grand Forks AFB Chief of Operations, in the back seat. Carl was selected for his thorough knowledge of the area and a pair of keen eyes to help Dave relocate the Eagle if the contrail level does not provide reasonable visual cues over the top.

Pete Garrison will run the radar van, be my ground contact, and provide assistance in the event of problems or emergency. Pete had flown all development flights on the Streak Eagle F-15 and knows it inside out.

His primary assistant will be Dick Cahill, the genius McAir (McDonnell Aircraft Co.) Project Engineer who "invented" Project Streak Eagle. Dick built the optimum flight profiles to achieve maximum altitude in minimum time and overall knows more about what we were doing than anyone in captivity.



This chart and the boxed data on the following page show the flight profiles, time-to-Mach speeds, and eight record times to altitude accomplished by the Streak Eagle. The MiG-25 had held the 20-, 25-, and 30,000-meter records, two of which the Soviet Union claims to have recaptured in May.
See p. 21.

The record-breaking pilots stand in front of their Streak Eagle F-15. They are, left to right, Majs. Willard R. Macfarlane; Roger J. Smith, the author; and David W. Peterson.

Dick's job during the flight is to monitor fuel remaining, time, and Mach number and advise Pete if we are "go" or if we should abort early and avoid the rush.

Maj. Joe Higgs will run Eagle Operations and ensure that crash crews, helicopters, and clearances are available on time. Norm Gaddy and Tom Hassler are the McAir crew chief and chief inspector who will make sure the Eagle is ready to fly. Sgts. Art Ball and Riley McVey are the crew chiefs on the F-4 chase aircraft.

Wayne Kupferer, Mo Gardner, and Roger Crane, the National Aeronautic Association observers, will certify and submit the record if we succeed. The team includes about forty other people.

It is 0900 and the briefing is over. A crowd of well-wishers is starting to assemble outside the briefing room. The weather still looks good. The runway has been cleared of snow, and the Fargo weather is excellent. The balloon results are in. Temperature at 30,000 feet is ten degrees below standard and two degrees below standard at 36,000 feet, where final acceleration will occur. The wind is more from the west than the north, but is blowing at eighty knots.

This is a go! The aircraft is released by maintenance. Everyone and everything is ready.

My stomach feels as it had in high school, twenty-two years ago when I stood on the goal line waiting for the opening kickoff. The difference is that this time I know the ball will be coming to me and although I have fifty other people to help me, the largest share of any failure will probably be mine. After Monday's attempt, I'm not sure how much more embarrassment the project will tolerate. At a time like this, I don't communicate well with my wife (or anyone else) so I take my flight data to an empty briefing room and lock the door.

The Flight Profile

The profile hasn't changed much since Monday's unsuccessful attempt. Release from the holdback cable at full afterburner with 7,000 pounds of fuel. Gear up and rotate for takeoff at the first indication of airspeed, about seventy knots. Watch the gear unsafe light and hope it goes out by 350 knots. If not, abort fast. Look for 0.65 Mach—about 420 knots. Rotate vertically into an Immelmann and hold 2.65 Gs. Expect to arrive level upside down at 32,000 feet at 1.1 Mach. Roll 180 degrees to right side up and accelerate to 600 knots. Climb at eight degrees to 36,000 feet at 600 knots. Hold 36,000, accelerate to 2.25, pull four Gs to fifty-five degrees. (I know it will now take sixty degrees with today's strong tailwind.) Look for four degrees' angle of attack. Hold four degrees until Pete Garrison calls to recover (passing the required 98,425 feet). Shut down afterburners when they blow out. Shut down the engines when they quit. At the "recover" call, try to hold zero angle of attack to minimize any tendency for control or gyroscopic unknowns to the flight path in the rare atmosphere. Ride ballistically to a fifty-five-degree dive angle. Look for 100 knots airspeed and start turning

RECORD FLIGHTS OF THE F-15 EAGLE— JANUARY 16–FEBRUARY 1, 1975

ALTITUDE (Meters)	ALTITUDE (Feet)	TIME (Seconds)	PILOT	DATE	PRIOR RECORD (Seconds)	PREVIOUS RECORD HOLDER	AIRCRAFT USED	DATE
30,000	98,425	207.80	Maj. Roger Smith, USAF	2/1/75	243.9	P. Ostapenko, USSR	MiG–25	6/4/73
25,000	82,021	161.02	Maj. David Peterson, USAF	1/26/75	192.6	P. Ostapenko, USSR	MiG–25	6/4/73
20,000	65,617	122.94	Maj. Roger Smith, USAF	1/19/75	169.8	B. Orlov, USSR	MiG–25	6/4/73
15,000	49,212	77.02	Maj. David Peterson, USAF	1/16/75	114.5	Lt. Cmdr. D. W. Nordberg, USN	F–4	3/3/62
12,000	39,370	59.38	Maj. Willard Macfarlane, USAF	1/16/75	77.1	Lt. Col. W. G. McGraw, USMC	F–4	3/1/62
9,000	29,528	48.86	Maj. Willard Macfarlane, USAF	1/16/75	61.7	Lt. Col. W. G. McGraw, USMC	F–4	3/3/62
6,000	19,695	39.33	Maj. Willard Macfarlane, USAF	1/16/75	48.8	Cmdr. D. M. Longton, USN	F–4	2/21/62
3,000	9,843	27.57	Maj. Roger Smith, USAF	1/16/75	34.5	Cmdr. J. W. Young, USN	F–4	2/21/62

for home—if you can figure out where home is on the snow-covered terrain without a compass.

At 55,000 feet or below, look for four green lights on the instrument panel to indicate the boost pump is on. Try to start both engines at once when above 350 knots and twelve percent rpm. If at least one starts and you have radio contact with Pete Garrison, talk about coming home to Grand Forks, depending on fuel remaining. If there is no start or no contact on radio, think about Fargo or ejection. It sounds complicated but really all the important decisions were made ahead of time. Except one thing: That's the fifty-five-degree climb angle intercepting zero angle of attack at 300 knots. This had given us about fifty-five knots of airspeed over the top in the simulator. Ample longitudinal pitch control on Monday when I ended up 2,000 feet short at 96,300 feet.

My boss at Edwards called afterward to assure me of his faith in simulators and me, "But don't go where you haven't been." "Hell, Boss, I've never been to 103,000, and that's where we've got to go to get through 98,400 in a climb."

The chief aerodynamacist in St. Louis for McAir has a different idea: "It will take a sixty-degree climb and four degrees' angle of attack to get there in record time."

"What kind of indicated airspeed will we see on top?" I asked. "What kind of pitch control will we have there?"

"Never mind. You need sixty degrees' climb angle and four degrees' angle of attack. You will have at least thirty-five knots over the top, and the aircraft should be controllable."

We have flown more than 4,000 flights in the F-15 with no accidents. I would hate like hell to be the first. But I had a lot of faith in the St. Louis pros, and the simulation had never been wrong. If I go over the top at thirty-five knots indicated, we will have only three pounds of dynamic pressure, but the aircraft will indeed be controllable. It will not exhibit any squirrels in directional control or roll control. Or will it?

Cleared as Filed

Now it's 0930. Time for the pressure suit fitting. Sgt. Don Needles is suiting me up alone today as his McAir counterpart, John Guss, has gone to Fargo to help me unsuit in case I must land there.

Don stretches the suit out on the floor of the personal equipment room. I strip down to my birthday suit and hustle into the warm, dry thermal underwear he's laid out. The full pressure suit will never be comfortable, but I'm glad I insisted on wearing it on every flight. At least I'm getting used to the discomfort and restricted mobility. Don helps me in, makes his pressure checks, and we are ready for the aircraft.

The author, Major Smith, is Operations Officer of the F-15 Joint Task Force, Edwards AFB, Calif. Born in Fostoria, Ohio, he is a graduate of Ohio State University and has a master's degree from the University of Southern California. Major Smith has more than 4,500 flying hours, many of them accumulated on seventy-five SEA combat missions in the A-37 and 128 in the F-105D.

A step stand instead of a ladder has been set up for the boarding because of my decreased mobility.

Don does all the checks and connections himself. I'm not much help. Crew Chief Norm Gaddy helps from the left side and removes the safety pins from the emergency power unit. I find my check list and snap it on my right leg. Tom Hassler is on the interphone now, and I ask him to open the hangar doors. The curious crowd retreats behind doors as a hedge against the subzero cold and expected noise.

The start and after-start checks are normal except for a caution light that indicates a heading and attitude primary system malfunction, but both systems look normal. I cycle the generator off and back on, hoping to clear the malfunction indicator. It does clear, but not until several minutes later when I am on the runway.

As I taxi from the hangar, Joe Higgs gives me the clearance: "Cleared as filed." This means essentially that all air traffic between Grand Forks and Fargo has been rerouted. I read the command and response checklist to Pete Garrison, and he acknowledges as I accomplish each item.

Dave Peterson is already airborne in the F-4. He checks in to say the weather is good all the way. I'm cleared on the runway by Grand Forks Tower and take my position on the hold-back hookup.

When I'm secured, the crew chief signals me for engine runup checks, after which he and his crew inspect the aircraft for leaks and vapor. The attitude and heading warning light blinks and goes out.

Pete acknowledges my final checks of shoulder harness locked and cockpit camera on. I now push up the throttles and put both engines into full afterburner. The fuel gauge shows 7,300 pounds, going down at 100 pounds every ten seconds.

Deciding that I'd rather be 100 pounds fat than 100 pounds light upon return, I call, "Twenty seconds to launch." I give a final salute to John Roberts, who operates the hold-back release (which also starts the timing clock in the radar van) and look at the airspeed needle. John gives me three seconds to get my eyes focused forward and fires the release. This is the kickoff!

Up the Hill

The release is less spectacular than on the 3,000-meter profile because the fuel load is two-and-a-half tons heavier. Instead of immediate rotation at the first indication of airspeed, I delay about a half second, then try to rotate the nose smoothly upward and raise the gear handle. The Eagle is airborne in less than four seconds from release. Now I sweat out the gear retraction in a near level acceleration, close to the runway. The red light goes out at 320 knots, indicating the gear and gear doors are up and locked. At 350 knots, a red light would have been a mission abort.

Now I'm looking for 0.65 Mach and the 2.65 G Immelmann. I overshoot 2.65 to nearly 2.9 Gs on a big flight-test G-meter where 0.2 G is equal to an eighth of an inch. I ease off to 2.65 and watch for vertical on the attitude indicator. Here the trick is to roll the aircraft less than a quarter turn to take advantage of the west wind during the acceleration but not get too far down range from Fargo. I overshoot the quarter roll slightly and notice the Eagle is supersonic at Mach 1.1.

I hit the 32,000-foot rollout altitude on top, roll 180 degrees from upside-down to level. Pete calls me to correct my heading twenty degrees right. Things happen rapidly now. As I work on the heading change, I overshoot 600 knots to about 610, but I get the eight-degree climb started. The acceleration is phenomenal! Mach 1.8, 36,000 feet; I turn the emergency hydraulic pumps on. The Eagle continues to accelerate a tenth of a Mach number (about sixty knots) every eight seconds. At Mach 2.0, I call 2,400 pounds of fuel remaining to Pete. Dick Cahill nods, and Pete says, "Go," indicating that enough fuel remains to complete the profile and recover.

A last check of cabin pressurization and 2.25 Mach and, "Here we go!" Four Gs and up the hill to sixty-one degrees. Looking for four degrees' angle of attack (alpha). Still showing 200 knots at sixty-one degrees of climb angle. The sky up there is deep blue, but there's no time to sightsee. Here comes four degrees, and there go the burners blowing out. The effort of shutting the afterburners down while encased in the pressure suit is exceeded only by that required to shut down the engines seconds later. Now then, where's four degrees alpha? How about five? Ease it back down before I lose it.

Over the Top

"Recover, recover, recover," from Pete Garrison—the most beautiful words I've heard in three months. At least, we've reached 98,425 feet or 30,000 meters. I still have no idea what the time has been.

Now let's get zero degrees alpha and ride ballistic. Nose still forty degrees above the horizon. The airspeed off the bottom of the scale. Pitch control is a little loose but positive. No tendency to yaw or roll. Plus fifteen degrees alpha now; correction—minus ten degrees. I tell myself to hang on and move that damn stick gently! Both hands on the pole, through the horizon and coming down. Fifty-five degrees nose down now, and airspeed is back on the gauge, increasing through seventy knots. Now 100 knots. Turn toward home.

Pete calls only forty-five miles down range. We'd expected to be fifty-five miles away, but the acceleration has been much better than expected. At 350 knots, I see four green lights and move both throttles to idle at 55,000 feet. Both engines light off, but the right one stagnates. Not enough indicated airspeed. I check the fuel: 1,600 pounds, enough to get home with a comfortable reserve.

Pete calls, "Deep Blue," our code word for much better time than expected. "Red" would have indicated no record time or failure to achieve record altitude; "White" a valid record time but not as good as expected, based on computer analysis. We had expected about 226 seconds.

Three more airstart attempts finally get the right engine among the living, and the compass and TACAN indicate I'm pointed generally in the direction of Grand Forks. Now it's time to waste attitude to get down. The Streak Eagle has no speed brakes, and a descent must be made at a higher-than-normal speed or the aircraft glides forever.

Dave calls to tell me he is tucked in in formation, and down we go. Pete calls the record time with an additive we have arranged to make sure we get a chance to discuss the flight before we hear about it on TV. Two hundred and eight seconds—thirty-six seconds off the old record!

God, I have to concentrate on landing now. No flybys today. Gear check good, touchdown, and into the barn.

The crowd of spectators has grown, and they all appear to have champagne. My wife is first up the ladder, and Don Needles is right behind, to help me out of the cockpit. The Eagle has now broken all eight world class time-to-climb records by an average margin of more than twenty-one percent across the board!

The people who build her and her engines and the people who maintain her and fly her have a right to be proud—and they are. The world time-to-climb records are now back in the USA. And life is a beautiful deep blue at forty plus six days. ■

This article will appear in a book, The F-15 in Action, *by Capt. Don Carson and Lou Drendel, to be published by Squadron/Signal Publications this coming autumn, and is printed here with permission of the authors.*

PARIS AIR SHOW 1975

PLOYS AND PARADOXES IN PARIS

BY CLAUDE WITZE
SENIOR EDITOR, AIR FORCE MAGAZINE

PARIS, JUNE 5

THE 30e Salon International de l'Aeronautique et de l'Espace—better known as the Paris Air Show—is bigger than ever in 1975. And the participants, military and civilian, are more serious about their mission than ever. Yet, in the light of our most recent history—particularly since the first of the year—and the nature of the debate raging in Europe and even today on the floor of the US Senate, the problem of NATO's survival is bigger than the air show or anything else.

Sen. Barry Goldwater, a regular attendant at Le Bourget, stayed home to defend defense. Sens. Alan Cranston, Edward Kennedy, and Stuart Symington should have come to Paris. Weaponry abounds. In thirty years covering air shows in Europe, this reporter never has seen so much emphasis on arms. And a staggering amount of the material on display is not designed to be airborne. This is not meant to detract from the hundreds of legitimate aviation and space wonders being offered from all over the world, from nations including Soviet Russia and Poland. The electronic miracles, for example, occupy more space and exhibit attention than the flying machines. Their sophistication reflects new highs in technology. The best originated in the United States, but our competitors are no slouches.

It may be the entire NATO problem is best illustrated by the myriad factors entering into the volatile subject of the General Dynamics F-16 air combat fighter. At this writing, a decision is awaited from Belgium. The Dutch, the Norwegians, and the Danes are ready to sign up to purchase the aircraft selected by USAF, but are awaiting a decision from Brussels. They should have it soon. USAF says it will buy 650 aircraft and has signed a first contract for $418 million. Belgium is expected to buy 116, Norway seventy-two, Denmark fifty-eight, and the Netherlands 102. The price in Europe will be in the neighborhood of $5.5 million each.

[The Belgian decision to buy the F-16 was announced in Brussels on June 7, two days after our Paris dispatch was written. The Belgian order was reduced from 116 aircraft to 102, with an option for fourteen more. See also p. 20.—THE EDITORS]

In order to bring about this deal, the United States must share both its technology and the jobs that will be created. At least half of the F-16s sold abroad will be assembled abroad and many of the components manufactured here. This is the American answer to the challenge of the French Mirage F-1.

At the Paris Air Show there were other manifestations of the rivalry. The F-16 pilots for the show are Neil Anderson of General Dynamics and USAF pilots Lt. Col. James Rider, of Santa Monica, Calif., and Lt. Col. Maurice "Duke" Johnston, Jr., of Wilmington, Del. Both are based at Edwards AFB, Calif. For their flight demonstration and the European debut of the F-16, they planned a daily five-minute demonstration: Takeoff with afterburner, climbing at forty-five degrees, a 360-degree turn with the gear still down. After retraction, a climbing spiral turn. Then other maneuvers, including a 360-degree turn at seven Gs.

The French, who run the Air Show and are trying to sell a different airplane, simply cannot match the F-16 in this kind of demonstration. The first two days of the show the US pilots were hampered by a low ceiling and their performance was restricted. The third day, the sky cleared. After the plane had been in the air for about a minute, the tower told the crowd that what they were watching was the Northrop F-5. After one minute and forty-five seconds, when Neil Anderson had completed his roll with the wheels down, the tower ordered him to land, and he did. Later, the French apologized and said the tower had the wrong script and thought another aircraft was doing an unauthorized maneuver. Some Americans were skeptical.

Initially, France's F-1 Mirage appearing in the show was painted in camouflage, predominantly gray. In contrast, the F-16 was highly visible in its red, white, and blue uniform. Before long, the Mirage started to put on a new uniform. The aircraft spent three nights in the hangar. After the first, it flew with blue wings, elevator surfaces, and tail. The second night with the paint brush brought further changes, and by the end of the final session, the aircraft's wings were blue on top, red on the bottom, and the fuselage was white with a blue nose and red stripes along the belly. Still when it flew, the new colors did not give the Mirage the exuberance and shorter turning radius of its rival.

After the first night of color alterations, the F-16 pilots were invited to lunch with the Mirage pilots. It was a happy affair, entirely fraternal, with much banter about the flying routines and the irksome restrictions imposed by show management. During the lunch, one

—Photos by Ben Kocivar

Hawker Siddeley Harrier (at left) danced off the ramp in VTOL demonstration. The aircraft is used by US Marines. In the static display at Paris, England's Britten-Norman Trislander, a feederliner, stands in contrast (above) to huge Russian Tu-144. USAF's F-16 (below) was the most-discussed, and admired, aircraft.

of the Mirage crewmen told the USAF pilots and General Dynamics' Anderson that the Mirage was being repainted, "and we hope you will not object." The Americans said they did not care what colors were worn by the French aircraft.

The Mirage spokesman was pleased and offered this compensating thought:

"We will not paint the Mirage like your airplane. Ours will be blue, white, and red."

The French took every opportunity, a few of them contrived, to deprecate the F-16. A spokesman for Dassault, the manufacturer of the F-1, used a press conference to attack the American effort. President Valéry Giscard d'Estaing, inaugurating the air show on May 30, warned that the "arms deal of the century" would test Europe's ability to unite, meaning it should unite on Mirage.

The F-16 seen in Paris now will go on a demonstration trip around Europe, visiting such nations as Spain, Italy, and Germany in addition to the four NATO powers that will have the aircraft in their arsenal.

The F-16 was flown from Edwards AFB, Calif., to the General Dynamics plant at Fort Worth, Tex., for installation of VHF radio and landing aids that can be used in Europe. Then it went to Pease AFB in New Hampshire for the takeoff from the US. The flight was nonstop to Ramstein, Germany, with four air-to-air refuelings en route. The F-16, which is a prototype, was escorted by a USAF F-4 for safety reasons. A C-141 also flew to Ramstein carrying a maintenance team and a full supply of spares. Some of these were brought on to Paris in a C-130 for support during the air show.

Another flap involving rivalry in the flying demonstration arose between the Rockwell International Sabreliner and the French Falcon, a Dassault product, like the Mirage. Both are jet executive transports. Bob Hoover, Rockwell's famous and superlative demonstration pilot, told AIR FORCE Magazine his show routine had been approved in advance and rehearsed at length in California. His French competitor was permitted to fly and Hoover was grounded for the first two days because French officials reversed themselves and disapproved of his flight program, which included a loop, eight-point hesitation roll, and a roll on takeoff. He was forced to modify his program before the show management would let him appear.

There has been no mention of the paradox created by the fact that France left NATO's military command in 1967 and now wants to sell it a weapons system. The Mirages in the French Air Force would not be committed to fight for NATO, but the Mirages in other NATO air forces would be, along, of course, with American airpower. Apparently, this aspect is overwhelmed by the fast-moving trend toward joint projects produced by multinational military industrial complexes. With the F-16 sale, the US is getting into this situation with both feet. There are a number of European aircraft already on the multinational production line, most notably the Anglo-French Concorde, the European Airbus, and several others. More will come.

There is talk here of reorganizing the entire European aerospace industry. One proponent of such a plan says it is essential for "political and economic unity." Boeing

Neil R. Anderson, General Dynamics F-16 test pilot (left), shakes hands with US Ambassador Kenneth Rush. Hand extended is that of Blaine Scheideman, General Dynamics vice president for the F-16.

has announced it will develop a wide-body trijet, now called the 7X7, sometime in 1980. Italy and Japan are among the nations that hope to take part. And it was announced in Paris last week that Marconi-Elliott Avionics of England will supply a head-up display (HUD) system for a development version of the General Dynamics F-16. The list goes on. It leaves the US, with its superior technology, facing a new kind of virile competition.

At this year's show there was strong evidence we know we are in a contest. The US Pavilion, a permanent building at Le Bourget, has sixty-eight exhibitors who hope to sell more than $75 million in export goods. The Department of Commerce is working hard to expedite sales. An important reason is that the value of aerospace vehicles sold abroad in 1975 is expected to hit $14.2 billion. To maintain this level, in the face of European determination, will require an unslackened US effort in research and development.

Another major hit in this year's flying show was the McDonnell Douglas F-15 air-superiority fighter. It is another USAF product looking for a roost in other countries. The manufacturer, headquartered in St. Louis, soon will open an office in London. It will offer the F-15, a variety of missiles including antitank weapons, and commercial aircraft.

Joe Dobronski, McDonnell Douglas Director of Flight Operations, has been demonstrating the F-15 to the crowd, which appears enthralled at the power displayed. One evidence of the interest the new USAF fighter has aroused is in the reaction of the Russians. The aircraft are kept on static display here, each surrounded by stanchions and rope. When it is almost time to fly, they are towed to the ramp. The first day of the show, when Dobronski climbed into the cockpit to be towed, three Russians approached and asked permission to look inside at the instrument panel. There was this exchange:

"Can we look in the cockpit?"

"No."

"Why?"

"No one is allowed to look in the cockpit."

"Can we look in ten years?"

"Yes, come back in ten years."

The Russians have several aircraft on display, including their Tu-144 supersonic airliner, now neck-and-

neck with the Concorde. Only personal guests of Alexei Tupolev, the designer, are permitted aboard.

The Russian aircraft are of less general interest than the Soviet exhibition telling of their accomplishments in space. Featured is the first display outside Russia of the Salyut space station, one of which now is in earth orbit. Alongside, the Russians have a huge solar physics telescope, carried by Salyut on some missions. The exhibit was studied by USAF's Col. William R. Pogue, the NASA astronaut who was pilot of our Skylab-4, the longest manned flight—more than eighty-four days—in space exploration. Later, Colonel Pogue told AIR FORCE Magazine he found the telescope of more interest than the Salyut station itself, and indicated his Russian guides refused to answer many of his questions on its operation.

As for the Russian space station, Colonel Pogue found it less complex and with less flexibility than our Skylab orbital workshop, where he spent so much time. Skylab, he said, provided more room for crew comforts and privacy, which he considers essential. He said the Russians now appear to be more open about what they are doing than had been his experience in the past. He also acknowledged that the material on display, which included a Venus probe, Interkosmos-I, Prognoz-2, and Oreol, a French-Russian space probe, were, for the most part, outdated in 1975.

Another American project, absent from the Paris Air Show but highly prominent in this year's focus on NATO's dilemma, is the USAF/Boeing Airborne Warning and Control System (AWACS). The aircraft itself was shown last September at the British Air Show in Farnborough and it has been in Europe, only a few weeks ago, touring key cities, particularly Brussels, where Dr. Malcolm Currie, Director of Defense Research and Engineering, explained its capabilities to NATO. Here in Paris, there are elaborate displays of the AWACS electronic equipment—IBM features AWACS at its exhibit in the US Pavilion—and Boeing has its AWACS experts on hand daily to meet and brief NATO visitors. The situation is highly complicated. AWACS for Europe probably is essential to the future defense of the Western nations. NATO's use of it will involve the most ambitious proposal for allied cooperation ever considered.

As in the case of the F-16, politics and economics are involved, in addition to security. The major difference is that AWACS has no competitor, and the cost is high. The decision to buy will have to be made at the highest level, by the Defense Planning Committee of NATO, where the French are not represented, and the North Atlantic Council, where the French have a voice. While France withdrew its military commitment to NATO during the de Gaulle regime, it does cooperate in the realm of air defense, while making no contribution to the NATO force structure.

The AWACS requirement could range from a dozen to thirty-six aircraft. The price per aircraft can range from $45 million to $65 million, depending on the configuration, the quantity, and the production rate. Aside from the common arguments already raging in the US over such matters as cost and the degree of AWACS' vulnerability to electronic jamming, NATO has its own family problems with the concept. It may sound trivial, but what kind of tail markings would they carry? Who would actually own the aircraft? Who would supply the crews and maintenance? How would the cost be split? Where would the aircraft be based? Who would command it? It would take several of the planes, all airborne, to cover the NATO front. Where would they fly from, and what areas would they cover?

Boeing spokesmen at the Paris show, men who have been living and working with these problems in Europe for a few years, say NATO's military chiefs have accepted the requirement and have agreed that AWACS is the best solution. Currently, they have a ten-month study under way—a report is scheduled for July 1976—by an international team led by a senior officer in the Royal Air Force. The report presumably will answer some of the questions, fix the size of the force needed, the configuration, and even the production rate. In addition, as pointed out earlier, there must be European participation in the production and a sharing of our technologies. USAF has advanced funding to help pay for NATO's report on AWACS.

On its recent visit to Europe, the system demonstrated its warning and control capability, including the detection and tracking of ships at sea off the coast of Europe and in the Mediterranean. The European military men were highly impressed. The airplane was not put on display at the Paris Air Show for two reasons. One is security. The other, apparently, was to avoid stimulating its critics at this sensitive moment in NATO history.

It is interesting, and significant, that President Ford visited Europe while the Paris Air Show was going on, but France was not on his itinerary. His appearance here would have had impact. Whether Henry Kissinger would consider that impact good or bad nobody knows. Certainly NATO was Mr. Ford's major concern during the hours he spent on the Continent, whether in Brussels or Madrid. And he pledged a continued US commitment to NATO as vital to American security.

In Europe, there are divided opinions on where NATO is headed. The destruction of NATO has been an announced goal of Soviet Russia for what is now becoming decades, and its very survival proves it has worked. A major cancer on the NATO body is the conviction, held by many in Europe and too many in the United States, that détente means the cold war is over. As a matter of fact, the realists know détente is a tool used by Russia to intensify its struggle without force of arms. The displays at the Paris Air Show, including all those guns, rockets, missiles, tank destroyers, guidance equipment, and the air weaponry, indicate skeptics also abound. While one school predicts the entire Continent will go Communist, there is another that says once the economic woes are corrected, Europe, and NATO, will resume its staunch front.

To this reporter, it seems clear the West must keep its guard up, regardless of the cost. If the Russians want me to have faith in détente, one thing they can do, for a starter, is tear down the Berlin Wall. It remains an obscenity, imposed upon the decent nations of Europe by Soviet Russia. ■

MILITARY ELECTRONICS

Where It Stands and Where It Is Headed

BY EDGAR ULSAMER
SENIOR EDITOR, AIR FORCE MAGAZINE

Already about three-fourths of the cost of missiles and almost a third of the cost of military aircraft go to electronic systems and devices. All signs point to increasing use of electronics in the years ahead . . . to see, to command, to navigate, to detect, to guide, and to perform the many other tasks that make up the Air Force's mission. AIR FORCE Magazine, in the following report, deals with a wide range of military electronics programs, arranged in three broad categories:

- Programs involving AFSC's Electronics Systems Division.
- Programs relating to electronic warfare.
- Advanced technology programs whose fruition is some time off.

Information for this article comes from a number of Defense Department and USAF experts in the Pentagon; Air Force Systems Command, Andrews AFB, Md.; Electronics Systems Division, Laurence G. Hanscom AFB, Mass.; Aeronautical Systems Division, Wright-Patterson AFB, Ohio; and Air Force Office of Scientific Research, Arlington, Va. The Editors gratefully acknowledge the assistance so freely rendered. Command Control and Communications is dealt with only briefly here since that topic is covered elsewhere in this issue.

—THE EDITORS

THE Defense Department's investment in electronics last year came to about $40.6 billion, or twenty-six percent of the total DoD equipment inventory, according to a study by the Institute for Defense Analyses and OSD's Advanced Research Projects Agency (ARPA). Known as "Electronics-X," the study found that the Defense Department spent approximately $15.3 billion on electronics in FY '74—$4.1 billion for R&D, $5.8 billion for procurement, and $5.4 billion for maintenance.

