

JUNE 1977/\$1

# AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE



## A-10: TAC's New Tank Buster



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# AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

MAGAZINE

## This Month

- 2 **Equity in Limiting Strategic Arms**  
Commentary by Fred Charles Ikle
- 8 **The Budget Is Not Stable** / By Claude Witze
- 12 **Improving Government Efficiency While Reducing Cost**  
By Maj. John R. Straton, Jr., USAF (Ret.)
- 20 **ASD's Efficient New Weapons** / By Edgar Ulsamer
- 26 **US Navy—1977** / By James D. Hessman
- 32 **The Retirement System: What Lies Ahead?** / By Ed Gates
- 36 **Hawker Siddeley's Hustling Hawk** / By Maj. John P. Kelly, USAF
- 40 **Hawk's Leading Particulars**
- 41 **Jane's All the World's Aircraft Supplement**  
By John W. R. Taylor
- 49 **Civil Air Patrol: USAF's Versatile Auxiliary**  
By Maj. Terry A. Arnold, USAF
- 54 **On the Threshold of 'Nonclassical' Combat Flying**  
By Edgar Ulsamer
- 59 **Canada's General Dextrase: Right Man, Right Time**  
By Gen. T. R. Milton, USAF (Ret.)
- 60 **Smithsonian's Silver Hill—A Unique New Museum**  
By William P. Schlitz
- 64 **Industrial Associates of the Air Force Association**
- 70 **The Problem of Eroding Benefits** / By Ed Gates
- 76 **AFA's 1976-77 Committees and Councils**
- 78 **Iron Gate Chapter's Fourteenth National Air Force Salute**

## ABOUT THE COVER



The A-10 program is "proceeding as planned." (See p. 20.) TAC's first operational A-10 unit, the 354th Tactical Fighter Wing at Myrtle Beach, S. C., will begin its transition to the new close-support aircraft this summer.

A-10: TAC's New Tank Buster

## Departments

- 4 Airmail  
6 Unit Reunions  
8 Airpower in the News  
10 The Wayward Press  
12 Perspective  
13 Aerospace World  
16 Index to Advertisers  
65 The Bulletin Board  
69 Senior Staff Changes  
70 Speaking of People  
71 What They're Saying  
73 Airman's Bookshelf  
80 AFA News  
84 AFA State Contacts  
88 There I Was

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## COMMENTARY

# Equity in Limiting Strategic Arms

By Fred Charles Ikle

**S**IX weeks after President Carter's alternative proposals for strategic arms limitations were rejected in Moscow, formal negotiations are resuming in Geneva. In this interval, the thrust of Soviet bargaining has shifted to the arena of American public opinion—its target the malleable amalgam of views held by Government officials, the news media, and private experts.

Only our side presents such targets. No editorials in Soviet newspapers analyze whether or not the Soviet proposal was equitable, no private experts publish criticisms of the terms Foreign Minister Andrei A. Gromyko offered, no Soviet parliamentarians promote "compromises" between the official Soviet and American positions.

Soviet arguments and concepts of equity need to be scrutinized. First in the long list of its complaints is that the United States proposals would destroy the new agreement partly negotiated on the basis of the 1974 Vladivostok accord. In fact, the Russians seek to alter the Vladivostok accord by trying to add a 370-mile-range limit on land- and sea-based cruise missiles on both sides—missiles never discussed at Vladivostok. Such a limit, moreover, could not be verified, thus placing no reliable curbs on possible Soviet cheating.

Second, the more ambitious of the two United States proposals, which calls for substantial arms reductions, is criticized for demanding that the Soviet Union give up more than the United States. Interestingly, Americans have dwelled on this point far more than the Russians. For these asymmetrical reductions are explained by facts that the Soviet leaders do not wish to emphasize: their missiles are more numerous, much bigger, and are being more ambitiously modernized than ours.

In the 1960s, we stopped deploying additional missiles and reduced our strategic budget year after year. We expected similar restraint from the Russians—in fact, we expected that they would not build up to our numbers of missiles, let alone exceed them. Alas, exceed they did, and by far. Now to establish parity at lower levels, it follows that the side that has built up larger forces or is modernizing more aggressively will have to give up more.

Those American critics who now worry that President Carter demanded too much disarmament from the Russians did not complain in 1972, when the Anti-Ballistic Missile Treaty had the United States dismantle one of its two ABM installations, while the Soviet Union, possessing only one, had to dismantle none.

The only alternative way to reach equal limits would be for the side with smaller forces to build up more.

This is the approach taken in the Vladivostok accord for the ceiling on missiles with multiple warheads (MIRVs). The Russians were permitted to build up to the level planned by the United States. This approach can sometimes provide useful arms control; it does not bring disarmament.

For the long run, if we are to reduce arms, we must maintain the principle that the side that has built up more has to give up more.

Another Soviet complaint today has long been recurrent in the arms talks: the argument that the United States enjoys an unfair advantage because of its nuclear-armed aircraft overseas that could reach the Soviet Union. It is true that the present scope of the talks leaves out thousands of nuclear arms of shorter range. But if all these arms on both sides were equitably included, the Russians would have to give up much in order to reach an even balance.

Clearly, our allies would have to be more directly involved if negotiations were thus broadened. They are within reach of some 600 older medium-range ballistic missiles and 600 medium bombers in the Soviet Union. To these forces, which already outnumber United States and allied regional nuclear arms, the Russians are now adding two far more powerful new systems—the SS-20 missile and the Backfire bomber. Here Soviet negotiators assert a one-sided principle: In limiting nuclear arms, arms are to be counted only if they can travel from Britain, France, China, or other countries into the Soviet Union, but not if they travel in the opposite direction.

We must not permit the Russians to define for us what is equitable. They are tough bargainers. For example, they appear outraged by the proposal that would require them to give up 150 of their 300 super-heavy missiles, a reduction that the United States, with no such missiles, would not have to make. And they consider it equitable for us to supply all the figures on which agreements must be based—not only our own forces but also theirs—while refusing even to confirm these figures.

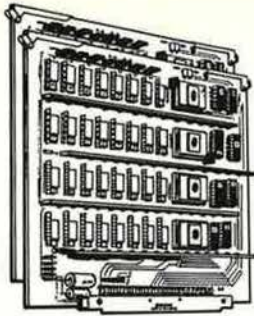
Beyond these questions of equity, it is important that we do not allow the Russians to stifle our ambitions for genuine disarmament. President Carter deserves strong support for reaching forward to achieve substantial and balanced arms reductions.

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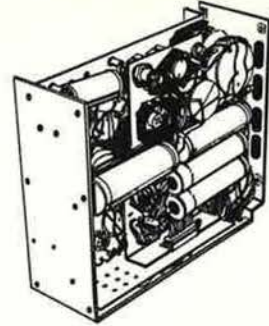
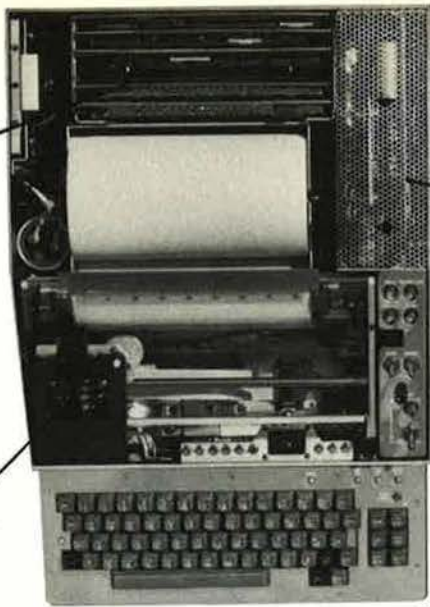
*Fred Charles Ikle was Director of the United States Arms Control and Disarmament Agency from July 10, 1973, to last January 19.*

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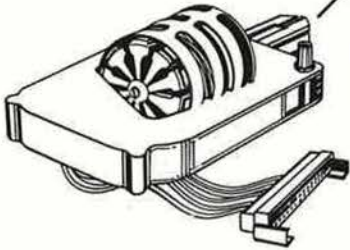




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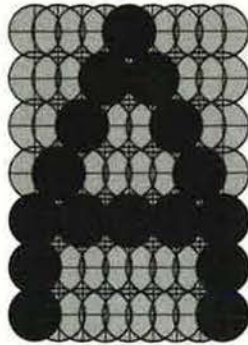


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mobile armed forces in extreme environmental situations, the Model T1148 has an MTBF of 2500 hours, an MTTR of less than 15 minutes, and it has excellent tempest and nuclear S/V characteristics. It has already been selected by the British Army for wide scale field deployment.

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# Airmail

## WW II Bomber Offensive

Having been involved in research on bombing in the twentieth century for five years, I would like to comment on some statements made by Gen. Ira Eaker during his interview with Albert Speer, published in the April AIR FORCE.

First, there are many public sources which point up the fact that the RAF's bombing program was faltering in 1942 and was rejuvenated by the August 1942 conference of Churchill and Stalin in Moscow, in which the Prime Minister got Stalin to accept the bomber offensive and the landings in North Africa as a substitute for an invasion in northwest Europe. Churchill's memoirs, the Woodward history of British foreign policy, and Harriman's memoirs all point up Second Front equivalency, as did Harris' statements at that time. The Soviets were, for whatever motives, eager to see the western Allies devastate German cities.

Second, on a related point, General Eaker's comments on the rejection by operational commanders of the targeting of the German power grid are interesting in light of the fact that the scientists working on "smart bombs"—which were used in Europe and Asia in World War II and Korea—found that the Air Force leaders were not enthusiastic about their use, not because they did not work, but because of the practice of measuring air successes in terms of tonnage rather than target effectiveness. The low-level pinpoint successes of the RAF using A-20s and Mosquitoes, and the Dam Busters proved that there were methods of hitting such small targets as transformers—but that they did not sustain the model of a large, heavy bomber system. Similarly, the RAF bomber barons rejected the Mosquito until it was proven in the field by Don Bennett's Pathfinders.

It is strange, moreover, that General Eaker's comments omit the key to electric power systems, *i.e.*, generating stations, which were as large a target as some of the fac-

tory systems attacked by "precision bombing" approach.

Roger A. Beaumont  
Associate Professor  
Department of History  
Texas A&M University  
College Station, Tex.

• *We assume that the "smart bombs" of World War II cited by Professor Beaumont were radio-guided bombs controlled by a mother plane. They were used in experimental quantities but with indifferent success. True smart bombs with electro-optical or laser guidance were not available until the latter years of the Vietnam War. It is worth noting that generator stations, usually located at the base of a dam, were not considered lucrative targets in Vietnam until the advent of the true smart bomb. These targets were too small for high-altitude attack, the axes of low-altitude attack limited by the dam structure, and heavily defended by antiaircraft systems.—THE EDITORS*

## Search and Rescue Missions

I wish to comment on the subject of the "Airmail" letter that appeared in March regarding the part played by the Joint Rescue Coordination Center, Ramstein AB, in the rescue of the balloonist, Ed Yost. I concur that Colonel Hickman and the Center have every right to be proud of the role they played in the rescue and that they are deserving of recognition and credit. However, as a taxpayer, I question the wisdom of the governmental policy that authorizes the expenditure of the resources that such a mission must demand.

Unless the training value derived matches the expense, I strenuously object to the policy that permits what was apparently a massive effort to rescue Mr. Yost and others like him. Unless I just don't understand, or am very shortsighted, I can conceive of no value to be derived from a successful balloonist's flight across the Atlantic other than the personal gratification of the "daredevil" who made the flight.

If I'm wrong, I would appreciate correction by your staff, or one of your readers. It would appear to me that if Mr. Yost, or any other similar hobbyists, chooses to take his life into his hands by attempting such daring feats, his life should be left in *his* hands.

I would be interested in knowing the amount of resources expended by the United States on this rescue mission and an assessment of the value derived by the United States other than the rescue of one of its "brave" citizens.

Lt. Col. Melvin Messer,  
USA (Ret.)  
Long Branch, N. J.

• *Each armed service is responsible for providing search and rescue (SAR) facilities in support of its own operations. As the majority of SAR missions are based on the humanitarian principle, military forces are encouraged to render aid to those in distress whenever possible. In coordinating and participating in the rescue of Mr. Yost, the Air Force was fulfilling its obligations under United States and International Civil Aviation agreements and responsibilities as outlined in the National SAR Plan.—THE EDITORS*

## Pleased Reader

The April issue of AIR FORCE Magazine was another superb production. Again—congratulations.

John Loosbrock's editorial was a grand lead-off; Claude Witze was entertaining with his "Cloud Over Mr. Warnke"; Eaker's interview with Speer was most interesting; Captain Gaskins is really a fine writer as well as a U-2 pilot; and, finally, Ed Gates really wrapped it all up with a bang with his "More Than Just a Place to Work."

In fact, I was so much impressed that here is my check for \$10 and if eligible, I would like to join the Air Force Association. I recognize red-hot outfit when I see it! Hence this red ink!

Gen. Wallace Greene, Jr.,  
USMC (Ret.)  
(Former Commandant, United States Marine Corps)  
McLean, Va.

## Questionable Discharges

On page 115 of the March issue you state that the Air Force is not giving "Discharge Under Other Than Honorable Conditions," instead dishonorable discharges. That is



roneous. Dishonorable discharges may still be given, though only by a court-martial. It is the "Undesirable" discharge that has been given the new name. This change has been reflected in AF Manual 39-12.

Capt. Jules F. Miller  
Assistant Staff Judge Advocate  
15th ABW (PACAF)  
APO San Francisco

### The News Censor

In "The Wayward Press," in the March issue, Claude Witze pointed out the power of the press is the power to determine what to print and what to leave out. That's the danger.

To omit news is to censor news. Who decides relevance and news worthiness? In most cases this determination to show and tell is left to the reporters themselves, due to our need for immediacy. This was pointed out quite clearly in the reference to the February 1 news coverage of the Senate Armed Services Committee.

Like it or not, a reporter for either the printed word or radio/TV is imposing his own brand of censorship by omission. This is a growing problem, without simple answers. Help keep us informed with *all* the facts about airpower.

Peter Onnigian  
Sacramento, Calif.

### More Military Clout

Leon Gouré's article, "Soviet Military Doctrine" [March '77 issue], stated that the USSR is committed to the doctrine of "ensuring the complete defeat of any aggressor," including the possibility of an all-out nuclear conflict.

This commitment may be known to US military leadership, but I don't believe the American people are aware of it. While the Soviets are quite extensively involved in keeping their military power/strength constantly updated, our government seems to be reducing military buildup and spending. I realize that the unpopular Vietnam era has put a sour taste in the mouths of the American people regarding any military spending; however, that doesn't make it less necessary. I do not delight in the thought of another war (I doubt anyone does); but, due to all the unrest in this world, it may yet be forced inevitably upon us.

The Soviet goal of total military superiority compels us to have mili-

tary clout equal to or superior to theirs. In order for us to barter with them, we'll have to play the numbers game and indicate to them that our forces, arms, weapons, etc., are capable of delivering the same, if not stronger, blow. The fact that the Soviets believe the first strike is paramount in a war makes us vulnerable to receiving it. We'll have to have the latest in weapons, planes, training, and a strong military power for deterrence. They cannot be so totally committed to such an extravagantly large military superiority solely to feel secure. We have to assume they intend to use it aggressively, not just reactively.

I would suggest that the American people be apprised of the consequences if the current feeling continues. More emphasis has to be placed on our military position or we could find ourselves in a very perilous position.

Olga C. Soda  
Denver, Colo.

### Calling American Fighter Aces

An historical document presenting the exploits and records of all American fighter aces is being published. The publisher needs material, *i.e.*, biographies, photos, etc., to produce the album.

American fighter aces of all wars and services are eligible to submit material and be included in the document.

Also of interest to many is the American Fighter Aces Association's annual meeting this month in San Antonio, Tex. [see "Unit Reunions," p. 6].

For details you may write  
William N. Hess  
Recording Secretary  
American Fighter Aces Ass'n  
P. O. Box 61268  
Houston, Tex. 77208

### Seeks Former Pilot

I'm looking for my former pilot, Lt. Dan David. He was from Connecticut and did some flying there before enlisting in the Army Air Corps. I was his crew chief in the 8th Squadron, 49th Fighter Group, in New Guinea in 1942-43. He was shot down and wound up at Pinellis AFB,

---

*We suggest that readers keep their letters to a maximum of 500 words. The Editors reserve the right to excerpt or condense as required in the interests of space or good taste. Names will be withheld on request, but unsigned letters are not acceptable.*

---

St. Petersburg, Fla., as a transportation officer. That was the last I heard from him.

Would love to have him attend our reunion [see "Reunions," March '77 issue] this July. Any information as to his present whereabouts would be appreciated.

Joseph Cunningham  
64 Woodland Rd.  
Chatham, N. J. 07928

### Looking for Brewer and Boggess

On June 20-22, we are having a crew reunion at my farm in Bishop, Ga. (sixteen miles south of Athens). Our crew was one of the original 58th Bomb Wing's (444th Bomb Group) B-29 crews. All eight surviving crew members will be here. This is the first time together for some of us since 1945.

We are anxious to invite the crew chief, Doug Brewer, and Lonnie Boggess, the replacement gunner, but so far have been unable to locate them. We would appreciate any information readers may have on either of these individuals. Also, we hope to have communications from people who knew our crew.

Col. F. C. "Duke" Steinemann,  
USAF (Ret.)  
Rt. 1, Box 195  
Bishop, Ga. 30621

### WAFSP to WASP

In the April issue of AIR FORCE Magazine, I read the "Airmail" section with great interest, agreed with the comments of MSgt. Merle C. Olmsted under the title of "Aviation History's Stepchild," and turned through the rest of the magazine to get a feel of its contents. "Belated Benefits for AAF's Women Pilots" was among those articles I scanned, then paused to read thoroughly.

Like Sergeant Olmsted, I have spent a great deal of my career in aircraft maintenance. And so it was that I became associated with the WASP program at Avenger Field in Sweetwater, Tex., from sometime late in 1942 to November 1943.

I, too, note some historical omissions and distortions. In the case of the WASP article, the ladies in question were referred to as "Women's Airforce Service Pilots" (your spelling). Perhaps thirty-four years have clouded memory, but is it not true that these ladies were known as Women Auxiliary Service Pilots rather than the other term? In fact, I believe they were *auxiliary* to the male civilian service pilots



# Airmail

mentioned during the account of the House opposition to legislation to commission the WASP. The acronym does not even fit, since Air Force is two words—making it WAFSP!

The distortion of this historical point may be a small one, but it serves to illustrate how the interpretation of facts changes with time. A recent TV segment of "Baa, Baa Black Sheep" bears this out when they showed WASP ferry pilots as commissioned officers.

I applaud Senator Goldwater for his tenacity in support of the benefits sought for this short-lived service of some very dedicated women. I also thank Mr. McDonnell for his fine article remembering a thirty-three year injustice to the WASP. I continue to read AIR FORCE Magazine as an active-duty member of the US Air Force, observing history in the making, though I must retire in 1978 due to "old age."

SMSgt. David E. Gloeckler  
San Antonio, Tex.

• *Our USAF Dictionary translation of WASP is "Women's Airforce Service Pilots" (Airforce one word, their spelling). After receiving Sergeant Gloeckler's letter we called the Office of Air Force History. Their version was the same with the exception of "Womens" (without the possessive apostrophe). Guess whoever christened the service couldn't face sputtering WAFSPs when referring to the ladies.—THE EDITORS*

## Raid on Berlin

I'm doing some research on the first US raid on Berlin (March 4, 1944) by the Eighth Air Force, and would like to have some personal accounts (and photographs) of men who flew on that raid.

M. N. Heuzenga  
Robinsonstraat 68  
Leeuwarden, Holland

## P-51 in Korea

I am compiling a photographic history of the P-51's activities in Korea. Also compiling a current address list of all personnel associated with the Mustang.

Warren E. Thompson  
7201 Stamford Cove  
Germantown, Tenn. 38138

## UNIT REUNIONS

### Airlifters

All airlifters are invited to attend the 9th annual Airlift Reunion/Convention and Symposium at the Bel Air Hilton Hotel, St. Louis, Mo., October 27-30. For information contact

Airlift Association  
P. O. Box 788  
Sarasota, Fla. 33578

### American Fighter Aces

A reunion of the American Fighter Aces Association will be held in San Antonio, Tex., June 15-19, at the Menger Hotel. Contact

William N. Hess  
P. O. Box 61268  
Houston, Tex. 77208

### CBI Hump Pilots Association

The 32d annual reunion of the China-Burma-India Hump Pilots Association will be held at The Inn of Six Flags, Arlington, Tex., August 25-28. For information contact

Mrs. Jan Thies  
917 Pine Blvd.  
Poplar Bluff, Mo. 63901  
Phone: (314) 785-2420

### IPM Society

The International Plastic Modelers' Society, USA, extends an invitation to participate in our 1977 National Convention in San Francisco, July 15-17. For further information write

IPMS-SF  
P. O. Box 126  
55 Sutter St.  
San Francisco, Calif. 94104

### Roswell AAF Vets

The annual reunion of the Roswell Army Air Force Veterans Association will be held July 8-10, in Roswell, N. M. Further information from

A. Varela  
46 Andrews Pl., RIAC  
Roswell, N. M. 88201

### No. 1 Air Commandos

The reunion of No. 1 Air Commando Group (original Wingate force) will be held July 28-30, at the Sheraton, in Philadelphia, Pa. Contact

Bob Bovey  
104 S. Lincoln Ave.  
Wenonah, N. J. 08090

### 33d Photo Recon Sqdn.

The 33d Photo Reconnaissance Squadron Association will hold its 4th reunion July 1-3, in Little Rock, Ark., at the Coachman's Inn. All 363d Tac Recon Groups are welcome. Call or write

James W. Foster  
6909 Glendale St.  
Metairie, La. 70003

Phone (504) 887-0848

### 57th Bomb Wing

The 9th annual reunion of the 57th Bomb Wing (B-25s, Mediterranean

Theater, WW II) will be held at the Chase-Park Plaza Hotel in St. Louis, Mo., July 13-17. All former members and supporting unit members, their families, and friends are most welcome. Contact

Hal Lynch  
11720 Whisper Bow Dr.  
San Antonio, Tex. 78230  
Phone: (512) 492-1015

### 58th Bomb Wing

The 21st annual reunion of the 58th Bomb Wing, 20th AF, will be held July 20-24, at Stowe, Vt. For information, write

Doug Kelley  
RD #3, Kellogg Rd.  
St. Albans, Vt. 05476

### 91st Bomb Group (H)

"Wray's Ragged Irregulars" of the 91st Bomb Group (H) are having a Rally, Round in Memphis, Tenn., July 1-3, at the Hyatt Regency. Come see what we're doing to the Memphis Belle.

Frank G. Donofrio  
1520 Channel Ave.  
Memphis, Tenn. 38113

### 302d TAW (AFRES)

The 302d Tactical Airlift Wing (AFRES), Rickenbacker AFB, Ohio, will celebrate its 25th anniversary as an Air Force Reserve unit on July 30. There will be an informal open house, parade, and a dinner dance at the base. All former members invited. Contact

Lt. Col. Harry Hafler  
302d TAW-DPM  
Rickenbacker AFB, Ohio 43217  
Phone: (614) 492-4045

### 379th Bomb Group

The 3d reunion of the 379th Bomb Group, 8th AF, will be held July 5-8 at the Edgewater Inn, Seattle, Wash. Please contact

Lt. Col. Anthony Chong, USAF (Ret.)  
AEI, Calif. 51st AFJROTC  
Lindhurst High School  
4446 Olive Ave.  
Olivehurst, Calif. 95961

### 434th Tac Fighter Sqdn.

The 434th Tactical Fighter Squadron "Bluenosers" of the Royal Canadian Air Force will receive their Air Standard on July 2. In conjunction with the presentation, the Squadron is planning a three day, all-ranks reunion of ex-434th members. Any ex-member interested in attending is asked to write

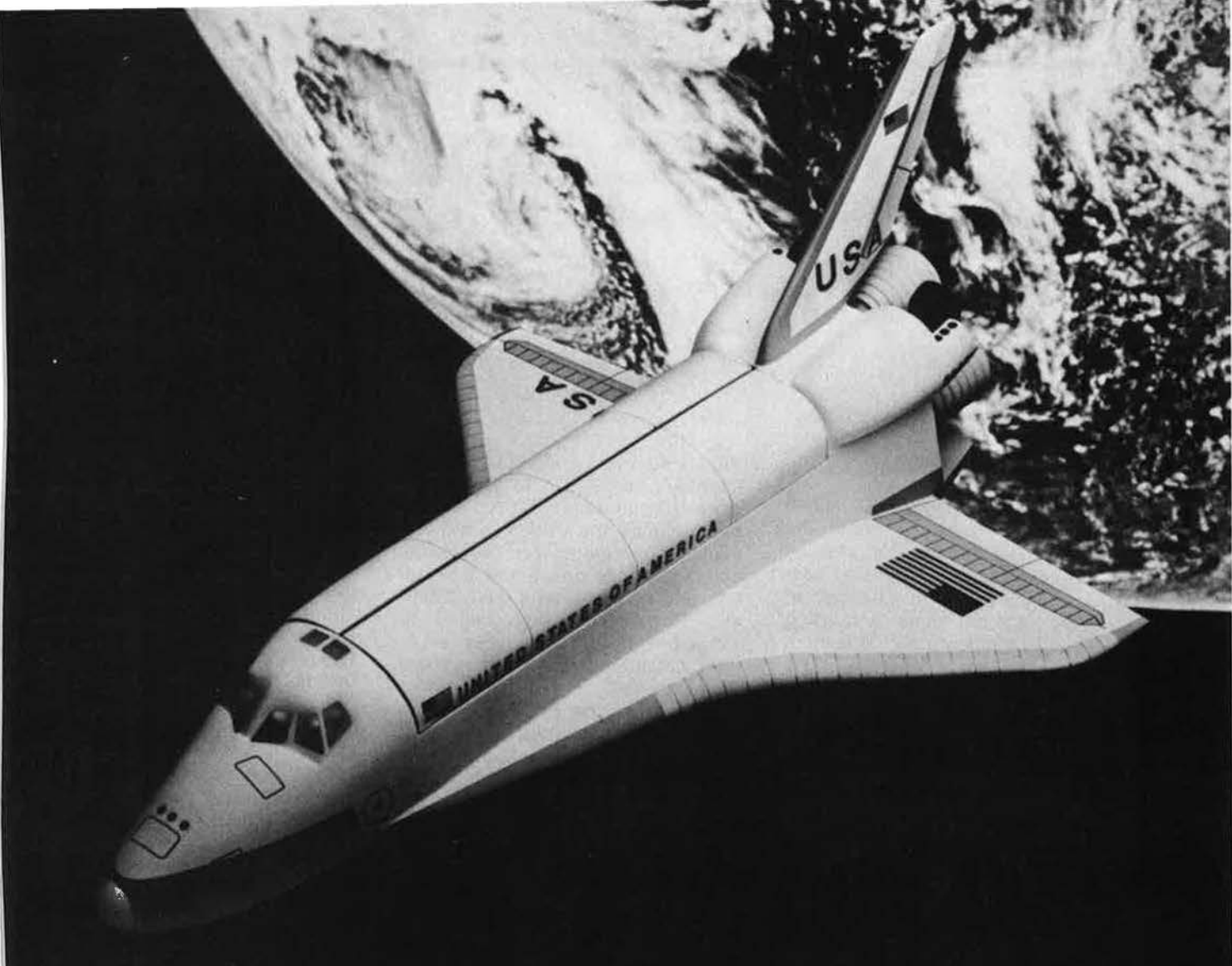
434th TAC (F) Sqdn.  
Canadian Forces Base Cold Lake  
Medley, Alberta  
Canada TOA 2M0

### 556th Recon Sqdn.

The 2d annual reunion of the 556th Reconnaissance Squadron will be held July 22-24 in Memphis, Tenn. Interested persons please write

Donald J. Chase  
4228 Ames Ave.  
Omaha, Neb. 68107





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These are just two examples of Vought's major subcontract capability. We also make the fuselages and tail assemblies for Boeing 747's.

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# Airpower in the News

By Claude Witze, SENIOR EDITOR

## The Budget Is Not Stable

Washington, D. C., May 9

If you are confused about the path being cut through Congress by the proposed budget for Fiscal Year 1978, which starts in October of 1977, you are not alone. According to the *Washington Star*, President Jimmy Carter met about a week ago with Democratic leaders and told them he had "not fully understood" the congressional budget process.

The truth is that the Democratic leaders, at least in the House, don't care much whether Mr. Carter understands it or not. They understand it, and they don't want the Executive Branch of the government stomping around on their turf. That's why, in the wee hours of April 28, the House voted, 320 to 84, to reject the Budget Committee's first effort to set a target figure for the year.

The damage was repaired a week later, but not until the Budget Committee went back to the counting room and produced new figures for national defense. The target resolution, which is not binding on the House, now calls for Pentagon budget authority of \$117.1 billion, up from \$116 billion, and outlays of \$109.9 billion, instead of \$109.6 billion. The change is not great, but there has been a lesson learned at each end of Pennsylvania Avenue.

In the House debate there was recognition of the growing Soviet capability, the public-opinion polls showing Americans want a more sturdy military organization, and the fact that the nation's welfare and public-assistance programs are wasting a substantial part of the funds granted. Thus, when the Budget Committee came up with its initial resolution, giving defense \$4.1 billion less in budget authority and \$2.3 billion less in outlays than

requested by President Carter, the members voted, 225 to 184, to restore the funds. Mr. Carter already had reduced the original Ford Administration figures for the Pentagon, before the committee took action and came up with what Chairman Robert N. Giomo called "a modest shift of resources away from national defense and toward social needs."

The vote of the House to restore this money was not the only reason the first resolution was rejected. The House leadership took umbrage at efforts by the President to save the defense program. There was an even more stern reaction to support thrown in by Defense Secretary Harold Brown, who did it in answer to requests from Capitol Hill. On top of this, there was the political atmosphere created by White House vacillations, particularly the sudden Carter withdrawal of the \$50 tax rebate package.

Somehow, the entire exercise, which consumed hundreds of pages in the *Congressional Record*, brought no results that seem worthy of the effort, which was to set a target that probably never will be hit. It was revealing only if viewed as a scream of agony from the liberal Democrats—who are powerful in the Budget Committee—and conservatives of both parties who stand aghast at the prospect of another record deficit. These strange bedfellows brought about the first crisis Congress has faced with its new budget procedures.

The liberals, by this time, are upset by the Carter priorities. According to the *Washington Post*, the Democratic liberal "establishment" has told the White House, "proceed as you are at your political peril." The message comes from the Americans for Democratic Action. Their president is Sen. George McGovern,

who ran for President in 1972 and won in Massachusetts and the District of Columbia. Mr. Carter did not win by a wide margin, but he is in the White House and his political advisors have told him it is a conservative vote that put him there.

All this was in the background as the House debated the first Budget Resolution. There was talk of "shifting wasteful defense expenditures to underfunded job-creating programs." The reply was that "there is waste also in food stamps, there is waste in welfare, and there is waste in Medicare." Rep. Marjorie S. Holt of Maryland, who is a member of the Armed Services Committee and the Task Force on National Security of the Budget Committee, pointed out that of all budget requests, "none has the scrutiny that the Department of Defense has in our House Committee on Armed Services. We go over it minutely." It was brought out, by another member, that the National Security Task Force of the Budget Committee spent six hours in session at three formal hearings. Hearings of the Armed Services Committee will fill a few thousand pages, gathered at hundreds of hours of hearings.

It is almost ironic that the squabble over the budget target resolution overshadowed an earlier vote, on April 25, in which the House endorsed, 347 to 43, a Defense Department authorization bill providing \$35.9 billion for procurement and research and development. This was the routine product of the Armed Services Committee. This year it essentially approved the figures proposed by the Carter Administration. The defense critics offered a few amendments that would have cut committee recommendations, but they were defeated. For all the preliminary noise from the Stop the B-1 campaign, the anti-bomber faction didn't even try to kill the authorization for five more aircraft.

The Armed Services Committee did shuffle some of the dollars around. Two items were restored that had been deleted when the Carter White House revised the Ford Administration figures. They are:

- For the Air Force, \$334 million for thirty F-15 aircraft and \$276 million for six Advanced Tanker Cargo Aircraft (ATCA).