Almost two-thirds of the dollar value of military electronics is in missiles and aircraft. The remainder is divided among communication and electronic systems, ships, ordnance, and vehicles. The principal functions that DoD's myriad of electronics perform, Dr. George H. Heilmeier, Director of ARPA, told this reporter, are navigation and identification, information processing and display, communications, electronic warfare (EW), surveillance, search, command and control, and "target exploitation," meaning penetration and attack.

Defense Department and Air Force experts interviewed by AIR FORCE Magazine agree that the explosive growth in military electronics will continue unabated. Three basic conditions account for this growth, the experts believe: First is the "economic imperative" to compensate for rising personnel costs by making weapon systems more automatic. Second is the dawn of what Maj. Gen. R. T. Marsh, AFSC's Deputy Chief of Staff for Systems, calls the "age of smart electronics." That term denotes, as in the case of smart weapons, the transition from brute-force use of electronics to intelligent systems and devices that adapt to such variables as changing threats, tasks, and environments to boost effectiveness and flexibility. The third reason, Maj. Gen. W. L. Creech, Commander of AFSC's Electronics Systems Division, told this reporter, is the intensifying recognition of using "command and control to multiply the effectiveness and utility of all other military resources and investments. The gains are disproportionately greater than the investment. A case in point is AWACS."

THE ELECTRONIC SYSTEMS DIVISION

A significant portion of USAF and DoD electronic systems—more than $1 billion in FY '75—is being developed and acquired by ESD. *(For a complete listing of ESD Programs, see pp. 52–53.)* A major program is AWACS, the E-3A Airborne Warning and Control System *(see July '74 issue, p. 69).* On April 30, 1975, the Air Force issued a $247.6 million agreement with Boeing Aerospace Co. for production of six AWACS aircraft, supplementing earlier contracts totaling $849 million for research, development, and long-lead funding.

AWACS is a modified 707-320B airframe topped by a thirty-foot rotodome and employs advanced radar, computer, and communications technologies. The system provides massive surveillance and command and control capabilities for tactical air, air defense, ground, and naval forces. A brassboard AWACS system, known as SID (for system integration demonstration), recently completed an extensive round of European exercises in concert with NATO land, sea, and air forces.

The brassboard aircraft flew twenty successful missions, witnessed by more than 800 NATO officials. These tests, ESD's Deputy for AWACS, Brig. Gen. Lawrence A. Skantze, told AIR FORCE Magazine, proved the E-3A's "interoperability" by linking its detection, tracking, and computing capabilities directly and in real time to surface forces, such as SAM sites, shipboard air defense systems, and French as well as NADGE (NATO's Air Defense Ground Environment) control centers. The high resolution of AWACS' multimode Westinghouse radar was demonstrated when the system detected and tracked wooden patrol boats and minesweepers with steel decks in up to twenty-six-foot seas.

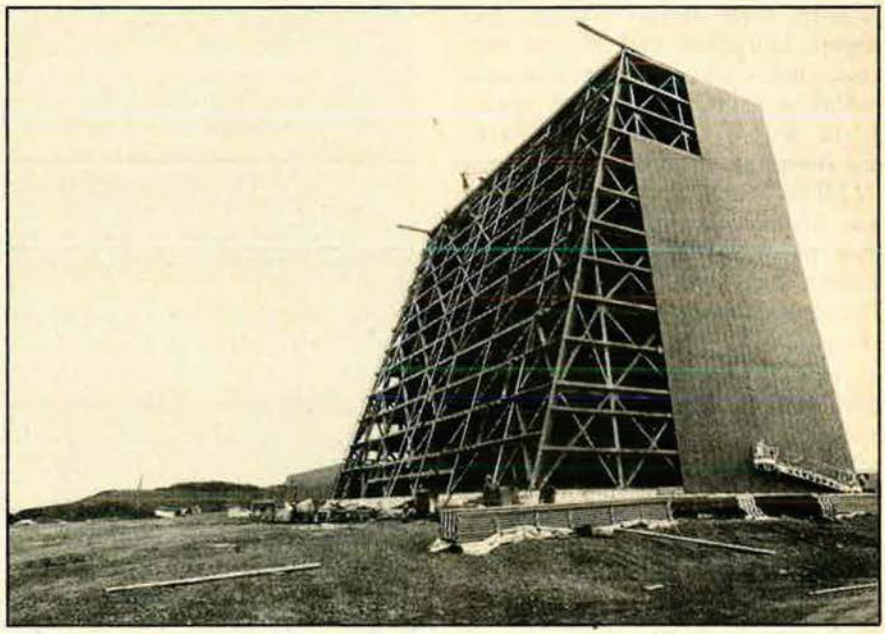
During a subsequent flight demonstration attended by this reporter, AWACS defeated two EB-57 jamming aircraft that attempted to mask a simulated attack by an F-4. The E-3A also proved that it can fix the position of jamming aircraft and, with the help of its IBM computer, vector defensive interceptors against them.

General Creech pointed out that the European experience of the brassboard model justifies "the belief that AWACS is several orders of magnitude more survivable than ground-based systems and far more jam-resistant than any other radar in existence." (General Skantze believes that exaggerated demands for essentially total survivability of AWACS are the result of confusing "survivability with immortality.")

Can an enemy interceptor shoot down AWACS? In absolute terms, General Creech explained, "The answer is yes. But in a relative sense, this is a very difficult job. AWACS is in business to detect threats and to call into action its own SAMs and interceptors. In effect, a hostile interceptor would have to attack AWACS in its area of greatest strength. Also, AWACS has the options of dropping below the enemy's radar horizon or of giving ground. The attacking fighter can follow only so far before he runs out of fuel.

"Concerning jamming, it is theoretically possible to defeat any radar. The question really is should we—at this early stage—spend money and resources to counter conceivable enemy capabilities even though there is no evidence that he possesses them or is considering their development. If we prepare every weapon system for every eventuality, we cost ourselves out of business immediately."

ESD Commander Maj. Gen. W. L. Creech stresses the multiplying effect of command control on the effectiveness of all other military resources.



COBRA DANE phased-array radar being built by ESD at Shemya AFS in the Aleutian Islands has a 100-foot-high structure housing some 15,000 antenna elements to monitor Soviet missile development tests.

The Defense Department's view of AWACS, General Creech said, extends "well beyond the classic role of an airborne radar and covers such capabilities as setting up over the battlefield to give the ground commander a big-picture view or linking ground radar and control centers to provide a synergistic utilization of all available command and control resources. This contributes materially to the system's cost-effectiveness."

The E-3A's ability to provide this synergism stems in part from an associated development effort currently in progress at ESD.

The Joint Tactical Information Distribution System

The services' Assistant Secretaries for R&D and the Director of Defense Research and Engineering recently designated the Air Force as the executive agency for a joint service program to develop a secure digital data system. Its purpose is to improve interoperability among air, ground, and naval combat elements, command and control centers, and data collection elements within a military theater of operations. Known as the Joint Tactical Information Distribution System (JTIDS), this program combines the Air Force's former SEEK BUS and the US Navy ITACS/IPINS efforts. *(See July '72 issue, "How Computers Will Fly Tomorrow's Airplanes.")*

At JTIDS' fulcrum is a technology that has been under development at ESD for several years to transmit digital data by means of TDMA (Time Division Multiple Access) broadcasts, using wide-band, spread-spectrum signals. The advantages of digital (numerical symbols) over analog (such as voice) information include much higher system capability, compatibility with data-processing equipment, and simpler security. TDMA divides time rather than frequency range, assigning each user a precisely clocked time slot in which to transmit. Arranged within twelve-second "frames," a TDMA net can allocate about 1,500 time slots of fewer than eight milliseconds each to its users. Slots are allocated to transmitters according to need. When necessary, multiple nets can be operated within the same

WHY THE AIR FORCE NEEDS AWACS

The Commander of the Tactical Air Command, Gen. Robert J. Dixon, recently was asked by AIR FORCE *Magazine why the Air Force needs AWACS. Here is his answer:*

In the AWACS, we are talking about a piece of equipment that costs a lot of money for several reasons. Unit production is very low, and you know what that does to costs. The radar technology is very good, very advanced, and expensive. This piece of equipment can cost as much as . . . $118 million a copy.

At one hearing, a congressman, after being told AWACS costs a lot, said, "Can you please tell me simply what we are talking about?"

I said, "Sir, we've had radar since before World War II. You know what radar does for us—we can 'see' with it. Now we are going to put it in an airplane and lift it up into the air and fix it so it can move at Mach 0.8, and stay in the air for ten hours or longer. Once we lift a radar into the air, we encounter a very tough technical problem. All radars can look up, but they don't do very well looking down—and we want to look down, particularly at moving aircraft.

"If we can get it up in the air and make it survive, and see down, out and around, we will begin to see *and to comprehend*. Then, when we can comprehend, we can use our brains instead of our guts and our instincts. Civil authority can choose between doing or not doing something in peacetime where the wrong choice could be catastrophic—mobilizing when we shouldn't or not mobilizing when we should. And in a crisis we could report to civilian authorities what is really going on, particularly in . . . Central Europe. We could also report what *isn't* going on, which is also a very valuable piece of information. The military commander could at least be expected to manage with intelligence the selection of where he puts force and where he does not—particularly airpower. And we might not have to have quite as much of it if we are able to put it where it is needed, instead of having enough of it everywhere at once."

When I finished, he said, "You mean it is a management tool."

Well, that's precisely what it is. It's a peacetime, crisis, wartime, management tool. It's incredible. It's a technical marvel, and it has an enormous mission—to give civil authorities and the commander the ability to behave with vision, to comprehend, and to act with logic.

All we have to do is think of a human being. How would you like to be able to see? You would. We would, too. *That's* what AWACS is all about.

frequency spectrum to accommodate high volumes of data, according to ESD's Assistant Deputy for Control and Communications Systems, Col. R. E. Byrne, Jr.

JTIDS uses a common broadband frequency divided into several narrow bands with only one band used at a given moment. As a result, the system engages in what ECM experts call "frequency hopping." Jamming effectiveness depends mainly on distance to the jammer, width of the frequency band to be blocked, and available power. As the band width increases, the effectiveness of barrage jamming decreases.

JTIDS forces an enemy to spread his jammer energy over a spectrum several thousand times wider than needed for actual message transmission. Jamming effectiveness thereby is reduced several thousandfold. Augmenting the system's jam-resistance is an encrypting device provided by the National Security Agency.

Any single element in a JTIDS net can act as either the control or as a relay point. This makes for high system flexibility and survivability. If the enemy destroys one of the points, another "automatically and immediately takes over his functions," Colonel Byrne said.

The JTIDS concept, General Marsh told this reporter, "may well turn out to be *the* revolutionary aspect of future electronics technologies. For the first time, it will be possible to knit together *all* combat elements under positive, real-time command and control. Everybody will be able to communicate in an orderly manner.

"Every fighter in the net, for instance, reports automatically his position, his stores, his fuel, and whatever difficulties he may be encountering. He may be equipped with 'smart' receivers that register specific threats and feed their information into the net. A commander sitting in front of a central console can then decide how to react. He can divert the fighter or he can send in a Wild Weasel to help him against electronic threats, and so on."

JTIDS, Colonel Byrne said, is being designed to provide maximum coordination, with individual users "reporting what they know best and

SAC and ESD experts check out developmental ground terminals of the Air Force Satellite Communications System.

each participant 'accessing' his computer to information relevant to him. Simply by hitting a button on his computer marked 'enemy status,' a participant acquires automatically everything that all the other users, including an AWACS, know about enemy status. Conversely—and this will be especially useful to single-seat fighters—he won't have to report where he is going and what stores he has on board because his central air data processor transmits that kind of information automatically."

The US Army's tie-in to JTIDS probably will involve the close air support mission, SAM operations, and threat information. Naval vessels and aircraft can be expected to use JTIDS in the same manner as USAF's tac air. The Navy is considering multinetted systems to tie together such diverse operations as ASW, fleet defense, and amphibious assault.

JTIDS is now in early engineering development. The MITRE Corp., Hughes Aircraft Co., International Telephone and Telegraph Corp., and the Singer Co.'s Kearfott Division are assisting the Air Force and the Navy in design and development. ESD is responsible for the general JTIDS program, with AFSC's Rome Air Development Center and Aeronautical Systems Division providing Air Force, and the Naval Air Development Center providing Navy, support. The program is keyed to an incremental, evolutionary pace. The first step involves netting AWACS to ground stations, which in a brassboard sense has already been tested. The second step, although not yet fully defined, involves netting existing ground sites to each other through JTIDS "adaptable interfaces"—sophisticated translators that permit communications between ground nets that at present can't interoperate, Colonel Byrne said. Timetables for acquisition of a full-scale JTIDS system are currently being reviewed by the Pentagon.

Phased-Array Radar Programs

US warning capabilities against SLBMs are limited at present. ADC's ground-based, coastal 474N radar system is obsolescent and has limited range. The Defense Department, therefore, has charged USAF with developing two phased-array radars, known as PAVE PAWS, to increase radar coverage of advanced threats and to provide better attack characterization information. PAVE PAWS is considered a high-priority addition to the National Command Authorities' World Wide Military Command and Control Center.

ESD's Assistant Deputy for Surveillance and Navigation Systems Col. H. J. McLoud, Jr., told this reporter that the new system is to complement the Early Warning Satellite System by providing a "clearly defined, small footprint" of any SLBM raid against the United States. PAVE PAWS' phased-array radar, actually thousands of radiating elements steered electronically by a computer, will track SLBMs in both boost and ballistic phases and thus predict with high precision their impact points. The system's range is to be "far enough to take care of all existing threats, including the new 4,200-nm-plus SS-N-8s, as well as some projected threats," he explained.

PAVE PAWS will be able to detect SLBMs regardless of whether they have "lofted, depressed, or minimum-energy trajectories because one way or another they have to come through our radar fan."

ESD is about to issue RFPs to the electronics industry covering the PAVE PAWS program. Acquisition cost of the two radar systems is expected to come to about $118 million, according to congressional

testimony. The system will replace the seven FSS-7 sites of the currently used 474N SLBM Detection and Warning network. PAVE PAWS will be augmented by AN/FPS-85, the Space Track radar at Eglin AFB, Fla., and the new ballistic missile surveillance and satellite tracking radar at Shemya Island, Alaska, known as COBRA DANE. AN/FPS-85 consists of more than 5,000 radar emitters and transmitters built into the face of a building that is a city block long and thirteen stories high.

COBRA DANE, currently under construction, is a large single-faced phased-array radar using advanced TWT (traveling wave tube) and power divider technology. This technique eliminates the need to provide each radiating element with its own transmitter, as is the case in the FPS-85 design. COBRA DANE is being developed by ESD to monitor and evaluate Soviet ballistic missile firings into the Pacific area as well as to provide space surveillance.

Another pivotal ESD space surveillance program is a deep-space electro-optical system currently being tested in New Mexico. Known as the SPACETRACK Augmentation System, it seeks to provide deep space operational surveillance covering altitudes from about 3,000 to at least 22,300 miles to cover geostationary (fixed in relation to the earth's surface) orbits. The currently used SPADATS network is limited to altitudes of less than 3,000 miles in operational surveillance and has geographic gaps. Defense Department testimony says that "the growing Soviet utilization of space for strategic and tactical purposes dictates that we extend our coverage . . . and demonstrate the feasibility of a near real-time ground-based capability to detect and track [objects in deep space. ARPA is] also developing a technology to determine whether a space-based surveillance system operating in the visible and/or long wavelength infrared portions of the spectrum would be cost-effective."

DoD believes these capabilities are paramount to provide timely warning of "threats to US satellites used currently for early warning of attack."

The deep-space surveillance system, Colonel McLoud said, will consist of "a number of advanced-technology telescopes tied together and probably boosted by electronic amplification to give us the ability to scan wide sectors of deep space." Present plans call for installing five systems worldwide. Current testing is to be completed by 1977 and will lead to the development of a prototype system by MIT's Lincoln Laboratory.

ELECTRONIC WARFARE

Electronic warfare, according to Air Force Secretary John L. McLucas, is "perhaps the technology most rapidly gaining in interest and appreciation within all three military services." Although aware of the "absolute necessity for a wide spectrum of EW capabilities," he added, "we in the Air Force are not losing sight of the fact that there is much more to the combat mission than the 'measure-countermeasure' race. The objective is assured penetration, at acceptable cost, through a combination of EW, defense suppression, and tactics."

Not counting the substantial investments in EW systems of the F-15 and B-1 programs, the Air Force will spend about $385 million on electronic warfare R&D and procurement this fiscal year. As Soviet EW capabilities increase rapidly—graphically demonstrated during the October 1973 Arab-Israeli war—USAF's investments in EW systems clearly are headed toward higher levels. As a result, the central requirement "is to produce EW equipment at lower cost," according to Col. J. D. Gahagan, AFSC's Director of Reconnaissance and Electronic Warfare. USAF is "reassessing design techniques down to the component level, including material selections and fabrication and manufacturing costs. But the normal benefits of mass production don't apply, since our systems are procured in limited quantities. Modularization and standardization only go so far in alleviating that problem," he pointed out.

EW technology is in the midst of fundamental change. Initially, the approach was to design a specific system to defeat a single threat. Proliferating threats and maturing technology have rendered this approach impractical. The current family of EW systems can defeat a variety of threats by being "tuneable" over a broad range. But to counter new threats or changes to current threats requires complex hardware or software (programming) changes, which take days, weeks, or months and usually can't be performed at the flight-line level. The present generation of "threat-dependent EW equipment can cope with the requirements *if* we are able to tell it what the threat is going to be. But if we are wrong and the threat changes, we lose the aircraft," ARPA Director Dr. Heilmeier pointed out. "We need to diagnose the threats as we encounter them and adapt to them on the spot."

AFSC's Deputy Chief of Staff for Systems, Maj. Gen. R. T. Marsh, sees military electronics entering an age of "smart electronics," boosting effectiveness and flexibility.

The availability of high-performance, relatively low-cost mini-computers and processors permits EW "power management," meaning nearly instant adjustment to a variety of threats and threat environments when coupled to adaptive sensors such as antennas. "In the

past, we designed antennas purely for a specific job, such as locating a target, and we didn't pay much attention to the environment in which we had to operate. Now we must allow for the fact that while our radar finds the target, the enemy's emitter locator finds us and we might be attacked by his antiradiation missiles or his jammer will put us out of business," Dr. Heilmeier said.

The central requirement, General Marsh, AFSC's DCS/Systems, explained, "is to be able to manage ECM, communications, and our own electronics systems in an extremely dense, hostile electronic environment. As I penetrate and the threat radars start painting me—and interfere with my mission—I need smart digital receivers aboard that diagnose precisely what is going on, what threat radars are picking me up, and in what manner. I then want to be able to use the same processing capability, without major action on my part, to analyze his signal and determine the optimum form of my jamming. It is not unthinkable that such a system could tell me how well it is doing by analyzing the threat's responses, and adjust itself accordingly.

"Such a system can be used to manage not just ECM but also communications and radar. If there is interference on one radar frequency, it seeks out a clear one. This means we have to build frequency agility into our radar systems. We are doing this to some extent already. The EW capabilities of the F-15 include assessment of the threat environment and adjustment to it. The same is true for the B-1. We are developing antennas that are broadly capable and electronically agile through frequency hopping.

"So far as automatic weapons delivery is concerned, the advanced F-4E Wild Weasel incorporates capabilities of this sort. This system, now in development, is being designed for a dense electronic environment and will be able to sort out those threats that are most bothersome, transfer this information to an antiradiation missile, and send it on its way. Conceptually, there is no reason why, later on, we couldn't provide fighters and bombers with the same capability."

The F-4E Wild Weasel is to replace the Air Force's F-105G and F-4C Wild Weasels used for SAM suppression during the Southeast Asian war. It combines the flexibility and responsiveness of a front-line tactical fighter with sophisticated avionics to find and destroy ground-based threats. The new system covers a broader frequency range than its predecessors and is also designed to present information in easy-to-read fashion. The older systems, Colonel Gahagan said, "require so much operator interpretation that in a truly dense environment things become very confusing. The F-4E will require less experience and training on the part of the crews."

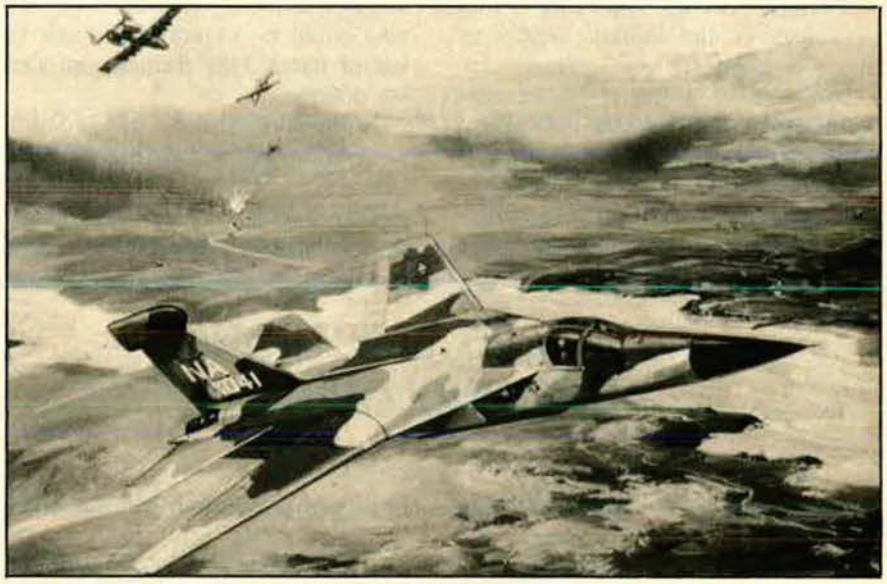
Another new USAF aircraft designed specifically for EW is the EF-111A Tactical Jamming Aircraft, currently in prototype development by Grumman Aerospace Corp. of Bethpage, Long Island, N. Y., for AFSC's Aeronautical Systems Division. The EF-111A replaces the obsolescent EB-66 with a high-performance aircraft to provide both barrier (standoff) and escort/penetration jamming in support of strike forces.

In the barrier jamming role the EF-111A will protect such aircraft as the F-16 and A-10 from electronic threats. A large portion of the aircraft's jamming equipment is taken from the US Navy's EA-6B EW aircraft. The twin-engine EF-111A's ample power reserves, combined with broad "frequency agility" and sophisticated high gain antennas make the Advanced Tactical Jamming Aircraft a very cost-effective EW weapon. "We find this approach far more efficient than equipping all strike aircraft with an across-the-board built-in capability that would be more costly and interfere with their basic missions," Colonel Gahagan added.

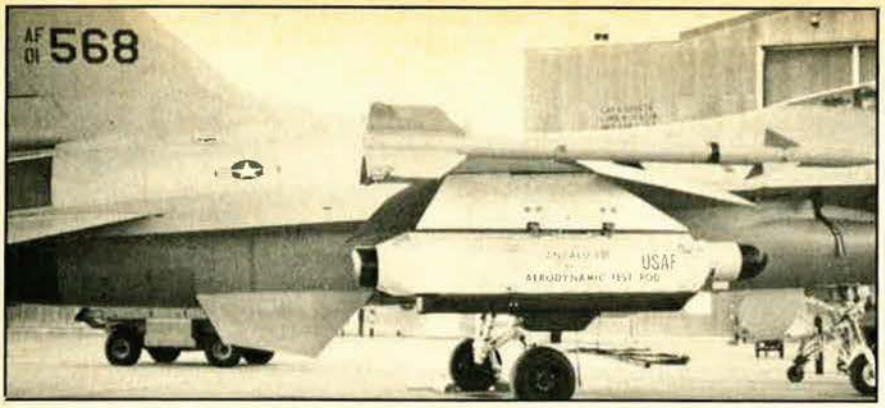
Visible and Infrared Spectrum Areas

The infrared (IR) part of the spectrum is of obvious military importance because that is where the heat output from engines, gun barrels, and missile exhausts radiates. Infrared-sensitive reconnaissance optics can detect these emissions as easily by night as by day. Thus, a fundamental IR countermeasure—one often overlooked in the past—is to make engine shielding a key design requirement. The A-10 close support system, whose engines are located above the fuselage, is one of the first to treat IR shielding as a key design criterion.

The second category of IR countermeasures is flares. Among USAF's EW programs is a pyrophorics program for high-intensity,



AFSC's Aeronautical Systems Division and Grumman Aerospace Corp. are developing a prototype EF-111A Tactical Jamming Aircraft that will provide both standoff and escort/penetration jamming in support of strike forces.



An AN/ALQ-131 Electronic Countermeasures pod for the new F-16 Air Combat Fighter is being prepared for aerodynamic testing. New USAF ECM equipment includes the capability to assess and adjust to changing threats.

fast-igniting flares that could be coupled with warning sensors so that a flare drops automatically whenever an IR threat is detected. (A similar approach is being considered for chaff dispensing.) The advantage of automatic release, according to Colonel Gahagan, is that it conserves the limited supply of flares or chaff.

An area of potential future concern involves both electro-optical and laser-guided systems. While there is no evidence that a foreign power has put laser ECM systems into operation, Air Force planners recognize the need to develop laser designators using coded pulses to prevent hostile ground forces from designating false targets. More difficult is the problem of camouflage, dummy targets, or concealment by smoke. These conditions apply equally to electro-optically guided weapons whose accuracy also could be impaired through the use of flares, light flashes, and similar means.

In the closing phase of the Southeast Asian war and during the October 1973 Middle East war, Remotely Piloted Vehicles emerged as promising electronic warfare tools. Under development is a low-cost, expendable harassment drone, possibly a mini-RPV, to draw SAM and antiaircraft artillery fire and to confuse and disrupt enemy radar. Full-sized drones were used effectively in Southeast Asia for recce missions.

Exploiting miniaturization in electronics and avionics, ARPA is investigating a sixty-knot, airborne system weighing no more than 100 pounds and flying at 3,000 feet to serve in EW, defense suppression, target designation, and surveillance missions. ARPA has already demonstrated that "at a cost of less than $10,000 such a system can compete successfully with more costly manned systems," according to Dr. Heilmeier.

ARPA is about to flight test a novel mini-RPV that folds into a missile case and can be shot like a rocket from the ground or an aircraft. Air-launch extends its operating range out to several hundred miles. Such a system could be equipped with lightweight, low-cost, high-performance radar data-linked back to a mother station, or a laser-linescanner and a direct line-of-sight flash detector as well as infrared detectors to locate weapons as small as a mortar, according to Dr. Heilmeier.

ADVANCED ELECTRONIC TECHNOLOGIES

Radar technology, although going back more than thirty years, still continues to promise significant further advances. An area of considerable interest is radar architecture, meaning schemes to separate—in terms of location—the transmitter from the receiver and the signal processor and display, Dr. Heilmeier told this reporter. In the case of an RPV, for instance, "why do we need all the 'smarts' in a vulnerable system? Why don't we merely keep the antenna, the transmitters, and the receivers aboard and put the signal processing on the ground? We are moving in that direction. Similarly, in the case of future AWACS aircraft, it may be more effective to confine its radar activities to reception and let somebody else radiate," he said.

Radar systems operating in the millimeter portion of the frequency spectrum are coming in for special DoD attention because of their small antennas and ability to provide high resolution. While range of these radars is limited and certain weather conditions can affect performance, "these factors don't matter too much if we use them on RPVs that can come quite close to the target and that we are willing to expose to greater risks than we would manned systems," according to ARPA. The agency is developing a millimeter radar system "that will weigh less than thirty pounds and cost about $15,000," Dr. Heilmeier said.

ARPA Director Dr. George H. Heilmeier sees the pivotal challenge in the design of high-energy laser devices to be "adaptive optics" that can overcome atmospheric attenuation.

Millimeter radar offers other important advantages. Its high resolution permits it to be used on the battlefield to detect moving ground

troops. Radars operating in the conventional microwave frequency range cannot distinguish between valid targets and the clutter caused by vegetation, and require complex Doppler-based motion detection.

Other areas of radar development include ways to improve the accuracy of weapons delivery by attack radars, including solid-state designs. Key concerns are improved resolution, more accurate velocity measurements, less vulnerability to weather, and high-gain antennas with increased sidelobe suppression. The last named relates to the energy that radiates off to the sides of the radar beacon, and determines the system's vulnerability to jamming. USAF radar programs that explore the potential for such advances include EAR, the electronically agile radar, and FLAMAR, the forward-looking radar.

The Computer: Heart and Mind of Electronics

The Defense Department has been able to rely on the prolific output—technologically far ahead of its nearest competitors—of the US computer industry for most of its general-purpose computer systems. This condition, most experts interviewed by this reporter believe, will continue, albeit with more exceptions than in the past.

Two, and eventually perhaps three, factors dictate special design techniques for some military computer systems. One is hardening against the transient nuclear radiation as well as the electromagnetic pulses encountered in nuclear warfare. The required techniques are not confined to shielding but involve fundamental computer circuitry and the materials used, down to the system's memory section.

The second criterion for nuclear survivability is a "nonvolatile" computer memory. Most computer memories are "volatile"; their data is lost if the power is turned off. This is no problem for commercial installations because data are transferred to magnetic tapes at the end of each day. In a strategic system, a memory loss would be fatal since the time from beginning to end of a mission is measured in minutes. Power has to be turned off automatically to protect the system from damage whenever special sensors detect power surges caused by electromagnetic pulses. Military computers requiring a high degree of survivability use a technology known as "plated wire" to obtain nonvolatile, radiation-resistant memories. Since commercial users have no such requirement, the limited market for the inherently more expensive plated wire memories has boosted costs even higher.

The third divergence likely to affect military computer users stems from DoD requirements for the digestion of vast amounts of data in near real-time. DoD concluded that "the progress and direction of computer memory development in this country are not sufficient to meet long-range defense requirements [and] present commercial trends toward microprocessors will not serve our projected needs in areas such as simulation and intelligence processing."

The Ominous Level of Soviet Research

AIR FORCE Magazine, in previous issues, and the Air Force Association's 1974 Statement of Policy were the first to call attention to the ominously high level of Soviet research relating to charged particle beam weapons technology.

Written congressional testimony presented recently by Dr. Heilmeier, Director of the Defense Advanced Research Projects Agency, included this statement:

"Some results of our recent assessment of Soviet science include detailed analysis of the work of four key Soviet R&D groups conducting R&D on high-current, high-energy, charged particle beams. Soviet research in this area, which has grown steadily since the early sixties, is currently conducted at a manpower level about twice that of the US work. The impressive Soviet research program includes a systematic effort to develop a comprehensive theory for the production and control of electron beams and investigations of applications in a broad range of technologies. The Soviet research on electron beams is important to the DoD because of its potential for the development of military technology including high-resolution radar, beam weapons, and space communications."

Suggesting that emerging technologies justify hopes of a major breakthrough, DoD predicted important new capabilities in "intelligence analysis, command and control, automatic data handling, scientific analysis, real-time signal analysis, and scientific modeling and calculation." The need for high-density computer memories, Dr. Heilmeier told this reporter, will become most acute beyond 1985 and involve the storing, processing, and intelligent, automatic real-time assessing of imagery (pictorial) data in digitized form.

The technological challenge, as yet unmet, is to store huge amounts of information and make it available rapidly, he pointed out. For modest storage requirements advanced technologies currently in being may prove adequate. Among them might be magnetic bubble or charge-coupled devices (CCD), according to Dr. Heilmeier. In the first instance, microscopic magnetic dots, or bubbles, embedded in slices of special magnetic crystals are substituted for conventional magnetic tape. These bubbles are arranged to perform specific computer logic functions through magnetic manipulation. Such a memory has no moving parts. Magnetic bubble data storage is attractive in spaceborne computer applications because it is nonvolatile and can be made "fail-soft," meaning a fault in a part of the system will not cause a general breakdown but only a limited impairment in a given function. While the magnetic bubble memory is reasonably impervious to nuclear radiation, the sensing electronics that read them are not, according to Dr. Heilmeier.

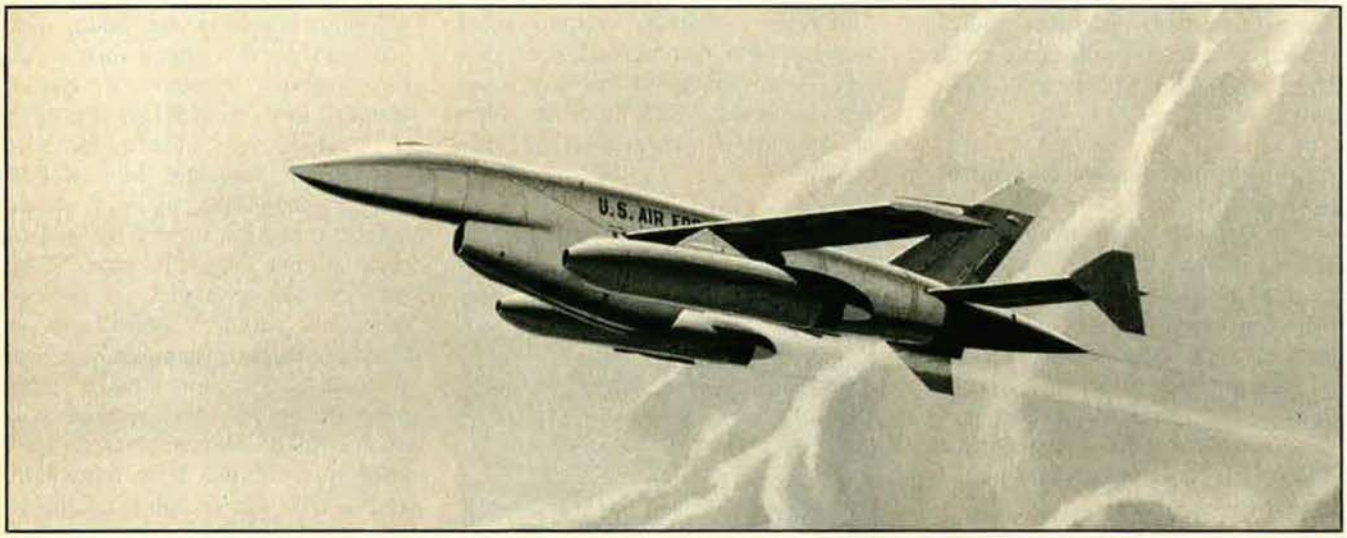
Charge-coupled devices show promise for such airborne applications as image sensing and processing as well as signal processing. They are, however, volatile. While transistors—the basic element of present computer memories—have made it possible to build minute chips of silicon containing thousands of memory elements, CCD increases the data density per chip to tens of thousand memory cells on the same chip. A solid-state device, CCD relies on the transfer of mobile electric charges from one semiconductor storage element to another to represent information.

Neither approach helps overcome

the basic physical limits imposed on data storage density by reliance on silicon chips, according to Dr. Heilmeier. As a result, he pointed out, "we plan to look beyond silicon and planar [two-dimensional] memory systems to such means as optical, electrochemical, electron beam and even real-world replicas of biological memories. We are also considering holograms [depositing information in a three-dimensional manner, usually with the help of laser beams] in crystals. At the same time, we are reexamining our basic approach to computer architecture. Initially, we had no choice but to rely on centralized processors because they were the only systems capable of doing the job. As miniprocessors and minicomputers become cheaper, however, it makes sense to consider joining them into federated [netted] systems. We know that there is room for improvement because the present state of technology is still far below the capacity and efficiency of the human brain."

USAF's and DoD's objective in advanced computer technology efforts—which may require a dozen or more years to reach fruition—is to meet defense requirements that "cannot now even be approached. Examples include immediate processing of high-resolution intelligence data for direct injection into command and control systems and the real-time simulation of complex weapon systems and military operations."

Another thrust in DoD computer research aims at "intelligent terminals" so that decision-makers and not programmers can operate the system. Also needed is the ability to "pursue goals so that if a computer is asked a specific question it remembers the subject and relates information received later on to that question. We are also working on terminals that can adapt to the user in terms of his professional jargon. We are making some progress in intelligent terminal design and have a program to achieve some of these goals for intelligence analysts."



The Air Force has a high level of interest in recoverable electronic warfare RPVs, and developed such vehicles for use during the Southeast Asian war, though they were never deployed. Also under examination are concepts of expendable EW RPVs as well as low-cost, expendable harassment vehicles to provide jamming and decoy functions.

While ARPA is developing the technology base required to map speech wave patterns into symbolic representations usable by computers, ARPA and Air Force experts doubt that fully voice-controlled computers can become a practical reality within the next ten or fifteen years. A five-year effort by ARPA to convert sounds into a digital language is moving toward final concept demonstration next year. The present goal, according to Dr. Heilmeier, is to process acoustic information at one-tenth human speaking rates with ninety percent accuracy while using a thousand-word vocabulary and moderately complex grammars.

Military computer experts agree that the ability to build ever greater and more reliable computational capabilities into spaceborne systems accelerates the trend toward distributive (netted) systems that reduce the requirement for extensive computer capabilities aboard individual aircraft. The triservice, USAF-developed Global Positioning System (GPS) can be considered typical of this trend.

$3 Billion for Software

While the cost of computer hardware has decreased by fifty percent every two years for the past three decades, software or programming has remained level in cost. The Defense Department spends about $3 billion annually on software compared to about $1 billion on computer hardware. Forecasts indicate that ratio may go up to ten to one by 1985 unless a cheaper way to write, test, document, verify, and de-bug (correct) software can be found.

At the root of the problem is the prestige and economic incentive for computer scientists to create new computer languages as well as the fact that literally hundreds of programmers, working concurrently and independently over a period of months, write the software that enables a computer to perform a specific broad task. An error by one programmer—and they must work in an *ad hoc* and creative fashion rather than by rote—can affect an entire program and may require

Spectronics Inc. of Richardson, Tex., developed a coupler that can accommodate eight fiber optics terminals.

literally thousands of man-hours to find and correct. The Defense Department, through ARPA, is hard at work on solutions.

Known as the National Software Works, this effort is keyed to "use the computer itself much more intensively in all aspects of software production and maintenance. This program, conducted jointly with the Air Force, is developing software procedures that are available over a network of diverse computers, accessible nationwide." As a result, a more efficient, uniform software "library" eventually will be available to all DoD users, according to ARPA's director.

Guided Laser Communications

The coupling of laser communications with fiber optics is of potentially pervasive importance to military systems designers. The principal advantages over conventional transmission of information by wire are far greater data rates, lower weight, elimination of EMI (electromagnetic interference) problems, and elimination of copper, an expensive and somewhat scarce material. Laser beams are lightwaves arrayed in a phased, coherent fashion. They retain the high frequency and short wavelength of light and can accommodate information at a thousand times the rate of microwaves. But weather conditions and dust particles can block laser beams. For this reason, the communications industry combined lasers with fiber optics, a form of wire made of glass fibers, coming up in effect with guided lasers.

The underlying principle is the physical phenomenon that light waves—which normally only travel in straight lines—propagate through glass rods even though the latter may be curved and twisted. The translation of this theory into practice turned out to be enormously difficult, because even the most minute impurities in the optical fibers can cause intolerable energy losses.

Dr. Heilmeier believes that optical communications will have revolutionary impact on military aircraft design and for similar tactical applications. "Their much lighter weight permits far greater redundancy, which means aircraft that can withstand much greater battle damage than is possible at present. On an A-7 aircraft, for instance, replacing just the wiring of the navigation and weapons delivery systems saves about 100 pounds." Most importantly, however, fiber optics should bring down cost and boost reliability—the twin criteria that will determine the ultimate success or failure of electronic systems design in the 1970s. ■

High-Energy Lasers

From its inception in the 1950s, the laser (short for Light Amplification by Stimulated Emission of Radiation) has been ballyhooed, hailed, and dreaded as the ultimate military technology.

But two decades later the question of whether this electro-optical technology can be so applied to operational systems remains yet to be answered.

The results of several years' work on high-energy laser systems by the three services and ARPA are currently being focused by a high-level committee of Defense Department experts, ARPA Director Dr. Heilmeier told this reporter. All three services, in addition to ARPA, have high-energy laser programs in progress. This is considered necessary because "of the wide diversity of potential applications" to the different missions of the services, according to DoD's congressional testimony.

In addition, the Energy Research and Development Administration (ERDA) pursues laser research as it relates to nuclear fusion and isotope generation.

This spring, a special advisory panel on laser fusion, which included Dr. John S. Foster, former long-time Director of Defense Research and Engineering and now a TRW vice president, reported to ERDA that possible applications of laser-fusion include "simulation of nuclear weapons explosion," the propulsion of space vehicles, and "even possible eventual use of compact laser-fusion explosives as nuclear weapons." The practical value of the latter application is being questioned by DoD, however. "Our nuclear weapons work well, without laser fusion. We already have clean [largely free of fallout] weapons, which is about the only contribution a laser trigger could make," according to Dr. Heilmeier.

DoD's high-energy laser research concentrates primarily on the infrared wavelength, precise pointing and tracking, and specific wavelengths that are least vulnerable to atmospheric attenuation. ERDA, on the other hand, is interested in the visual portion of the spectrum, high pulse systems, and the ability to "tune" laser frequencies.

A pivotal challenge in designing laser devices for use in the atmosphere, as opposed to space, lies in overcoming the attenuating (blocking) effects of clouds, moisture, turbulence, dust, and temperature differences. The first step is to refine the "windows," the frequencies that assure efficient propagation of the laser beam through air. ARPA is developing a technology known as adaptive optics, or as Dr. Heilmeier told this reporter, a "rubber mirror" coupled to smart sensors in a closed loop arrangement that changes its shape, and thereby compensates for "the tricks atmospheric turbulence plays on us."

Attenuation poses no problems for space-based lasers that are also being investigated by DoD.

What's Happening in Electronics at ESD

SYSTEM NO.	NAME AND MISSION	STATUS	CONTRACTOR
404L	**Traffic Control and Landing Systems (TRACALS):** TRACALS encompasses fixed and mobile ground facilities and equipment, with associated avionics, to update the USAF Air Traffic Control function. The major systems now being acquired as part of TRACALS include Terminal Navigation Aids, Radar Approach Control Equipment, Landing Systems, and Air Traffic Control Simulators.	Continuing Acquisition	Many
407L	**Tactical Air Control System (TACS):** A highly mobile communications and electronics system for command and control of tactical aerospace operations. Capable of modular deployment by airlift, helicopter, and truck, 407L can be adapted to specific geographic requirements. The system will provide radar and communications in the tactical environment, airspace management, communications for Army support, and air traffic control.	Transitioned	TRW Systems (integration) Many for equipment
411L	**Airborne Warning and Control System (AWACS):** Provides a survivable airborne air surveillance capability and command control and communication functions. Its distinguishing technical feature is the capability to detect and track aircraft operating at high and low altitudes over both land and water. It will be deployed by TAC in both initial phases of hostilities and in protracted situations. For ADC, it provides an efficient solution to the requirement for survivable strategic air defense surveillance and control.	Acquisition	Boeing
414L	**CONUS Over-the-Horizon Backscatter Radar (OTH-B):** The OTH-B radars will be a part of the North American Air Defense Command (NORAD) surveillance and warning system. OTH-B will detect targets at all altitudes and at extended ranges. The present phase of this program is to build a prototype OTH-B radar, test it for a year, and then make a decision on building two fully operational radars.	Acquisition	General Electric
416L	**SEED CLEAR:** Update of the existing AN/FPS-27 radar sets to satisfy operational requirements of the North American Air Defense (NORAD) system.	Operational	Westinghouse
427M	**NORAD Cheyenne Mountain Complex Improvements:** A program to acquire new data-processing equipment, software, displays, and communications for the NORAD Cheyenne Mountain complex. The NORAD Computer System, Space Computational Center, and the Communications System will provide the NORAD Cheyenne Mountain complex with an integrated, responsive capability and a growth potential that will meet a projected life span of ten years without replacement of major equipment or major software changes.	Acquisition	Aeronutronic; SDC
428A	**Tactical Information Processing and Interpretation System (TIPI):** The USAF TIPI/USMC MAGIS (Marine Air Ground Intelligence System) will provide more timely and accurate intelligence to USAF and USMC tactical commanders. Air transportable and housed in mobile shelters, the segments of the system employ automated aids for rapid processing, interpretation, and reporting of intelligence derived from airborne collected electronic reconnaissance and photographic and radar imagery.	Definition & Development	General Electric (integration) Many for equipment
433L	**Weather Observing and Forecasting System:** A system for the modernization of the Air Force Weather Service to provide high quality and timely weather observations, information, studies, advice, and forecasts in support of military operations and command and control systems.	Acquisition & Operational	Many
441D	**COBRA TALON:** A system to provide the Air Force with a detection and tracking sensor system for overseas deployment.	Operational	General Electric
450A/404L	**Tactical LORAN:** Development and acquisition of the AN/ARN-101(V) Navigation/Weapon Delivery for the RF-4C and F-4E aircraft. This system will provide a modular digital avionics retrofit with LORAN for these aircraft to satisfy tactical requirements for the 1975–1985 period. Development and acquisition of a Tactical LORAN C/D Ground Chain for worldwide deployment to provide LORAN environment for precision positioning in the tactical environment. Development of precise grid prediction capability and common grid positioning system for joint service use.	Preproduction	Sperry Rand, Lear Siegler, ITT
451D	**COMBAT GRANDE:** Upgrading, modernizing, and semiautomating the existing Spanish Air Force aircraft control and warning network.	Acquisition	COMCO
478T	**Combat Theater Communications:** A program to acquire new hybrid analog/digital and digital communications equipment for the tactical air forces. This equipment is acquired both for Air Force unique requirements and as part of the DoD Joint Tactical Communications (TRI-TAC) Program. Within the TRI-TAC Program, the 478T Combat Theater Communications Program Office is responsible for the development, testing, and production of the equipment assigned as Air Force responsibility and to ensure that the USAF requirements are met by all of the equipment procured through this joint service program. This program office also has responsibility for the interoperability of the equipment procured under the TRI-TAC Program with other communications equipments within the tactical air environment.	Definition, R&D, & Acquisition	Many
481B	**Advanced Airborne Command Post:** Provides the National Military Command System and Strategic Air Command with an improved Airborne Command Control and Communications System that will operate satisfactorily during the pre-, trans-, and postattack phases of a general war. The system will utilize some combination of automatic data-processing and peripheral equipment accessed through remote terminals installed in a Boeing 747 aircraft that will provide the facilities for future growth and advanced equipment.	Acquisition	E-Systems (first phase) Boeing (second phase)
485L	**Tactical Air Control System Improvements (TACSI):** Provides evolutionary improvements of equipment and capabilities of communication and electronic systems for command and control of tactical aerospace operations. The system consists of automated and miniaturized equipment compatible with existing Tactical Air Control System (TACS) equipment and interfaces with automated tactical data systems of the Army, Navy, and Marine Corps providing interoperability of joint forces.	R&D & Acquisition	General Dynamics, Hughes, ITT
490L	**Overseas AUTOVON Switches:** The key element of the overseas portion of the Defense Communications Agency's program to implement a worldwide Automatic Voice Network (AUTOVON). This system provides an automatically switched, wide-band communications network.	Operational with improvements continuing	Automatic Electric Co.
496L	**SEEK SAIL:** This program is the acquisition of a radar sensor for SPACETRACK. Implementation of this sensor will provide information to the Aerospace Defense Command on new satellites during the initial orbit. This sensor will extend the system coverage and provide data for updating the spacetrack catalog.	Development	None
496L	**SPACETRACK Augmentation:** The mission of the SPACETRACK system is to detect, track, and identify man-made objects in space. Improvements are needed to expand the system's capability in terms of extended range, greater coverage, better accuracy, and more timely reporting. Several studies and projects are under way to determine future requirements for modifications to the sensor network, on-site data processing, operating procedures, and system communications. Large ground radars and electro-optical systems are being considered for performing the deep-space surveillance mission.	Advanced Development	None

A CHECKLIST OF MAJOR ELECTRONICS PROJECTS

SYSTEM NO.	NAME AND MISSION	STATUS	CONTRACTOR
616A	**Air Force Support of MEECN:** A project to upgrade the Air Force Survivable Low Frequency/Very Low Frequency (LF/VLF) System as part of the Minimum Essential Emergency Communications Network. The LF/VLF System is designed to meet the requirements of CINCSAC and Joint Chiefs of Staff.	Development/Acquisition	None
633A	**Cobra Dane:** A program to acquire a phased-array radar to be installed at Shemya AFB, Aleutian Islands, Alaska, for the purpose of collecting intelligence data on Soviet missile development tests. Corollary missions are early warning and satellite tracking.	Acquisition	Raytheon
634B	**Joint Tactical Information Distribution System:** A program to develop a high capacity, reliable, jam-protected, secure digital information distribution system that will provide an unprecedented degree of interoperability between data collection elements, combat elements, and command and control centers within a military theater of operations.	Engineering Development	Many
681E	**Base and Installation Security Systems (BISS):** An evolutionary program to provide a DoD standard electronic security system for physical security and ground defense of DoD resources worldwide. The concept incorporates maximum commonalty of major items and a variety of supporting subsystems, offering a flexibility or choice of equipments that can be tailored to the physical characteristics of the deployment location and threat.	Development Acquisition Deployment	Many
968H	**Joint Surveillance System (JSS):** A program to provide the United States with a new peacetime air surveillance capability. The system will utilize radars and other sensors at joint FAA/USAF sites to simultaneously fulfill the civil mission of air-route traffic control and the military mission of continental air sovereignty. In its military role, Region Operations Control Centers will interface with other major North American command and control systems.	Validation Acquisition	None
1135	**Automated Armed Forces Examining and Entrance Station (AFEES):** The Automated Armed Forces Examining and Entrance Station (Automated AFEES) Program entails the design, development, test, and evaluation of a prototype Automated AFEES that will substantially improve examinee screening and administrative processing within the AFEES.	Engineering Development	Many
1136	**SAC Automated Total Information Network (SATIN):** A program to provide SAC with an integrated command-wide digital communications system that will satisfy, with updating, SAC requirements for command control, administrative, and support data transmission into the 1980s.	Validation Phase	None
1205	**Air Force Satellite Communication System (AFSATCOM):** The program is for the acquisition of UHF airborne/ground force terminals, airborne/ground command post terminals, ancillary equipment necessary for operational control, and communications transponders on selected Air Force satellites. In addition, the associated family of modular UHF transceivers will provide a command communications capability in the line-of-sight mode. The full-grown family of modular UHF radios will result in a common base to provide the transceiver for the satellite SIOP and Force communications terminals and direct replacement of the AN/ARC-27, AN/ARC-34, and other obsolete UHF command units identified by AFLC.	Development/Acquisition	Collins Radio
1213	**Airborne Weather Reconnaissance System (AWRS):** A high-priority program to provide the WC-130 fleet of the Air Weather Service with improved meteorological data gathering and information processing equipment designed to respond to the weather forecasting requirements of the 1970s.	Prototype Operational	Kaman Aircraft
2009	**ANMCC Processing and Display System:** The system will receive, process, and display Status Warning and Attack Assessment Data to support the National Command Authorities and the Joint Chiefs of Staff. The Processing and Display System for the Alternate National Military Command Center will be a duplicate of the system previously installed in the National Military Command Center. The Processing and Display System is comprised of two Display Subsystems: the Alphanumeric Wall Display Subsystem and the Large Screen Wall Display Subsystem.	Acquisition	Aeronutronic
2024	**Secondary Surveillance Radar Collision Avoidance System (SSR-CAS):** An airborne system based on the existing Air Traffic Control Radar Beacon System (ATCRBS) that indicates to the pilot the presence of other aircraft in the vicinity and provides maneuver commands to avoid midair collisions.	Advanced Development	In-house
2029	**Survivable Satellite Communication System (SURVSAT):** A system providing reliable and secure means for complete command and control of weapon systems during crises. Provides the ability to communicate with globally dispersed forces.	Validation Phase	None
2059	**PAVE PAWS:** Two dual-faced phased-array radars, one to be deployed on the East Coast and one on the West Coast. This system will be operated by the Aerospace Defense Command and will provide warning to the National Command Authorities of a sea-launched ballistic missile attack against the Continental United States.	Development	None
2121	**SEEK SKYHOOK:** This program is for the development of a low-level surveillance radar. This system will provide Aerospace Defense Command with the capability of detecting and tracking low-flying aircraft approaching the CONUS.	Development	None
7820	**Communications Security (COMSEC):** A program to guard overall security of systems against interception, traffic-flow analysis, cryptographic failure, and electronic countermeasures.	Continuing	Many
	Air Force World-Wide Military Command and Control System (AFWWMCCS): This program involves systems planning and engineering for Air Force elements of the World-Wide Military Command and Control System. Activities will focus on achieving system interoperability of existing and planned AFWWMCCS assets.	Conceptual Phase	None
	Weather Systems Planning: To plan for the development and acquisition of aerospace environmental support systems and equipments that would make significant contributions to operational and weapon system effectiveness.	Conceptual Phase	None
	Operational Applications of Special Intelligence Systems (OASIS): A program to develop hardware and software for the interface between operations and intelligence, making possible effective use of perishable intelligence data in support of air battle management functions.	Engineering Development	None
	Digital European Backbone System (DEB): A program that will incrementally transition portions of the European Defense Communications System from analog to predominantly digital transmission. This project will provide a wideband digital bulk encrypted terrestrial backbone for interconnect and alternate routing capability between the Defense Satellite Communications System's earth terminals and major commands in Europe.	Validation and Acquisition	None

WWMCCS— Nerve Center of US C^3

BY LT. GEN. LEE M. PASCHALL, USAF
DIRECTOR, DEFENSE COMMUNICATIONS AGENCY

Command control and communications, like the strategy it serves, is subject to constant change and modernization. How WWMCCS adjusts to change in national policy is described by the Pentagon's ranking military communications executive.

THE winter of 1971–72 saw the beginning of a major evolutionary change in the World-Wide Military Command and Control System (WWMCCS). Concern about the performance and survivability of our command control and communications structure led the Joint Chiefs of Staff and the Office of the Secretary of Defense to redefine WWMCCS and put greater management emphasis on its improvements.

The WWMCCS Council, consisting of the Deputy Secretary of Defense; the Chairman, Joint Chiefs of Staff; and the Assistant Secretaries of Defense for Intelligence and Telecommunications, reached a series of decisions on WWMCCS improvement actions then under consideration within DoD.

Among them were the WWMCCS computer update program, the Advanced Airborne Command Post program, expansion and modernization of the National Military Command Center (NMCC), expanded capabilities for the Minimum Essential Emergency Communications Network (MEECN), and a Warning System improvement plan. These major subsystem decisions were designed for near-term improvement of WWMCCS. All are now under way, and some have reached limited operational status.

Why, then, is there a need to establish a WWMCCS systems engineering office, a crucial council recommendation on which action is pending? What will it do?

Evolution of WWMCCS

To understand the need for such an office requires a brief look at WWMCCS as it has evolved during the past dozen years. WWMCCS was first defined in October 1962. The National Military Command System (NMCS) supporting the National Command Authorities, then consisting of the NMCC and three alternates (ground, sea, and air), was described as the "capstone" of the WWMCCS. Also included were the command centers of the unified and specified commands, together with those of the military services and the internetting communications.

In a subsequent Deputy Secretary of Defense memorandum, the commanders in chief of the unified and specified commands were given a stronger role in those command control and communications systems being acquired for them and for their components by the supporting military departments. The JCS agreed on CINC requirements and provided guidance and direction. The CINCs in turn reviewed the system design and the specifications proposed for their command and control systems by the supporting military department and submitted their views thereon to the service secretary.

The Joint Command and Control Requirements Group (JCCRG) provided the JCS with technical expertise to undergird the validation, direction, and guidance tasks. Additionally, the JCCRG was charged with developing a "functional design" for the NMCS which, when approved by the Director of NMCS Technical Support in the Office of the Director of Defense Research and Engineering (DDR&E), was sent to the Defense Communications Agency (DCA) for technical design and planning. After the JCCRG was disestablished in February 1970, some of its functions were gradually shifted to DCA; others remained in

Defense Communications Agency Director Lt. Gen. Lee M. Paschall is shown at a CTR display in the National Military Command Center.

J-3 (Operations) of the Joint Staff.

The resulting WWMCCS structure was a loosely knit confederation of command centers with a variety of computers and software, but with tightly controlled procedures. Interconnecting communications were largely standardized because they were provided in significant measure by the Defense Communications System (DCS). But communications networks for command and control purposes within the unified and specified commands tended more toward diversity than commonality.

During the late 1960s, much was done to achieve survivable emergency back-up communications to the force elements for use in a trans-attack period when one or more of the CINCs' headquarters might be damaged or destroyed. This resulted in the Minimum Essential Emergency Communications Network (MEECN) through which the JCS could preempt the most survivable communications to transmit emergency action messages (EAMs). As with any communications system that doesn't operate continuously, MEECN's performance did not provide the extremely high reliability required for EAM traffic. Moreover, there were technical incompatibilities between some of the MEECN elements, which limited its full capability.

To mount a systematic attack on these problems, DCA was directed to develop a MEECN system engineering capability. The MEECN System Engineer Office began by using JCS-approved scenarios, threat estimates, force connectivity requirements, and message time-of-delivery goals. It concentrated on survivability studies, technical interface problems, procedural and equipment improvements, and tests and exercises. Programmatic, technical, and procedural recommendations were made to the JCS and OSD in the form of an annual master plan.

Today about fifty-five percent of DCA's budget and half of its manpower are directly involved in supporting command and control activities. The oldest activity in DCA dealing with command and control is the staff element that provides technical support to the JCS for the NMCS. It was originally established in mid-1962 and headed by the late Maj. Gen. John B. Bestic, USAF. The original NMCC facility in the Pentagon was designed, and its implementation by the Air Force monitored for the JCS by DCA, as are the current expansion and modernization of the NMCC. The NMCS Technical Support activity also assists the JCS by preparing technical analyses and cost estimates for alternative ways to meet stated requirements, and more recently by the development of a master plan for the evolution of the NMCS.

The NMCS Support Center, located in the Pentagon, provides computer support for both the NMCC and its underground alternate in Maryland. The Support Center is also developing or converting to the standard WWMCCS computers most of the applications programs that have been standardized for use throughout the WWMCCS community.

Finally, the Joint Technical Support Activity, located at Reston, Va., is responsible for developing WWMCCS standard system software for worldwide use. It is also developing host computer software, needed if WWMCCS computers are

to be internetted, as well as trying to find solutions to the computer data base security problem.

The Engineering Issues

Thus, DCA had acquired over the years capabilities and missions that made it a principal candidate for a WWMCCS systems engineering office. The Deputy Secretary of Defense has stated his general agreement that the office should be established in DCA and requested the Director, DCA, through the Chairman, JCS, to draft a proposed detailed charter and organization for WWMCCS Council approval. A draft charter is under review in DoD.