- For the Army, \$77.7 million for the nonnuclear Lance missile ar



\$35.3 million for the improved Hawk missile system.

- For the Navy, \$24.4 million for the A-7E aircraft.

Two items were added that had not been requested by the Pentagon:

- For the Air Force, \$124 million for sixteen C-130H airlift aircraft.

- For the Army, \$17.2 million for twenty C-12 utility aircraft and \$25.6 million for long lead procurement for the Mechanized Infantry Combat Vehicle (MICV).

Two items were deleted from the Pentagon request:

- \$28.2 million for planned procurement of CTX utility aircraft for the Navy.

- A reduction of \$62.2 million in the request for support equipment related to USAF's F-16 aircraft.

There were cuts in research and development requests to the total of \$776.7 million. \$103 million was taken from the F-16 program and \$44 million out of the Airborne Warning and Control System (AWACS). The Army and Navy also lost some funding.

Because of its impact on votes in the House, the committee's reasoning is worth quoting, although it does not differ much from the approach a year ago under President Ford.

The committee report says:

"Our military posture over the past several years has been on the decline relative to Soviet advances in both technology and military capability. The present trends, which are clearly in favor of the Soviet Union, must be reversed if the United States intends to continue to maintain its ability to preserve freedom and deter aggression.

"There is little doubt that the Soviets are totally committed to a national objective of surpassing the United States in virtually every area of technology and military capability. Compelling this conclusion is the available information on the vigorous Soviet effort during the past two decades in extending its technology and production base; there are numerical indicators that can be readily established through the available literature."

The committee provided figures on the subject:

"For example, during the period 1971-75, the percentage of the Soviet work force engaged in research and development increased by twenty-five percent, when the US

percentage decreased during the same period by five percent. Currently, nearly seventy percent of the Soviet work force engaged in research and development concentrates its efforts on military applications as opposed to forty percent for the United States."

On manpower, the Armed Services Committee was highly critical of Defense Department management. It found serious deficiencies in long-range planning processes, and scolded:

"Many of the present serious problems should have been identified and, more importantly, acted on before they reached current proportions. Overall, the department appears to provide little long-term planning for many of the basic issues which should be addressed and analyzed, such as optimum quality levels for the service personnel, and the tradeoffs between the expense of recruiting vs. the costs of increased personnel turnover. This latter question is becoming increasingly relevant as the services generally attempt to increase the quality levels of their accessions at a cost varying between \$3,700 and \$5,700 to recruit each additional high school graduate vs. an average cost of \$1,000 to recruit all enlistees."

The other major criticism focused on naval shipbuilding. It said both the Ford and Carter proposals were "grossly inadequate." The commit-

tee says the Administration's program would continue the decline in Navy strength, with its request for only eleven combat vessels. It also was critical of the types of ships requested, and of the lack of attention paid to Soviet advances and the recommendations of the Joint Chiefs of Staff. Elaborate alterations were made in the ship spending program.

As we go to press, the corresponding report of the Senate Armed Services Committee is slated for early publication. The committee has agreed, 18 to 0, to report an authorization bill almost identical in size to the House version. In a preview statement, Chairman John Stennis indicated there are some differences that will have to be resolved.

For example, both committees are concerned about civil defense. While the House group boosted the Carter request for \$90 million up \$44.8 million to \$134.8 million, the Senate committee was less generous. It proposed adding only \$5.25 million.

The Senate committee also added to the Navy shipbuilding request, but would cut the F-14 buy from 44 to 36 aircraft.

On manpower, the Senate committee again is less generous than the House committee. The request, for the Air Force, was for 572,000 in active strength. The House approved this, but the Senate committee would cut it by 2,400. The Army



*Within the Administration, the liberal view supported by Vice President Mondale is that bigger spending for social needs should have priority.*

— WIDE WORLD PHOTOS



# Airpower in the News

would take a bigger slash, down 12,900 from the request of 790,000. The Navy, in the Senate version, would be granted 100 more sailors than requested. A final cut would be civilian personnel, down 19,800, as opposed to the House recommendations that it be boosted by

about 3,600. Mr. Stennis said his program will save \$191 million in Fiscal 1978, with recurring savings of \$380 million in later years.

From here on, if there is any single cross to be carried in battle by the Defense Department and the White House, it will be the wrangle over the size of the federal deficit. The liberal viewpoint, supported by Vice President Walter F. Mondale, is that bigger spending for social needs should have top priority. The funding can come from borrowing, plus cuts in defense. The more con-

servative view is that a balanced budget must be achieved within a few years, that national security must not be imperiled, and that welfare programs must be tightened up, not expanded.

At the moment, President Jimmy Carter is reputed to be in the camp of the more conservative advocates. The man has changed his mind on other issues, and there is no guarantee that he will not change it again. He is closer now to fully understanding the congressional budget process. ■

## The Wayward Press

There has been scant mention of it in the press, but in early April a bill was introduced in the House of Representatives that calls for a government examination of newspaper publishing. The author of the bill classifies newspaper publishing as one of the critical and basic American industries—in a class with automobile and drug manufacture—and says Uncle Sam has the obligation to find out how it is performing, "considering such criteria as efficiency, innovation, social impact, price, and profit."

Yes, it sounds like madness, but you have to consider the source. The sponsor of H.R. 6098 is Rep. Mo Udall, the liberal Democrat from Arizona who, only a year or so ago, was aspiring to be President of the United States. On the day he introduced H.R. 6098, Mr. Udall made a speech to the National Press Club in which he pointed with alarm to the fast-growing concentration of American newspapers into the corporate hands of about twenty-five newspaper chains. He said this handful of owners now controls more than half of our daily newspaper circulation. He compared this, with a straight face, to the fact that three companies make eighty-two percent of our cold breakfast cereal and one company provides ninety percent of our canned soup. Mr. Udall is terrified at the prospect of what he calls Chain Store News. A few quotes from his NPC address suffice to give the flavor of his reflections:

"I dread the day all newspapers look and read alike, when there will be less difference in daily newspapers than between the Big Mac and the Whopper—and less flavor.

"I seriously worry about the absence of local publishers and editors with real roots in the community. A leader whose concern goes beyond advertising lineage and newsprint costs. . . .

"I recognize that talk of regulation of newspapers is an area of special caution because of the First Amendment and the incompatibility of government control and the free press. But the business of publishing is also the business of selling advertising, which no one has contended is exempt from antitrust laws. For it is true that one can drive out competition and do great damage to consumers with a newspaper cartel even as with an oil cartel. . . .

"Today, what the titans of the chains want is profits—not power—just money. I fear that the quest for profits and higher dividends for their growing list of stockholders will transcend their responsibility to maintain an independent and dedicated influence in the community."

Mr. Udall's populist approach brought a response, at once. Here is the entire editorial opinion of *Editor & Publisher*, the newspaper world's trade weekly:

"If Rep. Morris Udall could pass a law returning all news-

papers now owned by groups public and private to their original owners, in twenty-five years the concentration of ownership would be the same as it is today unless confiscatory taxes on individual owners and their heirs are changed."

One publishing official said simply: "He doesn't know what he is talking about."

An editorial in the *Topeka State Journal* declared:

"Udall reveals not only a gaping lack of knowledge on the subject of newspapers and their ownership in America, but a vast dearth of common sense and philosophical faith in the principles upon which the free press is established in the United States."

The author went on to argue that newspapers are "exempt from the temptations of monopoly" and news staffs "too renegade to be controlled by a central headquarters somewhere off in some large city."

That should balance off the efforts of both Mr. Udall and the press proprietors in this contest of silly statements.

It is true that the chains, which call themselves newspaper "groups," are expanding fast. It also is true that the economics of the business, which include the impact of tax legislation, is largely responsible.

As for the sameness of newspapers, of which Mr. Udall complains by drawing a parallel with the output of fast food chains, group ownership has almost nothing to do with it. The technological revolution, involving communications and computerized or automated production, from the reporter's desk to the delivery truck, has everything to do with it. The congressman should find out how the *Wall Street Journal* uses a satellite to achieve simultaneous publication in multiple and widely separated plants. The *Journal* has a technological jump on the group newspapers, but not a big one.

Further, the newspaper business today is immensely profitable, although this is an angle not discussed in newspaper editorials. The *New York Times* made record profits in the first quarter of this year. While the *Washington Post* indulges in editorial fits when the steel industry seeks a seven percent price increase, in 1976 the paper boosted its subscription rate by twenty percent. A recent report from the Newspaper Survival Study says: "The American daily newspaper industry as a whole appears to be stable and profitable with an almost constant number of dailies from 1946 to 1976. Failure rate for daily papers is less than the national average for all commercial and industrial firms."

The publishers and editorial writers who set out to rebut Mr. Udall's case simply failed to use their best argument:

The trend toward central ownership of some daily US newspapers is none of the federal government's business. Why doesn't somebody say so?

—CLAUDE WITZE



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# Perspective

## Comment & Opinion

By Maj. John R. Straton, Jr., USAF (Ret.), MISSION VIEJO, CALIF.

### Improving Government Efficiency While Reducing Cost

On a recent visit to the Pentagon, President Carter was reported to have made the following statement while discussing Defense spending:

And I've been particularly concerned about the excessive retirement benefits that are available to those who have served in the military who then retire and get full-time jobs working for the government itself. This is too expensive.

Two things seem apparent from this statement: To Mr. Carter, the military retiree represents an enigma, and his advisors in the matter have not always provided him with accurate data.

In the first place, a military retiree is the victim of a system that forces retirement during what should be his most productive years (outside of a combat environment). Although he is not the architect of this system, he is much maligned for it and at the same time must accept the penalties imposed by it. His early retirement and substantially reduced income (ordinarily adequate for sixty to sixty-five years of age when the children have long been grown and gone) comes at a time when his expenses are greatest, for his children are of high school and college age, and he is paying off a mortgage.

A second career is essential at this time to meet these obligations; but at forty-plus, at a time of high inflation and high unemployment, he is often judged "overqualified" for employment in the private sector. Be that as it may, this situation has created a valuable, but barely tapped, human resource wherein the individual, having functioned in an environment of vastly greater responsibility than that usually seen by his civilian counterpart of equivalent age, is experienced well be-

yond what his years might suggest.

The military retiree should be recognized as a dedicated, patriotic citizen who wants to continue to serve his country with all the experience he has to offer. As shown by statistics previously published in military-oriented periodicals, but which saw little, if any, exposure in the public press, there are very few military retirees on the federal payroll compared to the number of federal civilian employees (about five percent) and compared to the number of military retirees available.

To clarify the matter of cost associated with government employment of military retirees, consider a qualified military retiree drawing benefits of \$X, and a civilian government position calling for a salary of \$Y. The government is going to pay a *maximum* of \$X + \$Y whether the position is filled by the military retiree or by a regular Civil Servant. In fact, if the position is filled by a retired *Regular* officer, the cost to the government is *less* than \$X + \$Y, since the *Regular* officer retiree must forfeit a substantial part of \$X when he is employed by the government. This cannot be considered as "too expensive."

Let's look at it from the standpoint of *subsequent* retirement cost. If the military retiree (after twenty to twenty-five years of service) had been selected for the civilian position and then retired from Civil Ser-

vice at age sixty to sixty-five after another fifteen to twenty years, the government would pay retirement benefits based upon (a) twenty to twenty-five years military service plus (b) fifteen to twenty years of Civil Service, or *forty- to forty-five years of total government service.*

If, however, the civilian (after twenty to twenty-five years of service) were placed in the position and retired after serving another fifteen to twenty years, the government would still be paying benefits for (a) twenty to twenty-five years service of the military retiree plus (b) forty to forty-nine years of Civil Service for the civilian, or *sixty to seventy years' total government service.* Obviously, hiring the military retiree would reduce retirement cost. Again, this cannot be considered as "too expensive."

Here, therefore, we have the means of improving the efficiency and quality of government and at the same time *reduce the cost:*

1. Extend the Dual-Compensation restrictions to apply to *ALL* military retirees when working with the government. This would (a) eliminate the present discriminating nature of the law, and (b) reduce government personnel cost. A "save-pay" feature should be enacted to protect those military retirees already employed by the government at the time the change in the law takes effect.

2. Make a concentrated effort to hire qualified military retirees.

3. Encourage state and local governments to also utilize this valuable human resource.

4. Establish a stable career forces complement with a minimum age for military nondisability retirement that is consistent with Civil Service. This will eliminate the wasteful practice of early retirement as well as the government's contribution to the swelling unemployment rolls.

### HOW TO SHARE YOUR PERSPECTIVE

The purpose of this department is to encourage the presentation of novel ideas and constructive criticism pertinent to any phase of Air Force activity or to national security in general. Submissions should not exceed 1,000 words. AIR FORCE Magazine reserves the right to do minor editing for clarity, and will pay an honorarium to the author of each contribution accepted for publication.



# Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

Washington, D. C., May 6

★ USAF's first F-16-equipped tactical fighter wing is to be located at Hill AFB, Utah.

The operational unit will be collocated with the Ogden Air Logistics Center, which will act as worldwide system manager for the General Dynamics-built Air Combat Fighter. This arrangement "would result in early and efficient responses to maintenance and logistics requirements," officials said.

The selection of Hill for the F-16 hinges on expected approval under provisions of the National Environmental Policy Act.

The unit—the 388th Tactical Fighter Wing—is to be assigned seventy-two F-16s, with another thirty of the Mach-2 fighters equipping a training squadron. The 388th is expected to be up to full strength

by the end of FY '80, and will require an increase of 370 manpower authorizations at Hill.

USAF intends to transfer the F-4 Phantoms currently at the base to Reserve components.

★ NASA achieved a major program milestone recently with the sixty-second-long test firing of the Space Shuttle Main Engine (SSME) at rated thrust conditions.

The SSME, the first engine to be controlled by computer, is more powerful for its size than any rocket engine previously developed.

The SSME is currently undergoing a test program at the National Space Technology Laboratories in Mississippi, and is slated for long-duration firings at various thrust levels as well as under rated conditions.

The engine is designed for seven

and a half hours of flight operation (fifty-five reuses) before overhaul, and will burn about eight and a half minutes during a typical Space Shuttle mission. The SSME can deliver 470,000 pounds of thrust.

★ On completion of a modification program late in 1979, 116 F-4Es will have been equipped as Wild Weasel aircraft, and designated F-4Gs.

First phase was the recent award of contracts to five firms to supply electronic warfare avionics for the conversion of the first twenty-five F-4Es to the Wild Weasel or G version: IBM, Owego, N. Y., receiver sets; Loral Electronics Systems, Yonkers, N. Y., displays; Texas Instruments, Dallas, Tex., homing and warning computers; GE, Utica, N. Y., analysis receivers; and McDonnell Douglas, St. Louis, Mo., software and support equipment.

The first F-4G is expected off the modification line at AFLC's Ogden Air Logistics Center in Utah in late 1978. Wild Weasels will have the capability and mission "to detect, identify, locate, suppress, and destroy enemy electromagnetic emitters."

★ An AFSC joint system program office has been set up at Eglin AFB, Fla., to direct R&D of an advanced medium-range, air-to-air missile to arm Navy and USAF fighters.

A follow-on to the AIM-7 Sparrow



USAF has designated the 388th Tactical Fighter Wing, Hill AFB, Utah, as the first combat unit to be equipped with the new F-16. See item above.



Being tested at Ft. Irwin, Calif., is Northrop's contender in the contest to develop an air-to-air missile to arm the newest generation of fighters (see above).



# Aerospace World

missile series, the weapon is being designed with USAF's F-15 and F-16 and Navy's F-14 and F-18 fighters in mind.

"Objectives of the program call for producing a missile with im-

proved electronic counter-countermeasures and low-altitude capability, reduced unit procurement and life-cycle costs, decreased missile weight and drag impact on aircraft operation, and improved overall system reliability and performance," AFSC said.



Chief Master Sergeant of the Air Force Thomas Barnes congratulates John Stetson during the latter's recent swearing-in ceremony at the Pentagon. The new Air Force Secretary, who has forged an outstanding and varied career as an industry executive, is the twelfth to hold the post.

proved electronic counter-countermeasures and low-altitude capability, reduced unit procurement and life-cycle costs, decreased missile weight and drag impact on aircraft operation, and improved overall system reliability and performance," AFSC said.

In operation, AMRAAM (for Advanced Medium Range Air-to-Air Missile) will use an inertial reference unit and microcomputer to project target coordinates obtained from the plane's radar. Closing on the target, the missile's active radar seeker will lock on and guide it to impact.

The AMRAAM program was initiated in June 1976 with the Phase I selection of Hughes, General Dynamics, and Northrop to produce a competitive design definition. Later, Raytheon and Ford Aerospace and Communications were issued no-

cost-to-government contracts to allow them to be competitive for Phase II procurement. Under Phase II, beginning in October 1977, two contractors will be selected for validation, encompassing total missile system integration, aircraft interface, fabrication, buildup, lab and environmental testing, and live demonstration firings. In 1980, the winning contractor will begin the missile's full-scale engineering development.

★ Canada is in the market for about 130 to 150 new high-performance, multipurpose fighters to replace the CF-104s and CF-101s that entered service in the late '50s and early '60s. (Canada's CF-5s, which were added to the inventory in recent years, are to be converted for an advanced training role in the 1980s.)

According to officials, "The new aircraft will serve Canada's sovereignty and defense needs through the turn of the century, including its contribution to the NATO Alliance."

Six aircraft are being considered: the Grumman F-14, McDonnell Douglas F-15, General Dynamics F-16, McDonnell Douglas/Northrop F-18, the Panavia Tornado, and the Dassault-Breguet F1E.

Faced with the inevitable budget constraints, "an essential element [in the selection] will be the extent

of the industrial benefits which can be offered by the manufacturers and the source nation," an official said.

The program, with cost spread over ten years, will include the purchase of test equipment, trainers, and related hardware.

Canada expects to sign a production contract by year's end and receive its first aircraft by mid-1981.

Officials said that the selection process will be complicated by the widely differing roles that Canada's air forces play in its NATO commitment and in North America.

★ Under a \$25 million AFSC contract, Boeing Co. has begun phase one of a program to restart production lines and build the "B" version of the Short-Range Attack Missile. Production of SRAM-A ceased in July 1975, when the final lot of the 1,500 supersonic air-to-ground missile was deployed by SAC aboard B-52 and FB-111 aircraft.

Boeing's move marks the first time that an Air Force contractor has prepared to start up missile production following an extended shutdown.

Phase one is concerned with training personnel and recertifying existing tools and hardware. Several subcontractors are involved.

According to Boeing, SRAM-B features a longer-life rocket motor, new warhead, and better resistance to nuclear effects, as well as a new computer with increased capacity and speed. Also upgraded will be ground-support equipment, to permit the simultaneous check of a full eight-missile launcher rather than missile by missile. The new equipment will also be able to test the Air-Launched Cruise Missile, gravity weapons, and the B-1 avionics.

Phase one will extend through September 1977, with the entire program taking an additional thirty-seven months.

★ The Aerospace Medical Research Lab, Wright-Patterson AFB, Ohio, has under way a program to provide greater aircrew safety through better cockpit design and improved restraint devices.

Receiving special attention is a hydraulically activated series of cables that will preposition a crewmember and restrain his arms and legs prior to ejection, which has always been hazardous and the cause of major injuries.



## J. Greg Kane Dies, AFA's Midwest Manager

J. Greg Kane, for more than twelve years Midwest Manager for the Air Force Association and AIR FORCE Magazine, died March 27, at Lutheran General Hospital, Park Ridge, Ill., after a short illness. He was sixty-three.

Greg, born in Baltimore, graduated from Loyola College in that city, and attended the University of Baltimore Law School. He had long experience in publishing, having been with the *Baltimore Sun* papers, *Army*, *Navy*, *Air Force Times*, and *Armed Forces Management Magazine* prior to joining AFA.

He was well known in aerospace circles throughout the Midwest, traveling extensively for AFA in twenty-one states from Minnesota to Texas. He is survived by his wife Beth and their six children.



Currently, the only prepositioning device is a retractable shoulder harness that secures a crewmember's spinal column against the seat back, leaving arms and legs to fend pretty much for themselves.

An ejection seat simulation device will play a key role in tests of the new equipment, due to begin this summer.

The speed with which the new prepositioning equipment operates is all important, since the time span between initiation of the ejection process and activation of the seat

has been shaved to one-tenth of a second.

The Lab is also conducting research on restraining harnesses that are reinforced with steel cables and others that will stretch on impact, thus easing the strain on a crewmember's body.

In a related matter, USAF has contracted the University of Kentucky to study the problem of spinal injuries suffered by ejecting pilots. It seems that in some 226 such exits from aircraft, twenty percent of the pilots suffered spinal damage. Data

uncovered in tests will be used for equipment improvement as well as made available to the GM auto crash study project.

★ A new, lightweight breathing system—based on NASA-developed space technology—is now available commercially to the nation's firefighters, the first major advance in such systems in twenty years.

But the space agency plans to go far beyond that in joining with the Fire Prevention and Control Administration to undertake "a comprehensive, long-term cooperative program to apply space-age technology and techniques to develop lighter, tougher, safer equipment" to aid in firefighting, the most hazardous of all occupations.

The first phase of Project FIRES (for Firefighters Integrated Response Equipment System) is being undertaken by Grumman Aerospace Corp., Bethpage, N. Y., to determine new standards for equipment and then apply them in the design and fabrication of a complete firefighter's ensemble using the latest in materials and manufacturing techniques.

Monitoring the program is a committee made up of firemen, chiefs, safety officials, and technical consultants from around the country.

Once prototype equipment is created, it will be tested under actual firefighting conditions in at least ten US cities, NASA said.

If successful, NASA and NFPCA will launch a program for commercial production of the equipment.

★ USAF is installing an energy control and monitoring system at the Arnold Engineering Development Center in Tennessee that will oversee most of the heating, ventilation, and air-conditioning in forty-two of the facility's buildings.

While the Hughes Aircraft Co.-built system will cost nearly \$900,000, it is estimated that it will trim the Center's annual energy bill by about \$130,000 and yearly labor costs by \$94,500. At that rate, the system will have paid for itself in four years.

The system utilizes a computer-controlled central station that is joined to distant terminals via coaxial cable and microwave links.

According to Hughes, the cable is such that closed-circuit television and voice capabilities could be added later.



the flight line at Boeing's Seattle, Wash., facility are five of the wing fleet of Air Force E-3A Airborne Warning and Control Systems craft. The first was delivered to USAF in March of this year.



# Aerospace World

★ AFA Past President and current National Director Joe Foss has accepted the chairmanship of the Lindbergh Memorial Fund's military committee.

The World War II Marine Corps ace who later served in the Air Force has been Governor of South Dakota and is now a KLM executive. He will coordinate participation of the military services, Reserves, and veterans in the 1977 "year of Lindbergh" observance and events, the fiftieth anniversary of the solo Atlantic flight.

The Fund, cochaired by Jimmy Doolittle and Neil Armstrong, was established to raise \$5 million, the annual proceeds of which will provide fellowships in science and exploration.

"Charles Lindbergh was a great patriot in war and peace, and a contributor to aviation and industry," the retired Air Force brigadier general and Medal of Honor recipient said in announcing his acceptance, "but he also foresaw that industrial progress would upset the balance with nature and earth's resources and spent his final years in this crusade."

The Lindbergh Memorial Fund is located at 30 E. 42d St., New York, N. Y. 10017.

★ In a long-proposed move, USAF is now officially proceeding with the closure of three major installations: Craig AFB, Ala., Kincheloe AFB, Mich., and Webb AFB, Tex.

"In light of the hard realities of defense budgeting," there is no alternative, officials said. The closings are to save "at least" \$75 million annually.

Since announced in March 1976, the proposed closures have been subjected to detailed study and the provisions of the National Environmental Policy Act.

The movement of people and equipment from Kincheloe will occur this summer; students at Webb and Craig will complete their current phase of training, with the



Attending a symposium at Edwards AFB, Calif., Lt. Gen. James H. Doolittle, USAF (Ret.), takes time out to chat about the B-1 bomber with AFSC's Commander, Gen. William J. Evans. Among other things, General Doolittle is cochairman of a fund in memory of Charles Lindbergh (see adjacent item).

bases reduced to caretaker operations in six months and ultimately to be declared excess to Air Force needs.

★ Based on the results of a test program, USAF has doubled the service life of the Northrop F-5E/F tactical fighter and trainer to 8,000 flying hours.

During the stress program, "a structurally complete F-5E airframe was subjected to more than 1,700 different load conditions representative of those experienced during 24,000 hours of actual flight," USAF/Northrop reported. This translated into more than 20,000 simulated flights that typically duplicated take-

off, climb, cruise, combat, descent, and landing.

Following the 24,000 hours of flight-by-flight fatigue testing, "the test airframe was then cycled to 9.1 Gs, representing 110 percent design load, for more than 1,000 cycles to determine remaining strength of airframe structure," officials said.

Besides USAF and USN, the Northrop aircraft is in service or on order in twenty-five nations, more than any other US-built tactical fighter.

★ Good news on the aerospace industry employment front: by December 1978, jobs will have in-

## Index to Advertisers

Aerospace Historian .....	
AIResearch Mfg. Co., Garrett Corp. ....	Cover
ECI Div., E-Systems, Inc. ....	
Grumman Aerospace Corp. ....	Cover
Hawker Siddeley Aviation Ltd. ....	
Jesse Jones Box Corp. ....	
Jet Electronics and Technology, Inc. ....	
McDonnell Douglas Corp. ....	17 and Cover
Motorola Inc., Government Electronics Div. ....	18 and
Vought Corp. ....	
AFA Insurance .....	86 and
AFA Symposium—Dayton .....	



## What Every Good Physicist Knows About Radar But Has Never Told You.

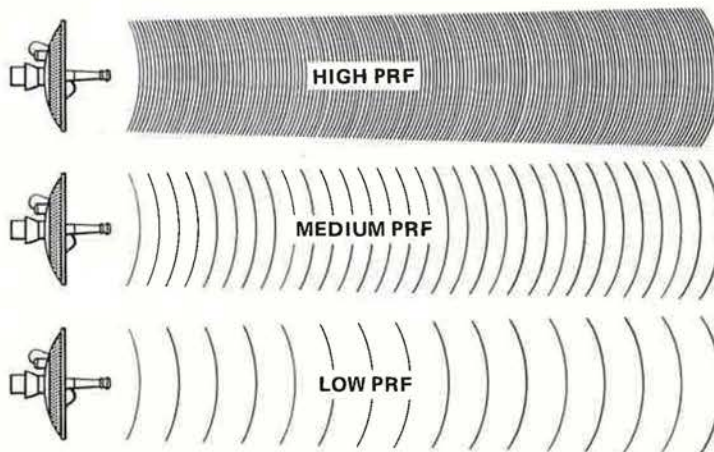
*The laws of physics dictate certain characteristics for radar — characteristics that seem shrouded in mystery for the layman, but which establish performance limitations profoundly important to mission-planners. The laws of physics are written in all languages and what you are about to read is no secret to radar experts, whatever their country.*

Fighter radars are frequently described as having a Pulse Repetition Frequency (PRF) level. PRF suggests that a number of radar energy pulses are transmitted in one second of time. High PRF means energy is transmitted by the radar at 100,000 or more pulses per second; low PRF means that energy is transmitted by the radar at approximately 1,000 pulses per second.

cause low PRF radar cannot detect aircraft below.

One advanced fighter now being developed will have a medium PRF radar. Medium PRF radars sacrifice the longer range detection of high PRF to achieve greatly improved capability against maneuvering targets.

F-15 and F-18 radars are the only fighter radars that have all three PRF



Fighters such as the F-4J and other aircraft with pulse-doppler radars designed in the early '60s operate with high PRF. These high PRF radars provide good long range detection of head-on targets, but the high frequency pulse rate offers restricted detection of tail-on targets. They lose track of maneuvering targets relatively easily.

Air combat radars such as those in the F-4E are low PRF. Low PRF radars are good for ground mapping, but for air-to-air missions they have lost favor to high and medium PRF radars be-

cause low PRF radar cannot detect aircraft below. One advanced fighter now being developed will have a medium PRF radar. Medium PRF radars sacrifice the longer range detection of high PRF to achieve greatly improved capability against maneuvering targets. F-15 and F-18 radars are the only fighter radars that have all three PRF

modes. High and medium modes operate together. High PRF modes give long detection ranges. Medium PRF modes give excellent capability against tail-on and/or maneuvering targets. Low PRF modes are activated for superior ground mapping during air-to-surface missions and back-up air-to-air capability. The laws of physics help establish the detection capabilities of high/medium/low PRF radars. F-15 and F-18 fighters aren't limited by these laws of physics. They choose the one that's right for the fight they're in.

**MCDONNELL DOUGLAS**



creased to 935,000 from the low of 895,000 in mid-1976. The peak was 1,500,000 in 1968.

According to the Aerospace Industries Association survey:

- Aircraft manufacturing will show "vigor"—because of orders for commercial transports by US scheduled airlines.

- Helicopter manufacturing employment will rise by five percent over December 1976.

- Missile and space projects will register a small gain during the survey period, reflecting accelerated Space Shuttle activity.

- "Other related products"—avionics, nonaerospace, and basic research—will continue an upward trend.



At Lackland AFB, Tex., SSgt. John W. Shinstock receives an associate of applied science degree from ATC Commander Gen. John W. Roberts. Such degrees, awarded by ATC's Community College of the Air Force, are the first ever granted by a military service to enlisted personnel, constituting a milestone in education.

★ "Congress 77," the first convention of the National Association of Flight Instructors, will take place September 16-18 in Columbus, Ohio.

The affair "will feature numerous clinics and seminars intended to promote and improve the profession of flight and ground instruction," NAFI said.

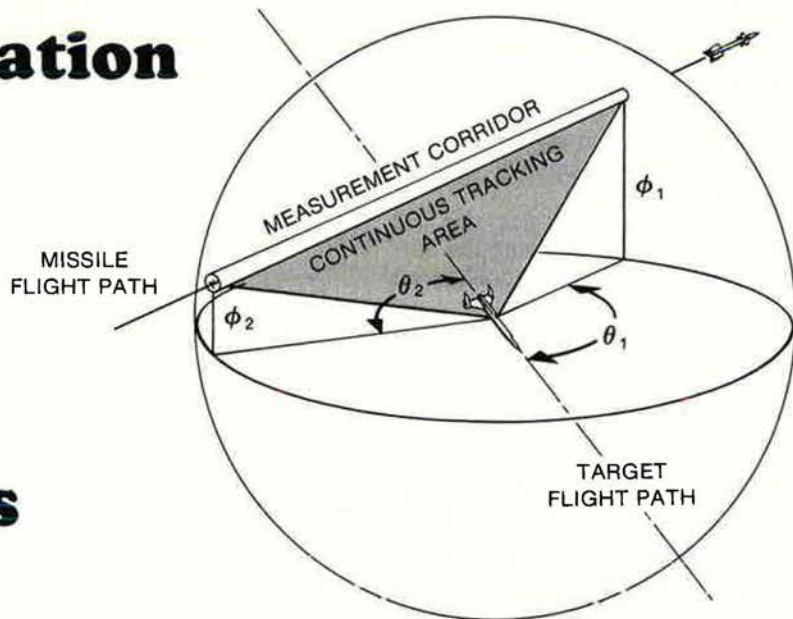
For details contact the NAFI, P. O. Box 20204, Columbus, Ohio 43220. Telephone (614) 459-0204.

★ **NEWS NOTES**—Secretary of Defense Harold Brown has reversed a previous decision to close the Minuteman III production line and



# Rewriting the book on

**Real-time evaluation of air-to-air & surface-to-air missiles, rockets & projectiles, and impact weapons is emphasized.**



Range/angle/angle scoring for sub-scale targets.

#### **For sub-scale targets.**

A vector miss distance indicator system developed for U.S. Air Force high-performance sub-scale targets uses tiny, lightweight electronics on the target with real-time computations accomplished by ground computers. The measurement corridor portion of the missile flight path is precisely identified as the attacking missile is continuously tracked through a detection volume surrounding the target. These range/angle/angle measurements are continuously transmitted to a ground computer where advanced high-speed data reduction makes trajectory reconstruction easy and "closest point" is automatically recorded.