At the end of 1973, DoD initiated a fundamental examination of the WWMCCS system architecture itself so as to place all of our worldwide military command and control systems into perspective. Deputy Secretary of Defense William P. Clements, Jr., described it this way:

> The purpose of the architectural program is to determine the essential information needs of the National Command Authorities and to determine the best systems for meeting those needs.
>
> Starting with a variety of situations and potential decisions options, we are asking, "In this case, exactly what information will the National Command Authorities need to handle the crisis?" By "exact information" we mean such things as accuracy of impact predictions, warning times, photos or message reports, as well as resulting decisions and instructions. The result is long lists of information requirements for all these scenarios.
>
> These requirements are then folded together, as many of them are redundant. There emerges a set of requirements which can be traced to specific situations and which must be met by specific systems.
>
> The selection between systems, and achievable sets of requirements, is then the key issue.

The architectural work being done by IBM with a number of subcontractors is monitored by the Director of Telecommunications and Command and Control Systems in OSD. By the end of this year a set of broad architectural alternatives will be submitted to the WWMCCS Council for its consideration. The Council is expected to select one of the alternatives. The goal is to specify an architecture target for WWMCCS to reach in the mid-1980s, representing tradeoffs between various operational capabilities and their cost.

The WWMCCS Systems Engineering Office then will have the broad task of translating that architecture into transition plans, technical design criteria, and standards, and monitoring progress toward the 1985 goal. Although that is an easy task to describe, for several reasons it will be much more difficult to achieve. Foremost among them is the continuing evolution of command and control systems. Weapons, force structure, technology, strategy, procedures, friends, enemies, and commanders all change. More often than not the command and control system and its supporting communications are forced to adapt to that changing external environment.

Next, our acquisition processes are not well designed to acquire something whose requirements are in a constant state of change. Changes in "scope" almost always cost time and money. Moreover, a new subsystem must be phased into an existing operational structure, frequently on a "hot cutover" basis. One can rarely, if ever, afford to stand down to a "not-combat-ready" status for a C^3 system when converting to something new, as can a wing converting to new mission aircraft.

Another significant factor is that WWMCCS is thought of as a "system," though its present configuration is more like a confederation. A "system" is generally described as a set or arrangement of things so related or connected as to form a unity. Thus, by definition, a "system" is bounded. But WWMCCS, particularly in a crisis situation, must be an unbounded set of capabilities where transparency (accessibility) and flexibility are the critical parameters.

The common goal is, of course, to support the National Command Authorities throughout a full range of possible military actions, some of which are highly unpredictable as to their command and control needs. The WWMCCS Systems Engineer must, therefore, accept WWMCCS as a federated set of capabilities rather than a unified system. But the Systems Engineer must accomplish the critical aspects of system design as though it were a unified system. This is indeed a difficult challenge.

And then what shall be the operating style of the Systems Engineer? Do we give him authority over many or few things? Should that authority be limited to technical issues or include the programmatic as well? To maintain objectivity, would it be better to somewhat insulate the Engineer from program decisions and implementation, or will that result in an "Ivory Tower" syndrome? There are myriad such questions. Many are likely to be answered with much less precision than desirable to an engineer, who typically wants all things exact and preferably quantified.

Essential Tasks

For these reasons, it is vital to the success of the WWMCCS Systems Engineer that the essential things to be done are understood at the outset. To illustrate, let's take four out of perhaps a dozen essentials that one could quickly list.

First, translation of the architectural concepts into the next level of design detail must begin very quickly. Probably the best form that could take would be the early development of transition plans that support the most urgent operational capabilities. To do this properly, the WWMCCS Systems Engineer must *understand* the architecture in the sense that he knows what it says, but, more importantly, the methodology and rationale behind the many

The author, Lt. Gen. Lee M. Paschall, became Director of the Defense Communications Agency on July 30, 1974. He had been Deputy Director, then Director of Command Control and Communications, Hq. USAF, since September 1968. His career in military communications was launched in World War II, when he served as battalion communications chief in the 45th Infantry Division.

alternatives it examined. Understanding also implies that the Systems Engineer feels comfortable with it. Otherwise there will be an immediate tendency to bend the architecture to fit the builder's ideas, with disconcerting results. This is not to say that the architecture will be unchangeable. Since C^3 systems evolve, there will have to be changes in the architecture, which leads into the second task—some form of configuration management or control.

The system configuration control job is already being done in part by the WWMCCS Automatic Data Processing (ADP) Program Manager in the Joint Staff, assisted by DCA organizations such as the Joint Technical Support Activity (JTSA) and the National Military Command System Support Center (NMCSSC). The NMCS and MEECN Master Plans prepared by DCA also provide both transition planning and some configuration management. One could go so far as to apply Military Standard procedures, though there is considerable doubt as to their utility in something like WWMCCS. However, there may be another way, a by-product of what is probably the most important task the Systems Engineer will perform—control of interface design criteria and standards.

Specifying interface criteria and standards is the key near-term activity with the largest long-term payoff in improved operational capabilities. The interface issues are quite complex and are found at two levels. The architecture will undoubtedly address many of these interface issues in broad terms, perhaps in terms of information flow across several component boundaries. The Systems Engineer, however, will probably have to design, or approve the design for, the means of achieving the desired information flow. DCA is already working in several of these boundary areas because of the need to achieve interoperability of communications for general-purpose usage. Much of that knowledge can be tapped by the WWMCCS Systems Engineer.

There are many interfaces at the lower level, and it is important first to decide which are the critical ones in this large group. "Critical" is here defined as those subsystem intersections, procedural or technical, whose transparency will enhance system-wide capabilities. These may be perceived as a current or future need. An example of the former would be the need to determine what subset of the performance characteristics of the Navy VLF modem (interface device) and that of the USAF must be standardized in both modems. An example of the latter is how shall the Advanced Airborne National Command Post (AABNCP) key the Navy Seafarer ELF transmitters? There is general agreement that the Systems Engineer must be able to exert more authority on these second-level interface problems than in any other task.

Finally, the systems engineering task will require a significant effort in support of tests and exercises of WWMCCS and its subsystems. The Systems Engineer can provide unique assistance to the JCS by developing inputs to JCS-sponsored exercises that are designed in nonobvious ways to stress what are thought to be the weaker technical links in the chain. Analysis of exercise results will form the basis for technical improvement recommendations. There will also be a need for special tests designed by the Systems Engineer. An example might be those associated with the acceptance of new capabilities to verify performance in practice, again in terms of the total system capability. This kind of test may be particularly critical for computer software because the problem of certifying software as error-free is an area of great uncertainty in today's state-of-the-art.

This has been a rather brief look at the more important functions that must be performed by the WWMCCS Systems Engineer. It will be a complex and challenging job, but one that must be done if we are to achieve the improvements in command and control that will allow flexible control of our military forces and also achieve the "multiplier" effect command and control gives to a force structure limited either by budgets or international arms agreements.

The decade 1955–65 was a period of intense development of missiles; that of 1965–75 saw a great emphasis on the development of airplanes. The coming decade will have equivalent emphasis on command and control systems. The WWMCCS Systems Engineer will thus have a major and exciting role to play in the forthcoming command and control decade. ■

At the heart of the World-Wide Military Command and Control System (WWMCCS) are high-speed, high-capacity computers. Command and control, General Paschall believes, will emerge as the paramount national security challenge of the coming decade.

Waging War on Rising Avionics Costs

BY DR. BERNARD LIST AND COL. FRANCIS P. DUBE, USAF

The trend toward greater reliance on avionics is colliding with rapidly increasing costs of electronic equipment, maintenance, and operations. The Air Force has developed a comprehensive plan to reduce these costs without impairing operational effectiveness.

"THE Air Force is increasingly plagued by the complexity, diversity, and cost of aircraft avionics systems. The increased cost of maintenance and operations, added to the increased cost of salaries, is rapidly shrinking the dollars available for weapon systems acquisition to a dangerously low level."

In 1972, with these words, Gen. George Brown, then Commander of Air Force Systems Command, launched a study aimed at reducing the cost and proliferation of avionics. The study involved all elements of AFSC: Aeronautical Systems Division (ASD), Electronic Systems Division (ESD), Space and Missile Systems Organization (SAMSO), and several of the Air Force Laboratories. Known as the Aircraft Avionics Study, it was completed in April 1973 and led to a comprehensive program under the overall direction of ASD, with principal laboratory support coming from the Avionics Laboratory.

During the past three years, significant progress has been made in avionics management and acquisition. Major actions include innovative managerial approaches, definition of technology programs, development of in-house capabilities, and reduction of life-cycle costs, including improved reliability and methods for minimizing proliferation.

Organization/Managerial Approaches

The principal recommendations of the Aircraft Avionics Study were:

(1) Create an in-house avionics system architecture (design) capability at Wright-Patterson AFB to perform the analysis and trade-off studies required in preparing specifications.

(2) Start advanced development of the Digital Avionics Information Systems (DAIS) program.

(3) Coordinate the broad range of technical activities within ASD, the Air Force Avionics Laboratory, and other laboratories that affect avionics cost and performance.

By early 1974, ASD had developed a detailed Avionics Implementation Plan that drastically changed the management of avionics development and acquisition. A main feature was the creation of an Avionics Advisory Board (AAB) reporting directly to Lt. Gen. James T. Stewart, ASD's Commander. The AAB consists of ASD Deputies for Engineering; Development Planning; Reconnaissance, Strike, and Electronic Warfare; Systems; subsystems representatives of the major Weapon System Program Offices (SPOs); the Director of the Avionics Laboratory; and a representative of the Air Force Logistics Command. The Board is chaired by ASD's Deputy for Reconnaissance, Strike, and Electronic Warfare, and reviews avionics development and production to avoid proliferation, in part by insisting on the greatest possible degree of standardization.

Many issues are involved from the standardization of fighter aircraft radio remote frequency indicators to selection of a suitable design to fulfill a particular program requirement. In the latter case, intersystem standardization is important. Wherever possible, the Board will recommend selecting a subsystem that is either in use, or is also required by another SPO.

The Avionics Advisory Board has ties with the various avionics organizations that make up the Wright-Patterson AFB Avionics Complex. Several organizational changes were made at WPAFB during the last two

years. The Avionics Program Office (RWV), formerly assigned to the Deputy for Subsystems, was moved to ASD/RW (Deputy for Recon/Strike/Electronic Warfare) in order to bring the responsibility for avionics subsystem equipment development and procurement under the same manager who had Reconnaissance, Strike, and Electronic Warfare development and procurement. Within ASD/RW, the Directorate of Plans and Evaluation became the Directorate of Avionics Standardization and Systems Architecture (ASD/RWS) to facilitate standardization of avionics. ASD/RWS concentrates on three specific areas:

- Improvement in translating technology into engineering development.
- Development of an in-house avionics systems architecture capability.
- Development of standardized avionics systems architecture capability.

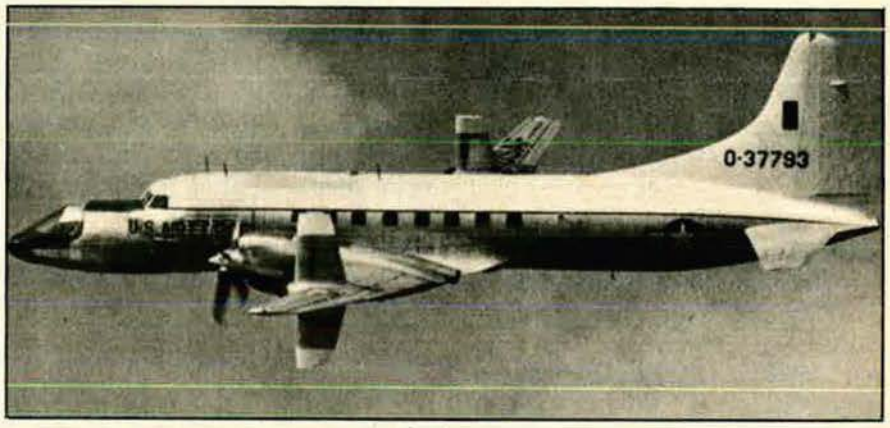
Personnel from both the Avionics Laboratory and ASD Engineering are collocated with ASD/RWS.

The Avionics Laboratory is making internal adjustments to help pinpoint means for reducing avionics costs. A Systems Avionics Division was created as a result of exploratory research studies that led to the present Digital Avionics Information System (DAIS) Advanced Development Program. Within the System Avionics Division, a group of engineers has been assigned to work on avionics life cycle costs. The Electronic Technology Division of the Avionics Laboratory is investigating Standard Electronic Modules (SEM) for avionics.

Technology Programs: DAIS

Among the programs spawned by the Aircraft Avionics Study are DAIS and the development of a standard multiplex data bus. In addition, a program has been started to determine the applicability of Standard Electronic Modules (SEM) to avionics equipment and the application of Computer Aided Design (CAD) to Avionics System Partitioning and standard module development. Work is under way to develop a standard microprocessor on a slice of silicon, and a family of standard avionics power supplies.

Computer and hardware resources of AFAL's Avionics Systems Analysis and Integration Laboratory (AVSAIL) are being combined with the Systems Engineering Avionics Facility (SEAFAC) in ASD's Directorate of Avionics Engineering. This group is to be called FAST, or Facility for Architecture Standardization and Test.



Early work by the Flight Dynamics Lab involved tests of a Fault-Tolerant Digital Airborne Data System aboard this Convair flying simulator.

FAST will be responsible for avionics programs requiring in-house systems engineering and simulation. It will be jointly operated by AFAL and ASD under ASD/RW management. Simulations from AVSAIL support the architectural phase in which mission analysis and systems partitioning work is done to provide the SPO alternative system configurations. FAST should be operational in July 1975.

One of the initial programs to achieve the objectives of FAST is the Digital Avionics Information System (DAIS) Advanced Development Program. The DAIS program is managed by AFAL with the help of the Air Force Flight Dynamics Laboratory, the Aerospace Medical Research Laboratory, ASD Engineering, and AFLC. The DAIS approach consists of four primary elements:

(1) A set of sensors required for a given mission.

(2) A standard multiplex data bus to interconnect these sensors with the digital processors and presentation and control system.

(3) A set of standard digital processors and memory elements.

(4) The presentation and control system that provides the crew information needed to perform the mission.

Successful demonstration of the DAIS concept and its application to various types of aircraft will save the Air Force money in a number of ways. Since the DAIS concept employs the standard multiplex data bus and standard interfaces between the sensors, the data bus, and the processors, it will no longer be necessary to rewire the aircraft to change a sensor or add processing capability. The cost of rewiring an aircraft to accept a new sensor may be three to five times the cost of the sensor.

Further savings and better reliability can be achieved as the same sensors and processors are used in more than one type of aircraft. As more and more units of the same kind are produced, cost comes down and reliability goes up. Military procurements tend to be limited in quantity, with each new weapon system developing its own avionics. DAIS' purpose is to make possible avionics commonality among various types of aircraft.

During the last three years a team of Air Force, Navy, Army, and industry people, led by ASD Engineering, worked on a multiplex data bus that is the heart of DAIS. This bus (MIL-STD-1553) operates at a one megahertz rate and uses a data format that will accommodate all data transmission requirements for projected aircraft except video signals, which will be handled on a separate cable. This standard system is being used on the F-16 Lightweight Fighter. Important cost and perfor-

__Dr. Bernard List__, one of the authors of this article, has been Commander of AFSC's Avionics Laboratory at Wright-Patterson AFB, Ohio, since July 1974. He had been the Lab's Chief Scientist and Deputy Director. Earlier, Dr. List was a Lab Director for Texas Instruments and a senior manager at the Battelle Memorial Institute. Coauthor __Col. Francis P. Dube__ is a navigator whose career in electronic warfare operations and staff positions includes a tour as ECM Division Chief in Vietnam. Since June 1974, he has been Director of Avionics Standardization and Systems Architecture at AFSC's Aeronautical Systems Division, Wright-Patterson AFB.

mance benefits can be gained through DAIS and standardized multiplex systems because of total systems integration. Examples are the Integrated Fire Control/Flight Control System and the Digital Flight Control System.

Standard Electronic Modules

Reducing the cost and increasing reliability and performance of avionics is not confined to the "black box" level. It also includes the elements that go into the black boxes. Standard Electronic Modules (SEMs) that can be assembled into various avionics systems are a key concern here. The concept was pioneered by the Navy Avionics Facility, Indianapolis (NAFI) about eight years ago. NAFI has shown that many different types of shipboard and submarine-based electronic systems can be built using relatively few standard electronic modules. These modules are defined by form, fit, and function. For airborne applications, the key question is, "What is the weight and volume penalty that must be paid to achieve cost and reliability benefits of Standard Electronic Modules?" Trade-off considerations are more significant for aircraft because of the generally more limited space available.

The Avionics Laboratory, ASD/RWS, Defense Electronics Supply Center, and Air Force Logistics Command are developing at NAFI an APN-59 weather radar using standard shipboard/submarine type modules. Since there already are many conventional APN-59 radars in operational use, flight tests of the SEM version of APN-59 should provide valuable comparative information about cost of ownership, reliability, and maintainability. The average cost of a standard module is less than $100, which makes possible a "throw-away" module maintenance concept and greatly simplifies both maintenance and logistics.

AFSC's Electronic Systems Division at L. G. Hanscom AFB, Mass., also has a SEM radar development program at NAFI for an air transportable ground radar, in order to gain additional SEM experience with that kind of equipment.

The cost and reliability benefits that can be realized by building standard avionics boxes with standard electronic modules are vast. When further combined with the achievements of Rome Air Development Center's component reliability program and the Manufacturing Methods Program for Avionics at the Air Force Materials Laboratory, the potential for cutting USAF's avionics costs can be realized.

Backing up the radar demonstration programs is an *ad hoc* group, established on April 1, 1975, that started an in-house study for an Air Force Standard Electronic Module program. Among the objectives of this study is formulation of a FY '77 program for exploratory, advanced, and engineering development.

Techniques also are being developed to apply computer-aided design to the partitioning of avionics systems and subsystems and to the design of Standard Electronic Modules. These are an extension of the same basic techniques developed at AFAL for the LSI (large scale integrated circuits) interconnection problem.

Other Technology Programs

Several more technology programs to reduce avionics costs are under way. Two approaches to developing standard, low-cost microprocessors for avionics applications are being investigated. The goal of one program, under direction of AFAL, is to develop standard microprocessors that in the 1980s will cost $1,745 each in quantities of 5,000 military-grade units or $350 in commercial grade. The military-grade price is roughly one-tenth that of similar airborne processing systems now in use. ASD/RWS has a Universal Digital Avionics Module (UDAM) under development, using a different approach to low-cost multiprocessors. These parallel approaches increase the probability of meeting Air Force requirements.

A program has been started in AFAL to define the requirements for a set of common power supplies built with Standard Electronic Modules. Standard power modules would offer great savings by eliminating the welter of different power supplies now used.

A number of programs also are under way at WPAFB to standardize software. The potential payoff from standard software modules and a standard software language is as great, if not greater, than that from standard hardware.

The WPAFB Avionics Complex is developing new techniques for specifying software requirements, a standard avionics software language, and standard software modules that can be used by many classes of aircraft. Another Avionics Lab program concentrates on the important and promising area of mechanized software production. Mechanization attacks the roots of software costs—the large numbers of programmers needed to write computer programs.

The interconnected programs that have been outlined are all directed to a single goal—reducing avionics cost and proliferation. Their payoff to the Air Force in the next two decades will be significant. The commercial market has demonstrated that sophisticated technology can be packaged in small size to perform complex functions at extremely low cost. The four-function pocket electronic calculator, selling for less than $20, is a prime example of what can be done in less than a decade. Only six years ago, a mechanical calculator weighing tens of pounds and costing $800 was needed to perform the same four mathematical functions.

The Air Force Systems Command RDT&E program is dedicated to solving the challenge posed by high-cost avionics and to providing the Air Force operational commands the ability to carry out their missions at reasonable costs. ■

Automating the Crowded Sky

BY RAYMOND G. BELANGER
DIRECTOR, AIR TRAFFIC SERVICE, FAA/DOT

The author discusses expanding electronic systems that help manage a growing volume of air traffic, plans for sharing military and FAA control facilities, and some air traffic control requirements of the next twenty-five years.

FLYING was a lonely business in the early days. Few private pilots had radios, and, for those who did, the information available was meager. Instead, pilots relied heavily on familiar visible landmarks for direction. Railroad tracks, roads, rivers, and towns below were as critical as the compass. Flying by night—what little there was—was even more of an adventure.

As air travel burgeoned, navigation had to keep pace, and primitive devices were abandoned for more sophisticated methods. The federal government got into the operating end of the air traffic control business in 1936 when the Bureau of Air Commerce took over the airway traffic control centers at Newark, Chicago, and Cleveland. Up to that time, the centers were run by private airline companies.

Today, the Federal Aviation Administration has about 25,000 persons involved in operating the National Airspace System. Most are controllers or flight service specialists at the twenty-five en route traffic control centers, some 400 airport towers, and 300 flight service stations in the fifty states, Guam, Panama, and Puerto Rico. These form the heart of the system that we loosely call "air traffic control." There are three basic functions of the system: surveillance, communications, and control.

The air traffic control system is used by 2,600 air carrier aircraft and some 20,000 military aircraft. The biggest customers, however, are the 150,000 private, nonairline aircraft that, for want of a better term, we lump into the category of "general aviation." These range from company jets to air taxis and smaller propeller-driven craft used by farmers to spray their crops.

Two sets of federal regulations control the operation of all aircraft. There are visual flight rules (VFR) that a pilot can use when visibility is good. When weather conditions are not suitable for visual flight, pilots are required to fly under instrument flight rules (IFR).

Until the end of World War II, civilian aviation traffic control was restricted to radio communications between the pilot and the controller. The controller jotted down on narrow strips of paper the latest time and altitude data, and his basic job was to make sure that the "flight strips" showed no two aircraft at the same altitude at the same time.

Following the war, air traffic control moved into its second generation with the introduction of radar. There was primary radar—electronic ground-based equipment. Later, secondary radar was introduced. It was developed by the military during World War II to identify targets as friendly or hostile. Secondary radar requires both ground and airborne equipment. The ground transmitter sends a coded signal that is picked up by a transponder (or receiver/transmitter) in the aircraft, and the aircraft response produces a brightening of the blip on the scope.

Those remained the heart of the basic system until the late fifties, when the introduction of commercial jets and the tremendous growth of aviation forced the government to think ahead to the air traffic control needs of the 1970s and eighties.

The National Airspace System

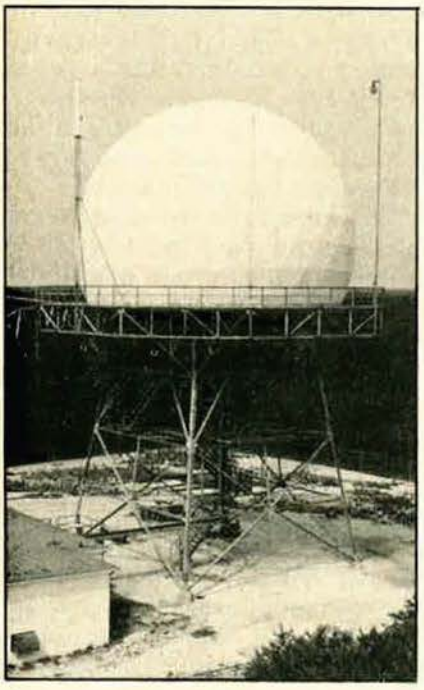
Controllers were spending increasingly more time in clerical chores and were being diverted from their primary job of separating traffic. They were still writing out data longhand on paper strips, moving plastic markers by hand to give aircraft identity and altitude. They kept in their heads other data on the aircraft they were working and had to

make mental calculations on the precise time to hand off aircraft to another sector or facility. All this went on in the midst of almost continuous radio communications between controllers and pilots and among controllers themselves.

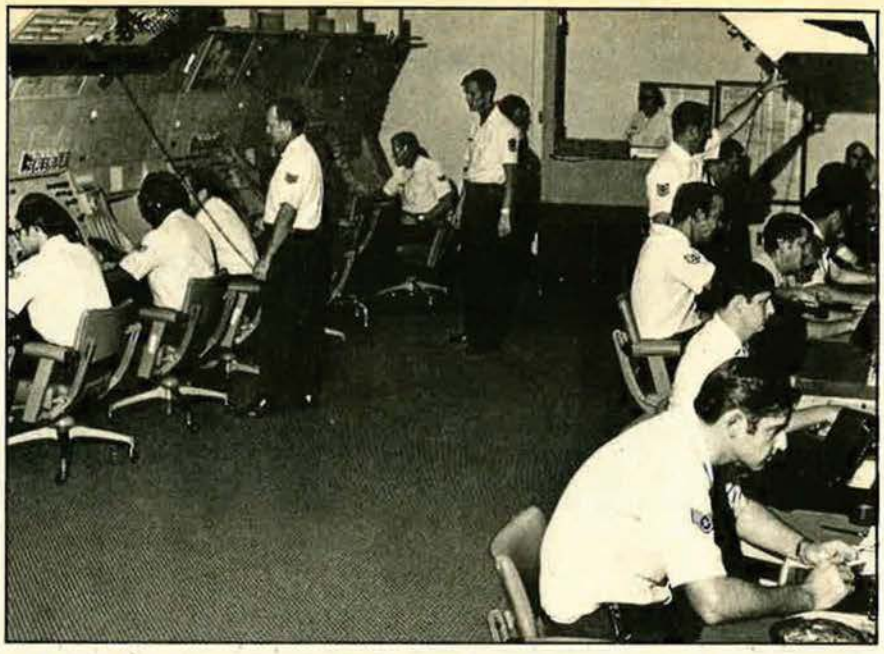
Clearly, the solution was not the addition of more and more controllers. It was wisely decided that the future lay in some form of automation that would free the controllers to do the tasks they were supposed to do. That decision led to a third-generation air traffic control system that began in 1970 with the introduction of semiautomated computerized systems in twenty of the centers within the forty-eight contiguous states and sixty-three of the busiest airport terminal areas.

Air Route Traffic Control Centers (ARTCC) are responsible for controlling IFR aircraft. An airliner flying from Denver to Salt Lake City, for example, is under the "control" of the center at Longmont, Colo., then the Salt Lake City Center, until about thirty-five miles from Salt Lake City, when it is handed off to radar approach control at Salt Lake City International Airport. A coast-to-coast flight can involve as many as eight centers.

The semiautomated system for centers is called NAS Enroute Stage A, for National Airspace System, Stage (or phase) One of an expandable system. NAS Enroute Stage A, to be fully installed later this year, had to be introduced gradually. First of all, controllers accustomed to the old methods had to get used to the system, both in terms of training and personal acceptance. The sheer magnitude of the project made it impossible to introduce it in one step.



FAA provides air route surveillance with the help of long-range radar systems such as the one shown above.



USAF-operated RAPCON (Radar Approach Control) facilities, such as the one shown here, often serve military, commercial, and general aviation aircraft. Joint use of USAF and FAA radar facilities started in 1959.

The first phase concentrated on automating the processing of flight data strips that had been consuming so much of the controllers' time. A flight plan can now be filed into the computer at the center or from such remote sites as flight service stations or military operations offices. Fifteen to thirty minutes before a plane is scheduled to take off, the computer calls up the flight plan and automatically prints out a flight data strip on a printer located at the console where the controller works.

Since each center controls a vast amount of airspace—often as much as 100,000 square miles—it is divided into sectors. As the flight moves from one sector to another, the computer automatically prints a flight data strip for the next sector just before the flight enters that area of control. This same process takes place when one center is ready to hand off a flight to the next center or approach control facility. Computers talk directly to computers, and the controllers are spared a time-consuming chore.

If a flight plan changes, a controller can punch that change directly into the computer by means of a small keyboard at the console. He can also call up information stored in the computer.

The flight data processing phase of the program has been completed at all twenty domestic centers.

The next phase—radar data processing (RDP)—is scheduled for completion this August when the Miami and Boston Centers' NAS Enroute Stage A go fully operational. Essentially, RDP refers to readout on the controller's scope of aircraft identity, altitude, and other vital flight data. This is presented in alphanumerics (letters and numbers) that appear in the form of a tag next to the target.

The controllers no longer have to get the aircraft's identity and altitude, note that data on the plastic markers, and move them across the scope. Aircraft tracking is done automatically for those aircraft equipped with a 4096 code, altitude-reporting beacon transponder. (The 4096 indicates the number of different codes available.) Aircraft not equipped with the appropriate transponder can be tracked, too, but altitudes are not reported automatically.

The NAS Enroute Stage A performs such other important functions as automatic coordination, handoff, and checking for erroneous or illegal flight plans.

The coordination and handoff capability is particularly important since it eliminates much of the telephone conversation formerly required to transfer a flight to another sector or facility. Now, when an aircraft approaches the boundary of a sector, a portion of the data tag begins blinking and continues until the controller accepting responsibility for the flight pushes a button that tells the computer the handoff has been made.

In addition to the computers and display assemblies, the NAS Enroute Stage A requires radar digitizers located at long-range radar sites to convert the raw data and the responding signals from the airborne transponders into language the computer can understand. One digital message is prepared for each target detected during each rotation of the antenna and is transmitted to the centers by telephone lines or microwave towers.

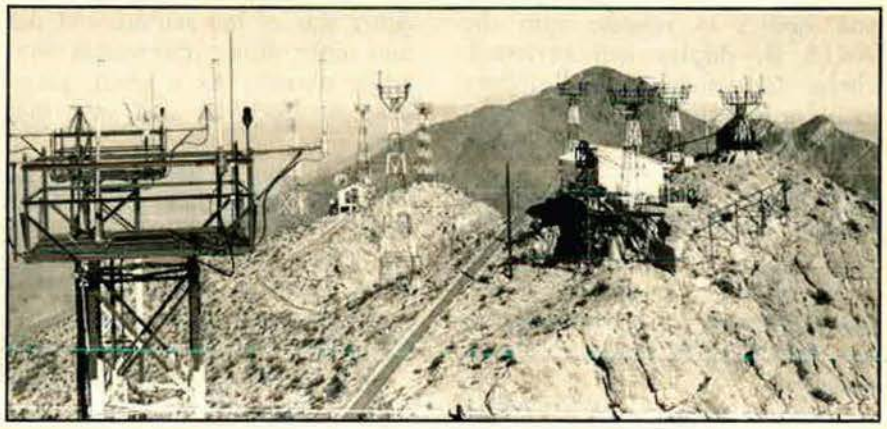
Joint Civilian/Military Use

Certain long-range radars used for en route traffic control are also used by the military for air defense control and surveillance activities. The desirability of joint civil/military use—for economy and efficiency—was recognized as early as 1947, but it was not until 1959 that the US Air Force and the FAA started using radars jointly. Last year, that program took another step with the announcement of plans for the transition of many radar units to FAA ownership, phasing out others, and eventual joint use of forty-three FAA-operated sites. Under the plan, the Aerospace Defense Command and the FAA will share ground-based radar, but their missions will continue to be handled separately—air traffic control by the FAA's en route centers, and the ADC surveillance and control activities by the five Region Operations Control Centers.

A single military height-finder radar will be located at forty-two of the FAA sites and the remaining site will provide surveillance data remoted via telephone circuits. The height finders will be maintained by FAA, but operated by seven-man military crews. By 1978, ADC plans to relinquish ownership of all but four of its long-range radar units. The four it retains will cover the areas along the US coastline that are not adequately covered for military purposes by the FAA network.

Not only the radar, but the operations at FAA centers are important to the Air Force mission. In all-out war directly involving the US, the FAA would cease to be a civilian agency and become an adjunct of the Department of Defense.

In Korea and Vietnam, the military had to be ready to operate en route air traffic control facilities. The FAA has a training program in center operations for USAF personnel. Currently, forty-eight enlisted persons and four officers are being trained at the Kansas City, Seattle, Denver, and Fort Worth Centers.



FAA's RCAG, such as this facility near El Paso, Tex., provides remote air-to-ground communications and consists of an unmanned transmitter/receiver system.

ARTS III Terminal Operations

The counterpart of NAS Enroute Stage A for terminal operations is called ARTS III, the Automated Radar Terminal System. While it does not now have as many features as NAS Enroute Stage A—simply because it doesn't need them—it, too, is modular in design and expandable. Like Stage A, it relieves controllers of tedious and distracting bookkeeping tasks that plagued them under the old manual system. There is alphanumeric display of aircraft identity, altitude, and estimated ground speed for transponder-equipped aircraft. This last feature is very important in congested terminal airspaces.

FAA is already developing software additions to the ARTS III. Earlier this year, a minimum safe altitude warning system was demonstrated at Stapleton International Airport in Denver. Basically, it is a system that alerts the controller whenever an aircraft descends or is predicted to descend below a safe altitude. When an unsafe condition is spotted, a sound alarm is triggered and the data tag next to the blip identifying the trouble-bound aircraft starts blinking. The controller immediately radios the pilot to warn him that he's too low. The only hardware the aircraft needs is an altitude-reporting transponder.

Work is under way on other additions to the ARTS III, including primary radar tracking and techniques to assist controllers in sequencing arriving planes and permitting closely spaced approaches and landings.

Once these features are added, the FAA will be able to make relatively minor modifications to the ARTS III-A (or enhanced ARTS III) that will produce major benefits for other nearby terminal facilities including military radar approach control facilities—RAPCONs, as the Air Force calls them, or in Navy parlance, RATCCs. By means of digital communication lines linking the ARTS III unit with a nearby RAPCON (fifty miles or less), these nonautomated facilities can enjoy all the benefits of the ARTS III, *e.g.*, alphanumeric display of aircraft, altitude,

The author, Raymond G. Belanger, is Director of the Federal Aviation Administration's Air Traffic Service. A World War II B-17 pilot, Mr. Belanger has been with the Civil Aeronautics Administration and its successor, the FAA, since 1946 as a controller, planner, Chief of the ATC Systems Programs Division, and Deputy Director of Air Traffic Service. In 1966–67, he attended the Air War College at Maxwell AFB, Ala.

and beacon code; automatic handoff, etc.; and the taxpayers will be spared the enormous costs of separate computers and additional airport surveillance radars.

Remote sites will need only the appropriate communications lines and buffers to operate with the ARTS III display and keyboard. Under this arrangement, military facilities lose no flexibility or independence. They, too, can make flight plan changes and recall stored data directly, merely by pushing buttons. As many as forty military sites—already slated by DoD for major equipment upgrading—are being considered for participation in the ARTS III-A "umbrella" program.

There is another system similar to and compatible with the ARTS III—called ARTS II—that is particularly suited for terminal areas with medium- or low-density traffic. The basic difference is that ARTS II cannot track aircraft (it simply associates aircraft identification with beacon code and radar blip) nor does it display estimated ground speed. However, the design is modular and can be readily upgraded to the ARTS III level. FAA has ordered sixty-nine of them and several will be installed in military radar approach control facilities starting next year.

Microwave Landing System

Takeoffs and landings, particularly in bad weather, remain the most critical aspects of flying. Landings at larger airports have been aided for some years by the instrument landing system (ILS). This device, located at the end of the runway, sends out a narrow radio beam that is picked up by a plane several miles out to help it make a safe approach and landing. Its major disadvantage is the narrowness of the beam that spreads out about three degrees on either side of the runway and permits only direct approaches to a single runway. As a result, planes have to stack up and wait their turn.

The ILS is also unsuited for areas with surrounding hills or buildings; its radio waves (VHF-UHF frequencies) bounce off objects and can give pilots erroneous information. Thus, it can be used only at airports in flat areas.

To help alleviate these problems, the US and other countries have been developing microwave landing systems (MLS). By throwing out a broad beam as much as sixty degrees on either side of the runway, the MLS will permit segmented or curved approaches. It will also allow closer spacing of parallel runways and thus increase airport capacity. Microwave transmission also gives a much more precise signal than lower-frequency radio, and the deflection problem will be virtually eliminated.

In addition to the boon it will be for civilian airports, the MLS will come in smaller, portable models for quick set-up and take-down at temporary airfields, which should make it especially attractive to the military.

Earlier this year, the US selected its MLS candidate—the Time Reference Scanning Beam Technique—that will compete next year with the choices of other member countries of the International Civil Aviation Organization (ICAO) for the MLS international standard.

The MLS is expected to be around up to the year 2000 or beyond to help eliminate the approach and landing problem that today accounts for about forty percent of all US civil aviation accidents.

The Next Twenty-five Years

But what about the rest of the air traffic control system? What will it be like twenty-five years from now? The question takes on some urgency in the face of predictions that all facets of air activity, including en route and terminal traffic, will increase five to seven percent a year.

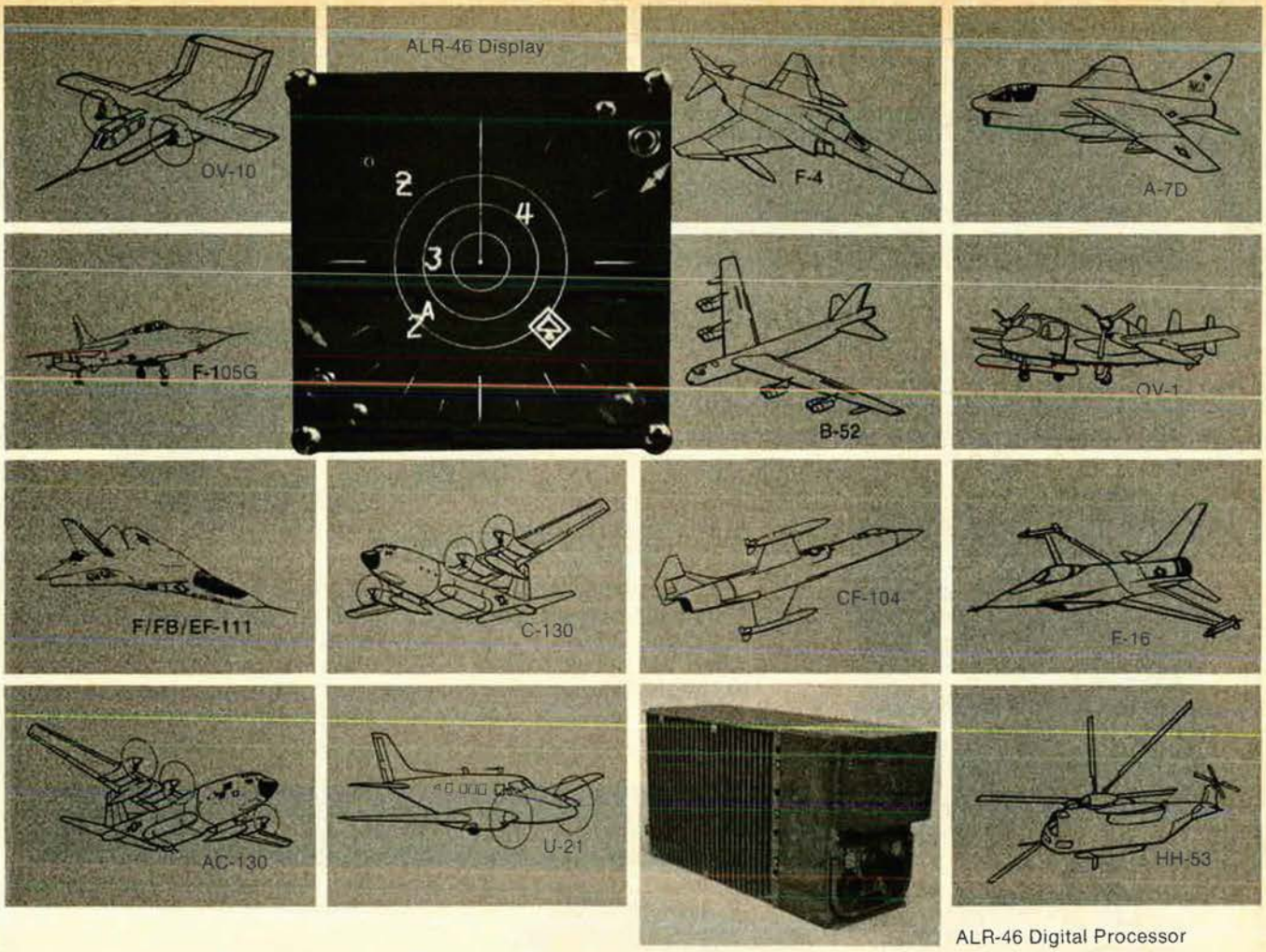
FAA has examined several alternatives for the future, including a proposal to scrap the present set-up and start a new system based on a constellation of satellites for surveillance, navigation, and communications. The advantages, such as complete coverage by a single coordinated system, were outweighed by fear of excessive reliance on a single system and the enormous initial capital costs for both ground and airborne equipment.

Instead, the FAA decided to upgrade the present "third generation," the heart of which will be the NAS Enroute Stage A and ARTS.

Satellites, however, will have a part in the upgraded third generation (UGR3RD) for relaying voice and data-link messages to and from transoceanic aircraft. Last year, the US reached an agreement with Canada and the European Space Research Organization (ESRO), representing nine European countries, for an AEROSAT program of two satellites over the Atlantic. Launching is expected to begin in mid-1978.

In general, increasing the National Airspace System's capacity while improving safety are the focus of the UGR3RD, since the amount of airspace and the number of airports will obviously not increase at the same rate as aviation activity.

One of the more predictable problems likely to occur in more crowded airways, unless something is done, is an increase in the number of midair collisions between controlled and noncontrolled aircraft. That is one of FAA's priorities, and we are working on a ground-based sys-



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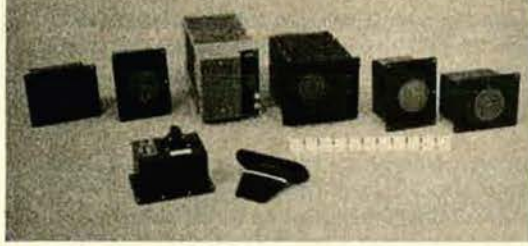

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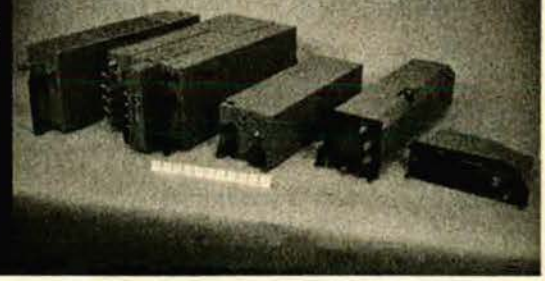

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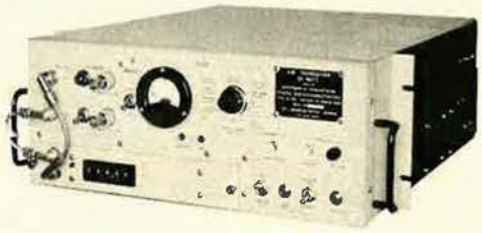

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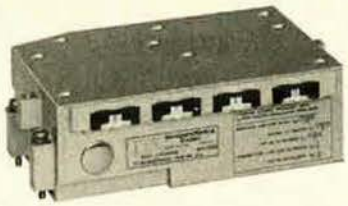

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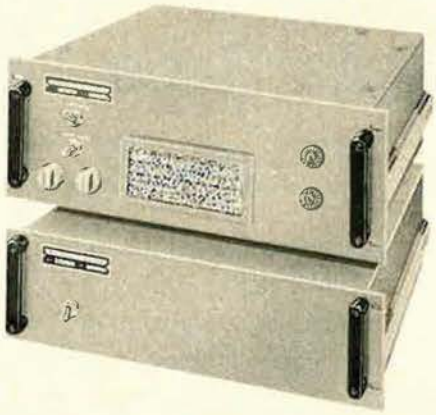

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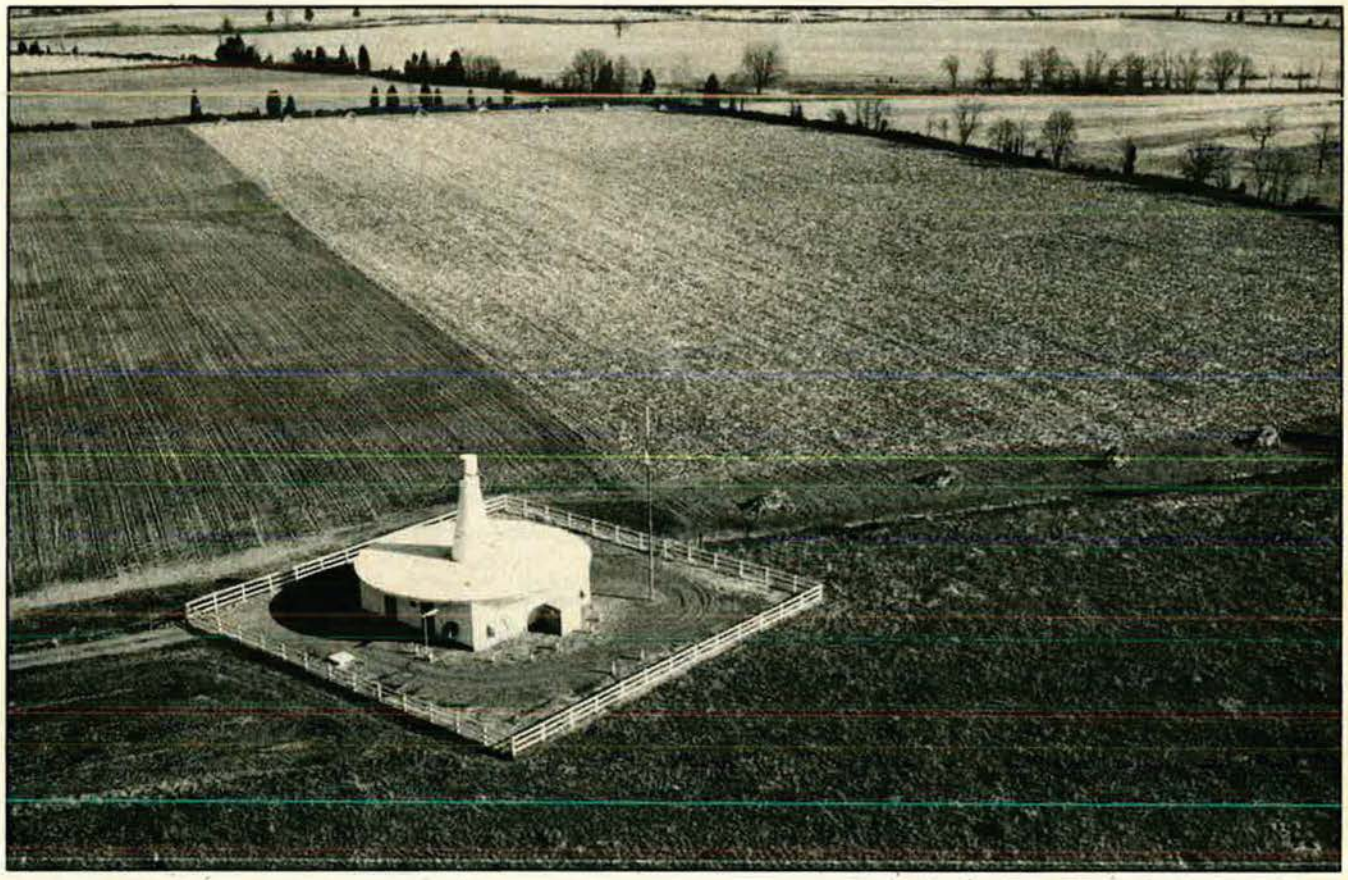
tem called "intermittent positive control." It will maintain surveillance on all aircraft—controlled and non-controlled—and will automatically transmit instructions when airplanes are posing a threat to each other.

Related to that is the need to improve the current method of communicating with beacon-equipped aircraft. The present beacon system is sensitive to responses outside its own main beam, with the possibility of garbled replies from two aircraft within the interrogation beam and at the same slant-range, although separated in location and altitude. Prototypes of discrete address beacon systems (DABS) are being tested to help eliminate that problem.

FAA is also testing improved methods of airport surface traffic control and is looking for solutions to the problem of turbulence in the wake of large aircraft. This latter problem presents a hazard to smaller trailing airplanes and prevents closer spacing of arriving and departing traffic. The en route airways and routes within terminal control areas will also be restructured. Now, the airways are straight-line segments defined by the radial branches of the navigational aid system, VORTAC. Eliminating that restriction will allow more direct routes and give more flexibility and capacity to the airways system.



Navigation aid known as VORTAC, for very high frequency omnirange station equipped with ultra-high-frequency tactical air navigation aid, provides pilots with position and direction information.

Automation will necessarily assume an increasingly larger role in the future of air traffic control, with people continuing to be a central part of the system but less occupied with manual functions. For example, the FAA currently operates a network of 400 Flight Service Stations (FSS) around the country, from which general aviation pilots (the principal users) can file flight plans and obtain weather briefings and other flight information.

The FAA is developing an automated FSS system to replace the present person-to-person preflight briefings of weather and NOTAM information. These computer-generated briefings will be received by touch-tone dial telephone, selective phone numbers, or in some cases directly by computer terminal. Flight plan filing and other FSS functions will also be automated, leading ultimately to a system capable of providing more timely and accurate preflight and in-flight information and flight-plan handling than was possible in the manual system.

This is a brief profile of what we expect air traffic control to be twenty-five years from now. But predicting the future is an inexact science, and forecasting what aviation and its needs will be by the turn of the century is no exception. Yet, the future is insistent in its demands for answers—even if these must be modified later.

The best responses are those based on solid planning that promise to do the best job at the lowest possible cost and with enough flexibility to accommodate the unpredictable. The "upgraded third" has all these ingredients and will bring us to the twenty-first century still enjoying the safest and most efficient air traffic control system in the world. ■

With the power of our F100 engines, the F-15 has climbed

And that's only one of eight time-to-climb world records the McDonnell Douglas F-15 achieved in a special test program. A test program in which it demonstrated its capability to intercept any known fighter threat at extremely high altitudes.

The records set by the F-15 were for altitudes of 3,000, 6,000, 9,000, 12,000, 15,000, 20,000, 25,000 and 30,000 meters. And they produced some interesting statistics. In the 3,000 meter flight, the F-15 lifted off the ground in only 400 feet—about seven airplane lengths. In the 6,000, 9,000 and 12,000 meter flights, the F-15 reached the speed of sound only 19 seconds after take-off. The aircraft also reached a target altitude of 15,000 meters in just over 77 seconds—about 10 seconds faster than the Apollo moon shots.

to 7 miles in less than 1 minute. Almost straight up.

This record-setting flight program once again verified the basic design, performance and reliability of the aircraft and its two Pratt & Whitney Aircraft F100 turbofan engines which operated within their normal limits and performed superbly at all speeds, altitudes and attitudes.

The F100 is also the powerplant for the new General Dynamics F-16. And for both aircraft, it provides a thrust-to-weight ratio of greater than one, enabling them to accelerate even while in vertical flight. Further proof of the proud performance we build into every engine.

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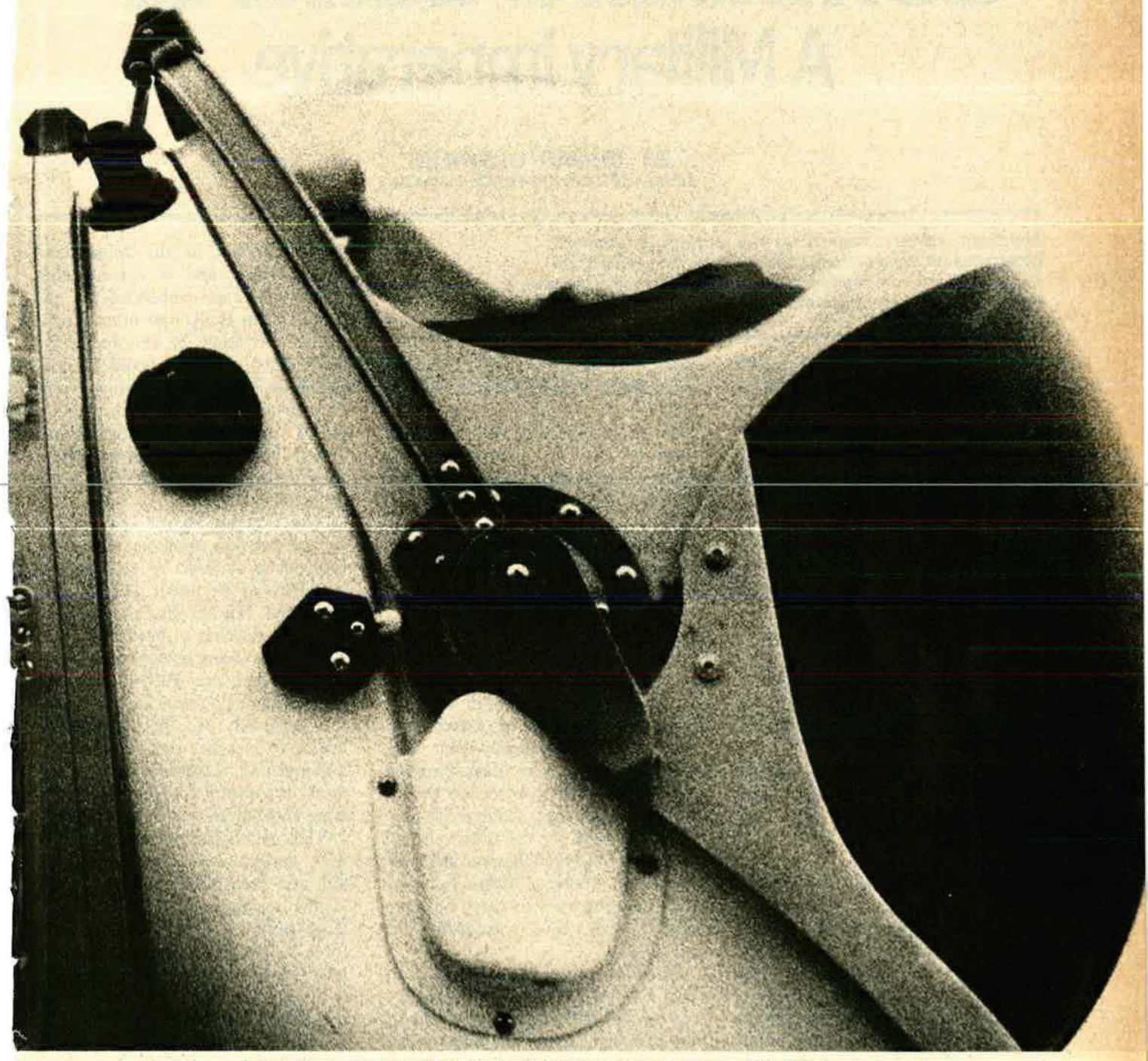

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THE ELECTRONIC AIR FORCE

Survivable Command Control— A Military Imperative

BY EDGAR ULSAMER
SENIOR EDITOR, AIR FORCE MAGAZINE

The chain of diverse capabilities that provides US strategic deterrence is only as strong as its weakest link. Here is the Pentagon's plan for modernizing its C³ systems to meet even the most stringent demands of the future.

IN AN era of flexible deterrence, translating decisions into deeds takes a complex, global command control and communications (C^3) system that is responsive, survivable, and versatile. The Defense Department's FY '76 budget request allocates $3.5 billion for the continuing development and operation of such a network. About forty percent of this money is allocated to research, development, and procurement, with the remainder going to operations, maintenance, and personnel, according to the Pentagon's Director of Telecommunications and Command and Control Systems, Thomas C. Reed. The C^3 portion of this year's budget is about sixteen percent, or $500 million above the comparable figure for last year.

Seafarer ELF

Communications systems operating in the extremely low frequency (ELF) range appear to be the only means for linking the three components of the strategic Triad through a single, central C^3 system, Mr. Reed said. ELF is virtually immune to high-altitude nuclear bursts that can disrupt transmissions in other frequency bands because its great wavelength tends to keep signals from being affected by the ionospheric disturbances caused by such explosions. But the overriding merit of ELF is its ability to communicate with both SSBNs (ballistic missile launching submarines) and SSNs (attack submarines) while they "stay at depth and run at operating speeds," Mr. Reed told AIR FORCE Magazine.

ELF penetrates seawater twenty times deeper than currently used VLF (very low frequency) transmissions. The present procedure is to keep SSBNs at depth "but to have them come up to receive communications periodically—but that may mean hours or days between messages. But in a crisis, we should be able to tell them instantly to execute option X. In the future, it will be absolutely vital that we have the ability to transmit instructions to the operating subs to carry out specific orders *now*," according to Mr. Reed.

Because of its survivability, an ELF C^3 system is also attractive for use by the other two components of the strategic Triad, he added. Receiving antennas could be installed relatively economically at the launch control centers of the Minuteman ICBM force, and it appears that patch antennas embedded in the skins of the B-52s and other strategic aircraft might be able to receive ELF. Such a system could be coupled with a hardened command post to provide the United States with a single, survivable communications system linking all strategic forces, thus replacing many of the present separate networks.

The Defense Department's plans to develop an ELF system were changed as a result of recent reassessments of the threat, according to Mr. Reed. The Navy's Sanguine program to develop a hardened ELF system has been scrapped in favor of Seafarer, a new ELF design with no hardening. Sanguine provided for thousands of miles of antenna buried in trenches three to five feet underground, combined with hundreds of transmitters encased in concrete and buried tens of feet deep.

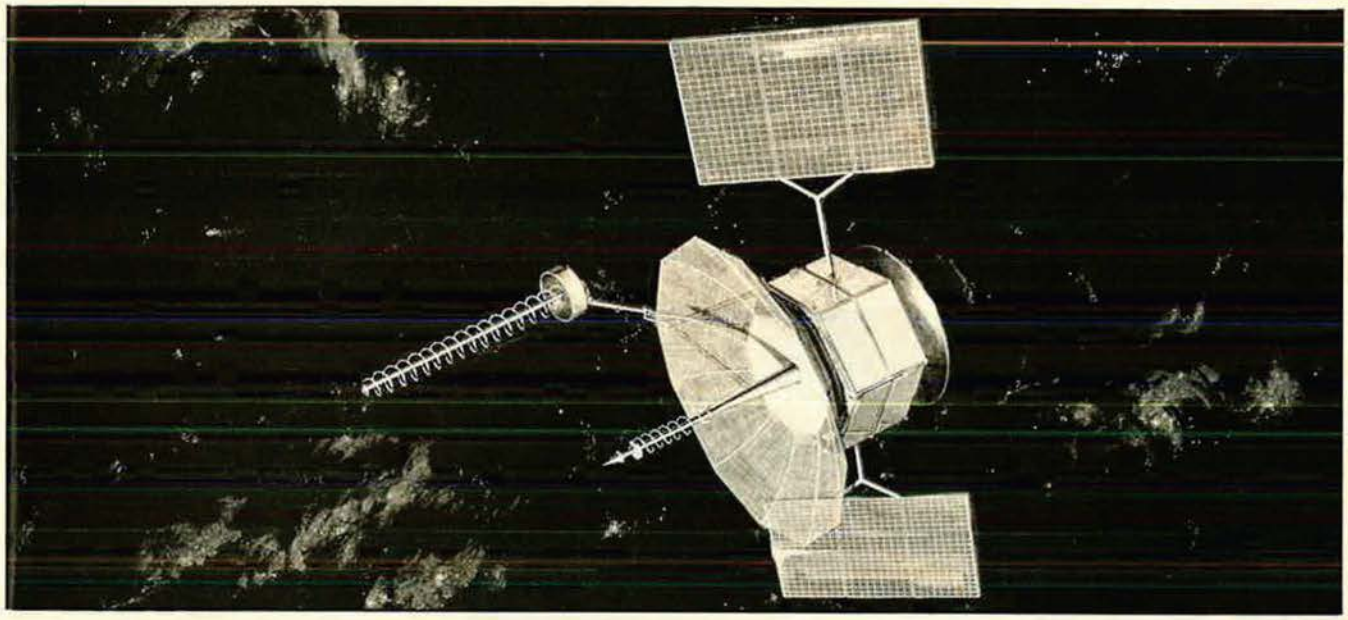
The underlying notion was that with hardened, dispersed transmitters and then-postulated low Soviet ICBM accuracy, it would take a large portion of the Soviet missile force to put Sanguine out of commission. But these assumptions are no longer credible, Mr. Reed told AIR FORCE Magazine: "Their CEP has improved and they have started to MIRV their ICBMs. So, even with transmitters hardened to several

thousand psi, it would, under the new conditions, take only a relatively small portion of the Soviet force to launch an attack with reasonable probability that Sanguine could be seriously damaged or destroyed."