#### **For full-scale targets.**

A range/range scoring system has been developed to achieve

the same results using the PQM-102 and other full-scale targets. Since the environmental and space constraints are less severe in larger vehicles, less complex electronics can be used resulting in lower cost.

#### **A scalar scoring bonus.**

Inherent in the design of both of the above systems is the important scalar scoring capability . . . at no added cost. And the data is valid within a radius of more than 200 feet of the target.

#### **Classical bullet-hit indicator problem solutions.**

We have attacked the classical vehicle noise problem in bullet-hit indicator systems, and on paper it appears to be solved. The problem of detecting and scoring small bullets was solved during successful breadboard tests earlier this year. And we're

making progress at a rate that may make these statements far too conservative by the time they get into print.

#### **Expendable mini-tracking beacons for \$1.00 each.**

Motorola has in development a new low-cost triangulation system to accurately score bomb impact points. Much of the system has already reached the breadboard stage, including an ultra safe, passive augmented, non-explosive, all-weather, expendable bomb scoring device. Present estimates indicate that the expendable beacon can be produced in quantity for less than \$1.00 each.

#### **Laser system tested.**

This spring Motorola successfully tested a dual sensor laser scoring system. The program, completed under contract to the

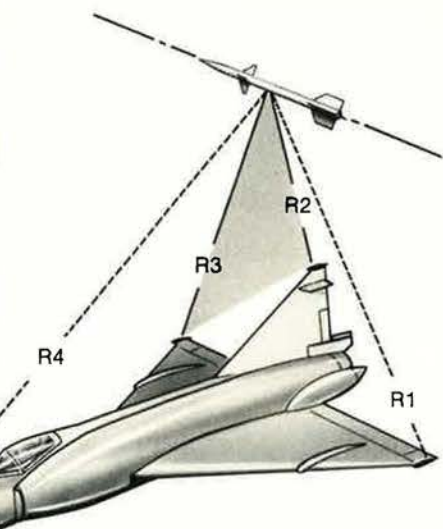


**MOTOROLA**

The mind to imagine . . . the skill to do



# scoring



Range/angle scoring for full-scale targets.

## Aerospace World

has directed USAF to procure an additional increment of ten missiles while a review of the need for continued missile production is under way. "At the same time," said the Secretary, "this production of full missiles would allow the more important parts to be used as spares should that ever be required."

For the first time since the Civil War, an officer has been called out of retirement to run West Point. President Carter, in April, named **Gen. Andrew J. Goodpaster**, who from 1969-74 served as Supreme Allied Commander in Europe, as the Academy's **new Superintendent**.

The nation's oldest existing com-

mercial airliner—a **Douglas M-2**—has been donated to the **National Air and Space Museum**. Built in 1926, the open cockpit plane carried mail and two passengers. Restored to flying condition last year to celebrate **Western Airlines'** fiftieth anniversary, the biplane is built of wood and fabric and powered by a World War I Liberty engine.

**Col. Thomas E. Brand** is the new **Director** of AFSC Electronic Systems Division's Air Force Satellite Communication System Program Office, in charge of air and ground terminals. Previously Deputy Director, he replaces **Col. James E. Baker**, now at Hq., AFSC.

**Died: Gen. Ludomil Rayski**, "Father of the Polish Air Force," who served with the RAF during World War II and was a leader of the Polish Air Force Association in Great Britain, in London in April. He was eighty-five. ■

U.S. Navy, proved the accuracy and efficiency of the electro-optical, range/angle/angle system and the scalar scoring bonus.

**Test your scoring systems on our test range.**

Motorola's test range, which accurately simulates operating conditions in a free space environment, is being used to check out our new advanced vector scoring systems under contract. And other systems can be checked out here too. . .yours or ours.

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Above, the largest gathering of Eagles took place at Langley AFB, Va., prior to recent deployment to Bitburg AB, Germany, where aircrews were met by their families, right. The aircraft, the first F-15s in Europe, are assigned to the 36th Tac Fighter Wing.





The Air Force is pushing the state of technology to gain important improvements in subsonic and supersonic air-breathing missiles for tactical and strategic application and is moving toward all-weather target acquisition and strike capability . . .

# ASD's Efficient New Weapons

BY EDGAR ULSAMER, SENIOR EDITOR

**T**HEIR job description is demanding: Keep the "flying" Air Force the best equipped there is at the lowest possible combined cost of development, acquisition, test, operation, and support. For the some 7,000 members of AFSC's Aeronautical Systems Division (ASD) at Wright-Patterson AFB, Ohio, the art of systems management is a high-wire act that delicately balances such divergent factors as operational requirements, technological opportunities, life-cycle costs, limited budgets, inflation, and limited personnel resources. As an added attraction, there is the challenge of multinational program management. In the case of the F-16 fighter, this means the most formidable management task ever faced within the Defense Department, with a total potential market in excess of \$25 billion, according to ASD Commander Lt. Gen. George Sylvester.

Beyond ASD's responsibility for managing technology that is in hand is the job of development planning. That means melding extrapolations of future mission needs and technological feasibility to arrive at such far-out concepts as equipping hypersonic aircraft with high-energy laser weapons to intercept, in the upper reaches of the atmosphere, ballistic missiles launched by enemy submarines.

The Division has a total annual budget of more than \$6 billion, executes about 1,100 new contracts with industry each year, and issues about 12,000 changes to existing contracts.

ASD's largest acquisition programs, managed by "super" SPOs (System Program Offices), are the B-1, F-15, A-10, and F-16. The fate of the B-1 bomber is to be determined by President Carter as this issue goes to press.

The F-15 appears to be headed toward a slowdown in production rate, from an originally planned nine to six and a half aircraft a month. In announcing this cut—\$334 million in FY '78—Secretary of Defense Harold

Brown explained that the lower rate is adequate to maintain a going production base "while a further analysis is made of the preferred mix of F-15 and F-16 aircraft." Congress, however, is considering continuing at the current nine-per-month production rate. The F-15 is operational at Luke, Nellis, and Langley AFBs, and Bitburg AB, Germany. The latter unit was activated in squadron strength on April 27, 1977. The F-15 program includes a procurement of 729 aircraft, which will be positioned in the US, and USAFE and PACAF.

Another factor that could affect the F-15 domestic buy is the Follow-On Interceptor (FOI) program, whose funding was delayed by the Administration's "Amendments to the FY '78 Budget and FY '79 Authorization Request," which defers "commitment to the F-15 while further consideration is given to the potential bomber threat, other candidate systems, the possible use of tactical aircraft based in the US, and the total future need for manned interceptors."

Another possible impact on the F-15 could be the RF-X program, involving an advanced tactical reconnaissance vehicle for the 1980s and beyond. The leading contender could be the F-15 airframe, but, as General Sylvester told AIR FORCE Magazine, "there is always the possibility that an unmanned system might yet still be considered. 'Milestone zero' types of mission analyses could well conclude that an RPV would be better suited for this mission." The RF-X (or R-X) mission requires a highly survivable platform capable of providing "near real time" target information during day, night, and all-weather conditions with the help of a high-resolution Synthetic Aperture Radar (SAR) system.

The A-10 program is proceeding as planned, according to General Sylvester. The Air Force is planning or using the A-10 as a testbed for a group of sophisticated sensors that could provide improved capability for any single-seat aircraft for ground attack under adverse weather conditions.

## The F-16 Management Challenge

In addition to the 1,388 F-16s ASD is acquiring for USAF, the Division also is responsible for overall man-

agement of the multinational phase of the program which involves production of 348 aircraft for the a



forces of Belgium, Denmark, the Netherlands, and Norway. The complex arrangement that ties the US and these four countries together in a joint acquisition program that could exceed \$25 billion in total sales provides for coproduction with a minimum offset of fifty-eight percent of the European procurement value. That feature, General Sylvester said, elevates the F-16 program to the toughest management challenge ever faced within DoD. Involved are three aircraft production lines, in Belgium, the Netherlands, and Fort Worth, Tex., and two production lines for the F100 engines in East Hartford, Conn., and Belgium as well as more than fifty subcontractors in the four European countries. Most of these subcontractors have been selected, primarily on the basis of merit and, secondarily, in a fashion that allocates equitable work distribution to each country, the ASD Commander said. The subcontractors will provide parts for the European and USAF's F-16s and for those that are sold to other countries.

All facets of the coproduction arrangement, including letting subcontracts, are scrutinized by the parliaments of the four countries. To ease the way through the maze

of political intricacies and sensitivities, a multinational steering committee was formed to provide broad policy guidance to the F-16 SPO. Other difficulties, General Sylvester said, are being created by the fact that the framers of US laws and policies governing the conduct of foreign business didn't contemplate the special conditions required to implement complex multinational consortia, especially the need for flexible interaction of differing codes and standards.

A joint contract administration organization in Brussels was formed to assure that quality control and contract administration are being accomplished. This organization is staffed with professionals on a multinational basis, approximately fifty percent USAF and fifty percent Europeans.

In spite of the unique management problems of the F-16 program, "we are making good progress. The European assembly lines and tooling are coming along well and we are on track with the 'not-to-exceed' aircraft unit price at which we will deliver the 348 European F-16s between January 1979 and December 1984," General Sylvester said.

## ASD's Cruise Missiles

The Air Force plans on initial operational capability (IOC) by July 1980 for the AGM-86 Air-Launched Cruise Missile (ALCM), currently undergoing full-scale development at ASD. This new schedule, eighteen months ahead of last year's plans, presumably was accelerated because of the increasing strategic and political importance of this versatile weapon system. ALCM is likely to be developed in two versions: an "A" with medium range of more than 700 miles, and a "B" with a range more than twice that of the "A" model. The latter is a stretched design that carries more fuel, the same avionics, and/or payload but won't fit the B-52's rotary launcher, which is used for SRAM (Short-Range Attack Missile) and the "A" version. In certain cases, the extended-range ALCM-B could be launched from outside the defended perimeter, against strategic targets in the Soviet Union. DoD directed USAF to give priority to ALCM-B, over the ALCM-A.

Purpose of ALCM is to increase the target coverage of the strategic bomber force and to saturate enemy air defenses. The air-breathing subsonic system, in the "A" model configuration, weighs about one-fifth and has a radar cross section about one-tenth that of Hound Dog, SAC's current supersonic cruise missile. Yet ALCM's navigational accuracy is a tenfold improvement over Hound Dog.

Two technical advances make new cruise missiles a technological breakthrough and account for their prominence at SALT: Small, efficient, and light turbofan

engines that consume less than one pound of fuel per hour for every pound of thrust generated; and sophisticated guidance technologies that, while not new, are becoming practical because of advances in minicomputer technology. Front-running among the guidance technologies is Terrain Correlation Matching (TERCOM) that updates the missile's inertial navigation system accuracy for low-altitude, terrain-following profiles. A radar altimeter provides a stream of ground-elevation information as the missile approaches an area whose terrain features are stored in its computer memory. By comparing the information, the computer determines the missile's actual position and instructs the autopilot to correct any deviation from the preprogrammed flight path. TERCOM can perform course corrections en route as well as in the terminal area.

TERCOM's accuracy is limited only by the quantity of the elevation data—the number of points measured within a given area—stored in its computer. Twenty flight-test missiles are to be procured within the next two fiscal years, and parachute recovery of some will permit their reuse. Flight demonstration of the first full-scale development "B" model is scheduled for January 1979. The Boeing Co. is in charge of ALCM's airframe design and fabrication, carrier aircraft equipment requirements, and hardware and software integration. Williams Research Corp. provides the engines for the Air-Launched Cruise Missile as well as for the Navy's cruise missile, the Tomahawk.

## USAF's Ground-Launched Cruise Missile

A January 14, 1977, OSD memorandum established a Joint Service Cruise Missile Program Office (JSCMPO), with the Navy as the lead service. Purpose of the joint management is to cut costs through maximum com-

monality in terms of subsystems, components, test, and evaluation.

OSD's January memorandum assigned USAF responsibility under the JSCMPO for the ground-launched



cruise missile (GLCM) program. This program will use the Navy Tomahawk missile adapted for Air Force use and is to achieve an expeditious IOC. The Joint Chiefs of Staff were directed to provide a position paper resolving potential service roles and missions issues, including questions pertinent to Army and USAF responsibilities for the in-theater GLCM "ground-launched nuclear deep strike" mission.

ASD and others "will have a great deal of work to do before we can start GLCM's full-scale development," according to General Sylvester. "True, the air vehicle will be patterned on [the Navy's General Dynamics-developed] Tomahawk and much of the ground support will be a spin-off from our RPV experience. Still, this is a complex management task involving close interaction with the USAF using command, the Navy, and

with ERDA [the Energy Research and Development Administration] on the warhead."

The initial Air Force position on GLCM centers on the need for "highly accurate launch control and position location systems linked to secure command control and communications," General Sylvester said. Whether or not GLCM, a mobile, probably truck-mounted system, is to be hardened against overpressure is still being studied. There is a firm requirement, however, to harden GLCM against the electromagnetic pulse (EMP) and transient radiation caused by nuclear detonations, according to the ASD Commander. The inherent hardness of the avionics that protect the missile during flight may not be adequate for prelaunch and postlaunch survivability in a nuclear environment. ASD is now forming a GLCM SPO as part of JSCMPO.

## The Advanced Strategic Air-Launched Missile

Late next year, at the White Sands, N. M., test range, ASD plans to test a missile propulsion system of pervasive importance to future strategic and tactical air-launched missiles. The underlying technology is called the Integral Rocket Ramjet (IRR). The ramjet, like the turbojet, burns a mixture of compressed air and a fuel. But where the turbojet relies on a complex rotating compressor to compress the air, the ramjet gets compression for free, by exploiting the ram effect of its high speed on the ingested air.

Ramjets fall into two general categories, those that fly supersonically but slow down the ingested air for subsonic combustion, and others that rely on technically more difficult supersonic combustion (scramjets) and fly at hypersonic speed. In the high-speed regime, the ramjet is simpler, smaller, faster, and more fuel-efficient than a turbojet and, compared to a rocket of equivalent size, it has far greater range. In the past, the ramjet's pluses were partly negated by the need for a rocket or other large, external booster to accelerate the vehicle to the low supersonic speeds where ramjets become operational. USAF's Bomarc and the Navy's Talos typified early conventional ramjet technology. IRR scores major size and weight reductions over earlier operational ramjets by using the ramjet combustion chamber as the motor case for the missile booster rocket as well as through the advent of new high-energy fuels.

The Soviet SA-6 surface-to-air missile is an example of IRR technology. USAF's involvement with integral rocket ramjet technology started at the Aero Propulsion Laboratory (APL) several years ago. Working with industrial contractors, APL came up with the concept of a multipurpose missile and performed limited feasibility testing. This work crystallized into what is now ASD's Advanced Strategic Air-Launched Missile (ASALM) project.

In March 1976, ASD awarded a contract with an estimated value of \$33.6 million to Martin Marietta Corp. of Orlando, Fla., for the Propulsion Technology Validation (PTV) project. The project is intended to

demonstrate state-of-the-art integral rocket ramjet technology and provide a "transfer function" from ground test to actual flight performance over the very large flight envelope that is anticipated for an ASALM-type vehicle.

The PTV is an important part of the total ASALM technology development effort, which includes study and subsystem hardware contracts with several other companies. The basic objective of this work is to investigate all useful system, subsystem, and technology options that should logically be considered in defining a next-generation cruise missile. These options are identified and put in a total system context through parallel Technology Integration Studies (TIS) contracts awarded to McDonnell Douglas and Martin Marietta in 1975. Subsystem studies and development hardware are provided by Marquardt Corp. and the Chemical Systems Division of United Technology Corp. in the ramjet area, Thiokol Corp. for the integral rocket, and Raytheon and Aero-neutronics for the guidance areas.

The current ASALM configuration being given serious consideration is a high-speed weapon, capable of cruising at low or high altitude and adaptable as a strategic air-to-ground or a theater air-to-air weapon.

In the air-to-air role, ASALM appears to be well suited for use against a Soviet AWACS. Its range would be significantly greater than the F-14's Phoenix system. Target acquisition would be by radar.

The seven PTV test flights are to be completed in 1979, concurrent with completion of the technology integration studies, thus opening the door to full systems validation and subsequent full-scale engineering development.

APL's work in support of ASALM and other advanced follow-on designs is keyed to two principal areas, according to Col. P. O. Bouchard, head of the Lab's ramjet engine division: Research on variable-geometry inlets and nozzles to extend the missile's range, and on hotter combustors to permit higher speeds. Both qualities affect system effectiveness and survivability. Variable-geometry devices, "at least on



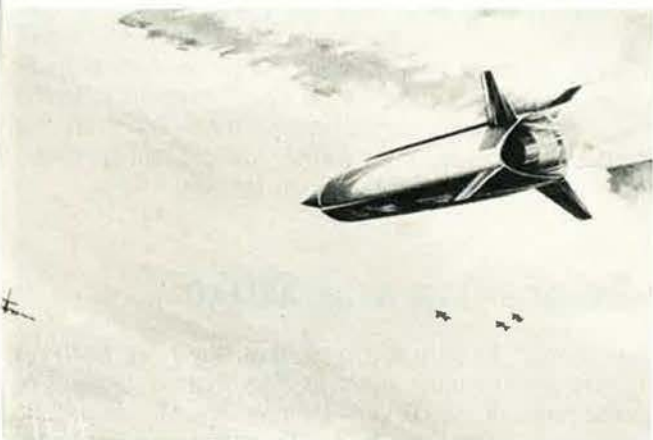
paper," appear capable of doubling the weapon's range, he said. Major gains can be expected from a three-dimensional carbon/carbon (an extremely heat-resisting

composite material used on space reentry vehicles) combustor developed by McDonnell Douglas that "permits an extremely hot burning propulsion system."

## IRR for Tactical Missiles

The Integral Rocket Ramjet's potential appears to be as great for tactical missiles as it is for cruise missiles, according to Colonel Bouchard. Tactical missiles at present are rocket propelled, and typically operate in a boost-coast mode which, for extended ranges, results in a relatively low average velocity and an unpowered terminal interception. The latter fact probably is the most serious deficiency because it restricts the so-called end-game maneuverability. "If the target [such as an advanced Soviet fighter] pulls nine Gs in the end game, it becomes very difficult for an unpowered missile to maneuver responsively and intercept the target. Generally, the missile with the most available energy in the end game wins," Colonel Bouchard said.

Ramjet-powered tactical missiles, by contrast, offer sustained thrust and increased end-game maneuverability, increased maximum range, shorter time to extended-range targets, a larger launch envelope, and a doubling or tripling of the missile's lethality against maneuvering targets at long range, he said.



ASALM, the Advanced Strategic Air-Launched Missile using hybrid Integral Rocket Ramjet propulsion, is suitable for attacking Soviet AWACS.

APL is not alone in its sanguine assessment of IRR-powered tactical weapons. Vice Adm. Forrest S. Petersen, Commander of Naval Systems Command, told a Washington meeting of the American Institute of Aeronautics and Astronautics earlier this year, "Tactical missiles for medium- to long-range applications are on the threshold of dramatic, 300 to 500 percent, gains in per-

formance. . . . Most current missiles are extensions of early guided rockets with severe limitations on maneuverability. The introduction of advanced aircraft aerodynamics techniques with bank-to-turn controls will eliminate constraints on achievable angle of attacks. When coupled with the sustained thrust of the integral rocket ramjet, the result will be an order of magnitude improvement in terminal accuracy for our future tactical missiles."

Ramjet propulsion, APL research indicates, is not the answer to *all* tactical missile problems. IRR missiles, Colonel Bouchard emphasized, are not meant to replace shorter range weapons such as aerial guns or dogfight missiles.

Three ramjet propulsion concepts for tactical missiles are currently being investigated by APL in concert with the Naval Air Systems Command: ducted-rocket, liquid-fuel, and solid-fuel ramjets. A ducted-rocket ramjet is scheduled for flight demonstration by FY '81. It is to be followed by the liquid-fuel ramjet and the solid-fuel ramjet within several years.

The liquid-fuel ramjet is the most complex, costly, but yet versatile engine because the fuel flow can be varied to match altitude and speed requirements. On the other hand, the ducted-rocket engine does away with the liquid-fuel tank, pump, and metering system and uses only a gas generator with a solid grain to supply hot fuel-rich gas to the combustion chamber. This system is easy to produce and can be assumed to be as reliable and maintenance-free as today's conventional solid-rocket motors. But the system is currently less versatile and less efficient than the liquid-fuel ramjet.

The solid-fuel ramjet simply employs an annular solid-fuel grain cast inside the combustion chamber; air flows through the grain and the resulting fuel/air mixture is burned. This solid-fuel approach is very simple, but the combustion process involves more technological unknowns than the other two types of engine. A decision on which ramjet engine type is to be used in future production tactical missiles is not expected before the early 1980s.

At present, the Air Force is not conducting extensive research on high-performance scramjets. NASA and the Navy are working on supersonic combustion ramjets at a moderate pace, with an eye on both manned and unmanned systems.

## Remotely Piloted Vehicles

General Sylvester firmly rejects the popular notion that the Air Force "is down on RPVs. To the contrary, we are investing considerable effort in this technology." Pointing out that USAF has developed a range of RPVs, extending from the chaff-dispensing AQM-34V and

TEDS (Tactical Expendable Drone Systems) to harassment mini-RPVs, he said that advocates of RPV designs that are new from the ground up, such as the Advanced RPV program, forget that "what you get are small gains in speed, range, and payload that cost a great deal of



money." The Air Force is looking at ways to remedy the key deficiency of RPV operations—the high cost and complexity of air launch, via C-130, and midair recovery, by helicopter. Current work, General Sylvester said, involves development of both ground-launch and ground-recovery capabilities.

Other key programs in progress are the BGM-34C multimission RPV, associated modifications to the DC-130 launch and control aircraft, and a multiple RPV control system.

The BGM-34C, according to Lt. Col. Tom Mascarella of ASD's RPV/ALCM Program Office, is a versatile design that can be configured relatively quickly—using modular nose payloads—to perform reconnaissance, electronic warfare (EW) support, or air-to-surface strike missions. First to be developed is the EW payload, with a production decision expected this summer. This version of the BGM-34C will incorporate the AQM-34V ECM payload. Contract awards on a reconnaissance version are likely late this year and involve use of the camera employed by the Compass Bin activities during the Southeast Asian war. For the moment, the air-to-ground strike module is intended only to demonstrate capability, without a specified production plan, according to Colonel Mascarella. The program office is exploring various rocket configurations for ground-launch. Rocket-assisted launch systems are favored because they don't infringe on runways needed for manned systems.

Promising ground recovery systems include a combination of parachute and airbag to cushion impact with the ground. The chute would function in a conventional fashion, but instead of the RPV being midair recovered by a helicopter, an airbag would be inflated to cushion ground impact. Another technique centers around the

use of quick-setting foam to achieve the same goal. Different chemicals would be sprayed from two nozzles to combine into a highly resilient cushion. Such a system could be retrofitted to the AQM-34V and the BGM-34C.

Linchpin of ASD's RPV work is the RPV Multiple Drone Control (MDC) System that is undergoing development testing at Hill AFB, Utah. Rooted in demonstration programs associated with earlier Combat Angel research, the MDC System installed in a DC-130 is designed to control up to eight RPVs in a sequential, rather than simultaneous, manner. In a practical sense, "if all of [the RPVs] are flying well, we will have little to do but to monitor their progress. But if one or more of them wander off track—and thereby require the operator's correction, we will only be able to sequentially redirect each RPV without losing track of the others," according to Colonel Mascarella. The DC-130 will have two launch-control stations, each controlled by an operator, and one ARCO, or Airborne Remote Control Operator, who monitors and, when necessary, corrects the performance of the vehicles in flight.

To date the most complete systems approach to an RPV is Compass Cope, a high-altitude, long-endurance RPV that takes off and lands in aircraft fashion. Teledyne Ryan and the Boeing Co. each developed two prototypes. After a series of studies and test flights, some from Cape Canaveral, Fla., to demonstrate their "viability" within FAA-controlled air corridors, Boeing was awarded a contract to develop a total system. The initial mission assigned to Compass Cope is high-altitude standoff battlefield surveillance. Other potential missions under consideration are communications relay, signals intelligence, and precision emitter location as part of the Precision Location Strike System (PLSS).

## Toward All-Weather Target Acquisition and Strike

PLSS is an umbrella program comprised of four complementary projects, each aimed at correcting specific deficiencies in USAF's ability to locate and strike targets. PLSS's central task is to make possible accurate detection of and standoff strike against a wide variety of targets—both emitters, such as radar, and nonemitters, such as bridges—under day, night, and adverse weather conditions, and in near real-time. Key components are the Advanced Location Strike System (ALSS), first developed for use in Southeast Asia; the Precision Location Strike System (PLSS); the Emitter Location System (ELS—keyed to threats associated with enemy air defenses); and the Photogrammetric Target Systems (PTS—pinpointing other types of targets).

PLSS was divided into two program elements in FY '78. PLSS, because of its importance, was accorded autonomous status. ELS, ALSS, and PTS were combined under the title of High Accuracy Targeting Systems.

A pivotal consideration associated with PLSS, according to General Sylvester, is the depth of the standoff and defense suppression that is being sought. The greater that depth, the more difficult it is to assure survival of both the vehicle carrying the system's sensors and the

strike force. To gain depth of view, the relay platform housing sensors must either fly very high or come close to the range of the enemy's interceptors. The deeper the strike force penetrates, the greater becomes its exposure. One answer is such standoff weapons as the GBU-15 modular guided glide weapon. No final decisions on either score have been made, according to General Sylvester. If USAF decides in favor of a high-flying platform to assure continuous coverage over an extended range, two leading candidates are the Compass Cope RPV and the manned U-2R.

Several key systems support USAF's drive for all-weather target acquisition and strike. They include the All-Weather Tactical Strike System (AWTSS), the Tactical Electronic Reconnaissance (TEREC) system, and the UPD-X SLAR.

The last-named program is a sophisticated system to locate and rapidly exploit rear-echelon targets under all-weather conditions—particularly staging areas of breakthrough or reinforcement forces. This high-resolution, side-looking airborne radar, tied by a jam-resistant air-to-ground data link to ground-based processing equipment, is being developed in cooperation with the Federal Republic of Germany.



## Long-Term Projects

A long-sought but elusive technological goal is the ability to detect, identify, and strike mobile targets under all weather conditions. ASD in concert with the Air Force Avionics Laboratory is taking a long step toward it with the All-Weather Tactical Strike System (AWTSS), according to Col. T. E. Horne, ASD's Deputy for Development Plans. AWTSS is a "two-phased advanced development effort that will demonstrate the use of high-resolution SAR [Synthetic Aperture Radar], navigation, and weapon-delivery technologies" to deliver guided or unguided weapons under all-weather conditions against a range of tactical targets such as tanks, mobile SAMs, and trucks "in the dynamic environment of the FEBA [forward edge of the battle area]." The AWTSS reflects a compromise between feasibility and cost, he said.

Hypersonic reconnaissance and penetrator aircraft

equipped with standoff weapons represent a tentative, long-term concept to assure penetration and survival in high-threat environments, according to Colonel Horne. This concept envisions augmentation by hypersonic cruise missiles that would be used to attack important fixed targets. Another major thrust is ASD's investigation of the "next generation strike system or systems." Six contractors are working with ASD and Air Force Flight Dynamics Laboratory to find out "what such a vehicle should be like. There is still some doubt whether it should be manned, unmanned, V/STOL, GLCM-like, or a mixture of two or more types. We do think, however, that any future aircraft should be 'digitized,' that is, the propulsion, flight control and weapon-delivery subsystems should be integrated through a digital multiplex data bus and digital processors."

## Management Policies

Two interlinked concepts, design to cost and life-cycle costing (DTC/LCC), continue as the basis of ASD's program management, General Sylvester asserts. The Advanced Medium STOL Transport (AMST) program—approaching source selection and development—exemplifies how ASD applies these design parameters. "By adding \$23 million to the development program and increasing the average flyaway cost by about \$340,000, we were able to incorporate three design changes that will produce net savings estimated at about \$776 million in total life-cycle costs." These changes, he explained, eliminated the need for a navigator through the addition and integration of some avionics, cut the required number of loadmasters to one through redesign of the cargo-handling system, and deferred the aircraft's programmed depot maintenance requirements. Boeing's YC-14 and McDonnell Douglas's YC-15 are the AMST prototypes competing in the current source selection.

ASD plans to test important refinements of life-cycle costing on AMST. General Sylvester proposes to reduce uncertainties of the government's life-cycle cost estimates and to directly involve the manufacturer in the operations and support costs of his system: "We plan to conduct two thirty-day operational readiness evaluations, one which would involve actual operations in a minisquadron using early production aircraft, and another two years after initial operational capability has been established. In each case, performance of the system will be measured against contractual requirements, and goals established in excess of requirements. The measured performance of the manufacturer's system that exceeds contractual requirements will be used as a basis for awarding up to \$8 million in additional incentives." The result would measure achievement of a design to life-cycle cost goal, akin to design to cost in systems acquisition.

Another technique for improving systems reliability that is being pursued by the Aeronautical Systems Divi-

sion and other USAF components is the Reliability Improvement Warranty (RIW) that commits a contractor to warrant the continuing operation of his equipment in the field for extended periods at a fixed price. The contractor's profit, if any, is determined by the reliability and maintainability of his equipment. RIW is being applied cautiously by ASD—involving five avionics procurement programs. "We don't want to move too far too fast until we have proof that RIW, which is contractually complex and often difficult to apply, really works. Only time will tell," General Sylvester told AIR FORCE Magazine.

Reduction of O&S (Operations and Support) costs is the target of another USAF program, initiated one and a half years ago and called PRAM (Productivity, Reliability, Availability, and Maintainability). It links AFSC and the Air Force Logistics Command in a joint program office. PRAM's purpose is to make "front-end" investments in systems design that pay off in reduced ownership costs and improved reliability. Since PRAM's inception, General Sylvester said, 212 projects have been initiated. Of these, thirteen have been completed at a combined cost of \$336,000 and a projected net savings of more than \$26.5 million.

ASD's devotion to and skill in getting maximum return on every dollar invested in RDT&E and acquisition are seen as paramount by its Commander: "A special challenge over the last several years has been the dramatic growth in the costs of O&S. To meet those costs we have been forced to devote a declining portion of our budget to development and procurement of new equipment. In the twelve years from 1964 to 1976, we saw the development and procurement share of Air Force spending drop from fifty to thirty-nine percent. Such a pattern can obviously have dire consequences for the future, especially when eroded by inflation. Reversal of that trend must be high on our agenda." ■



*In this first of a series of articles on our sister services, the author discusses the increasing scope of the Navy's mission, describes some problems unique to that service, outlines its modernization programs, and assesses the Soviet naval threat against which the US must plan.*

# US NAVY- 1977

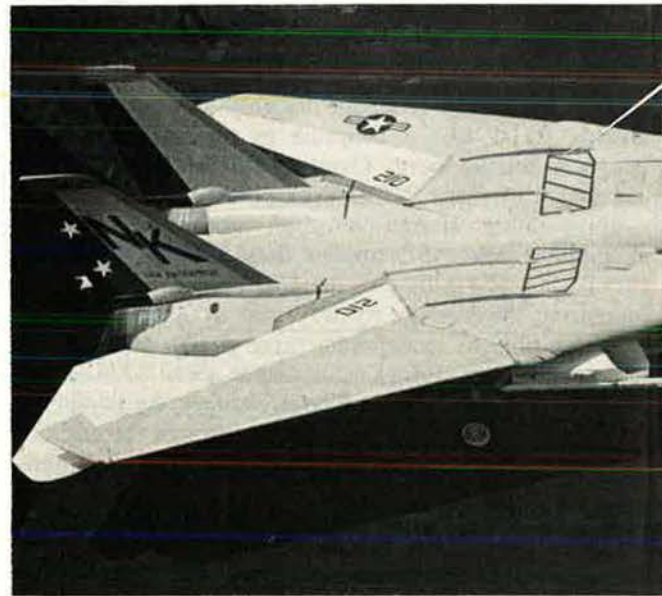
BY JAMES D. HESSMAN

**W**ITH a nuclear submariner in the White House—the fifth President in a row with a Navy background (and the first Annapolis graduate to hold the nation's highest office)—the Navy's story is certainly heard and well understood at the highest levels of government.