This realization, however, in no way negates the need for an ELF system. "As we go into the 1980s and 1990s, more and more countries will have nuclear weapons and thereby increase the possibility of nuclear exchanges. We want to be sure that in such an event we remain operable. Our knowledge of nuclear effects on communications is limited, since there have been no US tests of high-yield detonations in the atmosphere. But we do know that, far and away, ELF is the most survivable approach, not just in terms of signal but also because it uses such large antennas that the system is intrinsically quite invulnerable," according to Mr. Reed.

ELF's advantages, recent Pentagon studies concluded, can be exploited without hardened and redundant transmitters and at about a third the cost of Sanguine through a "surface-soft" system called Seafarer. In place of hundreds of hardened transmitters, Seafarer will use between four and six soft transmitters while retaining Sanguine's antenna arrangement essentially unchanged. "Seafarer gives us two of Sanguine's three advantages at one-third of its cost," in Mr. Reed's opinion.

At the same time, the Defense Department sees the need for a fully survivable system in the decades ahead and is formulating concepts for a superhardened ELF, identified as SHELF. While Seafarer would be adequate for nuclear conflict not involving massive, direct attack on the US heartland, SHELF must be able to cope with an all-out attack.



The US Navy's Fleet Satellite Communications System (FLTSATCOM), under development by SAMSO and TRW Systems Group, is scheduled for first launch next year. Operating in geosynchronous equatorial orbit, it will furnish worldwide UHF communications for ships, aircraft, submarines, and SAC.

SHELF, as presently envisioned, would have an antenna dozens of miles long and superhardened transmitters, both buried at a depth of thousands of feet, according to Mr. Reed. A DSARC (Defense Systems Acquisition Review Council) meeting is scheduled for early in 1976 to examine the high cost of drilling a very deep tunnel dozens of miles long, and to decide where to locate Seafarer. Two sites are under consideration—the White Sands missile range in New Mexico and the Nellis test range in Nevada. Other areas may enter the competition if local authorities decide that they want Seafarer, according to Mr. Reed.

An ELF test site in Wisconsin has been in operation for some time. ELF receivers for SSBNs and SSNs are being developed by Sylvania GTE and should be installed, ready for initial operational testing, in 1976. By the time of the 1976 DSARC meeting, enough ELF testing information will be available to support the council's decision whether Seafarer should enter full-scale development.

The E-4 Advanced Airborne Command Post

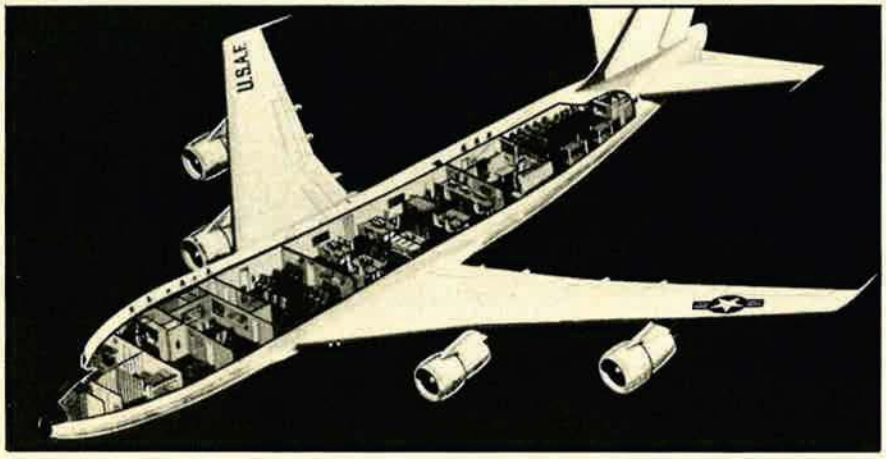
In December 1971, the Defense Department named the Air Force executive agency for developing an Advanced Airborne Command Post. The new aircraft is a replacement for the EC-135 National Emergency Airborne Command Posts (NEACP), normally operating from Andrews AFB near Washington, D. C., and of SAC's Looking Glass airborne command posts. The advanced system is needed because the EC-135 is too small, especially for the NEACP on-board electronic systems. The EC-135 also lacks nuclear hardening and is limited in the time it can stay airborne.

NEACP's mission is to assure that the National Command Authorities or their alternate successors have command control and communications during a nuclear conflict. Equipped with auxiliary power, the Advanced Airborne Command Post can either move to remote sites or, with aerial refueling, remain airborne for more than seventy-two hours, the currently envisioned maximum duration of an all-out nuclear

exchange. The command post must enable the President or his successor to make the decisions required by the US policy of flexible options. "This means thinking, this means conferences, and this means staff. The EC-135s can't accommodate these requirements and, realistically, would permit the NCA no more than a yes or no decision," Mr. Reed told this reporter.

In 1972, the Air Force selected Boeing's 747, modified with GE engines and reconfigured by E-Systems of Greenville, Tex., as the E-4 Advanced Airborne Command Post. Seven aircraft were to be procured for $556 million.

The first phase of the E-4A program, designated 1-A, involves adapting three aircraft to the NEACP mission. E-Systems has removed the C^3 packages from three EC-135s, installed them in the E-4As, and made other minor modifications. Phase 1-A is almost completed—and within forecast cost—with the first E-4A now operational, the second at Andrews AFB, and reconfiguration of the third nearly finished.



E-4A Advanced Airborne Command Post provides both the space and the facilities needed for unencumbered decision-making by national leaders.

Phase 1-B calls for acquisition of a fourth 747 (with the option of buying three more) and developing an advanced, optimized C^3 package. Boeing has had difficulties with the C^3 package and "appears to be badly overrun," Mr. Reed told AIR FORCE Magazine. The Air Force and the Joint Chiefs of Staff are currently conducting a four-month review of Phase 1-B in concert with staff experts from the Office of Telecommunications and Command and Control Systems. The Pentagon is vitally concerned with the E-4's role in the World-Wide Military Command and Control System. (The latter is the nation's central C^3 system extending from the White House to the Unified and Specified Commands and serves to implement the Single Integrated Operational Plan, or SIOP.)

The current review, to be completed by August 1, is not confined to engineering matters, but "examines the basic requirements of the system, including all command and control equipment. Items that are not absolutely essential to the Advanced Airborne Command Post's principal mission will be eliminated to reduce costs. Since the entire program was originally based on a design-to-cost approach, we don't yet know how many aircraft we can afford. We expect, however, that the total program cost, except for the inflation factor, will be very close to the $556 million figure of the initial estimate," Mr. Reed said.

The Defense Department, he added, "is looking very closely at whether we really need seven airplanes. We recognize that in part the requirement for seven E-4s stems from contingency planning involving failures or other problems of the first four airplanes. These contingencies are based on low probabilities, and it appears now that we could fall back on part of the EC-135 force, if necessary. Of course, a decision that we don't need all seven airplanes now doesn't necessarily mean we might not need them a few years from now."

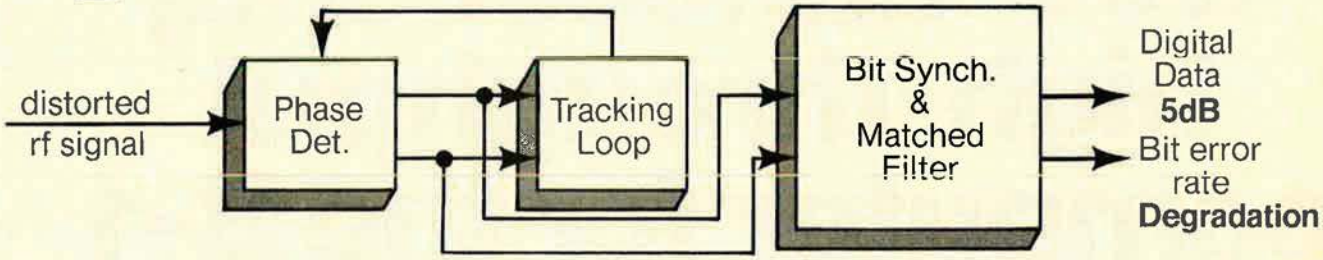
The final phase of the E-4 program, called Block II, involves developing an Automatic Data Processing (ADP) capability aboard the aircraft. The E-4s' ADP must be compatible with WWMCCS and its Minimum Essential Emergency Communications Net (MEECN). How much computational capability should be aboard the aircraft, how reliable links with ground-based WWMCCS computers would be during a nuclear exchange, and how to assure interoperability between the E-4s' computers and those on the ground are questions that will be probed late this year. They are "very difficult problems," according to Mr. Reed.

Survivable, Jam-Resistant Satellites

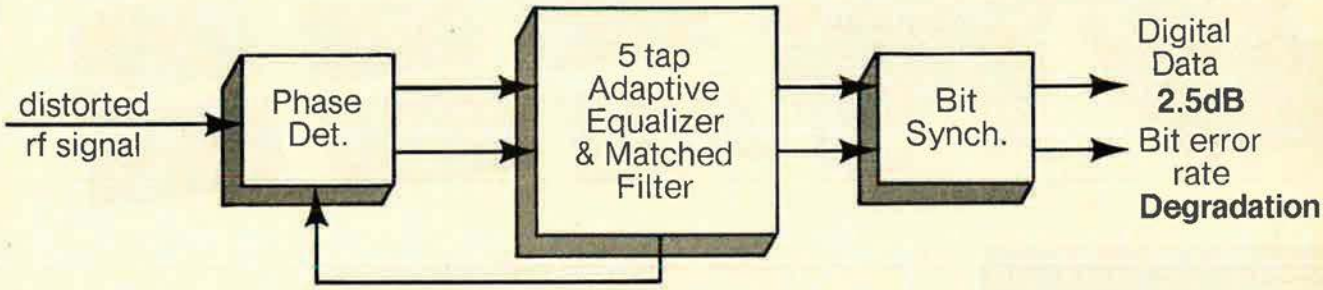
Communications satellite programs account for about a fourth of the Pentagon's C^3 R&D budget. DoD's principal program, with the Air Force as executive agency, is DSCS, the Defense Satellite Communications System. It is a high-capacity, super-high-frequency system that will provide jam-resistant voice and data transmissions for WWMCCS. Two DSCS II satellites were launched late in 1973 and are now operational, serving the Atlantic and Pacific theaters. Another two were to be launched this spring but failed to achieve orbit. A contract for an additional six Phase II DSCS satellites was let last year and they will provide an adequate number of satellites to achieve and maintain global coverage until the next generation of satellites becomes available.

A higher volume, more jam-resistant system, DSCS III, is planned for the early 1980s. After consulting potential contractors, the Defense Communications Agency plans to issue requests for proposal (RFPs) to industry this year, according to Mr. Reed. While some performance features of DSCS III are not yet defined, key concerns focus on available power, bandwidth, and directional antenna designs, the pivotal elements of jam-resistance. Equally important is determining the traffic volume the system is likely to carry. "The DSCS II is already oversubscribed in the Atlantic. Estimating what the future requirements will be

Space Data Distortion



One-Half Off.



***State-of-the-art**... a 5-tap adaptive equalizer has been demonstrated to recover over half the degradation caused by both rf multipath distortion and dominant sources of hardware distortion."*[1]

***Background.** Adaptive equalization techniques had solved major distortion problems in handling high-speed data over land lines. But no one made the principle work in a high-data rate microwave QPSK link. We did. Successfully.*

Here's what it can mean to you.

The reduction of both distortion and cost in a wide range of high speed data systems.

The creative application of adaptive equalization and our other high technologies to the solution of data system challenges.

And right now we can demonstrate results applicable to wideband data systems at rates up to 1 gigabit per second with significant designed-in savings.

(1) Stilwell, J. H. and Ryan, C. R., Performance of a High Data Rate Adaptive QPSK Modem Under Media Distortions, paper presented June 1975.

Our experience includes 7-bit resolution, 20 megasample per second low power A-D converters, gigabit/second multiplexers and digital processors, and transmitters and receivers.

Add to this: 1) years of experience in designing advanced circuits and building hardware to exacting DoD and NASA specifications; 2) careful integration of complex functions into complete data-to-readout systems; 3) a unique I/C capability, and you get a combination unmatched in industry. With this combination, on-schedule, on-budget delivery of the most advanced high data rate systems becomes a dependable reality.

For more data without distortion on a design-to-cost budget, call or write Floyd Danielson at 602-949-3305 at Motorola Government Electronics Division, 8201 E. McDowell Road, Scottsdale, AZ 85257.

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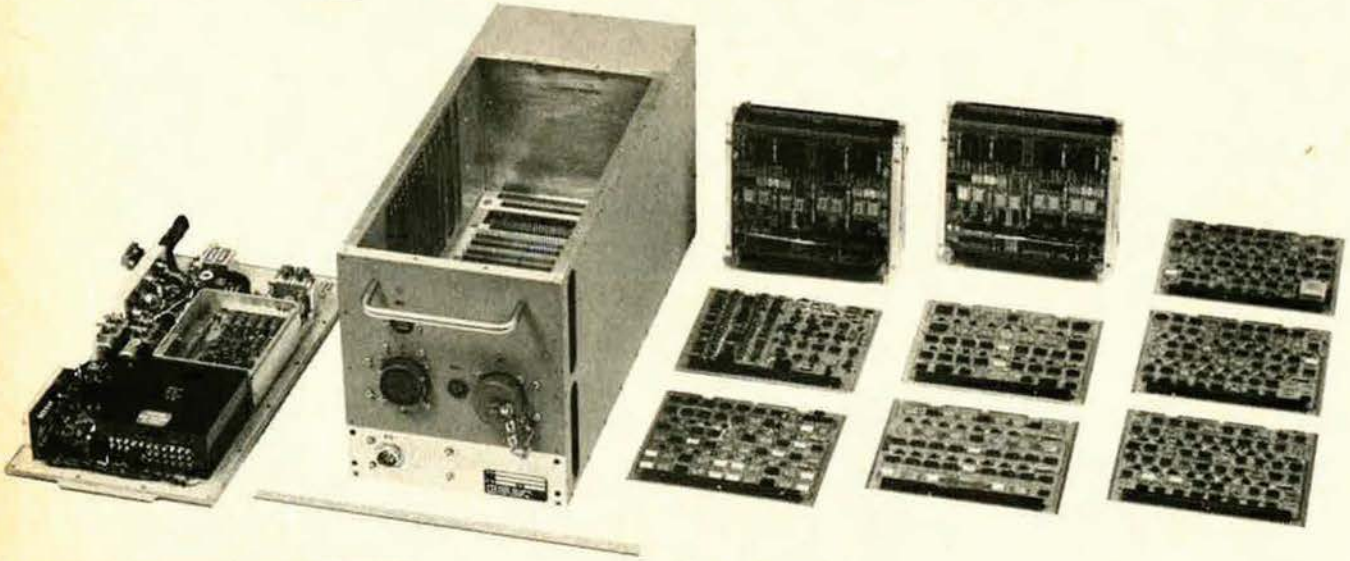
The mind to imagine . . . the skill to do

AIL selects Litton's 800-nanosecond, high-throughput computer for the B-1



Litton's low-cost LC-4516D was selected by AIL Division of Cutler-Hammer as the computer for the U.S. Air Force B-1 Defensive Electronics System. The LC-4516D has an 800-nanosecond 32K word core memory with growth to 64K words, and features 440 KOPS throughput. The operational MTBF is over 2000 hours.

AIL's selection of the LC-4516D is another vote of confidence for the GCS family of LC-4516 computers currently being applied to airborne weapon delivery, displays, ship's controls, aircraft navigation, missile guidance, and message processing functions.

Our production computers come in many shapes, sizes and performance characteristics—all cost-effective. If you have problems that a low-cost, high-performance computer can help solve, think Litton.

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is tough because we have to rely on judgments rather than concrete information," Mr. Reed said.

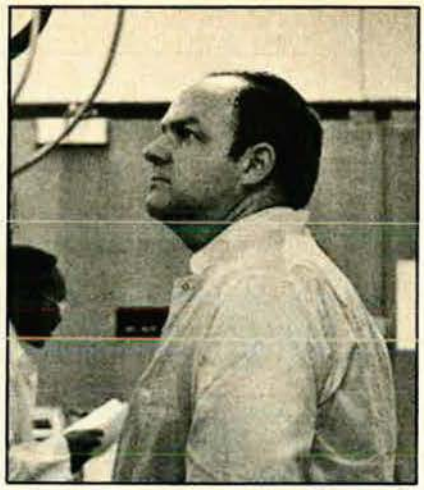
Satellite endurance affects the system's capacity significantly because increased longevity permits more stand-by systems without driving up costs. In order to encourage long-lived designs, the Defense Department hopes to emulate COMSAT's contracting technique of furnishing "in-orbit performance incentives to reward those contractors whose satellites function longer than the contract requires." The exact lifespan specifications can't be disclosed but are on the order of several years, according to Mr. Reed.

Two of the new AN/MCS-78 sixty-foot DSCS ground terminals are operational, with sixteen others under construction. By 1979, DSCS will deploy more than fifty terminals around the world to provide long-haul communication trunks for WWMCCS. Fully mobile terminals also are being developed to link up with tactical elements of the three services, including major ships.

The fall of Saigon and the associated evacuation of American citizens underscore the pervasive importance of reliable, real-time communications. During the Vietnam exodus the NCA's direct communications were limited to the flagship *Oklahoma City,* which has an SHF (super-high-frequency bandwidth) satellite terminal. There were no direct communications with the individual ships of the evacuation flotilla, Mr. Reed explained.

The present deficiency, he pointed out, will be corrected when FLTSATCOM, the Navy's new satellite communications system, becomes operational in about two years. FLTSATCOM operates in the ultra-high-frequency (UHF) band that requires only small, relatively simple antennas aboard ships, aircraft, and other vehicles.

These terminals are being installed now and will use leased channels on two COMSAT General Corporation MARISAT satellites for interim satellite relay capability covering the Atlantic and Pacific until FLTSATCOM becomes operational. The MARISAT satellites are scheduled for launch in August and October of this year. (Other key elements of the Pentagon's C^3 satellite effort are AFSATCOM and SURVSATCOM. (*See "The Importance of 'Military' Space," June '75 issue, p. 28.*)



Thomas C. Reed, DoD's Director of Telecommunications and Command and Control Systems, shown here examining Seafarer equipment, believes that ELF can serve as the single, survivable communications system for Triad.

Communications Security and TRI-TAC

The world, as Mr. Reed points out, "already is full of phone lines. We need to be able to use them securely." The Defense Communications Agency is now testing narrow-band digital voice processors having an estimated production price tag of less than $10,000 each. These machines encode the human voice into digital information that is then encrypted.

The reverse of this procedure takes place at the receiving terminal. The inherent challenge lies in eliminating redundancies of the human voice, such as tonal qualities that have no information value. Translating the redundancies into digital information saturates the bandwidth available on land lines. Recent tests show that digital processors can filter out all but the essential information contained in speech and thereby hold the digital stream to acceptable bandwidth, according to Mr. Reed.

Other work associated with the COMSEC program involves developing wide-band digital terminals for the US Army and Marines that can be carried and operated by one man, and narrow-band equipment for use mainly by all Navy ships and aircraft.

The security of US military communications was demonstrated during the evacuation of Saigon when "we maintained secure voice contact with all command posts and, indirectly, with the helicopters. If those opposing our evacuation had been able to listen in on our command net, we obviously would have had an intolerable situation," Mr. Reed told AIR FORCE Magazine.

Linked with but not a part of COMSEC is TRI-TAC, an all-services program to develop standardization or interoperable tactical equipment that can be "interfaced" with NATO communications systems. About $109 million has been requested by the three services in FY '76 for TRI-TAC development. In most instances, components are being developed by a single service for use by all.

The Air Force last year was put in charge of developing and producing a family of tactical communications control facilities under the TRI-TAC program. The basic purpose of these facilities is to connect the different communications terminals and switches to the transmission path and to furnish real-time quality control through testing, monitoring, patching, restoration, and alarm facilities for all connecting circuits and equipment.

TRI-TAC's central element is the AN/TTC-39 family of automatic switches being produced by Sylvania GTE whose "design-to-unit cost is coming in under target even though the contractor underbid the R&D portion of the program," according to Mr. Reed. The TTC-39 is a sophisticated automatic switchboard housed in two vans and compatible with COMSEC equipment. The system can accommodate both secure and open communications in either analog or digital form. The three services will use "hundreds of these systems scheduled to be operational by 1979," he said.

The array of programs in development under the aegis of OSD's Office of Telecommunications and Command and Control Systems, Mr. Reed stressed, can provide the National Command Authorities with "a central nerve system for flexible, adaptive, and survivable command and control over their military forces wherever they may be deployed." ■

The Issue:
"How to Keep Peace"

GEORGIA UNIT WINS AFJROTC CONTEST

By James A. McDonnell, AFA Director of Information

"How Best to Keep the Peace" was the theme for the Aerospace Education Foundation's 1974–75 Air Force Junior ROTC Contest. A color videotape produced by the AFJROTC unit at Forest Park High School, Forest Park, Ga., was judged the best among 128 entries from thirty-four states and dependent schools in four foreign countries.

This is the third year that the Foundation, a nonprofit affiliate of the Air Force Association, has sponsored the contest. Previous themes were "The Role and Significance of the B-1 Strategic Bomber" and "The Air Force as a Unique National Resource."

George D. Hardy, the Foundation's Board Chairman, said that although cadets had great leeway in developing their presentations, emphasis was on the interdependence of diplomacy and military power in the thermonuclear age. The purpose of the contest, he said, "was to supplement and reinforce the AFJROTC Aerospace Leadership Course by encouraging the cadets to project their findings to the public."

Secretary of the Air Force John L. McLucas announced the winning entry and the first four runners-up at a Washington reception on May 12, attended by more than 150 senior military and civilian leaders, including the Hon. John J. Flynt, US Representative from the Sixth District of Georgia.

"The events of the past few weeks," Secretary McLucas said, "particularly with respect to Southeast Asia, have promoted or accelerated a reevaluation of our nation's role in world affairs. Included in that reevaluation is a discussion of the proper contribution the military should make to peace and stability in the world. There are those who would have our nation withdraw to some degree from the center stage of world events and adopt a more isolationist viewpoint. . . .

"However convincing these arguments may appear, I believe military strength remains the essential cornerstone in keeping the peace and providing effective diplomacy. . . .

"The quality and depth of understanding displayed by the exhibits this evening indicate that the instructors, advisers, and supporters of Air Force Junior ROTC are doing a remarkable job in preparing our young people for the tough decisions of the future. Certainly we hope to see a number of these young men and women as future Air Force officers and airmen. My thanks to the Aerospace Education Foundation and the Air Force Association for their continued support of this very worthwhile program."

During the reception the winning entry was shown. Congratulatory messages were read from Georgia Gov. George Busbee, Forest Park Mayor Charles W. Summerday, County Superintendent of Schools Ernest L. Stroud, and Forest Park Principal H. W. Amick. Reading the messages was

Georgia Sens. Herman Talmadge, left, and Sam Nunn meet the winning cadets, David Hicks and Patricia White, and their adviser, Col. John W. Farr, USAF (Ret.).

The winners chat with AF Secretary John L. McLucas and Georgia Rep. John J. Flynt at an AFA reception.

the newly elected President of the Aerospace Education Foundation, Dr. William L. Ramsey, a nationally known educator and author in the field of vocational-technical and adult education, and the District Director of the Milwaukee Area Technical College *(see also p. 20)*.

Forest Park's winning presentation showed film clips of Soviet strength, with a dialogue between a male and female AFJROTC cadet concerning the need for the United States to conduct diplomatic negotiations from a position of military strength.

DR. WAYNE O. REED HONORED POSTHUMOUSLY

During the AFJROTC Contest reception, the late Dr. Wayne O. Reed, past President of the Aerospace Education Foundation, was named a Jimmy Doolittle Fellow in posthumous recognition of his contributions to the field of aerospace education. The Jimmy Doolittle Fellow Program was created to assist the Aerospace Education Foundation in expanding its pioneering work of making Air Force occupational training courses available to civilian schools. Dr. Reed, one of the founders of the Aerospace Education Foundation, was for many years an Associate US Commissioner of Education. The Doolittle Fellow Plaque was presented to Dr. Reed's widow by George Hardy, Chairman of the Foundation's Board of Trustees.

Runner-up entries formed a cross-section of contest formats. Huntsville, Ala., last year's winner, entered a sound-slide discussion opened and closed by a female cadet singing an original song with guitar accompaniment. The Atascadero, Calif., cadets' sound-slide entry was a look at peace and war through the ages, options for keeping the peace, and the probable consequences of a nuclear war with the USSR. Irmo, S. C., AFJROTC presented a television script of a US-Soviet confrontation over oil, bringing out the interrelationship of diplomacy and military might. Little Rock's Central High School unit featured an audiotape discussion of Switzerland's universal military service as a US peace-keeping option.

Preliminary and final panels of civilian and military judges evaluated the 128 presentations. It is estimated that the contest directly involved some 10,000 AFJROTC cadets, and many more times that number of parents, teachers, classmates, and local community people who learned about the Air Force through the students' involvement.

"HOW BEST TO KEEP THE PEACE"

Aerospace Education Foundation
AFJROTC Contest Winners
1974–1975 Academic Year

FIRST PLACE: Forest Park High School, Forest Park, Ga.
AWARD: A $4,000 scholarship and a distinctive plaque for permanent display by the winning unit.

RUNNERS-UP (in order)
S. R. Butler High School, Huntsville, Ala.
Atascadero High School, Atascadero, Calif.
Irmo High School, Irmo, S. C.
Central High School, Little Rock, Ark.

AWARD: Plaque for permanent display by the unit.

HONORABLE MENTION
Fort Walton Beach Senior High School, Fort Walton Beach, Fla.
The Marist School, Atlanta, Ga.
Medical Lake High School, Medical Lake, Wash.
North High School, Fargo, N. D.
Mater Dei High School, Santa Ana, Calif.
Cambria Heights Senior High School, Patton, Pa.
Iver C. Ranum High School, Denver, Colo.
Harrison County High School, Cynthiana, Ky.
Indian River Senior High School, Chesapeake, Va.
London Central American High School, London, England
Hopewell High School, Aliquippa, Pa.
Apollo High School, Owensboro, Ky.
Bellevue Senior High School, Bellevue, Neb.
Rutherford High School, Panama City, Fla.
Rutherford B. Hayes High School, Delaware, Ohio
Pine Bluff High School, Pine Bluff, Ark.
Hernando High School, Brooksville, Fla.
Anderson Union High School, Anderson, Calif.
Torrejon American High School, Spain
Pine Forest Senior High School, Fayetteville, N. C.

AWARD: Certificate of Merit

The winning unit will select from among its ranks a representative or representatives to be awarded a $4,000 scholarship for advanced education. The four runners-up will be awarded plaques for permanent display, and the twenty Honorable Mention winners will receive Certificates of Merit *(see box)*.

The top entry is to be on display during the Air Force Association's Aerospace Development Briefings and Displays held during its National Convention in Washington, D. C., next September.

Three representatives of the winning Forest Park High School were guests of the Air Force Association in Washington, D. C., May 11 through May 13: Col. John W. Farr, USAF (Ret.), the Aerospace Education Instructor; Cadet MSgt. Patricia Leah White, and Cadet SSgt. David Paul Hicks, the two cadets who engaged in the on-screen dialogue.

They toured the Pentagon, visiting Secretary McLucas; Maj. Gen. Guy E. Hairston, Jr., Air Force Director of Information; Maj. Gen. George J. Keegan, Jr., Assistant Chief of Staff, Intelligence; and Maj. Gen. Oliver W. Lewis, Director of Personnel Programs. The group also met with Georgia Sens. Herman E. Talmadge and Sam Nunn and Georgia Rep. John J. Flynt. ■

The defense budget is getting less flak than predicted six months ago. At least temporarily, recent events have aroused the public and some of their representatives from . . .

INDIFFERENCE— Archenemy of Defense

By Gen. T. R. Milton, USAF (Ret.)

Early in May, Sen. John Stennis turned up at the Air Force Academy to receive the Thomas D. White award for his contributions to national defense. The award was given at a parade. As I sat in the stands on that spectacularly beautiful Colorado morning and watched the cadets march by, all seemed as it should be.

The old Senator, miraculously recovered from his wounds, said the right and reassuring things to his audience of cadets who must wonder, from time to time, whether they really want to make a career in a profession so steadily attacked. And it was reassuring to realize that this sensible and expert man would be, as he has been for many years, a key factor in deciding perhaps the most important defense budget since World War II.