That's good not only for the Navy, but also for the nation at large—or so Navy partisans firmly believe.

And with good reason. The United States, for all its size, raw material resources, and technological capabilities, is in many respects a have-not nation, dependent on overseas sources of supply for varying percentages of some sixty-nine of the seventy-two vital metals, minerals, and other raw materials considered essential to the continued functioning and economic well-being of a modern industrialized nation.

That is the first but not the only reason why the United States needs a strong Navy now, more than ever before. The number of bases available to US ground and air forces overseas (and to the Navy as well) has diminished appreciably in recent years, and the Carter





Administration has hinted rather loudly in its initial foreign policy pronouncements that the US military contingents on Taiwan and in South Korea will be further reduced, and perhaps pulled out entirely. There also has been a cacophony of complaints from Capitol Hill about the cost of US troops in Europe, accompanied by congressional suggestions that, even if the various SALT negotiations fail to come up with a formula for mutual reduction of forces, a unilateral reduction by the United States might be a risk well worth taking.

Add to that the additional complications caused by the new interest of the superpowers in southern Africa and the vast reaches of the Indian Ocean, and it becomes apparent that the Navy's mission has grown in both scope and complexity.

That mission is spelled out, prosaically and in rather

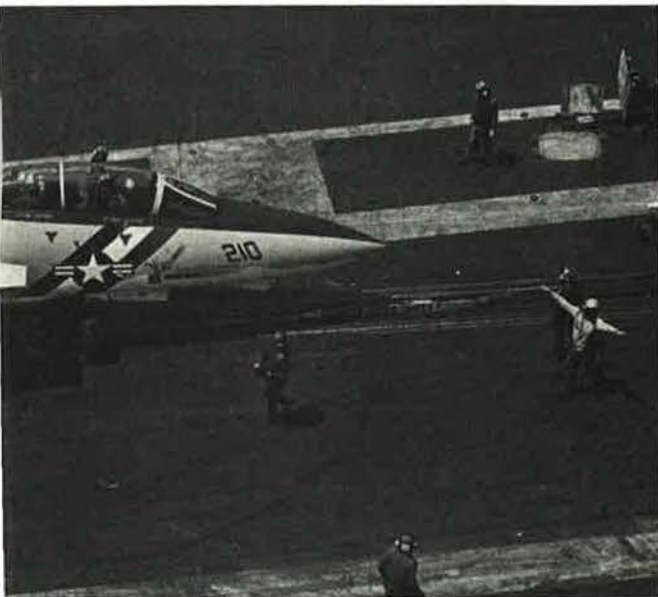
simplified form, in Title 10 of the US Code: To be prepared to conduct prompt and sustained combat operations at sea in support of US national interests. From both a practical and a strategic point of view, that support should be provided as far as possible from the United States itself.

Whether the US Navy can, in fact, carry out its assigned mission on a worldwide basis is less certain today than it has been since the War of 1812. The trouble is not the Navy's own capabilities—its personnel, ships, aircraft, and sophisticated weapon systems are probably the best in the world.

But the numbers simply are not there; not in sufficient strength to ensure that US forces would be predominant anywhere and everywhere on the world's oceans, which cover seventy percent of the globe.

That's a lot of water—far too much to patrol with a fleet reduced from 976 ships in 1968 to only 467 earlier this year, and with very little additional help possible for another ten years or more. Considering that the Soviet Union has more than twice as many ships as

*Far left, USN's amphibious assault ship USS Tarawa under way. Below, an F-14A Tomcat fighter ready for launch. Bottom, the nuclear-powered USS Los Angeles at sea. Right, subsurface launch of a cruise missile off the California coast.*





the US, plus the advantage of selecting time and place of confrontation at sea, if and when, the outlook is not good.

That grim fact of life is painfully recognized by the Navy's own senior officials. Adm. James L. Holloway III, Chief of Naval Operations, told the Senate Armed Services Committee on March 11, 1977, that, "Today the US Navy has a slim margin of superiority over the Soviets in those scenarios involving the most vital US national interests. In the event of conflict, the United States could retain control of the North Atlantic sea lanes to Europe, but would suffer serious losses to both US and allied shipping in the early stages. The Navy's ability to operate in the Eastern Mediterranean would be uncertain at best. US fleets in the Pacific could hold open the sea lanes to Hawaii and Alaska, but shortages of sea control and mobile logistic support forces would cause the United States to have difficulty in protecting its sea lines of communication into the Western Pacific."

But if the situation is bad today, tomorrow it could be worse. Admiral Holloway continued his candid assessment with the professional opinion that "at the current rate of improvement of their naval capability, the balance of maritime superiority will tip in favor of the Soviets within the next five to ten years," if the US Navy does nothing more than maintain "its current force structure."

### Forces in Being

That current force structure is itself impressive—in absolute terms. It is only when considered in relation to the naval strength of "our strongest potential adversary," as Pentagon officials delicately phrase it, that doubts begin to crop up.

To begin where one must and should begin, with people, the Navy and the nation are well served by a truly professional, hard-working force of some 536,000 officers and enlisted personnel, backed up by 306,000 Navy Department civilian employees and several hundred thousand Navy-oriented defense industry employees. Like the Air Force, the Navy is an incredibly complex, technically oriented organization. Its people have to be intelligent, well-trained, and well-motivated—and they are.

But there are some nagging problems on the personnel side. Despite the richer emoluments offered an All-Volunteer Force, recruiting has become increasingly difficult, and retention has dipped below acceptable levels in many key rates and ratings where, for comparable skills, private industry offers higher pay and more comfortable working conditions. The Navy's shortage of ships has necessitated a serious overcommitment of those ships, and embarked personnel, now in the operational inventory. Even the best motivated men become dispirited from working too long, too often, and too far away from home. The service-wide problem of family separation is more severe in the Navy than in the other armed forces. The fact that the nature of naval operations makes extended, repeated separations inevitable may make the situation easier to understand, but it doesn't necessarily make it more palatable.

What does make it somewhat more palatable is the

high quality of the Navy's current crop of ships and aircraft, and the even greater sophistication and capability of those now on the drawing boards and projected for future production.

Today's Navy is powerful, versatile, and mobile. The forty-one nuclear-powered Polaris and Poseidon ballistic missile submarines that make up the Navy leg of the US strategic triad have provided a so far invulnerable deterrent of devastating second-strike potential. The Navy's carrier fleet gives the United States a unique self-sustained capability of deploying massive power, conventional or nuclear, to any trouble spot in the world on extremely short notice. And the Navy/Marine Corps amphibious landing forces, now equipped and made considerably more effective by the use of helicopters and V/STOL aircraft for quick troop lift and gunfire support, could storm and probably subdue any beach or near-inland position in the world, no matter how well fortified.

Supplementing and supporting those specialized forces are other fleets of cruisers, frigates, destroyers, and multipurpose (nonstrategic) submarines, both conventional- and nuclear-powered, available for a variety of duties ranging from antisubmarine warfare (ASW) to gunfire support, from anti-air warfare (AAW) to convoy duty. And backing up those forces are more specialized patrol craft, minesweepers, amphibious landing ships and small craft, and a logistics fleet of oilers, refrigerator ships, and tenders (repair ships) that largely obviate the need for land-based support and make the Navy's combat forces virtually self-sufficient for extended operations at sea anywhere in the world.

### Modernization Plans

Coming along, moreover, are more and better systems. A few of the more important ships, aircraft, and weapons now in development:

- **Trident**—An 18,000-ton successor to the Polaris and Poseidon ballistic missile submarines. The Trident will carry twenty-four missiles, each capable of being MIRVed to ten warheads. The 4,000-mile Trident I missile will eventually be supplanted by a 6,000-mile version. From thirteen to twenty-nine Tridents will be built, at a unit cost of more than \$1 billion each.

- **CVV**—A smaller-cost, smaller-capability aircraft carrier, configured to carry a new generation of V/STOL aircraft expected to be the wave of the future in naval aviation. To hold down costs, the Administration probably will want the first one or two CVVs to be conventionally powered, but Congress may dictate otherwise. And there could be a last-ditch battle next year to restore funding for a final *Nimitz*-class, 93,400-ton, nuclear-powered supercarrier.

- **Aegis**—An advanced AAW system designed to protect the fleet, and ships in convoy, from enemy aircraft and missiles. Navy officials consider Aegis their top-priority program and were decidedly unhappy about various Administration and congressional moves to delete from the immediate Navy budget both an Aegis-carrying nuclear-strike cruiser (CSGN) and funds for conversion of the guided-missile cruiser (CGN) USS *Long Beach*, the world's first nuclear-powered surface warship, to an Aegis mode. Navy Secretary W. Graham



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Claytor, Jr., has told Congress the Administration will seek funds, possibly through a budget amendment, for installation of Aegis aboard a nuclear cruiser. In addition, funding probably will be approved for an Aegis destroyer, the conventionally powered DDG-47, a slightly elongated 9,800-ton version of the DD-963 or *Spruance*-class destroyers now coming into the inventory. (The thirty *Spruances*, plus the seventy-eight frigates of the *Oliver Hazard Perry* class planned for future construction, will help considerably in reducing the large "numbers gap" currently favoring the Soviet Navy.)

• **F-18**—A high-performance Navy air combat fighter designed to replace the workhorse F-4 Phantom and, later, the A-7E Corsair II. A single-place twin-jet armed with, among other things, Sidewinder and Sparrow missiles and a 20-mm gun, the F-18 will supplement the F-14A Tomcat, a versatile and highly capable fleet air defense fighter/attack aircraft equipped with the AWG-9 Phoenix long-range all-weather air-to-air missile system.

• **LAMPS**—A ship-based ASW helicopter armed with an impressive variety of underwater sensors and weapons. The MK III LAMPS (acronym for Light Airborne Multi-Purpose System) is programmed for installation aboard all of the Navy's future surface combatants.

• **Tomahawk**—The well-publicized and, to date, eminently successful Navy cruise missile, capable of launch from aircraft, surface ship, or submarine. Sometimes described as "the weapon the Russians fear the most," the Tomahawk also is considered a prime bargaining chip for US negotiators at the SALT talks. If the Administration does want to flip in that chip, however—which seems most unlikely—there will be a battle royal both in the Pentagon and on Capitol Hill, where there are numerous and powerful cruise missile supporters.

• **CAPTOR**—An ASW mine, or enCAPsulated TORpedo, designed to detect, classify (by movement "signatures"), and, if necessary, attack transiting enemy surface ships and submarines. Air-droppable, the CAPTOR probably will be deployed to work in conjunction with various of the Navy's supersecret underwater surveillance systems believed to be emplaced in or on the approaches to such strategic waterways as the Dardanelles, Bosphorus, Skaggerak and Kattegat (between the North and Baltic Seas), Straits of Gibraltar, and the so-called GIUK gap (the open ocean areas between Greenland and Iceland, and Iceland and the United Kingdom).

• **Surface Effect Ship (SES)**—An unprecedentedly

swift (eighty knots or better) ship of revolutionary potential. The initial "3K" or 3,000-ton SES is being designed primarily for ASW operations, but future versions are envisioned for use as aircraft carriers, cargo transports, and convoy escorts. The SES obtains its high speed by riding on a virtually frictionless air bubble, as does the smaller AALC (Amphibious Assault Landing Craft), planned to provide the Navy and Marine Corps a high-speed amphibious force capable of lifting the beans and bullets from point "A" somewhere over the watery horizon to point "B," high and dry far inland.

• **Patrol Hydrofoil Missile (PHM)**—A similarly swift (officially "over forty knots," but believed capable of at least fifty) 230-ton vessel carrying eight Harpoon missiles and an OTO Melara 76-mm gun. Because of cost problems, the originally anticipated thirty-ship buy was cut back to a single six-ship squadron, and even that number is in jeopardy. Navy enthusiasts are ebullient about the PHM, however, which can outrun anything it can't outgun, and would be especially valuable for straits and waterways control. It is pertinent to note that the USSR already has forty-two patrol hydrofoils operational: twenty-five of the fifty-knot, seventy-ton *Pchela* class; and seventeen of the bigger (230 tons) and more modern *Turya* class. The latter carry four twenty-one-inch torpedoes, two 57-mm guns, and two 25-mm guns.

### The Soviet Naval Challenge

How soon and how many of the preceding weapon systems, and numerous others of varying importance now in the RDT&E pipeline, will finish the long voyage from concept evaluation to operational hardware are the major unanswered questions now worrying the Navy's long-range planners. As exemplified by the hydrofoil disparity, US technology is usually somewhat more advanced than Soviet technology, but, more and more often in recent years, the USSR has proven much quicker in getting its hardware to the troops. (The Russians have a much less cumbersome procurement process, and a philosophical approach that US planners might well consider: "Better is the enemy of good enough.")

War is, unfortunately, a "come-as-you-are" scenario. The Tomahawk and the ALCM (the Air Force's Air-Launched Cruise Missile) will, by all accounts, be several generations ahead of their Soviet counterparts—but the latter have been operational for more than a decade. The Amphibious Assault Landing Craft will be, to the amphibious commander, a thing of beauty and a blur to behold—but the Russians already have less-capable AALCs operational. The CVV will undoubtedly, ten or twelve years from now, be the last word in V/STOL carriers—but it will be about fifteen years junior to the Soviet helicopter and V/STOL carrier *Kiev*.

The Soviet Navy, once a riverine, coastal, and back-water force, has evolved into a true oceangoing "blue-water" fleet distressingly well prepared for combat at any time in any clime. Though lagging well behind the US Navy in carrier, amphibious, and logistics support capabilities, the Red fleet possesses more firepower



per ton; impressive and continually improving electronics systems; an exceptional worldwide C<sup>3</sup> (command control and communications) capability as forcefully demonstrated in the recent Okean exercises; a national policy that fully integrates the Soviet Navy with the Russian merchant marine and the USSR's numerous and far-flung fishing and oceanographic survey fleets; and, last but far from least, the professionalism and well-justified *esprit de corps* appropriate to an oceanic superpower.

Finally, the Soviet Navy has something else which, in the event of a confrontation at sea, may prove more important than all of the above put together: It has numbers—very impressive numbers.

The USSR's numerical advantage is most impressive, and most dangerous, in its various submarine fleets. The forty-one-boat US Polaris/Poseidon force is quantitatively if not qualitatively overwhelmed by the USSR's sixty-one nuclear-powered and twenty diesel-



Steaming in the Mediterranean: the nuclear-powered aircraft carrier USS Nimitz, with nuclear-powered guided missile cruiser USS California as escort.

powered ballistic missile submarines. Among the nukes are several *Delta*-class ships. First operational in 1973, the *Deltas* carry twelve SS-N-8 missiles, which have a range of at least 4,200 miles and make it possible for the Russians to attack US inland targets from the well-protected waters of the Barents Sea.

The Russians also have, according to Admiral Holloway's testimony, some seventy-eight general-purpose nuclear submarines and 176 general-purpose diesel submarines, each of which is infinitely more capable than the primitive U-boats with which Hitler very nearly won the battle of the Atlantic in World War II. Considering that the Nazi submarine force at the beginning of the war was less than one-fifth the size of the current Soviet submarine fleet, it seems the US Navy has a large ASW problem.

That problem has been constant since the beginning

of the cold war, however. What is new, and nerve-racking, has been the emergence of the Soviet surface fleet, which now numbers, according to Admiral Holloway: twenty-one guided missile cruisers, ten light cruisers, thirty-four guided missile destroyers, fifty-three destroyers, 107 frigates, eighty-eight patrol escorts, eighty-two amphibious ships, 365 mine warfare types, and more than 500 other vessels of various shapes, sizes, and combat configurations.

Add to that, for the first time, a seagoing naval air arm. The USSR has operational, in addition to the previously-mentioned *Kiev*, two helicopter carriers, and is building two more *Kievs*. The European press reports that at least twelve *Kievs* are planned, but that number has not been officially confirmed by US or NATO sources. There are, however, some 1,200 helicopters and fixed-wing aircraft, including some sea-service Backfire bombers, in the Soviet Navy's air arm (most of which is land-based). In any oceanic confrontation near the vast Soviet land mass, the US Navy's still-superior air arm will not be alone in the sky.

### Some Silver Linings

Offsetting the bleak numbers picture and some longstanding domestic difficulties—the most important of which has been a dire and deadly feud (now somewhat ameliorated, fortunately) with the US shipbuilding industry—are several bright spots.

The US Navy is combat-toughened, well-led, well-trained, and inspired by two centuries of rich tradition and seagoing experience. Though no longer the world's largest Navy, it is still the world's best and most capable.

There is, happily, perhaps because of their similar adversities, a new spirit of cooperation between the US Navy and US merchant marine (also now outnumbered by the Russians). In time of war, the Navy realizes, it could not possibly keep US forces overseas supplied without calling on a supreme effort by both its own in-house Military Sealift Command and the privately owned US-flag merchant fleet.

Another ally, usually forgotten in time of peace but deservedly cherished when the guns start firing, is the US Coast Guard, itself in the throes of rebuilding and modest expansion.

But Navy/Coast Guard and Navy/merchant marine cooperation and coordination is traditional in time of war, as is cooperation among all the armed services. What is not quite so traditional, but which seems increasingly probable, is an active working relationship between the Navy and Air Force on ASW missions and in guarding the nation's sea lines of communication. That possibility, admittedly anathema to some of the less-flexible naval strategists, was given doctrinal blessing in a September 1975 "Memorandum of Agreement" between Admiral Holloway and Air Force Chief of Staff Gen. David C. Jones. The Holloway/Jones cooperation pact envisions that in time of war the Air Force might be called upon to assist the Navy in, among other things, search and identification, electronic warfare, tactical deception, attack against sur-



face and air units, and aerial minelaying. A word of caution, however: such a common-sense, unified approach is easier to postulate than to achieve. It might be remembered that, in his Fiscal Year 1973 budget statement to Congress, then-Defense Secretary Melvin R. Laird said that "there is no reason why the Air Force cannot be assigned some major responsibilities for control of the seas." (But it wasn't.)

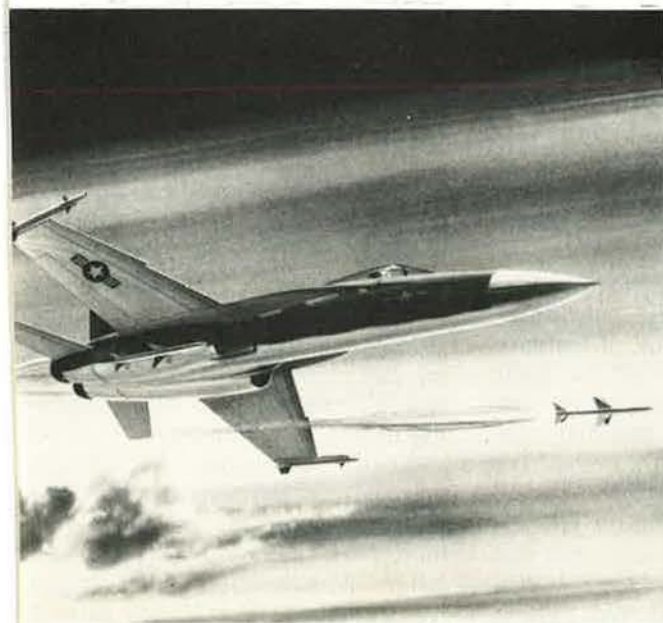
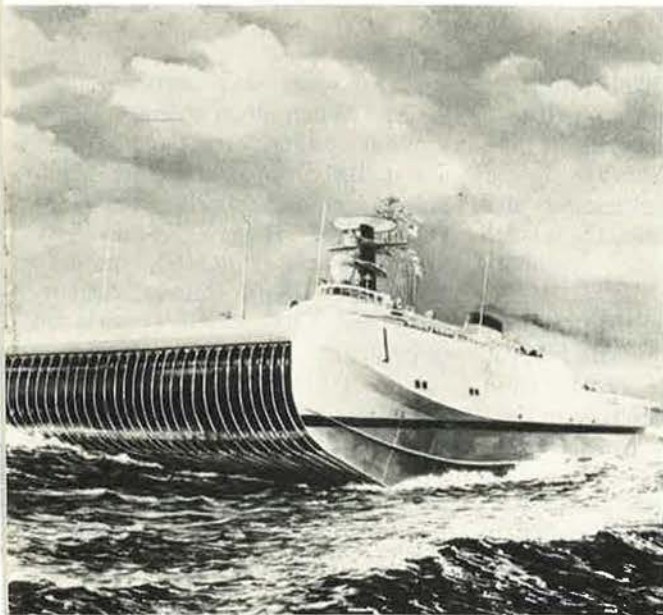
There is, finally, in addition to all the laudable intangibles of better working relationships and improved morale, more measurable help coming along in the form of increased appropriations and larger shipbuilding programs. For the seventh straight year, the Navy has received the largest share of the overall Defense Department budget—\$41.1 billion in the original budget submitted by former President Ford, about \$1 billion less in the amended Carter budget, and perhaps another billion or so less in what will finally emerge from the Congress at the conclusion of the lengthy and

intricate budget authorization/appropriations process.

And there is promise of further budget relief in the future. Despite current-year cutbacks (the twenty-five ships requested in the Ford budget were cut to twenty-two in the Carter budget, and reduced further to nineteen by the House Armed Services Committee, with additional FY '78 cuts yet possible), the long-range, five-year shipbuilding program still calls for funding of 156 ships in the FY '78-82 time frame (only one fewer than in the Ford five-year program), and the modernization or conversion of twenty others, including two carriers.

To summarize, therefore: The state of the US Navy today gives little comfort to any would-be enemy. There are numerous problems, many of them serious, but none incurable, and none that would be permanently damaging.

But if there is no real reason for black pessimism, there certainly are no grounds for unbridled optimism



Above left, artist's concept of a 3,000-ton surface effect ship submitted by Rohr Marine, Inc. Above, US Marines with equipment aboard the amphibious assault ship USS Guadalcanal prior to debarkation during "Operation Snowy Beach," an exercise conducted along the Maine coast to test Atlantic Fleet capability during adverse weather conditions. Left, artist's concept of the Navy's F-18, a high-performance air combat fighter designed to replace current F-4s and A-7Es and supplement F-14A Tomcats.

either, particularly considering the increasing scope of the Navy's mission and the still expanding capabilities of the Soviet Navy.

The American spirit, and America's armed forces, have always risen to their greatest heights at times of greatest challenge. John Paul Jones summarized that enduring truth when he said he wished to have "no Connection with any Ship that does not sail fast, for I intend to go in harm's way."

That is still the philosophy guiding today's Navy. ■



One of the major attractions of a military career—the retirement system—is under attack. The issue of retirement costs, too often discussed in black-and-white terms, is extremely complex and fraught with difficult trade-offs. But changes within the next two years appear inevitable.

# The Retirement System What Lies Ahead?

BY ED GATES, CONTRIBUTING EDITOR

**O**F all the thorny issues on the military personnel scene, the retirement system with its expanding price tag is probably the most complex—and explosive. And as “retirement” receives mounting publicity, the distress calls from throughout the service community have multiplied. Battle lines are being drawn.

On the offensive are Administration officials and certain members of Congress, together with a growing number of newspapers and rank-and-file citizens. They are seeking changes in the retirement system that will restrain rising costs, which, the Defense Department reports, have reached \$8.2 billion this year and will hit \$9.1 billion in FY '78.

On the defensive are service officials, military careerists, certain congressional supporters, and groups firmly committed to a strong defense posture. These include associations like AFA. Severe pruning of the retirement system, they recognize, would hurt recruiting and retention, damage morale, and soon impair military readiness.

Complicating the services' attempts to ward off damaging changes are the recent statements of concern by President Carter and Defense Secretary Harold Brown over the rapid rise in outlays. The headlines have also underscored Defense's own forecast of a \$30-plus billion annual outlay for the expected 1,400,000 military retirees by the year 2000. Presently there are 1,100,000 an-

nuitants. (The year-2000 estimate assumes annual raises of six percent in basic pay and four percent in the CPI.)

Meanwhile, that harshest of all critics, Rep. Les Aspin (D-Wis.), hammers away on related sensitive points. These include the fact that the average military retiree draws a pension starting twenty years before persons in the private sector, and most of the latter do not receive the automatic CPI raises Uncle Sam provides service retirees.

Mr. Aspin has stirred up a hornets' nest within the service community, for the present retirement system is its most cherished fringe benefit. Most members with even a few years' service regard it as sacrosanct. Earlier protests against Administration efforts to scissor the commissaries—which paid off—will be like whispers in the breeze compared to the eruption likely to occur throughout the military community, if the government slices too deeply into the retirement program.

A severe confrontation over the issue, some officials hold, would play directly into the hands of military union advocates. Yet others insist that the government has never been willing to face up to the high cost of the retirement program and “the time has come to act.”

So what's ahead? Will the government axe the present retirement system? Tamper with it gently? Will present retirees be affected? Those

who are part way through their careers? When might changes occur?

While specific, immediate answers are unlikely, some clues are available—from staff reports of the Third Quadrennial Review of Military Compensation (QRMC), military staff papers, and Defense Department and Capitol Hill experts on retirement.

Official plans to alter the system are in temporary limbo waiting creation of a Presidential “Blue-Ribbon Commission” to review all aspects of military compensation. It will focus particularly on the ten-volume QRMC staff study.

Supposedly, the Commission will buckle down to work soon and report its recommendations by October 1. Slippage seems likely, but even if that target is met, long months will pass before the government comes up with specific legislative proposals. And once that happens, Congress could sit on them for awhile. So the timing on changes is highly uncertain, but all who were questioned asserted that changes are coming.

Congress, during the interim waiting period, won't advance omnibus-type alterations on its own, according to informed sources.

Service authorities, for obvious reasons, are alarmed that the Blue Ribbon Commission may contain no more than minor military representation—perhaps one retired officer, reports hold. There is also internal



# System:

distress at the President's attack on the practice of military retirees working for Uncle Sam as civilians who collect two government checks, which critics like to call "double-dipping."

Latest Civil Service statistics show nearly 150,000 retired military members so employed, about 112,000 of them retired enlisted people. And thousands of near-retirees would like to follow suit. The President, however, has declared that the practice "ought to be eliminated." More recently, he told the Defense Department to draft a legislative proposal on the subject.

## Cracks in the Contributory Concept

Military retirement costs started their sharp rise more than a decade ago when the World II group acquired retirement eligibility. These exits have remained at a high level ever since, and inflation and other factors have contributed to the increase. According to the QRMC staff study, "the total growth of outlays is due to a complex interaction of total size of the military force, grade structure within the force, promotion policies, increased basic pay, growth in the CPI, and military personnel policies."

Military pensions are modest compared to congressional pensions and those of various state and local governments. But it's the total cost of the military's—because of its 1,100,-

000 annuitants, not a few hundred or a few thousand—that grabs the headlines. As of mid-1976, according to official Pentagon statistics, the average annual retired pay for the 751,244 enlisted retirees was \$5,076; for the 344,948 officer annuitants it was \$10,092. The spread in individual annual retirement pay was from \$2,088 for the 1,248 retired E-1s to \$32,484 for the 147 four-star generals. The 58,650 retired O-6s averaged \$15,168; the 85,166 E-8s averaged \$6,936.

Accompanying the rise in total pension outlays are the increase of studies and statements about the need to restrain further boosts. The most logical step, many quarters contend, is to set up a retirement fund—"make service people contribute to their pensions." Mr. Aspin endorses this approach. Some lawmakers, of course, are intrigued with the Civil Service system under which employees ante up seven percent of their pay into such a fund.

The Blue Ribbon Commission may plow this same ground again. But before doing so, it might consider what a University of Michigan study, prepared sixteen years ago for the Senate Armed Services Committee, discovered: that any contributory plan (1) covers only a small fraction of retirement benefit costs; (2) requires a general pay raise to offset the reduction in take-home pay; and (3) creates administrative costs which would "offset problematical

savings by placing the services in a position of running an enormous savings bank with some 2½ million accounts and with a heavy turnover among its customers."

Since only nine percent of enlisted members and nineteen percent of military officers serve long enough to be eligible for retirement, most of the huge bookkeeping project would go for naught. And such a move would run counter to the practice in the civilian sector, where the trend is toward noncontributory programs.

## Policies and Proposals

While it seems clear that a contributory system would not restrain rising retirement costs, "integration" of Social Security would. The government favors this step, which a great many private pension programs employ (*see below*).

Increasing the years of service to acquire retirement eligibility also has many supporters among those searching for savings. "Don't let them retire so early—make 'em serve longer, stretch normal service from twenty to thirty years," they insist.

Defense Department and Air Force officials caution, however, that apparent savings from forced thirty-year service may not materialize. USAF's military personnel chief, Lt. Gen. Kenneth L. Tallman, points out that active-duty pay is higher than retirement pay, and that a more senior force costs more in pay and allowances due to longevity increases and possible promotions. And higher pay means higher pensions when members eventually retire.

Furthermore, large-scale extensions of active-duty tenure slow promotions all down the line. The resulting reduced "career advancement outlook" may affect force quality and productivity.

General Tallman, who will become Air Force Academy Superintendent on August 1, and his associates worry that USAF's ability to attract and retain high-quality people could suffer. Reduced retention would lead to increased recruiting and training costs and bonuses which, along with the higher pay of an older force, could offset or exceed any retirement cost savings.

In other words, there are "trade-offs" that must be examined closely



in any major personnel policy alteration of this kind.

The Defense Department, meanwhile, is embarked on a dollar saving program that diverts part of basic pay raises into the quarters allowance (BAQ). Each such action tends to reduce a member's eventual retirement pay from what it otherwise would be, since retired pay is computed solely on basic pay.

The removal of the one percent add-on in the CPI formula is another cost-saving device recently put in motion. According to one estimate, it will restrain rising retirement outlays by \$19 billion over the next quarter-century.

Critics of the retirement program give little attention to the "Military Factor" or the "X Factor"—the dollar value that logically should be assigned to the unpleasant features of military service. These are remote tours, frequent transfers and TDYs, family separations, hazards of wartime service, and mandatory retirement during a member's most productive years. The X Factor, many feel, is worth considerable in retirement as well as during active service. Mr. Aspin in his antimilitary personnel publicity generally ignores it.

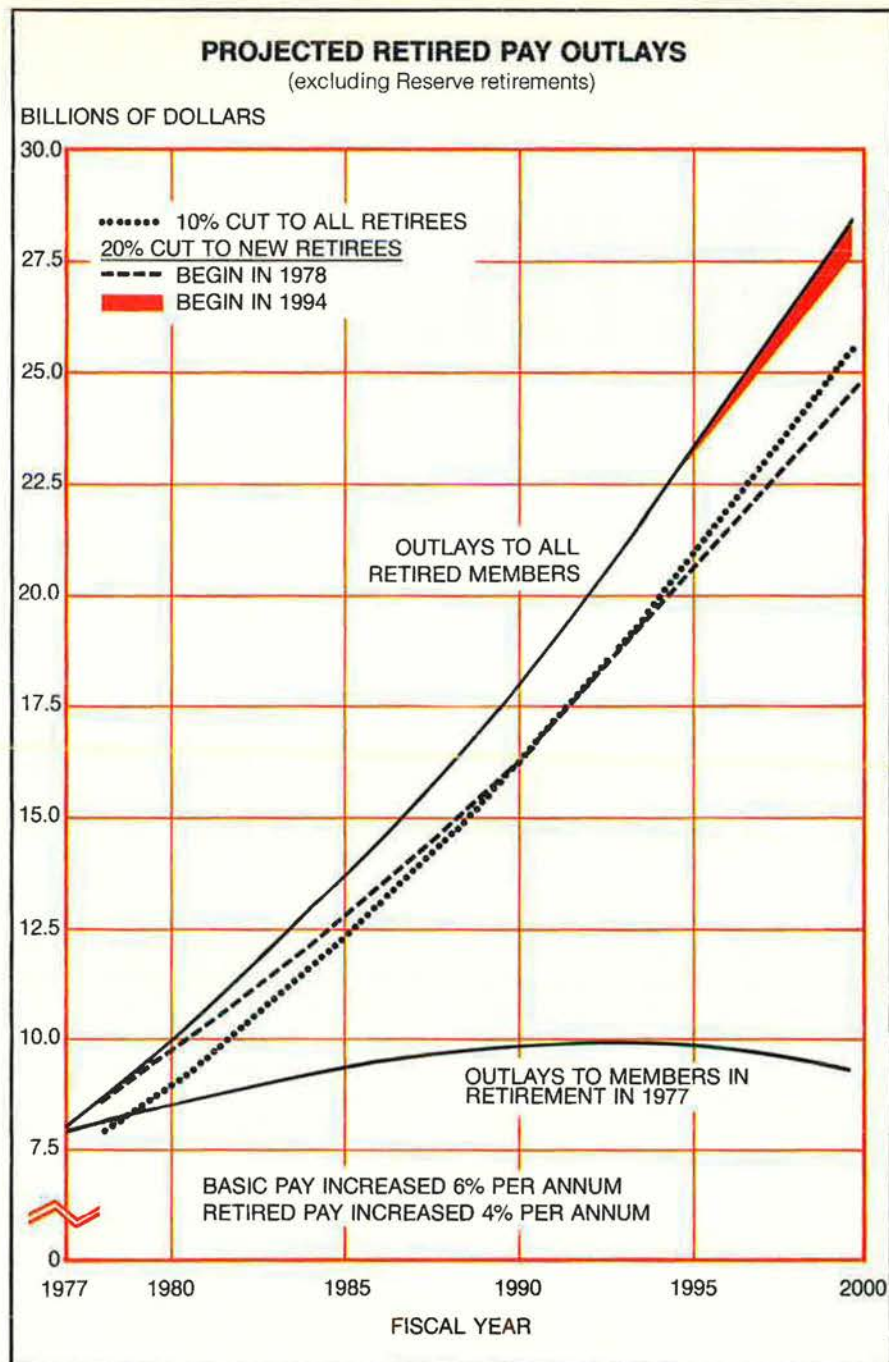
An issue receiving attention in some government circles is the automatic CPI raises. The General Accounting Office, for instance, has suggested limiting these raises to one a year, rather than the present two, and placing a ceiling on the percentage increase that can be granted. Also under federal study is a new price index that reportedly is less responsive to inflation.