In presenting this budget, Secretary of Defense Schlesinger—another sensible and expert man—must be a source of frustration to the more dedicated defense opponents, because he makes such dispassionate good sense. Consider Schlesinger's view of the congressional options. He says, essentially, that they are as follows. Take your choice, but realize what your choice means:

- Reduce the budget by an arbitrary percentage year after year. In this way the fundamental decisions are made by default without really having to face them.
- Recognize the strong connection between our safety, interests, and foreign policy on the one hand and the size, deployment, and composition of our forces on the other. If the defense budget is to be reduced, it should be done in clear recognition that we will not be able to carry out all our responsibilities.
- The third choice is to acknowledge that in a world such as ours military power remains relevant. This choice implies general acceptance of the Administration's strategic concepts and budget request.

Only a few months ago the prospects for this defense budget seemed pretty dim. A particularly disturbing straw in the wind was a Louis Harris poll conducted last December for the Chicago Council on Foreign Relations. Two opinion groups were represented: the public, a "stratified systematic national sample of 1,513 respondents," and the leaders, drawn in roughly equal proportions from the worlds of politics, government, business, and education.

Fifty-six percent of the leaders wanted to cut defense. And while about half of the public thought the defense budget should remain where it is, forty-two percent would cut it in favor of domestic programs.

However, that was last December. In six months we have learned some of the tough verities of life in a world we can no longer view as our oyster. The final collapse in Vietnam has had its inevitable effect on the rest of Asia, to our disadvantage. And the effrontery of the Khmer Rouge in seizing the *Mayaguez* was, apparently to the nation as a whole, the final straw.

Thus, it would seem the national attitude toward defense, reflected in the current congressional budget hearings, has changed. The House Armed Services Committee, despite the recent Round Head revolt, has just favorably reported out the procurement bill. There are other indications that this year's defense requests are going to receive far less flak than they would have a few months ago. Apparently there is not even going to be a serious effort to cut the troops in Europe. There is, for the moment, at least, an apparent renewed understanding that we are part of the world and must be prepared to play a strong role in it.

The disturbing thing about all this is that it took a debacle in South Vietnam and an irrational act of piracy to turn things around. A few months ago the world was just as dangerous, in terms of American present and future interests, as it now is. It will remain dangerous for a long time to come.

There has to be a strong element of continuity in our defense planning if the strength of the United States is to be maintained down the road. The defense budget is going to be an expensive proposition for a long time to come. It is no place to go for help in funding major domestic programs, for while there is inevitably some fat and inefficiency in anything that big, it is small change in federal budget terms.

The only large source of savings—aside from the force structure itself—is in major programs—the Trident submarine, the B-1, the F-14, and F-15, to name a few. They are the basis for our national defense in the 1980s. They have earned their places in the budget, and can withstand the capricious attacks of the professional defense adversaries. What they cannot withstand is indifference.

The Chicago poll of last December reflected, it seems to me, indifference rather than hostility to national defense. The events of these past two months have evidently changed some minds. The real question is whether or not the next twelve months, in the absence of any aberrant behavior on the part of our growing list of potential enemies, will again produce a negative national attitude toward defense spending. We can hope not, for this is not the sort of thing you can turn on and off from year to year.

Meanwhile, we can all take comfort in present trends. ■

The September "Anniversary" issue of AIR FORCE Magazine will be distributed to those attending AFA's 1975 Aerospace Development Briefings and Displays. In addition to this bonus readership, all advertisements in this issue will be prominently displayed in our "Industry Salutes the Air Force" exhibit at the entrance to Exhibit Hall. Closing for reservations is August 1. Why not join us? It is a good advertising buy!

U.S. AIR FORCE ANNIVERSARY ISSUE

AIR FORCE
MAGAZINE

INDUSTRIAL ASSOCIATES OF THE AIR FORCE ASSOCIATION

Listed below are the Industrial Associates of the Air Force Association. Through this affiliation, these companies have tangibly indicated their readiness to participate as "Partners in Aerospace Power," in the interest of national security.

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Aerojet-General Corp.
Aeronca, Inc.
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Allegheny Ludlum Industries, Inc.
American Telephone & Telegraph Co.
AT&T Long Lines Department
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The Bulletin Board

By John O. Gray
MILITARY AFFAIRS EDITOR, AIR FORCE MAGAZINE

USAF Wings Tough to Get

It's tougher than ever for young men to get into Air Force flying training schools these days. Some recent pilot training selectees can expect to wait eighteen months before entering school. In the years ahead, competition for pilot and navigator training "will continue to be intense."

That's the way Hq. USAF officials recently outlined the picture for AIR FORCE Magazine.

Continuing force cuts and other factors have created rated surpluses that authorities say will reach 2,500 in the pilot ranks and 700 in the navigator corps by late this fiscal year. So, training of new flyers is being cut back sharply, though excellent rated retention—56.4 percent for pilots reaching the eight-year service point in FY '75—offsets this somewhat so far as the total number of rated officers is concerned.

AFROTC remains the largest source for new pilots, but its backlog of new officers waiting for pilot school has soared following May and June graduations. Those who graduated in June can't get into pilot training for up to a year and a half, while AFROTC navigator hopefuls in that group face delays of up to nine months.

The Academy provides thirty percent of USAF's new pilots and fifteen percent of the navigators, and there are no delays getting into school. But getting into the Academy in the first place remains extremely difficult.

Officer Training School, slashed to the bone, is not open to pilot candidates now and probably won't be for at least two more years, though it should be able to accommodate a few navigator hopefuls.

Headquarters, meanwhile, has come up with a unique move to help reduce the rated surplus: allow "small numbers" to leave active duty for an extended period and later, if they wish, return and continue full military careers. The plan was being staffed at press time.

While a surplus now exists, the long-range forecast, three to four years ahead, is for rated shortages, due to reduced training quotas for new flyers and heavy retirements and other attrition late in this decade.

Hence, the new plan, to let certain flyers who may be on the fence about serving a full career get out now, with a guarantee of returning later. The project calls for looking "very carefully" at individuals wanting to leave in regard to "their aircraft, the likely make-up of USAF's future aircraft inventory, and many other factors," an informed source said.

Other, more routine releases were being offered officers in June; some nonrated types with as little as one year of service could exit. Even so, authorities said they expected Air Force would end FY '75 (on June 30) about 700 officers above the official target of 104,500. The overage was attributed to a drastic slowdown of voluntary losses in recent months.

The FY '76 officer RIF was to begin in July with 512 forced exits. The size and timing of subsequent RIF increments were still being studied at press time. But an official forecast the following: about 1,000 additional force-outs in two increments, one next January and the other in June 1976.

In a rare Pentagon visit by a head of state, His Imperial Majesty Mohammed Reza Pahlavi, the Shah of Iran, is escorted through the building by Secretary of Defense James R. Schlesinger (with pipe). The Shah paid a formal visit to the US to confer with President Ford in May.

Medicare Outlook: Promising

The Air Force is continuing to reduce its physician shortage, and the office of the USAF Surgeon General feels the year ahead will be a reasonably good one for military medicare.

Against an authorization of about 3,500 medical officers, USAF on April 30 had 3,139 on board, a smaller shortage than earlier predicted. The Recruiting Service, meanwhile, was attempting to attain its FY '75 quota of 600 new physicians direct from civilian life. By the end of April, 200 had entered active service (including nearly 100 general medical officers, or "family doctors"), ninety others had been selected, 236 applications were "being processed" and "several hundred more" were in the mill, the Surgeon's office said.

Recruiting efforts for FY '76 have been increased with the addition of nine medical recruiting teams, making thirty-two teams (115 people) altogether.

The new medical officer bonus, combined with the recruiting successes, are primarily responsible for USAF's better-than-expected doctor manning picture, according to Surgeon General Lt. Gen. Robert A. Patterson. Nearly 1,000 USAF doctors are now drawing the bonus (up to $13,500 annually).

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While Air Force expects to lose about 1,050 doctors in FY '76, gains are projected at 1,015 and could increase if the beefed-up recruiting effort pays off. And the emphasis will continue on securing "family doctors."

Meantime, the services' medical scholarship program established in 1972 is beginning to bear fruit. Early this year ninety-five USAF scholarship holders had graduated and nearly 1,200 others were enrolled in medical schools. Each service should get close to 300 new doctors annually from this program, which pays students' entire school costs plus $400 a month. Graduates must serve one year on active duty for each year in medical school.

The persistent threats within the Administration to cut military medical coverage and accommodate only active-duty members reportedly still linger, though there is some feeling the opposition may have diminished and that adverse actions may not surface during FY '76.

General Patterson and other top military medics, in a related development, have been fighting attempts within the Pentagon to pay medical bonuses only to military physicians working directly with patients. Administrators and other top staffers would suffer stiff pay cuts. This, it is held, would allow younger doctors to outdraw superiors, end incentives for promotion, and create near chaos throughout the medical services.

Authorities also told AIR FORCE Magazine that:

- Dependent and retiree care in FY '76 should continue at the same level as in FY '75. Despite some reports to the contrary, no bases have shut off care for retirees and their families.
- USAF is placing increasing emphasis on its nurse practitioner programs that "extend" physicians' services. Air Force now has 312 nurse practitioners and 165 enlisted physician assistants.
- The annual summer slump in base medical service due to doctors' reassignments and transfers is occurring as usual and should be no cause for alarm.

Commissary "Battle" Going Strong

The major military-oriented organizations, including AFA, various lawmakers, and individual citizens, vigorously defended the present military commissary system during hearings in May before a House Armed Services subcommittee. AFA President Joe Shosid's statement before the Committee appears on page 84.

At issue is the Administration's plan to withdraw direct federal subsidies for the comstores. Such action, Defense Department witnesses said, would increase prices and reduce shoppers' savings from the present twenty to twenty-two percent to twelve percent or less, compared with supermarket prices.

Defense's chief witness, Assistant Secretary (Comptroller) Terence E. McClary, said that military pay "is comparable" and that "we're trying to reduce the fifty-five percent of the military budget that is spent on people. . . ." Assistant Air Force Secretary (Manpower and Reserve Affairs) David P. Taylor testified that the average USAF family of four saves about $420 a year at the commissary. Defense's proposal "would cut that in half . . . [and] a decline in patronage would further reduce savings," he acknowledged.

But organizational and individual witnesses lined up solidly on the side of maintaining present customer savings. Subcommittee chairman F. Edward Hébert (D-La.), echoed their feelings by declaring that the government has a commitment "to uniformed personnel to continue reasonable commissary savings."

The Armed Services Committee was expected to approve, probably in June, one of several bills or resolutions that call for no change in the present system. Also pending were June hearings before the House Appropriations Committee. If comstores are to continue providing customers the current savings beyond October 1, the Appropriations unit must reinstate funds the Pentagon has deleted from the FY '76 military budget.

The General Accounting Office, meantime, has issued a new report saying that commissaries should not be allowed in large metropolitan areas because commercial supermarkets are readily available. Locating comstores in Washington, San Antonio, San Diego, and other big service towns violates congressional intent, the government's watchdog on federal spending declared.

Pay Picture Brightens

It looks like good news on several military pay fronts during the second half of this year. The forecast calls for a nine-plus percent hike in basic pay starting in October and a near-five percent hike in retired pay effective in August and payable starting in September. These raises seemed assured following congressional rejection of the President's request to limit federal pay increases to five percent this year.

In addition, a new law has boosted per diem for government civilians from $25 to $35 ($50 in special high-cost cases). The move is seen as paving the way for a similar boost this year for the military.

Congress, meantime, is weighing increases for service widows and children in Dependency Indemnity Compensation. The Senate Veterans Affairs Committee is considering a twelve to fourteen percent increase, though the Administration says that is too much. The committee is also considering an increase in VA disability compensation.

In a related matter, the Pentagon is drafting legislation to let the services withhold pay from all service members, to cover bad checks. Currently, only Air Force and Army enlistees are subject to involuntary deductions.

Postmaster General Benjamin F. Bailar recently affirmed US Postal Service support for a strong military reserve by signing a Statement of Support for the Guard and Reserve. Looking on are Army Maj. Gen. W. S. Smith, left, and USAF Col. Milton E. Mitler, key figures in gaining support for Reserve Forces of the US.

Promotion Change

Air Force is doubling up on the number of Regular officers being considered for permanent major and lieutenant colonel this year. A major policy switch, it means speedier promotions (and "new tenure") for many but earlier passovers and separation for others.

The change was launched with the annual permanent LC board, which was to meet June 23. Instead of considering only the 1955 year group, as previously planned, the panel considered the 1956 year group as well. Each contains about 2,200 officers.

The annual permanent majors board, slated to meet in August, will weigh the 1962 and the 1963 year groups, instead of only the former. Each contains around 2,700 officers, which should result in up to 500

Ed Gates . . . Speaking of People

Open Messes—Lean but Lively

It's a smaller, leaner operation than in years past, but the program apparently has overcome numerous financial problems and is a firm fixture in USAF's future. This important "people program" is the service's 400 clubs.

Combined, the Air Force clubs—Headquarters still insists on calling them "open messes"—last year did more than a quarter of a billion dollars' worth of business, employed 27,262 people, and turned a combined profit of $7.2 million. This was $300,000 more than the previous year and not far below earlier annual earnings when financial problems were much less burdensome *(see accompanying financial-membership chart).*

The USAF Military Personnel Center, Randolph AFB, Tex., which monitors the overall club program, noted that the membership decline—from 527,000 members four years ago to the present 448,000—is in proportion to base closings and cuts in personnel strength. The Center explained that a healthy fifty-three percent of eligible airmen and ninety percent of officers are members.

In a report for AIR FORCE Magazine, the Center also disclosed the membership breakout by category; active duty 306,500; retirees 71,400; civilian employees 35,700; and other 34,800. The last group includes contractor personnel, technical representatives, and honorary members.

While inflation and cost problems will continue to plague club managers and keep management always alert for new improvements, the chances of USAF clubs surviving appear to have improved within the past couple of years. In the February 1974 issue of AIR FORCE Magazine, this column reported that the Defense Department was painting a black picture of the future of military clubs generally.

One high authority suggested that to survive, clubs at many bases would have to consolidate. Air Force now reports that some clubs have gone that route. Its current club line-up shows the following: 207 NCO, 140 Officers', seven Airmen's, and forty-two Consolidated clubs.

The last group includes one Officer Training School club, two "totally consolidated" officer/NCO facilities, and thirty-nine "partially consolidated" clubs at smaller installations. If consolidation means the difference beween remaining open or closing, then that's the path to take.

Not a single USAF club was closed for financial reasons in the past year, USAF reported. Meanwhile, the 448,000 members and their families and guests continued to enjoy, though in some cases on what is undoubtedly a modified basis, the unique services and special atmosphere military clubs have traditionally provided.

Over the years, USAF club controversies, sometimes heated, have erupted over membership rules, pressures from high levels to force people to join, and reciprocal privileges (or lack of them). Such threats to the clubs, however, were nothing compared with the economic challenges. Removal of slot machines and their hefty revenues from Stateside clubs in the 1950s caused much hand-wringing. The same thing occurred before and shortly following removal of slots from clubs overseas in 1972 (except NATO clubs where they remain). Critics in both instances saw the closing of many clubs as a certainty.

Governmental action in recent years, which sharply increased the pay of club employees, was another financial hurdle thrown in management's lap. Add the soaring costs of food, liquor, and other items and the problem assumed sizable proportions.

Specifically, the Center was asked, how has Air Force handled the clubs' financial crunch? Its candid response:

"By raising prices and dues, offering less service, reducing entertainment, and by consolidating management functions where feasible to reduce overhead costs. Some giveaway programs have been eliminated or replaced with reduced price functions."

But it's not as grim as that may sound. The "ten to fifteen percent" increase in food and beverage prices at most clubs is not unreasonable. The Center report added that USAF is emphasizing "the food operation as the core of the open mess program" and, as part of the alcohol abuse project, "continues to discourage excessive alcohol consumption."

The range of monthly dues is now $2–$4 for Airmen's clubs, $2–$5 at NCO and Consolidated clubs, and $6–$12 at Officers' clubs ($7–$13 where dues are prorated by rank). By comparison with civilian facilities in today's economy, these rates appear extremely nominal. Authorities did not rule out some further dues increases, though their philosophy is to do so "only after all possible management prerogatives have been exhausted."

What about the future? Club officials promise "to keep alert to the needs of their memberships. This includes the entire spectrum of management from food and beverage operations to entertainment and decor."

Within their financial capabilities, USAF clubs will continue to respond to changing needs "whether they be fast food items, new equipment, or renovation and redecoration. In spite of the problems, we remain optimistic about the future of the Air Force Open Mess Program," Hq. USAF officials declared.

That's good to hear. ■

A Look at USAF Clubs

	CY '71	CY '72	CY '73	CY '74
No. Open Messes	462	439	411	400
Sales	$221.6M	$224.3M	$217.1M	$220.8M
Total Income	$269.7M*	$267.1M*	$250.3M	$253.8M
Net Earnings	$ 10.9M	$ 9.0M	$ 6.9M	$ 7.2M
Labor Costs	$ 82.7M	$ 82.4M	$ 78.8M	$ 85.2M
No. Employees	36,000	34,061	29,467	27,262
No. Members	527,000	514,000	475,000	448,000

* Includes slot machine income

The Bulletin Board

passovers (less than ten percent of the total). However, the actual RIFs for double deferments won't increase until nearly two years from now.

The action is not a major factor in USAF's drive to shave overall officer strength, authorities said. They view the change as helping officers chart their future earlier. Those officers whose eventual departure is speeded up one year "will be able to enter the civilian job market at a younger age with readjustment pay ($15,000, less a big tax bite) in hand," Headquarters said.

Officers twice passed over for permanent LC will continue to gain the "sanctuary" for retirement.

USAF noted that the doubling-up action this year moves the permanent promotion timetable closer to the majors' eleven-year and the LCs' seventeen-year promotion phase points in the single promotion system of the proposed DOPMS legislation. The new plan does not change hikes to permanent-Regular captain and colonel.

Coed Academies Near

The Air Force Academy will go coed a year from now, Hq. USAF officials predicted following the recent 303–96 vote in the House of Representatives to open the service academies to women. The approval was tacked on to the FY '76 military procurement bill. The Senate, as expected, endorsed the House action in June.

An Air Force authority said he doubted that USAF would be flooded with "fully qualified" female applicants. With only minor changes in dormitory facilities required at the Colorado Springs school, there should be no problem accommodating the first female contingent next summer, he said.

Rep. Sam Stratton (D-N. Y.) quarterbacked the House action that brushed aside the previously sticky question of training women for combat. He pointed out that twenty-nine percent of the male alumni of the USAF Academy have never had a combat assignment. The amendment requires that women be admitted to the academies on the same basis as men.

The House, in passing the procurement measure, also approved

AFA GOES TO BAT F

On May 12, AFA President Joe Shosid appeared before the Armed Forces Investigating Subcommittee of the House Committee on Armed Services to testify in support of House Bill HR 3363. The effect of that Bill would be to direct the Secretary of Defense to continue all commissary stores that were operating on January 1, 1975, and to continue the subsidy that makes possible the current level of savings to commissary patrons. Here is the statement in slightly abridged form.

I am grateful for this opportunity to appear before your Committee today to discuss what we believe is the most important fringe benefit to military men and women—after military health care. I refer to military commissary stores. I am especially pleased to be representing today more than 135,000 Americans affiliated with the Air Force Association. Our membership numbers more than 57,000 active-duty Air Force men and women—enlisted and officers of all ranks— as well as more than 20,000 military retirees.

At the outset, however, I want to emphasize that all of us in the Association are deeply grateful for the long and continuing record of concern of the Congress, together with the passage of very important legislation, all of which has contributed much to the enhancement of the welfare of American men and women who are now serving, or who have served, in the armed forces of our great nation. We thank you for this.

We believe this matter of commissaries which you and the distinguished members of your Committee are studying could well represent a prime indicator of whether or not our country does indeed intend to honor its commitments, implied if not contractual, to those whom it has asked to serve it.

We are deeply concerned with the mounting efforts by the Administration and Department of Defense to effect what could well be an emasculation of the commissary system. We are disturbed because this benefit directly affects those people who are most in need of assistance—namely, the lower ranking enlisted men and women, the lower ranking officers, the military retirees and their families.

We agree with the Office of Management and Budget that there may be room for considerable improvement in the management of commissaries. For this reason, we are pleased that the Department of Defense has established a special committee to determine what changes, if any, should be made to the military commissary store system.

We are aware, of course, that there has been no official recommendation by the Administration or the Congress to do away with military commissary stores, per se. Nevertheless, with the cutback in funded support of this activity, as recommended by the Administration, we fear that this may well be the result. Military people feel that reductions in commissary savings would represent a major step toward a complete phasing out of the stores. One noncommissioned officer got to the heart of the matter. He stated, and I quote: "We drive the seven miles to the commissary maybe twice a month. We fight the traffic, parking problems, overcrowded aisles, and long lines because at each visit we may save seven to eight dollars over the local supermarket. But cut that savings in half, and it wouldn't be worth the effort. Our friends feel the same way."

The result, he and others predict, would be the eventual closing of all commissaries because the Department of Defense then could cite "lack of patronage."

An Air Force sergeant recently wrote us as follows: "This particular issue is of concern to all personnel, especially in the lower grades, as it is an item that affects our financial stability and family welfare."

We submit that it is this matter of financial stability that is causing our service people to be so terribly disturbed. We do not deny that in certain instances local supermarkets are more physically convenient to the residences of military people. However, they are

the Administration's request for an end-FY '76 USAF strength figure of 590,000. Air Force officials, worried about eight straight years of manpower reductions, had exerted heavy pressure on Congress to not cut below that number.

The Senate Armed Services Committee, however, voted an extra cut of 7,400 USAF troops. It said the reduction should be applied to headquarters and other support areas. If this cut sticks in the eventual House-Senate conference, it will mean an Air Force of only 582,400 active-duty people by next year and perhaps more severe RIF problems throughout FY '76.

Manpower Report Controversial

The Defense Manpower Commission has issued an interim report chock full of controversial recommendations. Sent to the President and Congress, the report:

- Says the grade ceilings in the long-pending DOPMS legislative proposal are too generous and too many O-6s and O-5s are assigned to headquarters and support activities. It also asks changes in DOPMS to accommodate recalled Reserve officers.
- Urges the government to scuttle the new medical university designed to produce military physicians because it will cost Uncle Sam $200,000 or more per graduate, compared to about $34,000 through the military doctor scholarship program. The latter has been in operation the past two and one-half years in cooperation with established medical schools.
- Recommends a new, complex arrangement that would modify future CPI retirement pay raises, by removing the current one-percent "kicker" (that accompanies each raise) and adding a "catch-up" payment. This, the report holds, would preserve the purchasing power of a retiree's original annuity.
- Urges the retention of the standby draft until a "reliable alternative" has been developed. Sen. William Proxmire (D-Wis.) has been seeking to have the standby program, with its 2,500 people at 300 locations, eliminated.

The DMC is headed by former Assistant Air Force Secretary (Manpower and Personnel) Curtis W. Tarr. It is the first of a score of blue-ribbon commissions that have studied military personnel and related matters during the past thirty years to have been given the "statutory charge" of probing the entire Defense manpower area. The DMC later will announce findings on pay,

ITARY COMMISSARIES

far from being more financially convenient, especially in the large metropolitan areas.

The word we continually hear from those in support of the DoD and Administration position is "comparability." We are aware that military salaries have increased considerably in this past decade—with grateful thanks to the United States Congress. But what are we talking about when we speak of comparability?

When former Defense Secretary Robert S. McNamara appeared before the Congress in 1965 to discuss budgetary matters, he said, "Military compensation includes all taxable income, all nontaxable allowances, the tax savings, and supplemental benefits." This appearance involved hearings on comparability, and commissaries were considered one of the "supplemental benefits."

Again, in 1967, the Department of Defense released a document that attempted to explain to the Congress just what constituted "compensation." A most important category was labeled "supplemental benefits" and, within this category, the commissary and exchange benefits figured prominently. Thus, if DoD now attempts to dilute or eliminate the commissary benefit, it would, in effect, be eliminating a portion of what traditionally has been considered "compensation."

In defending its current effort to withdraw federal funding for support of military commissaries, the Administration offers as its main argument the assertion that: "Active-duty military compensation is now generally competitive with other public as well as private sector compensation."

But before dealing with the economics of this issue, let's first recognize that the claims of equality or excessiveness in military pay are based on an assumption that military and civilian jobs are "comparable" to begin with.

Are they? How many civilian employees are called upon to uproot their families involuntarily every few years . . . to endure twenty-four-hour alert duty assignments . . . to work overtime without additional compensation . . . to serve in remote and isolated areas . . . to give up certain freedoms and rights . . . risk injury, personal disability, or death, in battle?

It has been said that such items as government housing, the commissary, medical care, and the noncontributory retirement system increase true military compensation by 28.5 percent. But in comparing military salaries with those of civilian counterparts, often no provision has been made for such civilian fringe benefits as profit sharing, insurance programs, retirement plans, employee discounts, subsidized lunch rooms, bonuses, etc. A United States Chamber of Commerce study shows that fringe benefits add an average of 32.7 percent to civilian compensation in the private sector.

As our many colleagues have so ably testified, there *is* a dollars and cents issue involved here. A reduction in the commissary subsidy would, in our opinion, amount to a cut in pay to military people and retirees.

This proposed increase in commissary prices is just one more piece of evidence to the serving active-duty military person, and to the veteran retiree, that his government is changing the rules after the game is under way—or, in the case of the retiree, penalizing those who already have given so much.

Therefore, we respectfully ask that the issue of "comparability" not be permitted to cloud deliberations on this matter. If military compensation *is* comparable to civilian compensation, which we doubt, it only is because fringe benefits such as commissaries are a part of that compensation. So we also ask that the commissaries be viewed in their true light—as an integral part of that compensation which military people believed they were promised when they obligated themselves to serve their country.

We're not just talking about grocery stores. We're talking about something much more important. We're talking about a great country keeping faith with its people. For that reason we wholeheartedly endorse the provisions of H. R. 3363. ■

The Bulletin Board

allowances, benefits, staffing, Reserve Forces, recruitment, etc. The services have more recruiters than are needed, the interim report said.

Short Bursts

The Air Force is giving its **Retiree Council** some exposure by publicizing the recommendations the group advanced at its recent third annual meeting. Key recommendations support recomputation of retired pay, letting disability retirees collect both VA compensation and retired pay, keeping commissary savings at their present levels, and making major alterations in the survivor benefits program. The Air Force cannot openly endorse these recommendations—because the Administration doesn't support them.

To erase a shortage of supervisory personnel and increase prestige in the positions, USAF has given its **security police career field** ten extra E-9 and thirty-six additional E-8 promotions this year. The action ever so slightly shaves promotion chances in other fields. The SPs are also getting new uniforms and broader training. Behind the upgrading of the SPs is Air Force's desire to improve its nuclear weapons security.

An equalizer was provided recently when the President named the superintendents of the Air Force and Military Academies, James R. Allen and Sidney B. Berry, for the same **three-star rank** Vice Adm. William Mack, Superintendent of the Naval Academy, has held right along. Maybe it's time for another equalizer: make Navy's flag selectees serve first as one-star officers, like their USAF and Army counterparts do.

Lieutenants thirty to thirty-eight years old chalked up the **best selection record** for Regular Air Force commissions when officers in the "two-year" service group vied for the appointments recently. Overall, twenty percent, or 510, of the 2,517 competitors were selected. But among the 557 aforementioned older eligibles, 174, or thirty-one percent, were chosen. The really significant point here: The thirty to thirty-eight year olds were primarily career airmen who entered the officer ranks via the Airman Education Commission Program (the one Congress last year barred any more airmen from entering).

Airmen remain eligible for **commissions through the AFROTC program,** and the next board for those selections meets August 12. Selectees will probably enter college next spring. Emphasis in selections continues on technical and scientific backgrounds.

USAF's **1974 suggestions program** statistics include more than 23,000 clever ideas adopted; average cash award among military competitors, $61; average cash award among civilian employees, $74; total estimated first-year benefits to USAF, $83 million. Current suggestion attention is on "major economies" in federal spending, Hq. USAF said.

Word from the Military Airlift Command is that **"space available" seats** on MAC flights are harder than ever to get this summer. MAC's suggestion to Space A travelers: prepare for (1) long waits—"a week, or two . . . much longer if going to or from Europe," in MAC terminals, or (2) switch to commercial flights.