Air Force and Defense studies, however, don't address the possibility of curtailing future cost-of-living retired raises. But perhaps the issue should be faced. After all, the largely all-civilian Blue Ribbon Commission may be oriented toward a no—or partial—CPI arrangement. Remember, most private sector programs do not contain it. Numerous private programs, of course, increase pensions from time to time.

Any move to curtail cost-of-living adjustments for military retirees would also impact upon the 1,000,000 Civil Service retirees.

#### RMA—Potential Launch Pad

While it's difficult to pinpoint spe-



*This Air Staff exercise examines the impact on retirement costs of either of two hypothetical actions starting next fiscal year: (1) a ten percent cut in pay for all retirees, or (2) a twenty percent cut for new retirees only. Savings for both are minimal, the chart reveals. Thus, USAF personnel officials say, the only quick way to get significant savings—if that's what the Administration and Congress demand—is through "drastic changes to the current system which affect those currently retired." They scored any such moves as "patently unacceptable" and "a breach of faith."*

cific retirement system changes that surely are not more than a couple of years away, most observers visualize eventual adoption of key features of the Retirement Modernization Act (RMA). Maybe something slightly tougher.

Secretary Brown recently placed a "hold" on RMA, pending the out-

come of the Blue Ribbon Commission study. But RMA retains strong backing throughout the Pentagon. It is viewed as a logical and reasonable approach that doesn't rock the boat too hard, will eventually save money, and contains some needed reforms. The last include launching enlisted readjustment pay, and computing re-



tired pay on a person's average pay for the final year of active duty.

Because of RMA's readjustment pay feature, total retirement outlays would actually rise a bit for a few years after enactment. But long-term accumulated savings of nearly \$11 billion are forecast by the year 2000, a saving some influential quarters may now feel is insufficient.

However, significant "short-term" cuts in retired costs are virtually impossible unless drastic reductions are made in pay or pension eligibility for those already retired. Such reductions are highly unlikely, though, given the high-level assurances that those already retired would not be penalized by future changes (*see chart*).

Defense first advanced RMA four years ago (*see October '73 AIR FORCE*), via a massive but unsuccessful internal public relations campaign. It bombed; the troops blasted the scheme as too severe. But that was before the retirement system came under the more recent heated attacks. It also preceded the expressions of "concern" by the President and his Defense Secretary.

Air Force officials now feel that many lawmakers "do not believe RMA will sufficiently reduce retirement costs and that implementation will cost too much in the near term." Even so, its general provisions appear the most likely to be adopted, in some form at least. RMA aims to encourage more voluntary exits before normal retirement and longer service for those who reach retirement eligibility. Its two most controversial changes would:

- Reduce, on a gradual basis, the present fifty percent retirement for

### Retirement Benefit Comparisons

A recent Air Staff study of retirement costs reached the following conclusion:

"The size of the retirement bill conjures impressions that military retirement benefits are lavish. Our comparison on a provision-by-provision basis indicates that, while they are justifiably generous, they are comparable with those of many state and local employees engaged in hazardous occupations. Moreover, the trend in private systems is toward more munificent retirement benefits, and organized labor is likely to reinforce the trend. In the competitive labor market of the All-Volunteer Force, the services are compelled to offer an employment package which will attract and retain sufficient numbers of qualified officers and enlisted. The retirement system plays a significant role in this package."

twenty years' service to thirty-five percent; but when a retiree reaches the equivalent thirty-year service point, the full benefit (fifty percent) would be restored until he hits sixty-five.

- At age sixty-five, reduce retired pay by half the Social Security benefit attributable to in-service earnings. This is the "offset" referred to earlier that service members don't like, but chances are they'll eventually have to live with it.

RMA would also establish vested annuities starting at age sixty for members completing five through nineteen years of service, the previously mentioned enlisted readjustment pay, and the high-one computation formula.

### The Aspin Package

Of the other plans to overhaul the retirement system, Congressman Aspin's has drawn the most attention. Like RMA, his plan would not affect present retirees. It parallels the present Civil Service retirement system. By applying it to the military, it would delay pension payments "to encourage more thirty-year careers," the Wisconsin lawmaker declares.

The Aspin package would withhold pensions until age fifty-five for those who retire voluntarily with thirty or more years' service, and until age sixty for those with twenty to twenty-nine years' service. Mem-

bers with five, but less than twenty, years would rate a reduced pension at age sixty-two.

These provisions would carry out his main objective: slash the number of years—and hence the outlays—a retiree receives a pension. Aspin also provides a "transition" schedule, applying the old system to years already served and the new system to future years. He would calculate future annuities on a "high three" rather than RMA's more attractive "high one" basis.

Service authorities say that Mr. Aspin doesn't mention the difficulties of achieving savings under his plan. "To get retirement savings," an Air Force personnel authority said, "the reduction in retirees must offset the increased active duty and retired pay to those who stay in service longer. These increases occur even under current pay scales. Furthermore, additional longevity increases would probably be needed to provide adequate compensation for individuals who serve longer. For example, a major's last longevity raise currently is at eighteen years."

Adoption of the Aspin proposals would force what USAF calls "sweeping changes" in the Pentagon's military personnel philosophy. Officials visualize declines in recruiting and retention, an inability to keep the force young and vigorous, and a drop in morale.

Nothing as tough as the Aspin blueprint is likely to prevail, but the services are on the alert—just in case. Meantime, government experts in the retirement field—such as John Ford, the influential staff director of the House Armed Services Committee—appear agreed that present retirees have little to fear by changes that may be enacted. For those coming up the line, the crystal ball remains cloudy.

The Armed Services Committee is expected to withhold any serious action on retirement pay alterations until the Blue Ribbon Commission and the Administration come up with recommendations. That's some time away, but the consensus holds that changes are likely by late 1978 or 1979.

During the interim, however, the battle cries from both participants in the retirement pay battle will rise in intensity. ■

### Reserve and Guard Retirements

Reservists and Guardsmen are part of the military retirement picture. Last year, 62,155 of them—mostly officers—drew about \$280 million in retired, or "Title III," pay. The Pentagon projects a Title III population of 102,000, costing \$1.5 billion, by the year 2000. An inter-service group is conducting a lengthy study of Reserve compensation, retired pay included, which may lead to changes.



## PILOT REPORT

A USAF pilot on exchange duty with the Royal Air Force reports on the design, training concept, and flight characteristics of the RAF's new jet pilot/weapons trainer . . .

# Hawker Siddeley's Hustling Hawk

BY MAJ. JOHN P. KELLY, USAF

**I**N THE closing months of 1976, the Royal Air Force received the first deliveries of its newest jet trainer—the Hawker Siddeley Hawk. The Hawk is one of three new Free World jet trainers in competition for a lucrative market as several air forces look for replacements for their obsolete and aging trainers.

Hawk is a direct result of the RAF's reassessment of its training policies. In the late 1960s, it was decided that the flying training sequence could progress directly from the Jet Provost basic trainer (very similar to USAF's T-37) to the supersonic Jaguar, the Anglo-French ground attack fighter originally conceived by the RAF as a trainer. It soon became apparent that the gap between these aircraft was too great; therefore, an Air Staff Requirement was generated calling for a new low-cost, high-performance, transonic trainer capable of filling the dual roles of advanced flying training and weapons training. Hawker Siddeley Aviation's design objective for Hawk was to combine low ownership cost, maximum economy of operation, and state-of-the-art engineering. A fixed-price contract, based on a buy of 175 aircraft, was signed in March 1972, and Hawk's maiden flight was a mere two and a half years later.

Hawker Siddeley Aviation (HSA) is no newcomer to the design and production of ground attack/trainer aircraft. Over the past thirty years, HSA has produced 11,000 aircraft of these types—Hurricane, Meteor, Gnat, Hunter, and Harrier, to name a few.

The Hawk was designed for production from the onset; no prototype or preproduction models were produced. The first six aircraft were used by HSA and the Aircraft and Armament Experimental Establishment (the British Experimental Flight Test Center) for the developmental flight test program.

### Hawk Characteristics

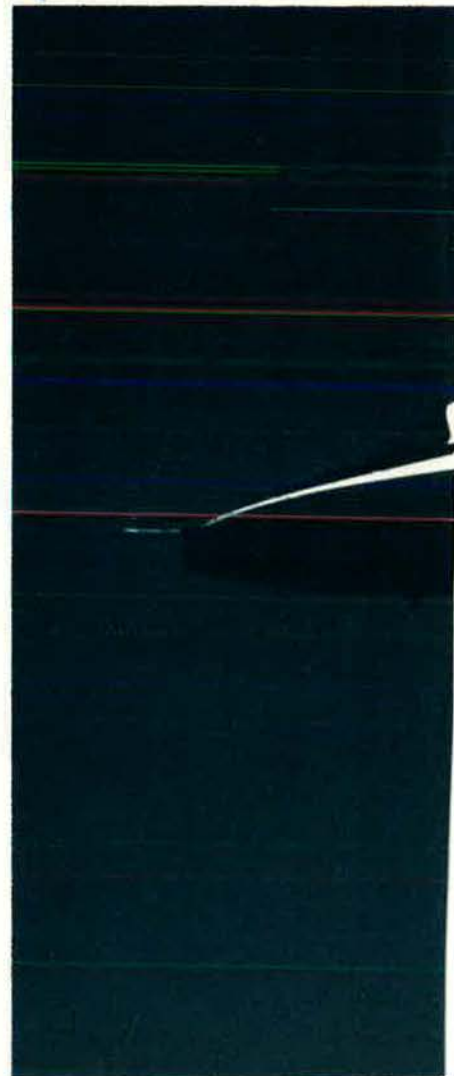
Looking at Hawk you at first visualize some aquatic creature. Its large canopy, raised instructor station, and tailplane anhedral give it a dolphin-like appearance. The Hawk's size falls between the two current advanced jet trainers of the RAF—the Gnat and Hunter.

The first thing that grabs your eye as you step up the aircrew ladder is the massive cast-acrylic canopy, hinged on the right side, resembling a large transparent pea pod. The top of the canopy is laced with a miniature detonating cord that is designed to shatter the canopy an instant before ejection. Slipping into

the bird and strapping into the Martin Baker Mark 10 ejection seat is a pleasant surprise, since British aircraft have never been known for their comfort or pleasant cockpit layout. In fact, the Gnat (even for a small chap like me) probably takes a prize for the tightest cockpit squeeze.

Hawk, for a change, was built with the pilot in mind. All the appropriate switches, knobs, and other paraphernalia are in easy reach and located logically around the cockpit. The rear cockpit, however, is a bit sparse by our standards, but falls in line with the RAF training tradition that "gives the instructor only those items deemed essential for his specific role"; hence there is a lack of radio and navigation tuning facilities in the rear.

The new Martin Baker seat is a pleasant change from other seats into which I have strapped. This seat will also be used in the British,





German, and Italian joint effort—the MRCA (Tornado)—and provides the pilot with a zero-zero escape capability as well as automatic chute deployment. To give the proper ejection trajectory, you dial up your boarding weight in the window scale on the arm rest. The chute is packed in a very comfortable, form-fitted headbox and is an aeroconical design which, when deployed, is considerably more stable than previous types. The chute provides a forward velocity and also can be steered. Hawk incorporates command ejection (a la F-4), which sequences the back seat first.

When you've completed the normal left-to-right prestart checks, another good feature of Hawk becomes apparent. The aircraft requires no external battery or starting cart since it has its own small gas-turbine starting unit that runs off the aircraft's batteries. The start-up is quite simple: merely de-

press the start/relight button on the throttle, wait for the ROTATION indicator to illuminate GREEN, and engage the ENG START switch. From there you sit back and watch it all happen: engine instruments stabilizing, gyros erecting, and illuminated captions on the central warning panel flickering out. Again Hawk surprises the uninitiated pilot. All the engine instruments, hydraulic gauges, and fuel indicators are metric! Hydraulic pressures are in bars and fuel in kilograms. Fortunately, the performance instruments read in feet, knots, and Mach—not in meters and furlongs per fortnight!

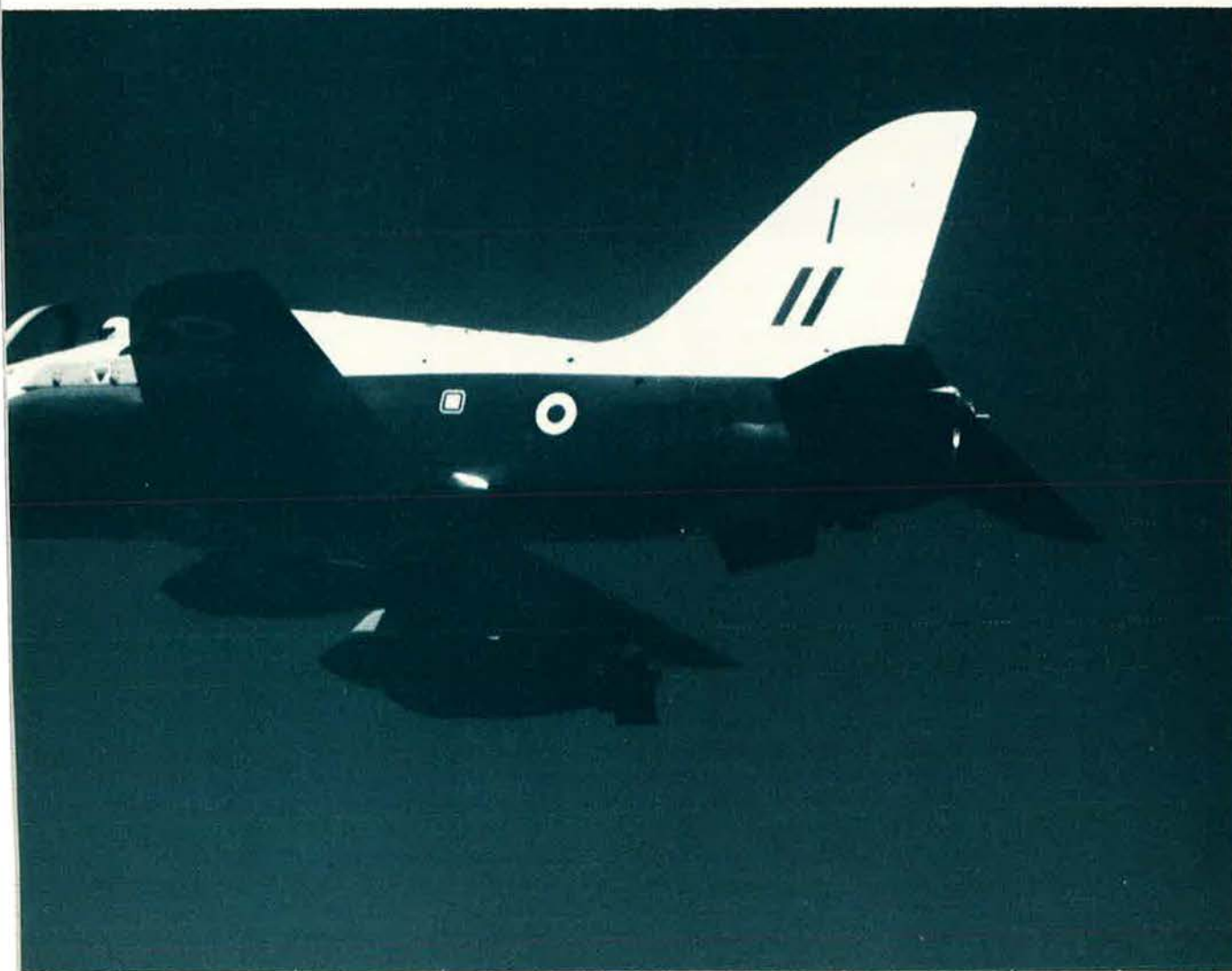
British design philosophy seldom incorporates nosewheel steering in fast jets, and Hawk is no exception. Taxiing calls for a combination of toe brake applications and, at first, a bit of luck, since Hawk's brakes

and fully castoring nosewheel are very effective and easy to overcome. The view while taxiing and, for that matter all through the flight, is fantastic, even from the rear seat, and is one of Hawk's major assets. The nose cone slope coupled with the raised seat positions give the front seater a fifteen degree look-down angle and the back seater a seven degree look-down on the centerline. I found the Hawk cockpit roomier than the T-38 and its visibility from the rear somewhat better than that in Talon.

#### Hawk in the Air

The pre-takeoff checks complete and the throttle set at 100 percent, the aircraft is eager to get airborne. Hawk uses a single Rolls-Royce Adour engine, which produces 23.8 kilonewtons of static thrust (whoops,

*This ground-attack variant of the Hawk, shown here in training colors, carries five 1,000-pound bombs. It has a payload capability of 5,600 pounds.*







there I go again). That's 5,340 pounds. The engine, incidentally, is the same one Jaguar uses, except Hawk's Adour is nonafterburning.

Hawk's all-up takeoff weight for the training version is just under 11,000 pounds, and she accelerates quickly after brake release. The rudder is effective almost immediately (fifty knots). At ninety knots you raise the nosewheel by just a touch of back pressure, and she's off the ground at 120 knots some 2,000 feet from brake release.

You have to be quick to raise the gear and flaps since the 200-knot configuration limitation is reached very soon after liftoff. Climb speed is 350 knots, and Hawk's efficient wing and double-slotted flap arrangement give you the feeling that you're in an elevator.

Hawk has all power controls (except for rudder) operating from a standard dual hydraulic system. She is nimble and responsive and handles

*Maj. John P. Kelly is on exchange duty with the Royal Air Force, serving at Hq., RAF Training Command, RAF Brampton, where his duties are involved with the advanced jet training program and introduction of the Hawk. His previous assignments have included flight instruction with USAF's Air Training Command, typhoon chasing for Air Weather Service, and a combat tour as an RF-4C pilot with the Tactical Reconnaissance Squadron. He is a Senior Pilot with 4,600 hours of flying time in a variety of USAF and RAF aircraft.*

like a baby carriage. Aerobatics are a pleasure, especially since the view through that enormous canopy is panoramic. I would rate her sensitivity as a bit twitchier than that of Talon.

The efficiency of the wing design is really apparent when you put Hawk through some max turning exercises. At sea level, she will sustain six Gs at 400 knots and turns on a dime. If you and your G-suit are up to it, she's cleared to +8 and -4 Gs. I normally quit somewhere between five and six. I'd also like to have a peek at the drag curves, which must be pretty flat, because,

although the bird will buffet and wing-rock if you over-pull, the air-speed decay is remarkably slow.

Preproduction Hawks gave little notice of an impending stall, so Hawker Siddeley added wing fences and vortex generators. Her stall characteristics are now quite safe and predictable, and she exhibits all the telltale signs of increasing buffet, lateral wander, and pitch oscillations. Control throughout the stall recovery is good, and she'll start flying again as soon as you ease the stick out of your lap.

To inadvertently spin the Hawk you really have to be a gorilla. It





takes a good boot of full rudder, and it's got to be held there. The recovery simply calls for restoring the rudder to neutral and she'll stop right then. Incidentally, the RAF syllabus will call for spinning profiles for the student.

Heading back to the traffic pattern after an hour of airwork I noticed the fuel gauge reading 500 kilograms. A rule of thumb for "Miss Hawk" is that she can fly one mile per kilogram of fuel at 30,000 feet. As far as the RAF is concerned, she can make any divert field in the UK and still have ample fuel for approach and landing. Believe me, in this country that is one big plus!

If it wasn't your day and the "blower" goes out, Hawk will quite happily glide at 165 knots, giving a range of two nautical miles per 1,000 feet. A small ram air turbine

*At left, a Hawk armed with two Sidewinder air-to-air missiles, a 30-mm Aden cannon, and two external tanks. The trainer version, below, holds close formation with speed brake extended. RAF students will receive both advanced pilot training and fighter/ground attack transition in the Hawk.*







Hawk's cockpit is roomy, its layout designed with the pilot in mind. On the attack version, the weapons sight is above the Attitude Direction Indicator.

will pop out aft of the rear cockpit and provide enough hydraulic pressure for the powered controls right through touchdown. No manual reversion or two-handed flying, as in the venerable Hunter, is required.

Back in the traffic pattern it's your option: TACAN, ILS, GCA, or visual. Hawk employs an ADI (Attitude Direction Indicator) and HSI (Horizontal Situation Indicator) quite similar to the T-38 but

without the Flight Director. And for once I felt at home in a British airplane.

The bird is quite straightforward in the pattern, using a downwind speed of 160 knots, final at 120-125 knots, and threshold speed twenty knots below that. The RAF will probably boost these up a bit to make it more compatible with current pattern speeds. When things look good, you dump full flaps and

check with stick down because those double-slotted flaps really bite. The view from the back is an instructor's dream. Even the touchdown point is visible until you raise the nose for the flare.

As we taxi back, the tower calls our airborne time—1 + 40. Not bad and we still have 250 kg left; enough to hold for fifteen to twenty minutes if we had to.

So ended my first trip in Hawk, an airplane I have been watching with great interest since coming on board with the RAF two years ago. The current trainers, Gnat and Hunter, have done yeoman service for more than fifteen years and are reaching the end of their useful life. Hawk, therefore, is the right aircraft at the right time for the RAF, and will provide a new dimension in sortie flexibility.

The RAF's advanced flying training pattern (Phase 2) has been increased by fifteen hours so that Hawk will be used in an eighty-five-hour syllabus. With those additional hours coupled with Hawk's superb endurance, the advanced pilot training school can concentrate more on the applied phases of training—low-level navigation and formation.

### Trainer With a Sting

Hawk will also be the training machine for the fighter and ground-attack lead-in course, prior to operational conversion training. The combat version can carry a combination of weapons in a five-station configuration. For weapons training, however, she'll be equipped with a 30-mm Aden gun pod and two 68-mm rocket launchers, or practice bombs. Students completing the eighty-five-hour advanced flying training syllabus will move on to a fifty-five-hour tactical weapons course, all conducted in the Hawk. This provides a low-cost but effective all-through-jet training package for future RAF fast-jet pilots. With a 6,000-hour service life, Hawk should be around quite a while.

The RAF is well into its instructor conversion program, and the first student course began ground school on May 30 of this year. Five weeks later, the first RAF student will fly Hawk, which, as a matter of interest, is the Fourth of July, 1977. Funny, but that date does ring a bell! ■

### HAWK'S LEADING PARTICULARS

(Data from Jane's All the World's Aircraft, 1976-77)

<b>Manufacturer:</b>	Hawker Siddeley Aviation Ltd., Surrey, England.
<b>Type:</b>	Two-place, tandem-seat advanced flying and tactical weapons trainer or ground-attack variant.
<b>Powerplant:</b>	Rolls-Royce/Turbomeca RT.172-06-11 Adour Mk 151 nonafterburning turbofan. Sea level static thrust: 5,340 lb.
<b>Length:</b>	36 ft. 7¾ in.
<b>Height:</b>	13 ft. 5 in.
<b>Wing Span:</b>	30 ft. 9¾ in.
<b>Wing Area:</b>	179.6 sq. ft.
<b>Wing Sweep:</b>	Leading edge 26°, quarterchord 21° 30'.
<b>Weight, Empty:</b>	7,450 lb.
<b>Takeoff Weight:</b>	11,100 lb. clean; 16,200 lb. max. takeoff weight.
<b>Fuel Capacity:</b>	Internal: 365 Imp. gal.; external: two 100-imp. gal. wing drop tanks.
<b>Max. Level Speed:</b>	562 knots.
<b>Service Ceiling:</b>	48,000 ft.
<b>Max. G Load:</b>	+8 and -4 with full fuel.
<b>Armament:</b>	Weapons trainer: two 68-mm Matra rocket launchers, one 30-mm Aden gun pod. Ground-attack variant: five-station configuration, allowing a 5,600-lb. weapon load.
<b>First Flight:</b>	August 1974.



# JANIE'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT



*Hind-A, first major production version of the Mil Mi-24 assault helicopter*

**MIL**  
MIKHAIL L. MIL DESIGN BUREAU,  
USSR

Following publication of the first accurate details of the **Hind-D** version of the Mil Mi-24 assault helicopter in the March 1977 **AIR FORCE** Magazine, further information on the various models has become available. It is still not possible to relate any of them precisely to the Mil A-10 in which Soviet woman pilot Galina Rastorgoueva set seven official records in Class E1. In any case, the aircraft used for the record attempts would have been specially prepared, with all possible excrescences removed. So the standard combat versions could not be expected to match as routine the record marks, which include a speed of 184.196 knots (341.35

km/h; 212.105 mph) over a 15/25 km straight course, 180.480 knots (334.464 km/h; 207.826 mph) around a 100 km circuit, 178.624 knots (331.023 km/h; 205.688 mph) around a 500 km circuit, 179.500 knots (332.646 km/h; 206.697 mph) around a 1,000 km circuit, climb to 3,000 m in 2 min 33.5 sec, and climb to 6,000 m in 7 min 43 sec. This first record awaits confirmation.

**MIL MI-24**  
**NATO reporting name: Hind**

This assault helicopter was known to exist for some two years before photographs became available to the technical press in early 1974. The two versions shown in those first photographs were each capable of carrying a squad of eight combat-equipped troops, and had attachments under their

auxiliary wings for a variety of ordnance, to keep down the heads of enemy troops in the drop zone and to attack targets of opportunity, including tanks. At least two units of approximate squadron strength were based in eastern Europe by the Spring of 1974, at the northern and southern ends of the border separating the forces of NATO and the Warsaw Pact nations. Since that time two more versions of the Mi-24 have been identified in operational units, including a formidable gunship in the class of the Advanced Attack Helicopter now under development by Hughes for the US Army.

The basic airframe, power plant, and transmission system appear to be common to all versions, with differences in armament, operational equipment, and tail rotor location. In addition, the gunship has a



completely new crew cabin forward of the engine inlets and above the fuselage floor, which appears little changed. Four major variants of which details may be published are known by the following NATO reporting names (note that details of **Hind-C** are different from those appearing in the March AIR FORCE Magazine):

**Hind-A.** Armed assault helicopter, with large enclosed flight deck for crew of four, comprising pilot, co-pilot, gunner-navigator and forward observer. Auxiliary wings, with considerable anhedral, each carry three weapon stations for heavy armament, supplemented by large-calibre machine-gun in nose. Anti-torque rotor, originally on starboard side of offset tail pylon, repositioned to port side on later and converted aircraft. Initial production Mi-24s were of this model.

**Hind-B.** Similar to **Hind-A** except that auxiliary wings have neither anhedral nor dihedral, and carry only the two inboard weapon stations on each side. This version is believed to have preceded **Hind-A** and was not built in large numbers.

**Hind-C.** Generally similar to late-model **Hind-A** but without nose gun and under-nose blister, and no missile rails at wingtips.

**Hind-D.** Basically similar to late-model **Hind-A**, with tail rotor on port side, but with front fuselage completely redesigned for primary gunship role. Tandem stations for weapon operator (in nose) and pilot have individual canopies. Front canopy hinged to open sideways, to starboard; footstep under starboard side of fuselage for access to pilot's rearward-hinged door. Rear seat raised to give pilot an unobstructed forward view. Probe fitted forward of top starboard corner of bullet-proof windscreen at extreme nose may be similar to US low-air-speed sensing equipment, to ensure optimum conditions for minimum dispersion of 57 mm rockets. Under nose is a four-barrel Gatling-type large-calibre machine-gun in a turret with a wide range of movement in azimuth and elevation. Undernose pack for sensors, possibly including a forward-looking infra-red scanner, slaved to gun, and low-light-level TV. Wing armament of **Hind-A** retained, but forward-looking (electro-



This photograph of the Mi-24 gunship, **Hind-D**, shows the repositioned tail rotor, now standard on all but early models of this helicopter

optical?) sensor transferred from top of port inner pylon to wingtip. Many small antennae and blisters. Extended nosewheel leg to increase ground clearance of sensor pack; nosewheels semi-exposed when retracted.

Several hundred Mi-24 helicopters are currently operational, mainly of the **Hind-A** version, but with increasing numbers of **Hind-Cs** and **Hind-Ds** which appear to be complementary. Except where indicated, the following details apply to all current versions:

**ROTOR SYSTEM:** Five-blade main rotor and three-blade tail rotor; latter now on port side of offset tail fin. Main rotor blades believed to be of glassfibre, on cast titanium head. Balance tab and electrical leading-edge de-icing on each blade.

**FUSELAGE:** Conventional all-metal semi-monocoque structure of pod and boom type. Forward portion, above shallow floor structure, differs with role.

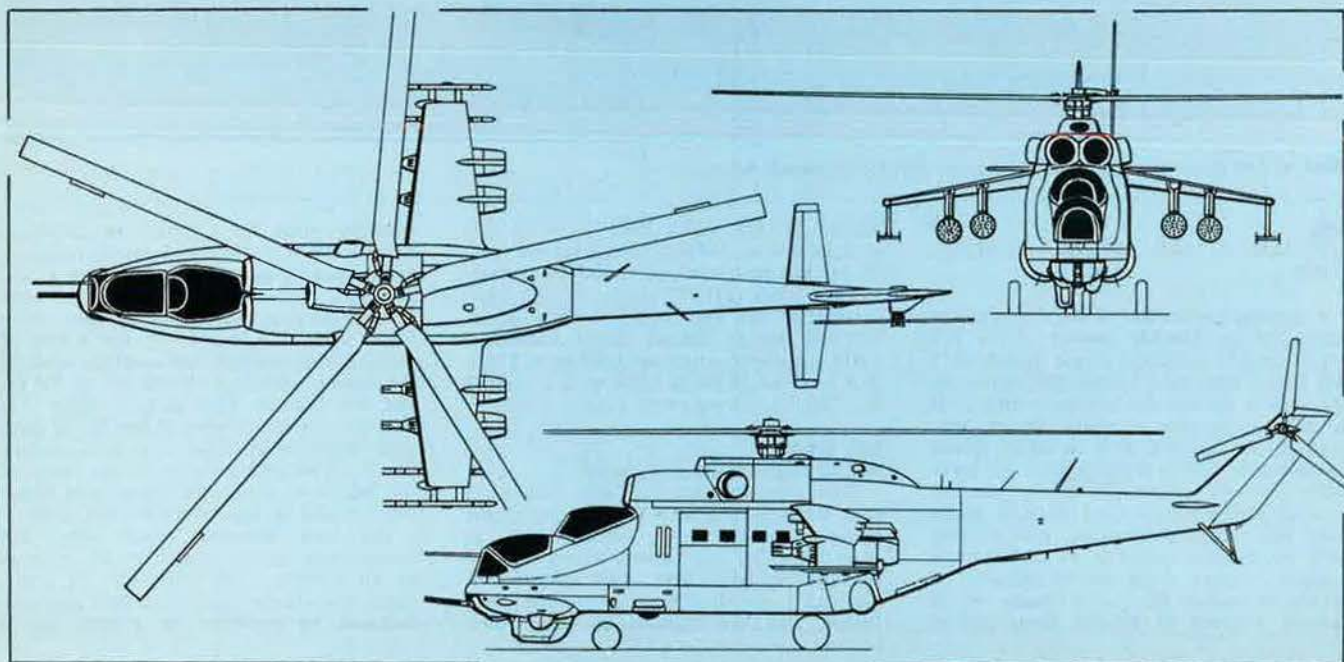
**AUXILIARY WINGS:** Cantilever shoulder wings of tapered planform, with marked anhedral and incidence. No movable surfaces.