Law requires that the head of the Federal Aviation Administration be a civilian. But Congress waived the rule for FAA's first and second chiefs, Lt. Gen. Elwood R. Quesada and Gen. William F. McKee, both distinguished USAF retired officers, and provided that both could receive their military retirement pay and benefits. But it has recently denied retired status to Alexander P. Butterfield, a Regular USAF colonel who resigned his commission some years back to become the third FAA chief. Mr. Butterfield will, however, draw a Civil Service pension. Butterfield is perhaps best known for revealing the existence of the White House taping system that led to President Nixon's departure from office. ■

Senior Staff Changes

PROMOTIONS: To be **Lieutenant General:** James R. **Allen;** Martin G. **Colladay.**

RETIREMENTS: L/G Royal N. **Baker;** B/G Lyle W. **Cameron;** M/G Ray M. **Cole;** B/G Robert H. **Gaughan;** B/G Georges R. **Guay;** M/G John R. **Hinton;** M/G Edward P. **McNeff;** B/G Charles E. **Word.**

CHANGES: M/G Andrew B. Anderson, Jr., from Dir., Ops. Plans, SAC, Offutt AFB, Neb., to C/S, SAC, Offutt AFB, Neb., replacing M/G Martin G. Colladay . . . **Col. (B/G selectee) Kelly H. Burke,** from Cmdr., 2d Bomb Wing, SAC, Barksdale AFB, La., to Asst. DCS/Plans, SAC, Offutt AFB, Neb., replacing B/G Jerome F. O'Malley . . . **B/G Rupert H. Burris,** from Cmdr., Northern Comm. Area, AFCS, Griffiss AFB, N. Y., to V/C, AFCS, Richards-Gebaur AFB, Mo., replacing B/G William W. Gilbert . . . **L/G Martin G. Colladay,** from C/S, SAC, Offutt AFB, Neb., to Dep. Chairman, NATO Mil. Committee, Brussels, Belgium, replacing Lt. Gen. Richard F. Shaefer . . . **Col. (B/G selectee) Robert F. Coverdale,** from Cmdr., O/L A, Twenty-first AF, MAC, Pope AFB, N. C., to Cmdr., 317th Tac. Alft. Wing, MAC, Pope AFB, N. C. . . . **B/G William W. Gilbert,** from V/C, AFCS, Richards-Gebaur AFB, Mo., to DCS/Comm.-Elect., NORAD/ADC, Ent AFB, Colo. . . . **B/G William G. MacLaren, Jr.,** from C/S, Fifteenth AF, SAC, March AFB, Calif., to Cmdr., Pac. Comm. Area, AFCS, Hickam AFB, Hawaii (add'l duty as DCS/Comm.-Elect., PACAF), replacing B/G William R. Yost.

L/G Winton W. Marshall, from Vice CINC, PACAF, Hickam AFB, Hawaii, to Dep. CINC, US Readiness Comd., MacDill AFB, Fla. . . . **B/G (M/G selectee) James P. Mullins,** from DCS/Acq. Log., AFLC, Wright-Patterson AFB, Ohio, to DCS/Plans & Ops., AFLC, Wright-Patterson AFB, Ohio . . . **B/G Jerome F. O'Malley,** from Asst. DCS/Plans, SAC, Offutt AFB, Neb., to Dir., Ops. Plans, SAC, Offutt AFB, Neb., replacing M/G Andrew B. Anderson, Jr. . . . **B/G George W. Rutter,** from Insp. Gen., AFLC, Wright-Patterson AFB, Ohio, to DCS/Acq. Log., AFLC, Wright-Patterson AFB, Ohio, replacing B/G (M/G selectee) James P. Mullins . . . **B/G William R. Yost,** from Cmdr., Pac. Comm. Area, AFCS, Hickam AFB, Hawaii (add'l duty DCS/Comm.-Elect., PACAF), to Cmdr., Northern Comm. Area, AFCS, Griffiss AFB, N. Y., replacing B/G Rupert H. Burris.

A 15% DIVIDEND

is being paid to Air Force Association Military Group Life Insurance participants for 1974—a 50% increase in savings over 1973 and the 10th dividend in the last 13 years...plus four benefit increases at no extra cost.

That's in addition to the finest group life insurance coverage ever provided by the Air Force Association to its members.

Details? Please turn the page.

LIFE INSURANCE YOU CAN DEPEND ON

AFA's Double Protector for Military Personnel with Optional Family Coverage Available

THE STANDARD PLAN
($66,000 Maximum)

THE HIGH OPTION PLAN
($100,000 Maximum)

Insured's Age	Coverage	Extra Accidental Death Benefit*	Monthly Cost Individual Plan	Optional Family Coverage Spouse	Optional Family Coverage Each Child**	Monthly Cost Family Coverage
20-24	$66,000	$12,500	$10.00	$6,000	$2,000	$2.50
25-29	60,000	12,500	10.00	6,000	2,000	2.50
30-34	50,000	12,500	10.00	6,000	2,000	2.50
35-39	40,000	12,500	10.00	6,000	2,000	2.50
40-44	25,000	12,500	10.00	5,250	2,000	2.50
45-49	15,000	12,500	10.00	4,050	2,000	2.50
50-59	10,000	12,500	10.00	3,000	2,000	2.50
60-64	7,500	12,500	10.00	2,250	2,000	2.50
65-69	4,000	12,500	10.00	1,200	2,000	2.50
70-75	2,500	12,500	10.00	750	2,000	2.50
20-24	$100,000	$12,500	$15.00	$6,000	$2,000	$2.50
25-29	90,000	12,500	15.00	6,000	2,000	2.50
30-34	75,000	12,500	15.00	6,000	2,000	2.50
35-39	60,000	12,500	15.00	6,000	2,000	2.50
40-44	37,500	12,500	15.00	5,250	2,000	2.50
45-49	22,500	12,500	15.00	4,050	2,000	2.50
50-59	15,000	12,500	15.00	3,000	2,000	2.50
60-64	11,250	12,500	15.00	2,250	2,000	2.50
65-69	6,000	12,500	15.00	1,200	2,000	2.50
70-75	3,750	12,500	15.00	750	2,000	2.50

✱ A 15% dividend was declared for all 1974 participants, even further reducing net monthly cost of insurance!

*In the event of an accidental death occuring within 13 weeks of the accident, the AFA plan pays a lump sum benefit of $12,500 **in addition to** your plan's regular coverage benefit, except as noted under AVIATION DEATH BENEFIT, below.

**Each child has $2,000 of coverage between the ages of six months and 21 years. Children under six months are provided with $250 protection once they are 15 days old and discharged from the hospital.

AVIATION DEATH BENEFIT: A total sum $15,000 under the Standard Plan or $22,500 under the High-Option Plan is paid for death which is caused by an aviation accident **in which the insured is serving as pilot or crew member of the aircraft involved.** Under this condition, the Aviation Death Benefit is paid in lieu of all other benefits of this coverage.

AFA's DOUBLE PROTECTOR is a **double opportunity** for you to get the life insurance coverage you want and need. AFA's **Standard Plan** is adequate for most families. But if you have a need for greater protection, you should select the **High Option Plan.**

FAMILY PLAN AVAILABLE. Protect your whole family (no matter how many) for only $2.50 per month. Insure newborn children as they become eligible just by notifying AFA. No additional cost.

COMPARE THE ADVANTAGES OF THESE AFA PROGRAMS FOR MILITARY PERSONNEL

Wide Eligibility. All active duty, Ready Reserve and National Guard personnel under age 60, plus Academy and college or university ROTC cadets are eligible for this coverage. (Because of certain limitations on group insurance coverage, Reserve and Guard personnel who reside in Ohio, Texas, Florida and New Jersey should request information from AFA headquarters on a separate policy providing similar benefits.)

No War Clause, hazardous duty restriction or geographical limitation.

✱ **Reduction of Cost by Dividends.** While the payment of future dividends cannot be guaranteed, the net cost of this coverage has been reduced by dividends in 10 of the last 13 years.

Keep Your Coverage after Leaving Active Duty. Both the premium amount and schedule of benefits will remain the same.

Disability Waiver of Premium Benefits, if you become totally disabled for at least nine months, prior to age 60.

Full Choice of Settlement Options, including individualized arrangements for special situations.

Guaranteed Conversion Privilege. Coverage under the group program may be converted to any permanent plan of insurance offered by the Underwriter, **regardless of your health,** upon attainment of age 75 or termination of AFA membership.

Convenient Premium Payment Plans. Premium payments may be made by monthly government allotment, or direct to AFA in quarterly, semi-annual or annual installments.

EFFECTIVE DATE OF YOUR COVERAGE. All certificates are dated and take effect on the last day of the month in which your application for coverage is approved. Coverage runs concurrently with AFA membership. AFA Military Group Life Insurance is written in conformity with the insurance regulations of the State of Minnesota. The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minnesota as trustee of the Air Force Association Group Insurance Trust.

EXCEPTIONS. There are a few logical exceptions to this coverage. They are:

Group Life Insurance: Benefits for suicide or death from injuries intentionally self-inflicted while sane or insane shall not be effective until your coverage has been in force for 12 months.

The Accidental Death Benefit and Aviation Death Benefit shall not be effective if death results: (1) From injuries intentionally self-inflicted while sane or insane, or (2) From injuries sustained while committing a felony, or (3) Either directly or indirectly from bodily or mental infirmity, poisoning or asphyxiation from carbon monoxide, or (4) During any period a member's coverage is being continued under the waiver of premium provision, or (5) From an aviation accident, either military or civilian, in which the insured was acting as pilot or crew member of the aircraft involved, except as provided under AVIATION DEATH BENEFIT.

CHOOSE EITHER OF THESE STRONG, DEPENDABLE PLANS! MAIL THIS APPLICATION TO AFA TODAY!

TO HELP THE PEOPLE WHO DEPEND ON YOU!

APPLICATION FOR AFA MILITARY GROUP LIFE INSURANCE

United of Omaha

Group Policy GLG-2625
United Benefit Life Insurance Company
Home Office Omaha, Nebraska

Full name of member _____
Rank Last First Middle

Address _____
Number and Street City State ZIP Code

Date of birth Mo. Day Yr.	Height Weight	Social Security Number

Please indicate category of eligibility and branch of service.

- ☐ Extended Active Duty
- ☐ Air Force
- ☐ Ready Reserve or National Guard
- ☐ Other _____ (Branch of service)
- ☐ Air Force Academy
- ☐ _____ Academy
- ☐ ROTC Cadet _____ Name of college or university

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

This insurance is available only to AFA members

- ☐ I enclose $10 for annual AFA membership dues (includes subscription ($9) to AIR FORCE Magazine).
- ☐ I am an AFA member.

Please indicate below the Mode of Payment and the Plan you elect.

HIGH OPTION PLAN			STANDARD PLAN	
Members Only	Members and Dependents	Mode of Payment	Members Only	Members and Dependents
☐ $ 15.00	☐ $ 17.50	**Monthly** government allotment. I enclose 2 months' premium to cover the period necessary for my allotment to be established.	☐ $ 10.00	☐ $ 12.50
☐ $ 45.00	☐ $ 52.50	**Quarterly.** I enclose amount checked.	☐ $ 30.00	☐ $ 37.50
☐ $ 90.00	☐ $105.00	**Semiannually.** I enclose amount checked.	☐ $ 60.00	☐ $ 75.00
☐ $180.00	☐ $210.00	**Annually.** I enclose amount checked.	☐ $120.00	☐ $150.00

Names of Dependents To Be Insured	Relationship to Member	Dates of Birth Mo. Day Yr.	Height Weight

Have you or any dependents for whom you are requesting insurance ever had or received advice or treatment for: kidney disease, cancer, diabetes, respiratory disease, epilepsy, arteriosclerosis, high blood pressure, heart disease or disorder, stroke, venereal disease or tuberculosis? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance been confined to any hospital, sanitarium, asylum or similar institution in the past 5 years? Yes ☐ No ☐

Have you or any dependents for whom you are requesting insurance received medical attention or surgical advice or treatment in the past 5 years or are now under treatment or using medications for any disease or disorder? Yes ☐ No ☐

IF YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

_____

_____

_____

I apply to United Benefit Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid. I understand United reserves the right to request additional evidence of insurability in the form of a medical statement by any attending physician or an examination by a physician selected by United.

Date _____, 19 ____ _____
Member's Signature

7 / 75
Form 3676GL App

Application must be accompanied by check or money order. Send remittance to: Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

By Don Steele
AFA AFFAIRS EDITOR

THE NATION'S CAPITAL CHAPTER, WASHINGTON, D. C.

cited for consistently effective programming in support of the mission of AFA, most recently exemplified in its symposium, "The Air Force—1975 and Beyond."

The Olmstead Chapter of Harrisburg, Pa., recently sponsored a dinner meeting honoring the Civil Air Patrol and featuring an address by Col. Jon Hill, Commander of the CAP's Middle East Region. Following his presentation, Colonel Hill, left, presented a copy of the book, Hero Next Door, a history of the CAP, to Chapter Vice President Robert W. Eno, Jr., center. Looking on is CAP Lt. Col. Robert J. Miller, Chapter Secretary.

The Nation's Capital Chapter's 1975 Symposium, entitled "The Air Force—1975 and Beyond," featured opening remarks by Gen. David C. Jones, USAF Chief of Staff, and closing remarks by the Hon. John L. McLucas, Air Force Secretary.

More than 250 leaders of AFA, the Air Force, and aerospace industry attended the one-day event, which was held in the Marriott Twin Bridges Motor Hotel.

Chapter President George Troutman was the Moderator, and panelists included: Hon. William W. Woodruff, Assistant Secretary of the Air Force for Financial Management; Lt. Gen. Joseph R. DeLuca, Comptroller of the Air Force; Lt. Gen. Robert E. Huyser, DCS/Plans and Operations; Lt. Gen. William J. Evans, DCS/Research and Development; and, Lt. Gen. William W. Snavely, DCS/Systems and Logistics.

Among the many letters of congratulations and commendation was one from an aerospace executive whose letter expressed the consensus of all attendees: ". . . the program sponsored by the Nation's Capital Chapter of AFA on 2 April was the best that any local chapter of any organization has sponsored in the last several years. The fact that the entire Air Force leadership was there to express their beliefs in down-to-earth terms was an indication of how seriously they considered the get-together."

In recognition of the Chapter's consistently effective programming in support of the mission of AFA, and this symposium in particular, AFA President Joe L. Shosid, a special guest at the symposium, names the Nation's Capital Chapter of Washington, D. C., as "AFA's Unit of the Month" for the month of July.

SMSgt. David H. Van Meter, center, a volunteer membership drive worker for the Wright Memorial Chapter at Wright-Patterson AFB, Ohio, is shown enrolling the Air Force Logistics Command's (AFLC) top enlisted man, CMSgt. Anthony J. Madonna, left, senior enlisted adviser to the AFLC commander; and A1C Henry Noble, Jr., stenographic specialist at the headquarters.

AFA's Fort Worth Airpower Council recently contributed the net receipts from its charity golf tournament to the Air Force Assistance Fund Campaign for 1975 at Carswell AFB, Tex. On hand for presentation of the check for $1,440 were, from left, Col. Dave Blais, Commander, 7th Bomb Wing; Council Chairman Herman Stute; 1st Lt. Ben Hagins; and Capt. Jack Peeke. Organizations that benefit from the Fund are: Air Force Aid Society, Air Force Village, and Air Force Enlisted Widows' Home Foundation. (USAF photo by A1C Ronald D. Lewis.)

National, State, and local officials of the Air Force Association recently met with Maj. Gen. Charles E. Buckingham, right, Air Force Logistics Command Chief of Staff, to discuss, among other items, the progress on the AFA annual membership drive. Included in the session were, from left, Jack Withers, AFA National Director; Wright Memorial Chapter President Fred Orazio; AFA National President Joe L. Shosid; and Ohio State AFA President Robert Hunter. (Official USAF photo.)

AFA National, State, and local AFA officials visit with the guest of honor, Maj. Gen. Donald L. Werbeck, Commander, Air Force Communications Service (AFCS), during the Harry S. Truman Chapter's recent dinner dance saluting AFCS. Left to right are, Earl Clark, Vice President for AFA's Midwest Region; Kansas State AFA President Al Sweers; AFA National President Joe L. Shosid, the guest speaker; General Werbeck; and Robert Combs, Converse Kelly, and Ray Peterman, Missouri State AFA President, Vice President, and Secretary-Treasurer, respectively.

Maj. Gen. Herbert J. Gavin, Commander, Sacramento Air Logistics Center, McClellan AFB, Calif., visits with members of AFA's Llano Estacado Chapter after addressing a Chapter dinner at Cannon AFB, N. M. Shown are, from left, Col. John Bennett, Commander, 27th Tactical Fighter Wing; General Gavin; Brig. Gen. Robinson Risner, Commander, 832d Air Division; and Chapter President Marty Loftus.

Betty Topjian, Massachusetts State AFA Vice President and volunteer AFA Membership Chairman at Hanscom AFB, discusses the membership drive with Col. Sigurd L. Jensen, Jr., base commander. The sign in the background was erected by the Hanscom Chapter.

Texas State AFA President Vic Kregel, right, visits with three award recipients at the Alamo Chapter's recent Awards Banquet, at the Turtle Creek Country Club in San Antonio. They are, from left, TSgt. Raymond J. Hutchinson, USAF Security Service "NCO of the Quarter"; TSgt. Donald J. Heath, AFMTC Security Police School "NCO of the Year"; and MSgt. Gilbert D. Gerland, 12th Flying Training Wing, Randolph AFB, "Senior NCO of the Year."

During a recent luncheon meeting sponsored by AFA's Greater Los Angeles Airpower Chapter, George A. Harter, center, its President, presents the Chapter's first community award to Hubert L. Kaltenbach, left, publisher of the South Bay Daily Breeze newspaper. Lt. Gen. Kenneth W. Schultz, right, Commander of the Air Force's Space and Missile Systems Organization (SAMSO) and the guest speaker, praised the Breeze for keeping its readers throughout Southern California informed of the work being done by SAMSO and the aerospace industry. (Official USAF photo.)

Head-table guests at the luncheon held during the Texas State AFA's recent Executive Committee meeting in El Paso included, from left, former AFA National Director Earle N. Parker; Brig. Gen. Dan Brooksher, Commander, 26th NORAD Region, Luke AFB, Ariz.; and Texas State AFA President Vic Kregel. General Brooksher was the luncheon speaker and, during the program, Mr. Parker presented the Texas State AFA's Earle North Parker Scholarship of $1,000 to Harold Scroggins of Waller, Tex., winner of the State AFA's essay contest. Harold's essay was entitled "Why a Peacetime Air Force?"

CROSS COUNTRY . . . Gen. Bruce K. Holloway, USAF (Ret.), former Commander in Chief of the Strategic Air Command, and a former AFA National Director, was the principal speaker at a recent meeting of the **Central Florida Chapter.** General Holloway commended the people of the Central Florida area for their support of the Air Force during the time McCoy AFB was active, and for their continued support since the decision was announced to deactivate the base. Chapter President Howard McClain was the master of ceremonies. More than 325 members and guests attended the meeting.

COMING EVENTS . . . New York AFA Convention, Tarrytown Hilton, Tarrytown, July 11–13 . . . **Louisiana AFA Convention,** the Chateau, Shreveport, August 22–23 . . . **AFA National Convention and Aerospace Development Briefing and Displays,** Sheraton-Park Hotel, Washington, D. C., September 14–18.

Volunteer workers in the AFA membership drive at the Arnold Engineering Development Center (AEDC), at Arnold AFS, Tenn., are shown discussing plans for the drive. They are, from left, TSgt. Carless Wall; Col. W. C. English, Jr., Commander, AEDC; Maj. Bill Boss; and Mr. Herb Kissling. (Official USAF photo.)

Jack Kraras, President of AFA's David D. Terry, Jr., Chapter of Little Rock, Ark., and the Director of Training and Professional Development for the Arkansas Power and Light Co. (AP&L), recently was promoted to brigadier general in the USAF Reserve. Shown pinning the stars on Jack are AP&L's Senior Vice President Arch Pettit, left, and Maj. Gen. James G. Randolph, right, Commander, Oklahoma City Air Logistics Center, Tinker AFB, Okla.

Honored guests at the AFA membership dinner held recently at Kincheloe AFB, Mich., included, from left, Col. Rolland Ash, 449th Combat Support Group Commander; Col. John Shaud, Vice Wing Commander; Mrs. Shaud; Thomas Krell, C. Ernest Kemp, and Mrs. Gloria Kemp, Sault Ste. Marie Chapter Treasurer, President, and Secretary, respectively; Mrs. Kovar; and Col. Otto L. Kovar, Jr., 449th Bomb Wing Commander, and host for the evening. Mr. Kemp delivered the keynote address on AFA's role in assuring America's airpower, and Colonel Kovar presented a film and briefing on the B-1 test-flight program.

PLAN NOW TO ATTEND . . .

AFA's 1975 Annual National Convention and Aerospace Briefings and Displays

September 15, 16, 17, 18
Washington, D.C.

AFA's 1975 Annual National Convention and Aerospace Briefings and Displays will be held at the Sheraton-Park and Shoreham-Americana Hotels, September 15-18. Accommodations are limited at the Shoreham-Americana Hotel and will be used primarily by other organizations meeting in conjunction with AFA's 1975 National Convention.

All reservation requests for rooms and suites at the Sheraton-Park Hotel should be sent to: Reservations Office, Sheraton-Park Hotel, 2660 Woodley Road, N.W., Washington, D.C. 20008. Be sure to refer to AFA's National Convention when requesting reservations. Otherwise, your reservation requests will not be accepted by the Sheraton-Park.

AFA's National Convention activities will include luncheons for the Secretary of the Air Force, and the Air Force Chief of Staff and the Air Force Anniversary Reception and Dinner-Dance. The National Convention will also include AFA's Business Sessions, Symposium, and several other invitational events, including the Presidents reception, the Annual Outstanding Airmen Dinner, and the Chief Executive's Reception and Buffet Dinner.

We urge you to make your reservations at the Sheraton-Park Hotel as soon as possible to insure obtaining your reservations. Arrivals after 6:00 p.m. require guaranteed payment for the night of arrival.

This Is AFA

The Air Force Association is an independent, nonprofit, airpower organization with no personal, political, or commercial axes to grind; established January 26, 1946; incorporated February 4, 1946.

OBJECTIVES

The Association provides an organization through which free men may unite to fulfill the responsibilities imposed by the impact of aerospace technology on modern society; to support armed strength adequate to maintain the security and peace of the United States and the free world; to educate themselves and the public at large in the development of adequate aerospace power for the betterment of all mankind; and to help develop friendly relations among free nations, based on respect for the principle of freedom and equal rights to all mankind.

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More than 700 leaders of the Air Force, industry, government, AFA, and the community attended the recent "California Salute to SAC," jointly sponsored by the California State AFA, the Riverside and San Bernardino Chapters of AFA, and the Riverside and San Bernardino Chambers of Commerce. Principals in the program included, from left, AFA National Director Ed Stearn, the chairman; AFA National President Joe L. Shosid, the master of ceremonies; Gen. Russell E. Dougherty, Commander in Chief, Strategic Air Command, and the guest speaker; and San Bernardino Chapter President Jay Golding. Gen. Curtis E. LeMay, USAF (Ret.), was the Honorary General Chairman, and Gen. Jack J. Catton, USAF (Ret.), introduced the speaker. During the program, California State AFA President John Lee presented the State AFA's Distinguished Service Award to Lt. Gen. William F. Pitts, Commander, Fifteenth Air Force (SAC) at March AFB.

Michigan State AFA President Richard Mossoney, right, presents Lt. Col. Carl Stone a State AFA check for trophies to be presented at the first annual Michigan State JROTC Drill Competition. Colonel Stone is Aerospace Education Instructor at the Carl Brablec High School in Roseville. The presentation was made during the Mount Clemens Chapter's recent AFA Anniversary Dinner.

During the awards ceremony at the Spring Semester Dining-Out hosted by AFROTC Det. 842 at Lamar University, Beaumont, Tex., Congressman Charles Wilson (D-Tex.), left, the honored guest and speaker, presented Cadet Lt. Col. Robert M. Smithson the Air Force Association AFROTC Silver Medal. Congressman Wilson, an avid supporter of defense programs, serves on the Political and Military Oversight Subcommittee of the House Foreign Affairs Committee. Cadet Smithson, a 1975 AFROTC Distinguished Graduate of Det. 842, has served as Cadet Corps Commander, Senior Staff Commander, and held numerous Arnold Air Society positions.

Two balloon-era airmen—Alberto "Duke" Flores and O. T. Jensen—recently were made honorary members of AFA's Scott Memorial Chapter. Both are residents of Bellevue, Ill., and retired after more than thirty years in the military; Flores in 1946, as a master sergeant, and Jensen in 1949, as a captain. In the photo, Flores, left, inspects the balloonist badge worn by Jensen.

Maj. Gen. James R. Allen, Air Force Academy Superintendent, the guest speaker at a recent meeting of AFA's Colorado Springs Chapter, visits with AFA National, State, and Chapter leaders after the meeting in the Ent AFB NCO Club. Shown are, from left, H. A. Kortemeyer, Chapter Vice President; General Allen; Roy Haug, Vice President for AFA's Rocky Mountain Region; Howard Cloud, Colorado State AFA Vice President; James Hall, Colorado State AFA President; and Ken Johnson, Chapter Vice President. (Official USAF photo.)

Bob Stevens'

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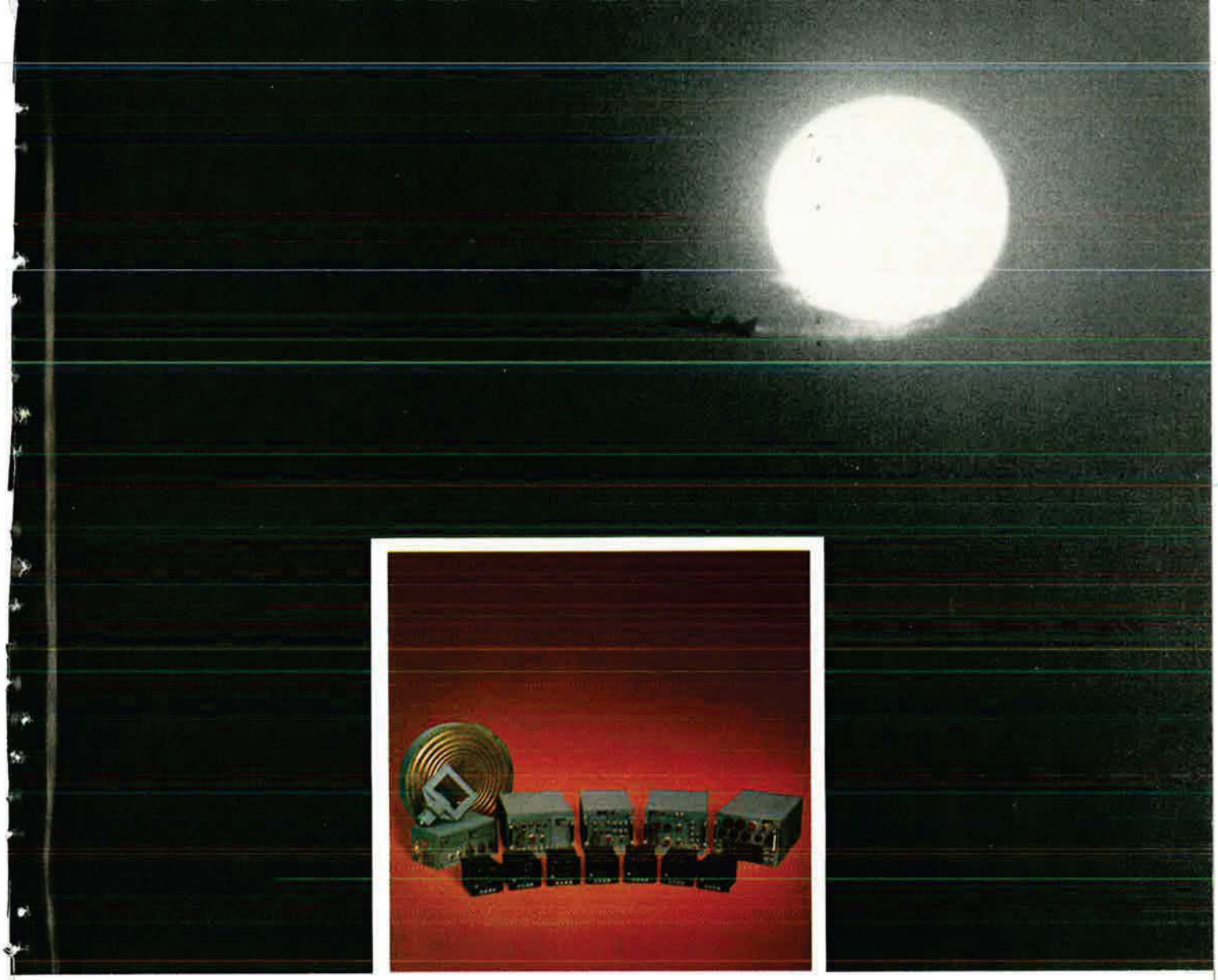

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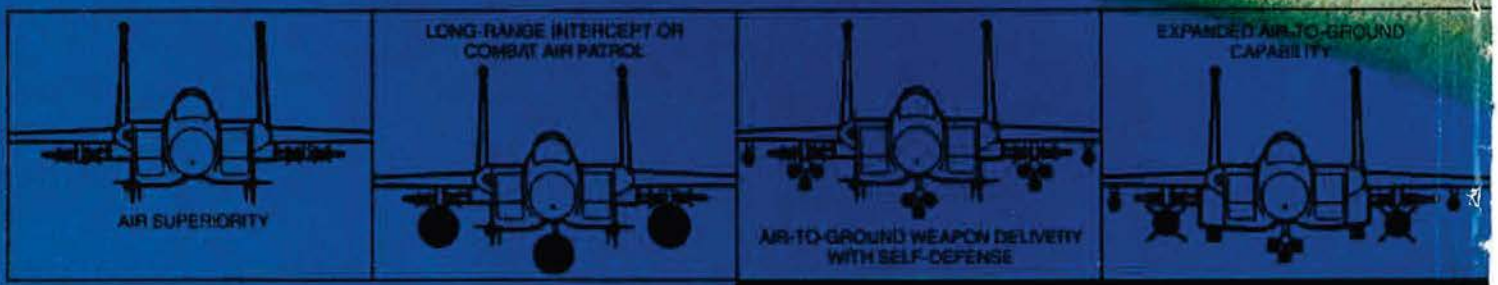

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