**TAIL UNIT:** Swept fin, offset a few degrees, serves also as tail rotor pylon. Variable-incidence horizontal stabiliser at base of fin.

**LANDING GEAR:** Tricycle type, with rearward-retracting twin-wheel nose unit, and single-wheel main units with oleo-pneumatic shock-absorbers and low-pressure tyres. Main units retract rearward and inward into the aft end of the fuselage pod, turning through 90° to stow almost vertically, discwise to the longitudinal axis of the fuselage, under prominent blister fairings. Tubular tripod skid assembly protects tail rotor in a tail-down take-off or landing.

**POWER PLANT:** Two 1,118.5 kW (1,500 shp) Isotov turboshaft engines, related to the TV2-117A engines of the Mi-8 but shorter,

The gunship version of the Mil Mi-24, known to NATO as **Hind-D** (Pilot Press)







The completely redesigned nose of the gunship is shown clearly in this closeup

mounted side by side above the cabin, with their output shafts driving rearward to the main rotor shaft through a combining gearbox.

**ACCOMMODATION (Hind-A):** Crew of four; eight fully-equipped troops in main cabin. Access to flight deck via large rearward-sliding blistered transparent panel which forms the aft flight deck window on the port side, and a large upward-hinged window forward of this. At front of passenger cabin on each side is a large door, divided horizontally into two sections which are hinged to open upward and downward respectively. Optically flat bulletproof glass window in nose, with wiper, for gunner.

**SYSTEMS:** Dual electrical system, with three generators. Stability augmentation system. Electro-thermal de-icing system for main and tail rotor blades.

**ELECTRONICS:** Include ADF navigation system with map display.

**ARMAMENT (Hind-A):** One large-calibre machine-gun in nose, probably slaved to undernose sighting system. Rails for four Swatter anti-tank missiles under endplate pylons at wingtips. Four underwing pylons for rocket pods (each thirty-two 57 mm rockets), special bombs, or other stores. Reportedly under development for the Mi-24 is a 'fire-and-forget' anti-tank guided missile with optical contrast and TV seeker, and with a range of about 4.3 nm (8 km; 5 miles).

**DIMENSIONS, EXTERNAL:**

Diameter of main rotor	17.00 m (55 ft 9 in)
Diameter of tail rotor	3.90 m (12 ft 9½ in)
Length overall	17.00 m (55 ft 9 in)
Height overall	4.25 m (14 ft 0 in)

**WEIGHTS (estimated):**

Max external weapons	1,275 kg (2,800 lb)
Normal T-O weight	10,000 kg (22,000 lb)

**LOCKHEED**

**LOCKHEED-GEORGIA COMPANY (A Division of Lockheed Aircraft Corporation);** Head Office: 86 South Cobb Drive, Marietta, Georgia 30063, USA

**LOCKHEED L-400 TWIN HERCULES**

Lockheed announced on 25 January 1977 that the company has designed a twin-

engined derivative of its four-engined C-130 Hercules. This resulted from a preliminary canvass in 30 countries, which indicated a potential demand for a freight aircraft in this category.

Designated L-400, this aircraft will have a hold the same size as that of a C-130, and will be able to carry 10,206 kg (22,500 lb) of cargo over a range of 550 nm (1,018 km; 633 miles). Structural changes by comparison with the C-130 will affect parts of the wings, the power plant, and main landing gear; the new aircraft will also have simplified systems and instrumentation. Many components and spares will be common to both versions, and the L-400 will be able to utilise C-130/L-100 ground handling and test equipment, as well as training programmes. The fuselage and tail unit will be substantially the same as those of the C-130, except that the flight deck will be similar to that of the Model L-100 series.

Changes to the wing include a reduction of 6.70 m (22 ft 0 in) in the span of the centre-section. The existing outer wing panels are retained, and a new constant-chord wing-tip, 1.37 m (4 ft 6 in) long, is fitted to each wing outboard of the aileron. Because of the considerably lower gross weight, the landing gear can be simplified, and the two tandem wheels each side on the C-130 are replaced by a single wheel on each main unit.

It is estimated that the initial cost of the L-400 will be approximately 25% less than that of the four-engined C-130. It will require a crew of only two, instead of four.

**TYPE:** Short-range civil or military transport.

**WINGS:** Cantilever high-wing monoplane.

Wing section NACA 64A318 at root, NACA 64A412 at tip. All-metal two-spar stressed-skin structure. Conventional light alloy ailerons have tandem-piston hydraulic boost, operated by either of two independent hydraulic systems. Lockheed-Fowler light alloy trailing-edge flaps. Trim tabs in ailerons. Leading-edges anti-iced by hot air bled from engines.

**FUSELAGE:** Semi-monocoque light alloy structure.

**TAIL UNIT:** Cantilever all-metal stressed-skin structure. Fixed-incidence tailplane. Trim tabs in elevators and rudder. Control surfaces have tandem-piston hydraulic boost. Hot-air anti-icing of tailplane leading-edges by engine bleed air.

**LANDING GEAR:** Hydraulically-retractable tri-

cycle type. Single wheel on each of the main units, which retract into fairings built on to the sides of the fuselage. Nose unit has twin wheels and is steerable through 60° each side of centre. Oleopneumatic shock-absorbers. Main wheel tyres size 56 x 20-20. Nosewheel tyres size 39 x 13-16 Type VII. Hydraulic brakes with fully modulating anti-skid units.

**POWER PLANT:** Two 3,424 kW (4,591 shp) Allison 501-D22D turboprop engines, each driving a Hamilton Standard four-blade metal constant-speed fully-feathering reversible-pitch propeller. Water-alcohol injection system. Fuel in two main and two auxiliary integral wing tanks with total capacity of 13,472 kg (29,700 lb).

**ACCOMMODATION:** Crew of two on flight deck. Flight deck and main cabin pressurised and air-conditioned. Standard loads can include 2½-ton truck and 105 mm howitzer; 155 mm howitzer and its high-speed tractor; five pallets each 1,814 kg (4,000 lb); four containers each 2.4 x 2.4 x 2.7 m (8 x 8 x 10 ft); 88 (max) troops; 64 (max) paratroops; 74 litters and 2 attendants. Two doors on port side, one forward adjacent to nosewheel unit, one aft of landing gear fairing. One door on starboard side aft of landing gear fairing. Hydraulically-operated main loading door and ramp at rear of cabin.

**SYSTEMS:** Air-conditioning and pressurisation systems. Two independent hydraulic systems, powered by engine-driven pumps, each with an electrically-operated auxiliary backup pump. Electrical system supplied by two engine-driven 60/90kVA generators. Auxiliary generator driven by APU which can be operated in flight.

**ELECTRONICS:** Standard electronics include radar, flight director, gyro/magnetic compass, VHF nav/com. Wide range of options available to customer's requirements.

**DIMENSIONS, EXTERNAL:**

Wing span	36.48 m (119 ft 8¼ in)
Wing chord at root	4.88 m (16 ft 0 in)
Wing chord, mean	3.93 m (12 ft 10¼ in)
Wing aspect ratio	9.63
Length overall	29.81 m (97 ft 9½ in)
Height overall	approx 11.58 m (38 ft 0 in)
Tailplane span	16.05 m (52 ft 8 in)
Wheel track	4.36 m (14 ft 3½ in)
Wheelbase	10.55 m (34 ft 7¼ in)
Propeller diameter	4.27 m (14 ft 0 in)
Propeller ground clearance	1.89 m (6 ft 2½ in)

**DIMENSIONS, INTERNAL:**

<b>Cargo compartment:</b>	
Length excl ramp	12.50 m (41 ft 0 in)
Length incl ramp	15.55 m (51 ft 0 in)
Max width	3.05 m (10 ft 0 in)
Max height	2.74 m (9 ft 0 in)
Floor area, incl ramp	49.54 m² (533 sq ft)
Volume, incl ramp	127.4 m³ (4,500 cu ft)

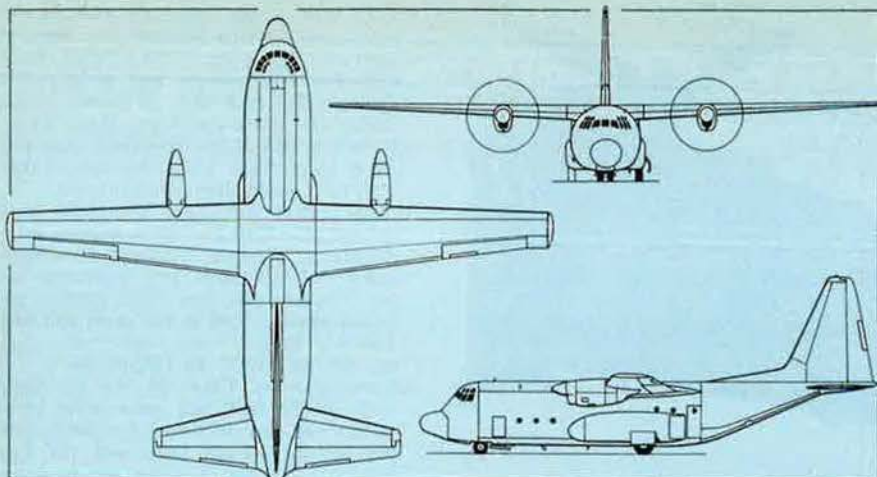
**AREAS:**

Wings, gross	136.81 m² (1,472 sq ft)
Fin	20.90 m² (225 sq ft)
Rudder, incl tab	6.97 m² (75 sq ft)
Tailplane	35.40 m² (381 sq ft)
Elevators, incl tabs	14.40 m² (155 sq ft)

**WEIGHTS AND LOADINGS (estimated):**

Weight empty	23,971 kg (52,847 lb)
Operating weight empty	24,449 kg (53,900 lb)
Max payload	11,385 kg (25,100 lb)
Max ramp weight	38,329 kg (84,500 lb)
Max T-O weight	38,102 kg (84,000 lb)
Max landing weight	37,648 kg (83,000 lb)
Max zero-fuel weight	35,834 kg (79,000 lb)
Max wing loading	278.6 kg/m² (57.07 lb/sq ft)





Lockheed L-400 Twin Hercules (two Allison 501-D22D turboprop engines) (Pilot Press)

Max power loading  
5.56 kg/kW (9.15 lb/shp)

PERFORMANCE (estimated, at max T-O weight):  
Cruising speed  
250 knots (463 km/h; 288 mph)  
Max rate of climb at S/L  
488 m (1,600 ft)/min  
Rate of climb at S/L, one engine out  
114 m (375 ft)/min  
Service ceiling  
8,230 m (27,000 ft)  
Service ceiling, one engine out  
3,960 m (13,000 ft)  
Min ground turning radius  
21.18 m (69 ft 6 in)  
T-O run  
1,020 m (3,340 ft)  
Landing run  
915 m (3,000 ft)  
Range with 10,206 kg (22,500 lb) payload,  
5% fuel reserve plus 30 min loiter  
550 nm (1,018 km; 633 miles)  
Ferry range with max fuel, 408 kg (900  
lb) payload, reserves as above  
3,050 nm (5,650 km; 3,510 miles)

**MBB**  
**MESSERSCHMITT-BÖLKOW-BLOHM**  
GmbH; Head Office: Ottobrunn bei München,  
8 München 80, Postfach 801220, German  
Federal Republic

**MBB BO 105**  
A total of 320 BO 105s had been delivered (of some 350 ordered) by the beginning of this year, when production was at the rate of six to eight helicopters each month. Recent customers included the People's Republic of China, which has taken delivery of four to support offshore oil exploration in northern China. From 1979 the German Army will begin to replace its current Alouette IIs with 227 BO 105 VBH liaison and light observation helicopters. It is expected that these aircraft will be supplemented by about 200 BO 105 PAH 1 anti-tank helicopters. For this role, the BO 105 can be fitted with outriggers to carry either six Euromissile Hot or four BGM-71 TOW missiles, with a stabilised sight above the co-pilot's position.

Licence assembly of about 12 BO 105s per annum is undertaken by PADC in the Philippines and Nurtanio of Indonesia.

Latest version to be type certificated by the LBA in Germany (on 19 November 1976) is the BO 105 CB, in which the former 298 kW (400 shp) Allison 250-C20 turboshaft engines are replaced by a pair of 313 kW (420 shp) Allison 250-C20Bs. This version is operable in external air temperatures from  $-45^{\circ}$  to  $+50^{\circ}\text{C}$ , compared with  $-30^{\circ}$  to  $+40^{\circ}\text{C}$  for the BO 105 C.

The version supplied to the UK, with modified equipment, is designated BO 105 D. The BO 105 S has increased seating or cargo capacity in a 0.25 m (9.8 in) longer fuselage.

PERFORMANCE (BO 105 CB, at normal T-O weight):  
Never-exceed speed at S/L  
145 knots (270 km/h; 167 mph)  
Max cruising speed at S/L  
132 knots (245 km/h; 152 mph)  
Max rate of climb at S/L  
540 m (1,772 ft)/min  
Max operating height  
5,182 m (17,000 ft)  
Hovering ceiling in ground effect  
2,900 m (9,515 ft)  
Range with standard fuel, no reserves:  
at S/L 310 nm (575 km; 356 miles)  
at 1,525 m (5,000 ft)  
355 nm (656 km; 408 miles)  
Max range with auxiliary tanks at S/L  
540 nm (1,000 km; 621 miles)

**MBB/KAWASAKI**  
**MESSERSCHMITT-BÖLKOW-BLOHM**  
GmbH; Address as previous entry  
**KAWASAKI HEAVY INDUSTRIES LTD;**  
Aircraft Group Office: World Trade Center  
Building, 4-1 Hamamatsu-cho, 2-chome,  
Minato-ku, Tokyo, Japan

#### MBB/KAWASAKI BK 117

Following nearly two years of negotiations, an agreement was signed on 25 February 1977 between MBB and Kawasaki to develop jointly an 8/12-seat multi-purpose helicopter known as the BK 117. This design supersedes two earlier, separate projects known as the MBB BO 107 and the Kawasaki KH-7.

Development costs of the BK 117 programme, estimated at \$33-35 million, will be shared equally between the two companies. MBB will be responsible for the main and tail rotor systems, the tail unit, and the dual hydraulic systems; Kawasaki will be responsible for the fuselage, landing gear, transmission system, and smaller items of equipment. There will be two production centres, at Munich and Gifu; first flight is planned for mid-1979, with deliveries of production aircraft beginning in 1981.

The BK 117's four-blade rigid main rotor will be essentially a scaled-up version of that already fitted to the BO 105, from which aircraft the hydraulic system also will be adapted. Kawasaki will utilise the basic transmission evolved for its earlier KH-7 design. Power plant of the BK 117 will be a pair of 447 kW (600 shp) Avco Lycoming LTS101-650A turboshaft engines or, optionally, Allison 250-C28 turboshafts. The aircraft will have a two-blade tail rotor mounted on the central fin, forward of which there will be a tailplane carrying twin endplate fins.

Standard seating in the BK 117 will be for eight persons, including the pilot; but versions with six (executive) and 12 (high-density) seats are envisaged. Both military and civil applications are foreseen, and the BK 117 will have many accessories that are interchangeable with those of the BO 105.

#### DIMENSIONS, EXTERNAL:

Diameter of main rotor 11.00 m (36 ft 1 in)  
Diameter of tail rotor 1.90 m (6 ft 2 3/4 in)

#### WEIGHTS:

Basic empty weight 1,400 kg (3,086 lb)  
Fuel 470 kg (1,036 lb)  
Normal T-O weight 2,650 kg (5,842 lb)  
Max T-O weight 2,800 kg (6,173 lb)

#### PERFORMANCE (estimated):

Normal cruising speed  
142 knots (264 km/h; 164 mph)  
Rate of climb at S/L 660 m (2,165 ft)/min  
Hovering ceiling in ground effect  
4,000 m (13,125 ft)  
Normal range 294 nm (545 km; 338 miles)

Artist's impression of the MBB/Kawasaki BK 117 eight/twelve-seat multi-purpose helicopter, now under development







Ilyushin Il-86 prototype (four Kuznetsov turbofan engines) (Tass)

**ILYUSHIN ILYUSHIN DESIGN BUREAU:** Headquarters: Moscow Central Airport, Khodinka, Moscow, USSR

**ILYUSHIN IL-86**  
**NATO reporting name: Camber**

Since the prototype of this four-turbofan wide-bodied passenger transport (CCCP-86000) flew for the first time on 22 December 1976, it has been possible to identify the type of engine currently fitted. However, the Soviet Union continues to show interest in the British Rolls-Royce RB.211 turbofan, and the possibility that this engine might be fitted to production Il-86s should not be discounted.

First indication that the Il-86 was under development was given at the 1971 Paris Air Show. Mr Genrikh Novozhilov, successor to the late Sergei Ilyushin as chief of the Ilyushin design bureau, told visitors that a wide-bodied transport known as the Il-86 was then in the early project design stage. No final decision on the configuration, or number of engines, had been taken at that time; but in the Spring of 1972 a model of one projected configuration was displayed publicly in Moscow. This design was similar in layout to the Il-62, with four rear-mounted

turbofan engines and a T-tail, but was intended to be much larger, with a two-deck fuselage. It was described and illustrated in the 1972-73 *Jane's*.

Simultaneously with the display of this original model, it became known that the Il-86 had been chosen for development, after a competition in which it was evaluated against proposals from the Antonov and Tupolev design teams. If it proves successful, it is expected to follow the Tu-154 interim airbus in service with Aeroflot in the late 'seventies.

By the end of 1972, it became evident that the design of the Il-86 had evolved along different lines to those suggested by the model displayed six months earlier. In particular the engines had been repositioned into four underwing pods, permitting the tailplane to be lowered on to the rear fuselage. The prototype, in this form, made its first flight of about 40 min from the old Moscow Central Airport of Khodinka, where the Ilyushin bureau has its headquarters, to the official flight test centre, piloted by Hero of the Soviet Union A. Kuznetsov.

The following details should be regarded as provisional:

**TYPE:** Four-turbofan wide-bodied passenger transport.

**WINGS:** Cantilever low-wing monoplane of all-metal construction, made at Voronezh. Dihedral from roots. Sweepback 35° at quarter-chord. Large slotted trailing-edge flaps, in two sections along entire span of each wing inboard of aileron. Multi-section spoilers in top surface, forward of all four flap sections. Full-span leading-edge slats, with small cutaway to clear each inboard engine pylon. Shallow fence on top surface in line with each pylon.

**FUSELAGE:** Conventional semi-monocoque light alloy structure of circular cross-section.

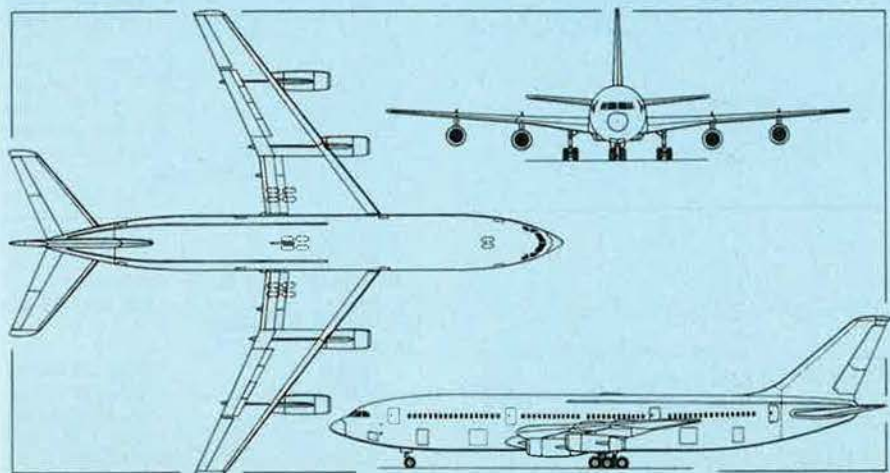
**TAIL UNIT:** Conventional sweptback cantilever structure, with tailplane dihedral. Each control surface in two sections. Tail unit made at Kiev.

**LANDING GEAR:** Retractable four-unit type. Rearward-retracting steerable twin-wheel nose unit, and three four-wheel bogie main units. Two of the latter retract inward into the wing-root fairings; the third unit is mounted centrally under the fuselage, slightly forward of the others. Main landing gear made at Kuibyshev.

**POWER PLANT:** Four Kuznetsov turbofan engines, each rated at 127 kN (28,500 lb st), mounted on pylons forward of wing leading-edges. Fuel capacity 70,000-80,000 litres (15,400-17,600 Imp gallons).

**ACCOMMODATION:** Standard flight crew comprises two pilots and a flight engineer, with provision for a navigator if required. Upper deck, on which all seats are located, is divided into three separate cabins by wardrobes, galleys, and cabin staff accommodation, with toilets at front and rear of the aircraft. Up to 350 passengers in basic nine-abreast seating throughout, with two aisles. Suggested mixed-class alternative layout provides for 28 passengers six-abreast in the front cabin, and 206 passengers eight-abreast in the other two cabins. Passengers are intended to enter via three airstair-type doors, made in Kharkov, which hinge down from the port side of the lower deck. Two of these doors are forward of the wing; the other is aft of the wing. Four further doors at upper-deck level on each side, presumably for emergency use. Coats and hand baggage are intended to be stowed on the lower deck before passengers climb one of three fixed staircases to the main deck. Cargo

Provisional three-view of Ilyushin Il-86 four-turbofan wide-bodied passenger transport aircraft (Pilot Press)





holds are designed to accommodate baggage and freight in 16 standard LD3 containers. Access is via upward-hinged doors forward of the starboard wing-root leading-edge and at the side of the rear hold. Containers can be loaded and unloaded by means of a self-propelled truck with built-in roller conveyor. Films will be shown in flight, and there will be a choice of 12 tape-recorded programmes to listen to.

**DIMENSIONS, EXTERNAL:**

Wing span 48.33 m (158 ft 6½ in)  
 Length overall 58.50 m (191 ft 11 in)  
 Diameter of fuselage 6.08 m (19 ft 11½ in)  
 Height overall 15.70 m (51 ft 6 in)  
 Tailplane span 19.00 m (62 ft 4 in)

**DIMENSIONS, INTERNAL:**

Main cabins: Height 2.61 m (8 ft 7 in)  
 Max width approx 5.70 m (18 ft 8½ in)

**AREA:**

Wings, gross 320 m² (3,444 sq ft)

**WEIGHTS:**

Max payload 40,000 kg (88,185 lb)  
 Max T-O weight 188,000 kg (414,470 lb)

**PERFORMANCE (estimated):**

Normal cruising speed at 9,000–10,000 m (30,000–33,000 ft) 485–512 knots (900–950 km/h; 560–590 mph)  
 Landing speed 130–135 knots (240–250 km/h; 149–155 mph)  
 Range with max payload 1,268 nm (2,350 km; 1,460 miles)  
 Range with max fuel 2,480 nm (4,600 km; 2,858 miles)

**AHRENS**

**AHRENS AIRCRAFT CORPORATION;**  
 Head Office: 2800 Teal Club Road, Oxnard, California 93030, USA

**AHRENS AR 404**

Ahrens Aircraft Corporation initiated the design of a four-engined passenger/cargo transport in January 1975; construction of a prototype began in August of that year, and this flew for the first time on 1 December 1976. It is intended to gain certification under FAR Part 25. Design emphasis has been to evolve a simple and robust multi-purpose transport aircraft that is easy to operate and maintain. A square constant-section fuselage has been adopted to provide maximum volume and simplify the loading of containers; the wing is mounted on the fuselage upper surface, eliminating any wing carry-through structure within the fuselage. A modular concept has been chosen for all systems to simplify maintenance; it is claimed that an engine can be removed for replacement within 20 minutes. The details which follow apply to the production version:



Prototype of the Ahrens AR 404, with non-retractable main landing gear and only six cabin windows on each side

**TYPE:** Passenger/cargo transport.

**WINGS:** Cantilever high-wing monoplane. Wing section NACA 64<sub>3</sub>-618. Dihedral 0°. Incidence 0°. Three-spar fail-safe light alloy structure, with light alloy skins. Electrically-operated and synchronised two-section single-slotted trailing-edge flaps of light alloy construction on each wing. Manually-actuated plain ailerons of light alloy construction, with electrically-operated trim tab in each. Modified Hoerner-type wingtips.

**FUSELAGE:** Semi-monocoque square constant-section fail-safe structure of light alloy.

**TAIL UNIT:** Cantilever structure of light alloy. Manually-actuated control surfaces. Electrically-operated trim tabs in elevator and rudder.

**LANDING GEAR:** Prototype had tricycle gear, with retractable nosewheel and fixed main units. Production aircraft will have hydraulically-retractable tricycle gear, all units retracting forward to simplify free-fall extension in emergency. Main units retract into sponson on each side of fuselage. Oleo-pneumatic shock-absorber and twin wheels on each unit. Hydraulically-steerable nose unit has wheels and tyres size 6.00-6. Main wheels and tyres size 7.00-8. Hydraulically-operated disc brakes.

**POWER PLANT:** Four 314 kW (420 shp) Allison 250-B17B turboprop engines, each driving a Hartzell three-blade metal constant-speed and fully-reversible propeller. Four wing fuel tanks with combined total capacity of 2,650 litres (700 US gallons).

Propeller blades are de-iced electrically. **ACCOMMODATION:** Crew of two side by side on flight deck, with dual controls. Up to 30 passengers can be accommodated in commuter version, with a 'two and one' seating arrangement having an aisle width of 0.38 m (1 ft 3 in). Five-track seat/cargo restraint system in cabin floor may be used for seat attachment, direct cargo tiedown, or for the fitting of rollers to facilitate the handling of palletised cargo. Three standard D3 containers can be accommodated. Twelve cabin windows on each side. Passenger door aft of wing on each side. Crew door on port side; communicating door between flight deck and cabin. Split cargo door forms undersurface of aft fuselage, lower half serving also as a loading ramp, which can be left open to permit the carriage of outsize cargo or to allow the dropping of paratroops and supplies. Accommodation air-conditioned and heated.

**SYSTEMS:** Hydraulic system for landing gear retraction, brakes, and nosewheel steering. Electrical system powered by four Lear Siegler engine-driven generators, each developing 28V 150A DC. Dual storage batteries and external power sockets. A small APU driving a 28V 150A generator is housed beneath the co-pilot's seat, and is intended for emergency electricity supply and for battery charging.

**ELECTRONICS AND EQUIPMENT:** Collins AP.106 autopilot, blind-flying instrumentation, navigation and communications transceivers, and transponder are standard. Weather radar and other electronics optional.

**DIMENSIONS, EXTERNAL:**

Wing span 20.12 m (66 ft 0 in)  
 Wing chord, constant 1.98 m (6 ft 6 in)  
 Wing aspect ratio 10.1  
 Length overall 14.73 m (48 ft 4 in)  
 Height overall 5.33 m (17 ft 6 in)  
 Tailplane span 7.32 m (24 ft 0 in)  
 Wheel track 4.27 m (14 ft 0 in)  
 Propeller diameter 2.29 m (7 ft 6 in)  
 Propeller ground clearance 1.45 m (4 ft 9 in)

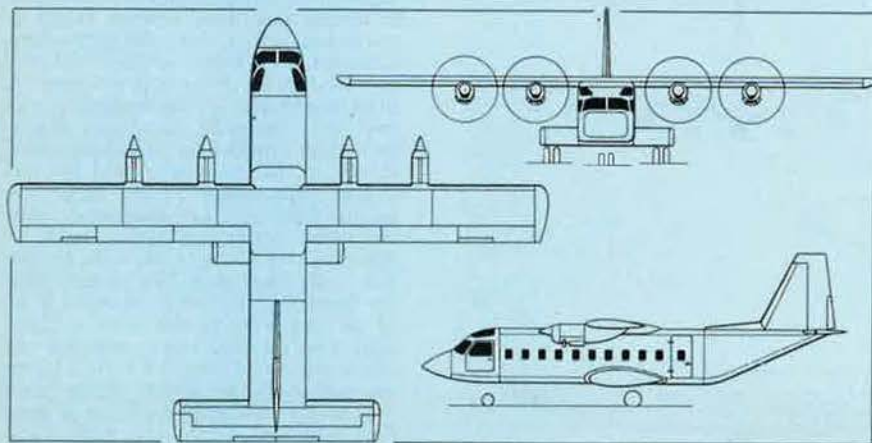
**Cabin doors (each):**

Height 1.52 m (5 ft 0 in)  
 Width 0.76 m (2 ft 6 in)  
**Rear cargo doors (upper and lower):**  
 Width 1.63 m (5 ft 4 in)

**DIMENSIONS, INTERNAL:**

**Cabin:**  
 Length 7.32 m (24 ft 0 in)  
 Max width 1.85 m (6 ft 1 in)  
 Max height 1.83 m (6 ft 0 in)  
 Floor area 13.6 m² (146 sq ft)  
 Volume 24.64 m³ (870 cu ft)

One proposed production configuration of the Ahrens AR 404 (Pilot Press). Details of a subsequent proposal, with lengthened cabin, will be included in the August Supplement





<b>AREAS:</b>	
Wings, gross	39.85 m <sup>2</sup> (429 sq ft)
Ailerons (total, incl tabs)	3.99 m <sup>2</sup> (43 sq ft)
Trailing-edge flaps (total)	5.95 m <sup>2</sup> (64 sq ft)
Vertical tail surfaces (incl tab)	4.83 m <sup>2</sup> (52 sq ft)
Horizontal tail surfaces (incl tab)	11.15 m <sup>2</sup> (120 sq ft)
<b>WEIGHTS AND LOADINGS (estimated):</b>	
Weight empty, equipped	3,402 kg (7,500 lb)
Max T-O weight	7,711 kg (17,000 lb)
Max wing loading	193.5 kg/m <sup>2</sup> (39.6 lb/sq ft)
Max power loading	6.16 kg/kW (10.1 lb/shp)
<b>PERFORMANCE (estimated, at max T-O weight):</b>	
Max level speed at 1,525 m (5,000 ft)	190 knots (352 km/h; 219 mph)
Max cruising speed at 1,525 m (5,000 ft)	180 knots (333 km/h; 207 mph)
Stalling speed, flaps down	80 knots (148 km/h; 92 mph)
Max rate of climb at S/L	366 m (1,200 ft)/min
Service ceiling	8,230 m (27,000 ft)
Range with max fuel, no reserves	1,050 nm (1,946 km; 1,209 miles)

**LOCKHEED-CALIFORNIA**  
**LOCKHEED-CALIFORNIA COMPANY (A**  
*Division of Lockheed Aircraft Corporation);*  
*Head Office: Burbank, California 91520,*  
*USA.*

**LOCKHEED L-1011 (MODEL 385)**  
**TRISTAR**

In January 1966, Lockheed-California began a study of future requirements in the short/medium-haul airliner market. The design which emerged, known as the L-1011 (Model 385) TriStar, was influenced by the published requirements of American Airlines, which specified optimum payload/range performance over the Chicago-Los Angeles route, coupled with an ability to take off from comparatively short runways with full payload.

The original design centred around a twin-turbofan configuration. Discussions which followed with American domestic carriers led to the eventual selection of a three-engined configuration, and the Rolls-Royce RB.211 high bypass ratio turbofan was chosen as power plant.

In June 1968, the L-1011 TriStar moved to the production design stage. Construction of the first aircraft began in March 1969, and this was rolled out in September 1970. The first flight was made on 16 November 1970. On 22 December 1971, class II provisional Type Certification was received, permitting delivery of aircraft to customers for route proving and demonstration purposes.

This original version of the TriStar is now known as the L-1011-1; orders and options for it total 180, of which 129 had been delivered by 1 February 1977. Four other versions were available in early 1977, and orders and options for 13 L-1011-100s, three -200s, and 12 -500s had been received by 15 February 1977, of which 9 -100s had been delivered.

Lockheed announced on 15 March 1977 that the company was holding discussions with major airlines throughout the world regarding new versions of the L-1011 TriStar for service on short/medium-range routes in the 1980s. These have the designations L-1011-400 and -600, being three- and two-engined respectively, relying upon technology available from current TriStars. Versions

designated L-1011-400A and -600A would feature newly emerging technology and structural components now being developed by the company.

Details of current production versions, and available information on the four proposed new versions, follow:

**L-1011-1.** Basic TriStar. Initial delivery of the L-1011-1, to Eastern Air Lines for crew training, made on 6 April 1972, followed by a similar delivery to TWA. FAA certification was granted in the same month, and the first passenger service with the TriStar was flown by Eastern on 15 April. Scheduled services began eleven days later. Powered by three RB.211-22B turbofan engines, each rated at 187 kN (42,000 lb st).

offering particular benefits to operators serving 'hot or high' areas. Outward configuration identical with that of L-1011-1. Powered by RB.211-524 engines (each 213.5 kN; 48,000 lb st). Optional max T-O weights of 204,120 kg (450,000 lb) or 211,375 kg (466,000 lb) according to whether new centre-section tankage is fitted. Ordered by Saudi Arabian Airlines.

**L-1011-250.** Long-range version, with further increase in max T-O weight to 224,980 kg (496,000 lb) and max fuel capacity of 96,160 kg (212,000 lb), through added centre-section tankage. Outward configuration identical with that of L-1011-1. Wings, fuselage, and fin front spar web reinforced to cater for higher design loads.



*ABOVE: One of four Lockheed L-1011-1 wide-bodied transports acquired by LTU German Airlines. BELOW: First TriStar lower-deck lounge, installed in an L-1011-1 of LTU German Airlines, used on new weekly scheduled charter flights between Dusseldorf and New York/Los Angeles*



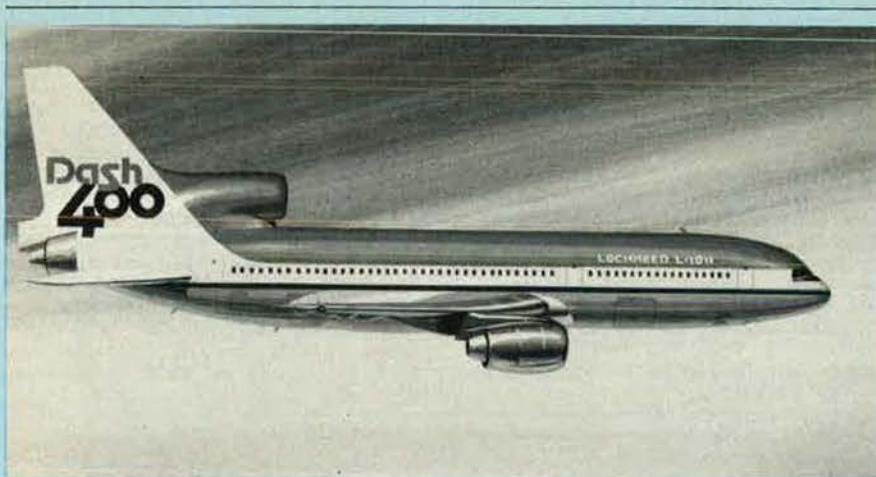
Total fuel capacity 90,140 litres (23,814 US gallons).

**L-1011-100.** Longer-range version. Outward configuration identical with that of L-1011-1. Available with RB.211-22B engines (each 187 kN; 42,000 lb st) or RB.211-22F engines (each 193.5 kN; 43,500 lb st). Max T-O weight of 204,120 kg (450,000 lb) can be increased to 211,375 kg (466,000 lb) with additional 8,165 kg (18,000 lb) of fuel in new centre-section tanks. Ordered by Cathay Pacific, Gulf Air, and Saudi Arabian Airlines.

**L-1011-200.** Longer-range version, with improved take-off and climb performance,

New nosewheel unit and strengthened main landing gear axles. Larger tyres with increased ply rating on all units. Braking capacity increased. Powered by RB.211-524B engines (each 213.5 kN; 48,000 lb st). Galley can be below-deck, as on other versions, or dispersed on main deck, which doubles available space in forward cargo hold. Expanded forward hold accommodates 16 LD3 half-width containers or 5 pallets, each measuring 2.23 m x 3.17 m (88 in x 125 in). For pallet loading, the forward cargo door is replaced by a 1.72 m x 2.64 m (68 in x 104 in) power-operated upward-opening door. Main-deck galleys reduce





The projected L-1011-400 short/medium-range TriStar announced by Lockheed in March of this year

passenger accommodation from typical 273 to 253 in eight-abreast coach configuration, and from typical 302 to 284 in nine-abreast coach configuration, in each case with 10 per cent first class forward.

**L-1011-400.** Proposed short/medium-range version with external dimensions identical to those of the L-1011-500. Powered by three RB.211-22B engines derated to 10 per cent less thrust, to improve operating economy and extend engine life, the -400 would have a max T-O weight between 158,985 kg (350,500 lb) and 169,870 kg (374,500 lb), and would carry between 200 and 250 passengers according to seating layout. Range of this version would be up to 2,700 nm (5,000 km; 3,107 miles).

**L-1011-400A.** Proposed version of the L-1011-400 which would have the fuselage shortened by 2.03 m (6 ft 8 in), and would accommodate 200-231 passengers according to seating layout. It would introduce new technology features, as well as composite materials for the construction of such items as control surfaces, leading- and trailing-edges, doors and panels, beams and posts. Benefiting from new technology would be the wing, which would incorporate advanced supercritical wing sections, extended wing-tips, and an active control system, in which the aircraft's control surfaces are moved automatically to counter manoeuvre or gust

loads without action by the pilot. Extension of the present L-1011 system would introduce an active aileron system, permitting increased wing span to provide drag reduction and save fuel, without other structural modification to the wing. Power plant would be the same as that of the L-1011-400 and max T-O weight 158,985 kg (350,500 lb).

**L-1011-500.** Extended-range version, with a max T-O weight of 224,980 kg (496,000 lb) and max fuel capacity of 96,160 kg (212,000 lb) through added centre-section tankage. Fuselage is shortened by 4.11 m (13 ft 6 in); all other external dimensions are the same as for L-1011-1. Three RB.211-524B engines (each 222.4 kN; 50,000 lb st). Galley located on main deck. Forward cargo hold accommodates 12 LD3 containers or four pallets each measuring 2.24 m x 3.17 m (88 in x 125 in). Centre hold takes 7 LD3 containers. In a mixed-class configuration, with 24 first-class passengers in six-abreast seating and 222 economy passengers in nine-abreast seating, the aircraft carries 246 passengers. Max accommodation for 300 passengers. Ordered by British Airways.

**L-1011-600.** Proposed short/medium-range version with a fuselage 6.48 m (21 ft 3 in) shorter than that of the L-1011-500, new wing centre-section but retaining the outer wing panels of the L-1011-1, a new tail unit which eliminates the mounting for the third

With two RB.211-524B turbofans, the L-1011-600 is Lockheed's projected 'compact' TriStar for the 1980s



engine but retains the tailplane-elevator and fin-rudder assemblies of the L-1011-1, and two RB.211-524B engines the same as those which power the L-1011-500. Maximum take-off weight would vary between 119,750 kg (264,000 lb) and 134,715 kg (297,000 lb), providing accommodation for 174-200 passengers over ranges of up to 2,700 nm (5,000 km; 3,107 miles).

**L-1011-600A.** Proposed version of the L-1011-600, with a new supercritical wing, advanced high-lift system, and new tail unit, all constructed from high technology materials. Power plant and accommodation as for -600, but max T-O weight 119,750 kg (264,000 lb). External dimensions change also: wing span 43.51 m (142 ft 9 in); length overall 42.98 m (141 ft 0 in); height overall 16.15 m (53 ft 0 in); wing area 210.3 m<sup>2</sup> (2,264 sq ft).

A description of the basic L-1011-1 can be found in the 1976-77 *Jane's*; the revised and additional performance figures which follow apply to the five current production versions:

**PERFORMANCE (A: L-1011-1 at max T-O weight of 195,045 kg—430,000 lb; B and C: L-1011-100 and L-1011-200 respectively at max T-O weight of 211,375 kg—466,000 lb; D and E: L-1011-250 and L-1011-500 respectively at max T-O weight of 224,980 kg—496,000 lb, except where indicated):**  
Never-exceed speed, all versions

Mach 0.95  
(435 knots; 806 km/h; 501 mph) CAS

Max cruising speed, mid-cruise weight at 9,145 m (30,000 ft):

A 520 knots (964 km/h; 599 mph)  
B 515 knots (954 km/h; 593 mph)  
C 530 knots (982 km/h; 610 mph)  
D, E 525 knots (973 km/h; 605 mph)

Econ cruising speed, mid-cruise weight at 10,670 m (35,000 ft):

A, B 480 knots (890 km/h; 553 mph)  
C, D, E 485 knots (899 km/h; 558 mph)

Stalling speed at max landing weight, flaps and gear up:

A at 162,385 kg (358,000 lb)  
148 knots (274 km/h; 170 mph)  
B, C, D, E at 166,920 kg (368,000 lb)  
151 knots (280 km/h; 174 mph)

Stalling speed at max landing weight (as above), flaps and gear down:

A 108 knots (200 km/h; 124 mph)  
B, C, D 109 knots (202 km/h; 126 mph)  
E 111 knots (206 km/h; 128 mph)

Max rate of climb at S/L:

A 856 m (2,810 ft)/min  
B 765 m (2,510 ft)/min  
C 847 m (2,780 ft)/min  
D, E 777 m (2,550 ft)/min

Service ceiling, all versions  
12,800 m (42,000 ft)

FAR T-O field length:

A 2,426 m (7,960 ft)  
B 3,243 m (10,640 ft)  
C 2,460 m (8,070 ft)  
D, E 2,838 m (9,310 ft)

FAR landing field length, at max landing weight:

A 1,734 m (5,690 ft)  
B, C, D 1,768 m (5,800 ft)  
E 1,957 m (6,420 ft)

Range with max passengers and baggage, international reserves:

A 2,870 nm (5,319 km; 3,305 miles)  
B 3,660 nm (6,783 km; 4,215 miles)  
C 3,680 nm (6,820 km; 4,238 miles)  
D 4,520 nm (8,376 km; 5,205 miles)  
E 5,260 nm (9,748 km; 6,057 miles)

Range with max fuel, international reserves:

A 4,360 nm (8,080 km; 5,021 miles)  
B 4,820 nm (8,932 km; 5,550 miles)  
C 4,880 nm (9,044 km; 5,619 miles)  
D 5,900 nm (10,934 km; 6,794 miles)  
E 6,150 nm (11,397 km; 7,082 miles)



# CIVIL AIR PATROL: USAF'S VERSATILE AUXILIARY

The 64,000 volunteer members of the Civil Air Patrol—now in its thirty-sixth year, and since 1948 a USAF auxiliary—perform a variety of services for the nation, the Air Force, and airpower in general that few of us appreciate.

BY MAJ. TERRY A. ARNOLD, USAF  
CONTRIBUTING EDITOR

**T**HE tiny aircraft's crew was fighting growing exhaustion and frustration. It had been nearly two days since they were first called to help find the lost civilian aircraft.

Sister aircraft were flying similar patterns in other areas of the search grid that cut a swath across four states. Ground parties, too, were at work below, sifting through the tangle of underbrush, hoping to stumble upon their elusive objective.

The searchers, both in the air and on the ground, were civilians, supporting the rescue coordination effort of the Air Force's Aerospace Rescue and Recovery Service. They were members of the USAF auxiliary, the Civil Air Patrol (CAP).

As the tiny search aircraft passed into the calm and comforting shadows of a valley nestled deep in the New Mexico hills, the cockpit's uneasy silence was shattered by the staccato "beep-beep" signal from an emergency locator beacon. Sagging spirits immediately soared. They could not see the "little bird lost," but the signal received from its emergency locator transmitter told them it was down there somewhere.

The closest ground party was quickly contacted and



Members of a CAP cadet squadron sponsored by the 354th TFS at Davis-Monthan AFB, Ariz., look over an A-7D.

directed to the valley. Within minutes, the wreckage was found. Two survivors were given first aid and carefully put aboard a waiting helicopter for a flight to the nearest hospital.

As the chopper lifted off with its precious human cargo, the aircraft with the CAP markings on its tail circled overhead. Dipping its wings in salute, the aircraft banked and headed for home. CAP's mission was completed—successfully.

CAP resources committed to this single rescue mission included twenty-three aircraft, thirty-one ground vehicles, twenty-eight mobile radios, and 141 people.

## Thirty-five Years of Service

Performing such service is nothing new to this band of citizen volunteers. First organized by farsighted air enthusiasts a week before the Japanese attack on Pearl Harbor, CAP has long assisted the nation during war and peace.



Top, two Pennsylvania CAP seniors check a search area on the map before launching a mission. Right, Pennsylvania Wing pilot starts his engine during an SAR test. Below, a Mississippi CAP pilot combs his assigned area of a search grid. Bottom, CAP cadets during a ground rescue training mission.

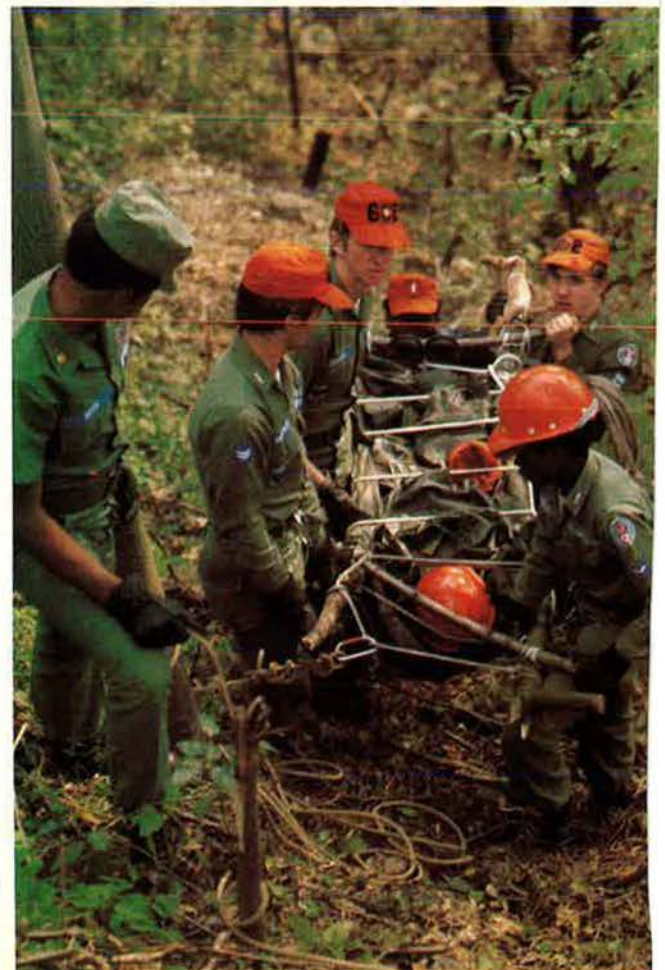
During the early stages of World War II, the relatively small US Army Air Forces needed time to increase its strength. There were more tasks than the fledgling Air Force could handle. That void was partially filled by the dedicated pilots of the CAP using their own small but effective aircraft. CAP's first assigned mission was aerial patrol of our Eastern and Gulf coasts, seeking out Nazi U-boats. When active military units relieved CAP of this dangerous task, its service to the nation did not cease. CAP aircrews went on to perform equally hazardous tasks from patrolling borders and towing aerial targets used by antiaircraft artillery trainees to giving potential AAF pilots their first taste of flying.

A grateful nation awarded CAP members more than 800 Air Medals and twenty-five War Department decorations for exceptional wartime civilian service. These bold and daring acts were not without sacrifice. By V-J Day, sixty-four CAP crewmen had given their lives.

At war's end, supporters fought to retain the continued service of an active CAP. Their battle was won in 1946 when Congress chartered the Civil Air Patrol as a nonprofit, benevolent corporation of volunteer members. CAP's threefold mission of Aerospace Education, youth development through the Cadet Program, and Emergency Services for humanitarian relief reflects the objectives set forth by Congress. In 1948, Congress placed the CAP under the protective wing of the newly established Department of the Air Force.

### Organizational Structure

CAP's organizational and managerial structure is a combination of corporate-level officials, nearly 2,000 field units, and Air Force liaison personnel assigned at national, regional, and state levels. CAP's corporate headquarters is at Maxwell AFB, Ala., and provides overall guidance to assist CAP in meeting its chartered responsibilities. There are eight Regional headquarters,





"CAP provides the bulk of the  
resources used in search and ground  
rescue missions within  
the continental United States."

and wings in each state plus Puerto Rico and the District of Columbia. Squadrons are the basic CAP elements at the working level and are located throughout the country.

CAP's National Commander, a corporate position, is presently filled by CAP Brig. Gen. Thomas C. Casaday. Air Force Brig. Gen. Carl S. Miller, as a private citizen, is CAP's corporate Executive Director. As an Air Force officer, he is commander of USAF personnel assigned to the Air Force liaison program, an element of the Air University. General Miller and his staff advise and assist the corporation in the conduct of its day-to-day activities and act as liaison between CAP, the Air Force, and other federal departments.

While no federal funds are provided for CAP operational expenses, such funds are provided for the liaison program and for reimbursement for fuel consumed and communications expenses incurred during official USAF missions. CAP's revenues depend mostly on dues and voluntary contributions from members. Its corporate budget totaled just over \$600,000 for each of the past two years.

CAP's more than 64,000 volunteer members are classed either as cadets or seniors. Cadets generally range from thirteen to eighteen years of age while seniors are eighteen or over. Squadrons are designated as cadet, senior, or composite, the last having both seniors and cadets assigned. Seniors usually fill local command and staff positions and perform flying duties. Cadets assist by manning ground search parties and other mission support activities.

#### **CAP Mission Support Saves Dollars**

CAP provides the bulk of the resources used in air search and ground rescue missions within the continental United States. Under the National Search and Rescue Plan, the Air Force coordinates available resources for

such missions within the Inland Region area. In fulfilling its congressionally chartered responsibilities, CAP currently flies an astounding seventy-five percent of all Air Force-authorized search-and-rescue flying hours in the US.

There are nearly 700 CAP corporation aircraft, and the CAP has the use of more than 5,500 privately owned member aircraft. Active CAP pilots number nearly 20,000, better than half of the entire senior membership.

Last year, CAP was credited with saving thirty-four lives while locating 385 search objectives. These efforts required 817 missions totaling almost 9,000 sorties and 17,600 flying hours.

General Miller says that this direct CAP support provides significant savings in fuel costs alone. "We reduce costs by flying small aircraft in these search missions," the Air Force liaison commander told AIR FORCE Magazine. "Using military aircraft would cost considerably more than the slightly over \$20 per flying hour for a CAP aircraft." Living, travel, and maintenance costs are borne by CAP members.

Authorized missions are determined by Military Airlift Command's Aerospace Rescue and Recovery Service through its Rescue Coordination Center at Scott AFB, Ill.

An extension of CAP's humanitarian assistance is its nationwide radio communications network. Currently, more than 19,000 mobile and fixed radio stations offer the Disaster Assistance Administration expanded communications during emergencies. Equipment is either CAP-owned or provided by individual members at their own expense.

#### **Expanded Mission + Inflation = Higher Costs**

The continuing rise in private and commercial air activity has generated an increased need for CAP's search-and-rescue services. Expanded services mean



**“About twelve percent of all  
USAF enlisted personnel . . . [and]  
six percent of each entering  
class at the Air Force Academy  
are former ‘CAPers’”**

increased costs. When these costs are accented by spiraling inflation, there are justifiable limits to how much CAP can continue to pay from its own pocket to get the job done. “If CAP’s humanitarian missions are to be maintained at levels of previous years,” warned General Miller, “authority for CAP support must be expanded.”

The current law that establishes the relationship between CAP and the Air Force (Section 9441, Title 10, United States Code) was last revised in 1954. It outlines the DoD support limits. Under these limits, there is no authority to appropriate funds directly for CAP, and excess government property is available to CAP only from the Department of Defense.

Plans to amend the current law were formulated by the Air Force in the early seventies; however, the first proposal did not reach Congress until February 1973. Failing to gain passage, it was reintroduced by four separate sponsors in the 94th Congress, but these proposals were not supported by the Administration and hence were not acted on. This year DoD has included the proposal in its legislation program for the 95th Congress. The proposal is again under consideration within the Administration to determine whether or not to present it to the 95th Congress.

If the changes are adopted, funds for specific areas of CAP operational expenses on USAF-requested missions would be authorized. Funds would also be authorized for some of the uniform costs for CAP cadets similar to support given Air Force Junior ROTC cadets. Additionally, government excess property would be provided from all federal agencies, including property held by contractors.

The Air Force Association has long supported the CAP Supply Bill amendment. As part of its 1976 policy papers presented and unanimously adopted at last year’s National Convention, AFA again voiced its back-

*At the time this article was written, Maj. Terry Arnold was completing his year’s training with AIR FORCE Magazine, under the Air Force Education With Industry program. On April 1, Major Arnold became Executive Editor of USAF’s Airman Magazine, headquartered at Bolling AFB, D. C. He is the third AIR FORCE Magazine EWI “alumnus” to fill a senior editorial post with Airman, following Maj. John Correll and Lt. Col. Fred Meurer, both of whom have served as Editor of Airman.*

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ing by strongly advocating “increasing CAP’s capability to perform its search-and-rescue mission.”

**Awareness: Key to CAP Education Programs**

Besides its more publicized humanitarian missions, CAP increases aerospace understanding within its ranks, and the general public through education and training programs. CAP works closely with educational institutions and state departments of instruction in developing aerospace education programs.

Cadet training receives the bulk of CAP effort and is limited “only by the imagination,” said General Miller. Generally, cadet programs stress the “whole person” concept. Instruction covers aerospace education, leadership laboratory, moral leadership, and physical fitness. Senior programs include study of flight principles, air navigation, weather, and communications. Senior members also can participate in various USAF resident and correspondence educational programs.

This month (June), CAP is sponsoring a four-week National Aerospace Education Leadership Development Course at Maxwell AFB. This nontechnical course is targeted at civilian aerospace educators. Current problems and issues, education resources, leadership skills, and an action plan for aerospace education will be covered. AFA’s subsidiary, the Aerospace Education Foun-





*At left, Cadet members of a ground search team participate in an exercise, and (beneath) are briefed by a senior CAPer on proper use of a walkie-talkie. Below, women cadets ready for inspection during the annual National Cadet Competition. Bottom, Cadets watch a mock operation at Sheppard AFB, Tex.*



ation, donated \$400, enabling an AFJROTC instructor to attend.

The ultimate goal of such educational programs is to provide an understanding of aerospace. "We are fighting a continuing battle with public apathy, lack of awareness, and misunderstanding of the impact air and space power has on today's society," said General Miller. "Through expansion of these efforts in aerospace education," he continued, "CAP members believe they can contribute materially to the continuing aerospace supremacy of the United States."

#### **USAF Receives Additional Benefits**

Besides its help in performing Air Force search-and-rescue missions and creating a more positive aerospace environment, CAP provides additional direct benefits to USAF by developing trained, highly motivated young men and women for possible future Air Force duty. About twelve percent of all USAF enlisted personnel are former CAP cadets, according to most recent statistics. Historically, about six percent of each entering class at the Air Force Academy are former "CAPers." General Miller was obviously pleased when he said, "The Academy class of 1980 had 1,593 'doolies,' and 104 of them were former CAP cadets." Of the first 157 women admitted to the Academy, seven were former CAP cadets.

Increased USAF support should allow CAP to continue and, hopefully, expand its activities. Gen. David C. Jones, USAF Chief of Staff, has outlined the need for Air Force installation commanders to beef up their support of and cooperation with CAP units. With this backing added to the economic stimulus expected by passage of the Supply Bill amendment, and increased public understanding of airpower's contribution to our society, CAP will continue its unselfish and dedicated national service. ■





*The synthesis of advances in aerodynamics and related fields appears to make possible new generations of combat aircraft that behave differently and perform far more efficiently than today's high-performance fighters.*

# On the Threshold of 'Nonclassical' Combat Flying

BY EDGAR ULSAMER, SENIOR EDITOR

**A**LMOST everything the Air Force does—and a significant share of what the Navy and NASA do—in advancing technologies related to combat aircraft design is funneled into AFTI, the Advanced Fighter Technology Integration program of the Air Force Flight Dynamics Laboratory at Wright-Patterson AFB, Ohio. AFTI is a joint program with NASA and is rooted in several technology programs that in 1974 and 1975 culminated in AFTI I. The goal, then as now, is to look for, validate, and demonstrate those technologies—and their synergistic interaction—that enhance subsonic and transonic maneuver, tracking and kill capability in air-to-air and air-to-ground combat, and improve survivability.

The initial program phase involved comprehensive studies by Fairchild Industries, McDonnell Douglas, and Rockwell International of what such a "technology demonstrator" might look like and which technologies it might most beneficially incorporate. The contractors were directed to consider, but were not confined to, several promising technologies in advanced aerodynamics, control, materials, and high acceleration cockpit design. In a departure from past programs of this type, AFTI is not wedded to—even though it could result in—the concept of a new-from-the-ground-up aircraft. Quite possibly AFTI, if eventually raised to the level of a required operational capability (ROC), could take the form of a series of modifications of one or more high-performance aircraft in USAF's inventory.

Arranged in sets of technology, called Tech Sets I, II, and III, AFTI is not scheduled to reach hardware status until the next decade, according to AFTI Program Manager Charles J. Cosenza. Tech Set I is being launched with the award of predesign contracts to McDonnell Douglas, involving modification of a testbed F-15, and to General Dynamics, involving modification of a testbed F-16.

## AFTI Tech Set I

The Tech Set I AFTI 16/15 Technology Demonstrator is to "integrate technologies for improved survivability and air-to-air, and air-to-surface weapon delivery," according to Project Manager Welbourne G. Williams. The demonstrator aircraft is going to be quite different from airplanes flying today. Its flight modes are to be "nonclassical. We haven't yet decided to what level, but we want direct side force and lift control for fuselage aiming and weapon line pointing, in addition to a trainable gun," he said.

"Nonclassical" flying presupposes the integration of several advanced design techniques. First, in a chronological sense, is fly-by-wire technology, pioneered by Air Force Flight Dynamics Laboratory programs culminating in the Survivable Flight Control advanced development program. These programs established the practicality and technology base for fly-by-wire (FBW) primary flight control, which is the requisite technology for the more advanced "nonclassical" control modes.

Simplified, FBW is a closed-loop information system that continuously feeds back into the cockpit data from an aircraft's motion sensors and transmits electrical command signals to the control surface actuators. The mechanical linkages between the pilot's control column and the actuators are replaced by electrical wires. In place of the conventional center stick requiring extensive motion by the pilot, there is a small, limited-motion sidestick with a built-in armrest. The sidestick serves as the "input" into a flight control computer that processes and modifies this information, combined with data from the control surface sensors. The computer's output then "steers" the aircraft.

The initial fly-by-wire technology became the stepping-stone to digital flight control and, further, to the "digitized airplane," involving concepts such as the Digital Avionics Information System (DAIS). This scheme employs a central nervous system called the multiplex bus, through which messages flow from and to various processors (computers) controlling such subsystems as flight control, fire control, navigation, and ECM.

Reliable fly-by-wire flight control opens the door to flying airplanes of relaxed static stability. Unstable airplanes are not new; the Wright brothers' airplane exhibited that quality. A stable airplane returns to level flight after a disturbance. The unstable vehicle does the opposite; if turbulence raises its nose, for instance, it will continue to climb steeper and steeper. The stable airplane is obviously easier to fly, but it exacts a high price for its predictable aerodynamic behavior. Inherent stability requires increased fuselage length and larger tail surfaces, thereby increasing drag and reducing maneuverability.



A number of techniques have evolved—and are lumped together under the term Controlled Configured Vehicles (CCV)—for providing unstable vehicles with artificial stability through a fly-by-wire control system and to enable the pilots to fly them with the same ease as stable designs. An aerodynamically unstable configuration with artificial stability offers improvements in all flight conditions and speed regimes. Better cruise performance and higher maneuverability can be attained, not at the expense of one or the other, but in concert because the aircraft's electronic brain closely couples the operation of the control surfaces to various flight conditions and performance requirements. CCV is useful beyond the task of maintaining artificial stability. Maneuver load control, the use of multiple control devices to modulate load distribution on the main lifting surfaces, is a promising application of CCV. A number of selected CCV concepts are being flight-tested in a modified YF-16 at Edwards AFB, Calif., under the Air Force Flight Dynamics Laboratory CCV Advanced Development Program.

Even more dramatic and revolutionary are Precision Flight Path Control and Maneuver Enhancement Control. These techniques involve direct side force and direct lift controls that make it possible through closely coupled interaction of sophisticated vertical and horizontal control surfaces to point the aircraft and its weapons in a direction different from its flight path or to adjust (translate) its flight path laterally and vertically without having to rotate in pitch, yaw, and roll. In essence, it means changing the aircraft's flight path or altering the relationship between its longitudinal axis and its flight path without pulling Gs. Applied to defensive capability, an aircraft with direct force control is an extremely elusive quarry for both enemy fighters and SAMs. In the offensive mission, a fighter with direct force control, once locked on a target in the air or on the ground, can utilize fuselage pointing to maintain attack position for longer periods of time with a wider variety of attack flight paths.

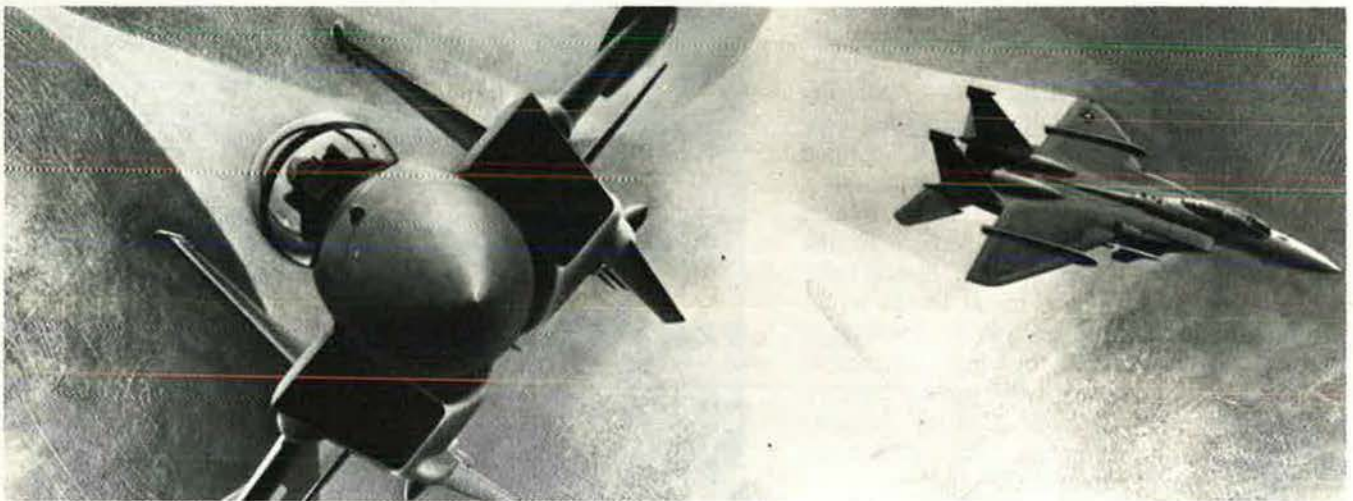
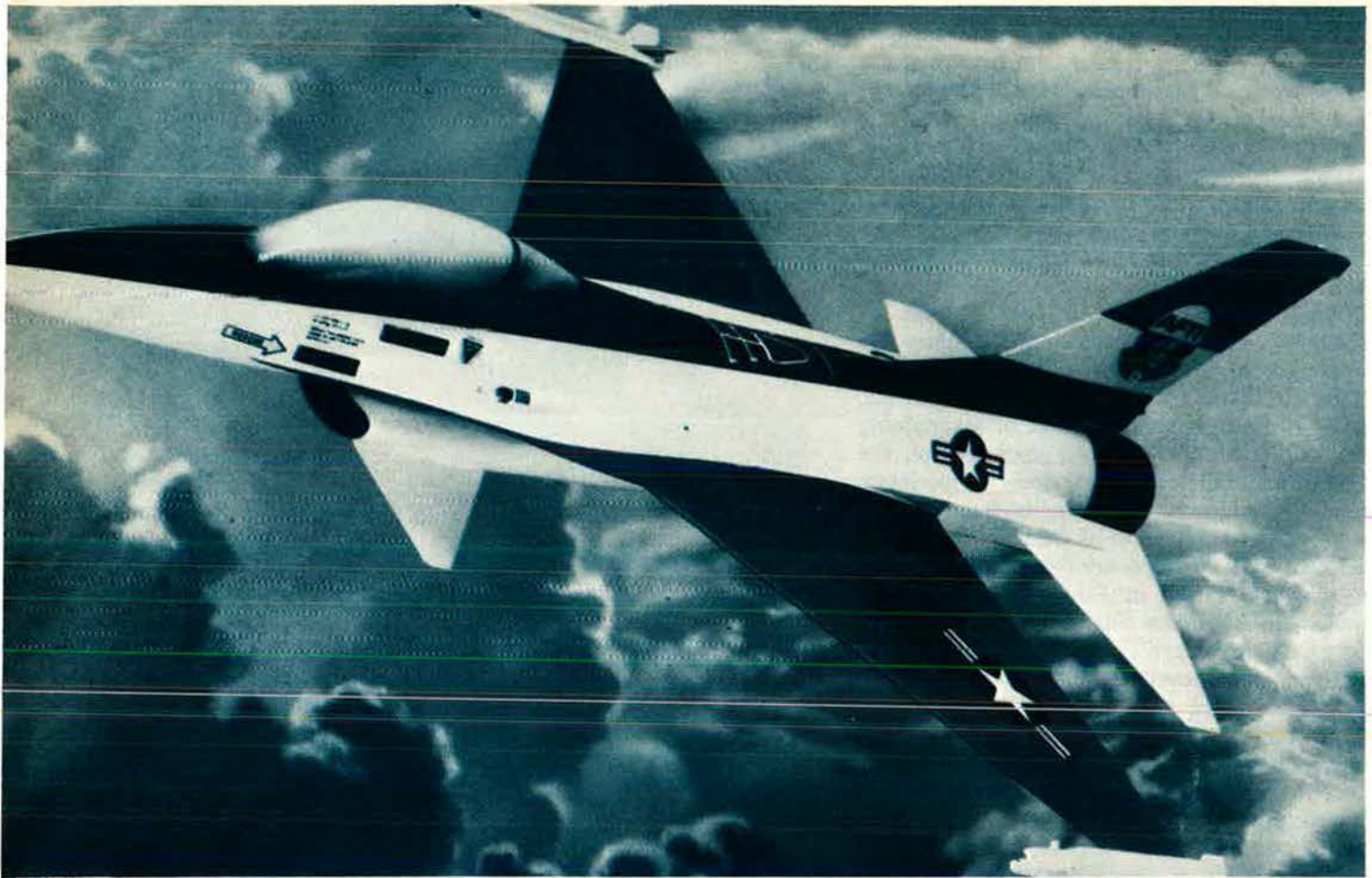
Maneuver Enhancement Control achieves quickened responses in all axes by blending conventional with direct force controls.

Tech Set I will concentrate on "the non-classical flight modes of 'steering,' 'pointing,' and 'translating,' as well as on integrated fire and flight control and flight/propulsion coupling," according to Mr. Cosenza. A possible



*Phase I AFTI studies in 1974 and 1975 involved three major aerospace companies and culminated in three different design proposals. TOP: McDonnell Douglas proposed a vectored-lift fighter (VLF) using a variable-incidence wing (outside of the nacelle), a movable chin canard, and fully movable vertical stabilizers. MIDDLE: Fairchild proposed a 2-D nozzle. BOTTOM: Rockwell stressed canards and composite materials.*





*Tech Set I is expected to lead to comprehensive modification of either an F-15 or F-16 test aircraft in the early 1980s. General Dynamics is modifying the F-16 (top) and McDonnell Douglas the F-15 under pre-design contracts.*

option is the so-called variable-incidence wing or variable-incidence wing section technology to improve lift and roll control.

Other technologies under consideration that the Tech Set I demonstrator aircraft could validate are new aerodynamic/structural design techniques, including use of advanced composite or metallic laminate materials, supercritical or "sloped rooftop" airfoils, and advanced pilot/vehicle interfaces, including a high acceleration cockpit (HAC). The payoff of

this phase of the AFTI program is to be "an improved delivery platform all around," according to the Program Director. Tech Set I is expected to lead to comprehensive modification of an F-15 or an F-16 test aircraft in the early 1980s.

#### **AFTI Tech Set II**

Another phase of the AFTI program is Tech Set II that concentrates on and integrates other advanced technologies. Three contractors—



Boeing, General Dynamics, and Grumman—are “looking at a total of six different aircraft configurations involving an F-111 testbed,” according to Mr. Cosenza. In part, Tech Set II is an extension of a joint USAF/NASA program, known as TACT, for Transonic Aircraft Technology. This two-phased program first explored supercritical wing designs on the F-111 testbed and then took an important step toward a radical technological departure, the “mission adaptive wing.”

Because of the cambered configuration of aerodynamic lifting surfaces, the airstream flowing over those surfaces can reach the sonic range even though the vehicle is flying at transonic speed. This can occur at aircraft speeds as low as Mach .65 on thick wings or at close to sonic flight speed in the case of thin or slightly swept wings, thereby generating a standing shockwave. The results are airflow separation, an increase in drag, and buffeting. Considerable progress is being made in combating the so-called shock-boundary layer phenomenon through advanced airfoil designs such as the so-called supercritical wing. These shapes delay the onset of airflow separation and, at the same time, reduce the standing shockwave, and minimize its effects. The payoff is less drag

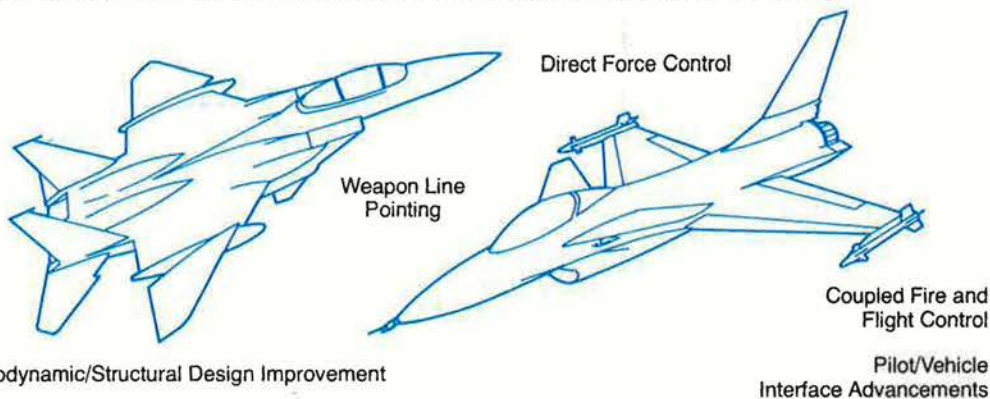
and buffeting, which translates into greater range, better fuel efficiencies, and the ability to fly faster transonically without having to pay the price of supersonic aerodynamics.

The second phase of TACT, now called AFTI-111, took wing technology one step further and explored the possibilities of adapting aircraft wing shapes to specific flight regimes and other mission requirements. Present technology compromises wing shapes in some flight modes in order to optimize them for others. The only technique for changing wing camber is providing leading edge slots and trailing edge flaps. These devices exact a high price in terms of high drag and aerodynamic flow separation. They are deficient because they are uneven. An ideal wing would be variable, yet would have smooth contours rather than the surface irregularities of current high lift devices. In principle, such a wing should provide high camber at low- to medium-subsonic speeds, become a supercritical wing at transonic speeds, and change to essentially symmetrical airfoil configuration during supersonic flight. The answer suggested by AFTI-111 is an arrangement of flexible skin covering a wing that can be shaped mechanically and is called the mission adaptive wing.

### TECH SET I-AFTI-16/15 TECHNOLOGY DEMONSTRATOR

Integrated Technologies for Improved Survivability & Air-to-Surface & Air-to-Air Weapons Delivery

Digital  
Flight  
Control  
System



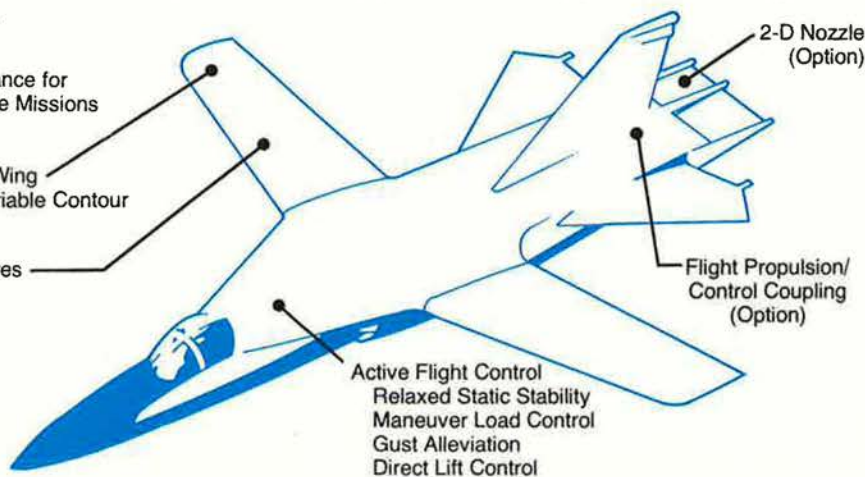
AFTI Tech Set I demonstrator is to incorporate but need not be confined to the technologies listed.

### F-111 TEST BED- TECH SET II

Aerodynamic Performance for  
Wide Mach &  $C_L$  Range Missions

Mission Adaptive Wing  
Smooth Skin Variable Contour  
Variable Sweep

Advanced Structures



AFTI Tech Set II involves six configurations by Boeing, General Dynamics, and Grumman.



In the AFTI-111 phase of Tech Set II, mission adaptive wing technology is being explored in detail under close USAF/NASA cooperation. Project Manager Ronald DeCamp told AIR FORCE Magazine, "We are after a wing system that makes it possible for the pilot to redesign his wing in flight. Some of these changes would be controlled by the pilot and others, such as load control, would be automatic. We would not expect this to be a heavy system and are optimistic that we can make the wing actually lighter than in current technology aircraft." The mission adaptive wing technology of Tech Set II will be linked to active flight control techniques, including relaxed static stability, maneuver load control, gust alleviation, and direct lift control.

Another innovative technology candidate for this AFTI phase is the so-called 2-D, for two-dimensional, nozzle. Maneuverable and integrated with the airframe, the 2-D nozzle can apply thrust in directions different from the longitudinal axis of the aircraft. Its benefits, broadly, are lower drag because of high streamlining; improved lift and reduced takeoff and landing distances because of thrust vectoring and reversing; higher combat maneuverability, also due to thrust vectoring or modulation; and high aircraft survivability because of cutbacks in heat emission and radar cross-section. The 2-D nozzle is also being considered for exploration on an F-15 testbed, and a decision will be made next year by the Air Force and NASA as to which aircraft—the F-111 or F-15—is to serve as test vehicle. Advanced materials are

to be used only on those components of the F-111 testbed that are being modified to demonstrate new technology. Modification of the demonstrator aircraft is planned to start in the early 1980s.

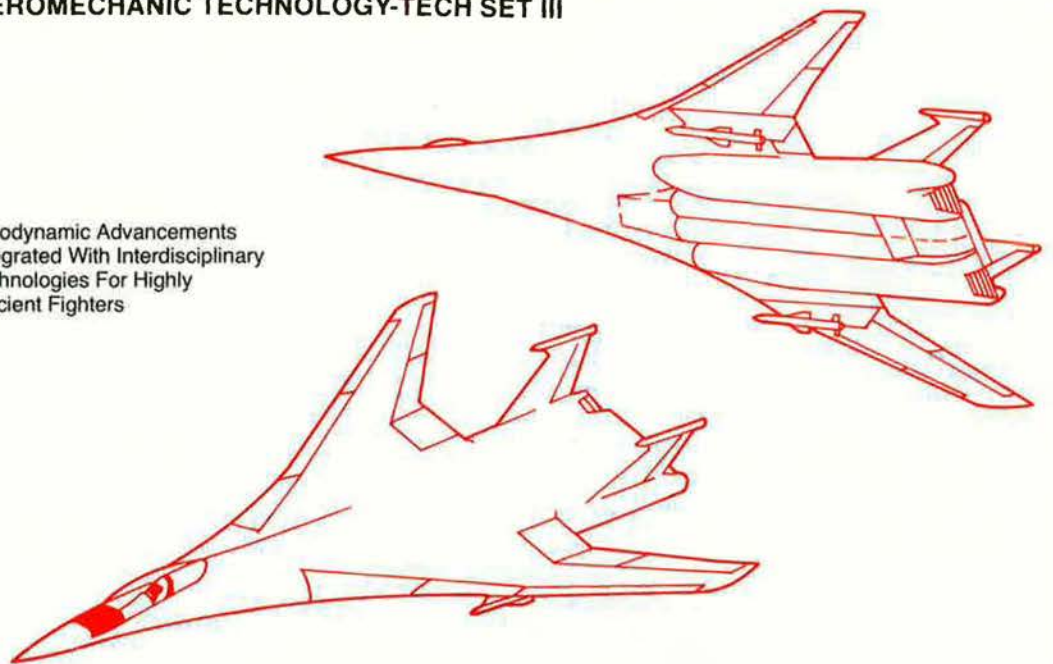
### AFTI Tech Set III

Assuming continuing interest by the Air Force and the Defense Department, the findings from AFTI's two initial phases and related Air Force studies will be funneled into a project called Aeromechanic Technology Tech Set III. This project would blend the lessons of Tech Sets I and II with other interdisciplinary technologies to provide the comprehensive concept and design features of an advanced, highly efficient fighter called the AFTI "X" vehicle. Its final form, Mr. Cosenza said, could be the modification of existing aircraft, a full-scale new demonstrator, or a remotely piloted research vehicle similar to the joint NASA/USAF HiMAT—for Highly Maneuverable Aircraft Technology—vehicle. Whether or not the Air Force will carry forward into full-scale engineering and production the AFTI technology or whether the decision may be to graft some of the advanced technology of the program to existing aircraft, is not known at this time.

What is clear already, Mr. Cosenza and his team point out, is that by taking a gradual approach that begins with modified testbeds rather than a series of new prototypes, AFTI will provide USAF with various forms of performance enhancement options at the lowest possible costs and risk. ■

### AEROMECHANIC TECHNOLOGY-TECH SET III

Aerodynamic Advancements  
Integrated With Interdisciplinary  
Technologies For Highly  
Efficient Fighters



AFTI Tech Set III combines the lessons of preceding AFTI work with other advanced technologies and could lead to modification of existing aircraft, a full-scale new aircraft, or a remotely piloted research vehicle.



Five years ago, the Canadian Forces suffered from an identity problem and a budget that was little more than a payroll. But all that has changed—or is changing—under the leadership of a remarkable Chief of the Defence Staff . . .

# Canada's General Dextrase: Right Man, Right Time

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

**J**acques Albert Dextrase, General, Canadian Forces, will retire this September after serving five years as Chief of the Defence Staff. It has been a remarkable five years for this intense, sardonic, and very private man. When Jimmy Dextrase became CDS, there was some undisguised resentment in the Anglo-Canadian ranks at the selection of a French Canadian for Canada's top military post, his distinguished combat record notwithstanding. Now, five years later, it should be clear to all Canadians, Anglo and French, that Canada could not have made a better choice.

In 1972, Canada was on a pretty aimless military course, the mission and very purpose of its forces in doubt. It had been only two years since some peremptory Canadian reductions; and the threat of even greater reductions, to include a possible withdrawal from Europe, had created a grave crisis in the NATO Alliance. After many heated meetings, the matter was not so much solved as papered over, leaving both the future equipping and the very utility of Canada's NATO forces in question.

There was still, in 1972, an identity problem in the Canadian military. In 1964, the Defence Minister, Robert Hellyer, took the first step toward unification by bringing logistics and training under single management, and by abolishing the positions of the service chiefs, replacing them with a Chief of Defence Staff.

In 1968, the services themselves were abolished as legal entities. This

amalgamation took place with all the festivity of a shotgun wedding. And while in theory there was no more Navy, Army, or Air Force, the trouble lay in the fact that true integration of armed forces is infinitely more complicated than simply putting everyone in the same uniform. The morale of Canadian airmen was, at that point, particularly low. The proud RCAF was most vulnerable to having its mission parceled out to the land and sea elements of the newly created Canadian Forces.

The Dextrase solution was simple and practical. He opted for unification, not integration, a difference that is more than semantic. He put the emphasis on common support while retaining mission identification. There is still in fact, if not in name, a Canadian Navy, a Canadian Army, and a Canadian Air Force, all operating under the logo of the parent conglomerate—the Canadian Armed Forces.

These past few years have also seen renewed governmental interest in the vitality of these forces. The current Canadian defense budget reflects a twelve percent increase in real terms through 1981. The objective of this increase is to raise capital expenditure to twenty percent of total defense costs, a refreshing change in a budget that was fast becoming simply a payroll.

With this new budget in hand, the Canadians are ready to spend some money on major equipment. They have ordered 300 German Leopard I tanks for the Canadian Forces in NATO, an action that essentially disavows the 1970 decision to furnish only lightly armored scouting forces to Europe. Canada is also in the market for a new maritime aircraft

and new ships for its navy. Most interesting of all, perhaps, is the forthcoming decision on a new fighter (see also "Aerospace World," p. 13).

The Canadians are our partners in the North American Air Defense Command, and their choice of a fighter must take that into account. If the Soviet bomber threat is sufficiently credible, then the NORAD requirement will probably be the main influencing factor. If an interceptor does not look like an essential, then NATO requirements would presumably dictate the choice. And, remembering the Scot and French names that seem to predominate in Canada, there will also be a few business considerations, like cost and production sharing, to be taken into account. Our own ambivalence in this business of continental air defense is another factor the Canadians must consider. Is the US interested in a new interceptor to counter the Backfire threat, or will the interceptor role be carried out by the tactical forces?

As we all know but sometimes forget, we are inextricably tied to Canada, and not just by that 3,600-mile undefended border. There is, first of all, our industrial interdependence. My Ford Pinto, bought in Colorado, was made in Canada, according to a discreet but firmly attached decal. Toronto celebrated its entry into the American League by taking a series from the Yankees, and never mind the fact that the Toronto players are US citizens. To balance it off, our hockey heroes, and villains for that matter, are nearly all Canadians.

We are close, but we are also different, and it is our occasional failure to recognize this difference that causes Canadian resentment.

These days, our neighbors are preoccupied with the difficulties in Quebec and the separatist movement that threatens to divide the country. If for no other reason than that a unified and stable Canada is very important to us, we can hope the separation never comes about.

Meanwhile, it is worth noting the contribution the unified Canadian Forces, under their leader from Quebec, Jimmy Dextrase, are making to the cause of a single Canada. Military unification, Canadian style, probably came along just in time. By breaking the old molds, changing the uniforms, getting away from the old British look and tradition, it has brought the French Canadians fully into the armed forces. ■





# Smithsonian's Silver Hill— A Unique New Museum

BY WILLIAM P. SCHLITZ, ASSISTANT MANAGING EDITOR

**T**HE seasonal pilgrimage of US citizens and foreign visitors to Washington, D. C., is in full sway, but is not expected to match the hordes who swarmed to the nation's capital during last year's Bicentennial celebration.

A major magnet for visitors continues to be the beautiful new National Air and Space Museum, located on the Smithsonian grounds between the Capitol and the Washington Monument. From its opening to the public last July 1, to the end of December, the Museum played host to a phenomenal *five million* people.

Early on, Smithsonian and Museum officials recognized a dilemma: Despite the building's huge interior, exhibit space was dwarfed by the Museum's extensive collection of historically significant aircraft and artifacts



In the foreground: a restored World War I Spad XIII fighter.

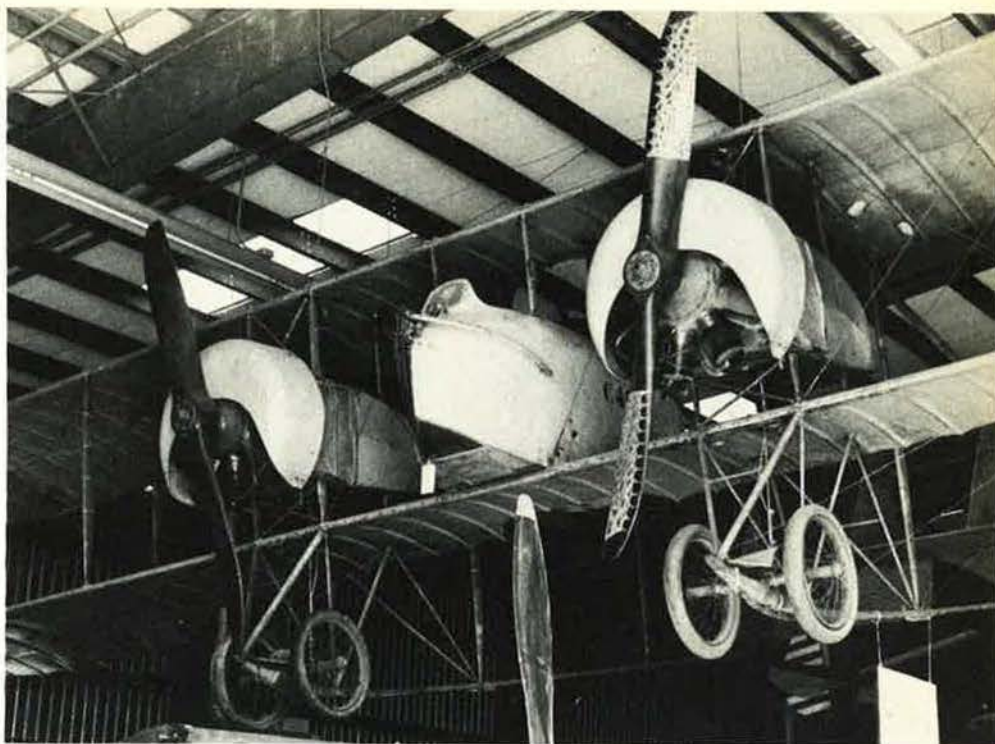
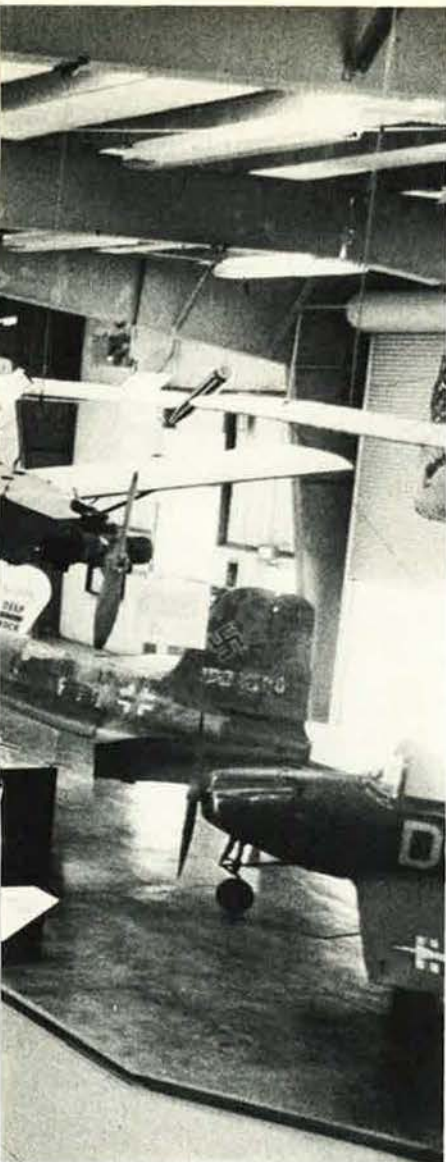
brought together through the years since the Age of Flight began. The decision was made, and then implemented in January 1977, to open to public tours several buildings at Silver Hill in Suitland, Md. Some six miles from the capital city, Silver Hill has acted as repository for Smithsonian artifacts since the site was acquired in 1950. The facility now consists of twenty-five hangar-like buildings spread over twenty-eight acres.

The Air and Space Museum's buildings at Silver Hill house the core of the Museum's storage, restoration, and preservation activities.

## The Silver Hill Museum

Now known as the Silver Hill Museum, two of the buildings (with a third planned) are "no frills" display areas where visitors can





*On the left is one of the three Silver Hill Museum buildings now open to public tours. Above, a French Caudron G-4 bomber of World War I. Introduced in 1915, it was the first two-engine aircraft used on the Western Front.*

**Photos by William A. Ford, ART DIRECTOR**

Hill Museum are awaiting restoration; others are exhibit-ready. The plan is to rotate a number of displays between Silver Hill and the main Museum, which is very liberal about lending exhibits to other museums around the country and, in fact, has donated artifacts considered excess to requirements. Of the collection of 265 aircraft, some sixty-five are on view at the downtown Museum at any one time; the rest reside at Silver Hill.

### **Meticulous Restorations**

A third building at Silver Hill Museum open to guided tours is the center for the Museum's restoration and preservation work—an essential but heretofore behind-the-scenes activity.

In this workshop, skilled craftsmen take often severely battered aircraft and work magic on them, restoring them meticulously to their original condition. Currently being renovated is a D-VA Albatros fighter of World War I fame. For repair of its framework, plywood has been imported from Finland—to match the original. The name of the game here is "authenticity." In rebuilding the

earlier planes, their skins are made of the particular grade of fabric used on the original, and paint colors and camouflage designs are also matched exactly. Thus, the Museum technicians and specialists must be historians in materials and tools as well as multiskilled artisans.

When the Museum curators decide which aircraft is next in line for restoration, a work order is issued for a painstaking survey of the aircraft in question. A detailed inspection report is then drawn up, which includes the materials needed, estimated manhours, and other minute details.

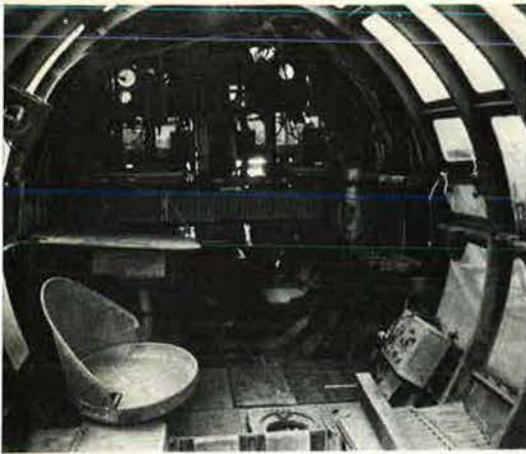
On approval of the report, usually a two-man team is assigned to the restoration project. Although shop specialists are called upon in unusual circumstances, these men do their own welding and machining, sheet metal and woodwork. Their aim: to bring the aircraft as close to operational status as possible while also acknowledging the preservation necessity—a fine line. In complex tasks, such as rebuilding aircraft engines or refurbishing landing gear, photos are taken at various

view aircraft ranging from pioneer planes to such flying oddities as the 620-mph Messerschmitt 163B rocket fighter, which, when employed in the latter stages of World War II, jettisoned its wheels after takeoff to attack Allied bombers and then landed on an extendable skid. Besides fifty-five or so aircraft, also on exhibit are spacecraft, engines, propellers, models, and even kites (the Smithsonian's earliest aeronautical acquisitions, they were donated by China following the US's 1876 Centennial).

Among aircraft of special historical note: the XP-80, the first US operational jet fighter; a Spad XIII with its original World War I fabric; a 1915 Caudron G-4 two-engine bomber; and a Hawker Hurricane IIC of Battle of Britain distinction.

Some of the objects at Silver





*Interior of a Japanese "Frances" bomber that was also used as a night fighter during World War II.*

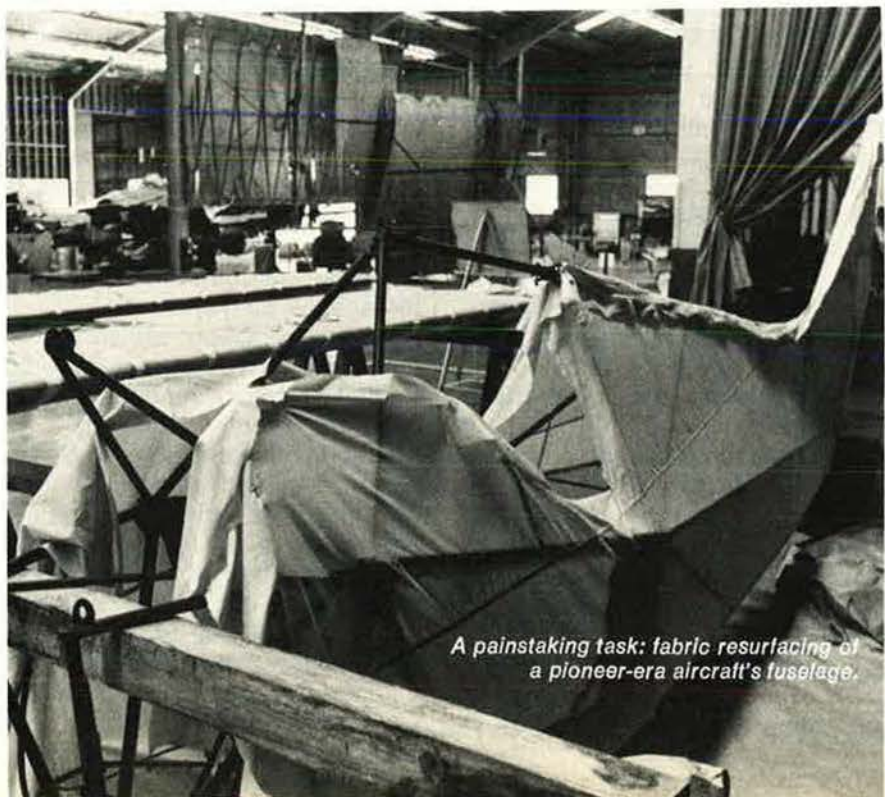
stages to assure accuracy and to ease reassembly. (These photos are also of use to other museums' aircraft restoration projects.)

The Silver Hill Museum's professional restoration work force of fifteen rebuilds four aircraft per year, on the average. There is no need to worry about layoffs, since an ample store of aircraft awaiting restoration is in the Museum's storage bays. Among them is a rare Japanese World War II sea-plane and a P1Y1 "Frances" medium bomber.

### **On-Going Projects**

Beside the Albatros, work is currently under way on *Excalibur*, a P-51 Mustang used to pioneer transpolar navigation, and a 1929 sport-flying Aeronca. Waiting in the wings: a twin-engine Me-262, the first operational jet fighter that might have altered the air war in Europe had enough been produced and pilots been available to fly them. Restoration will begin in mid-1977 and take about a year, but the plane will look like new in its colorful camouflage, and remain a treasure of aeronautical history for posterity.

The schedule of Silver Hill Museum tours, conducted by volunteer guides and on a reserved basis only, is varied to meet public demand. For information about it and the volunteer program, call weekdays (202) 381-4056 between 9:00 a.m. and noon, or write "Tour Scheduler," Education Office, National Air and Space Museum, Washington, D. C. 20560. ■

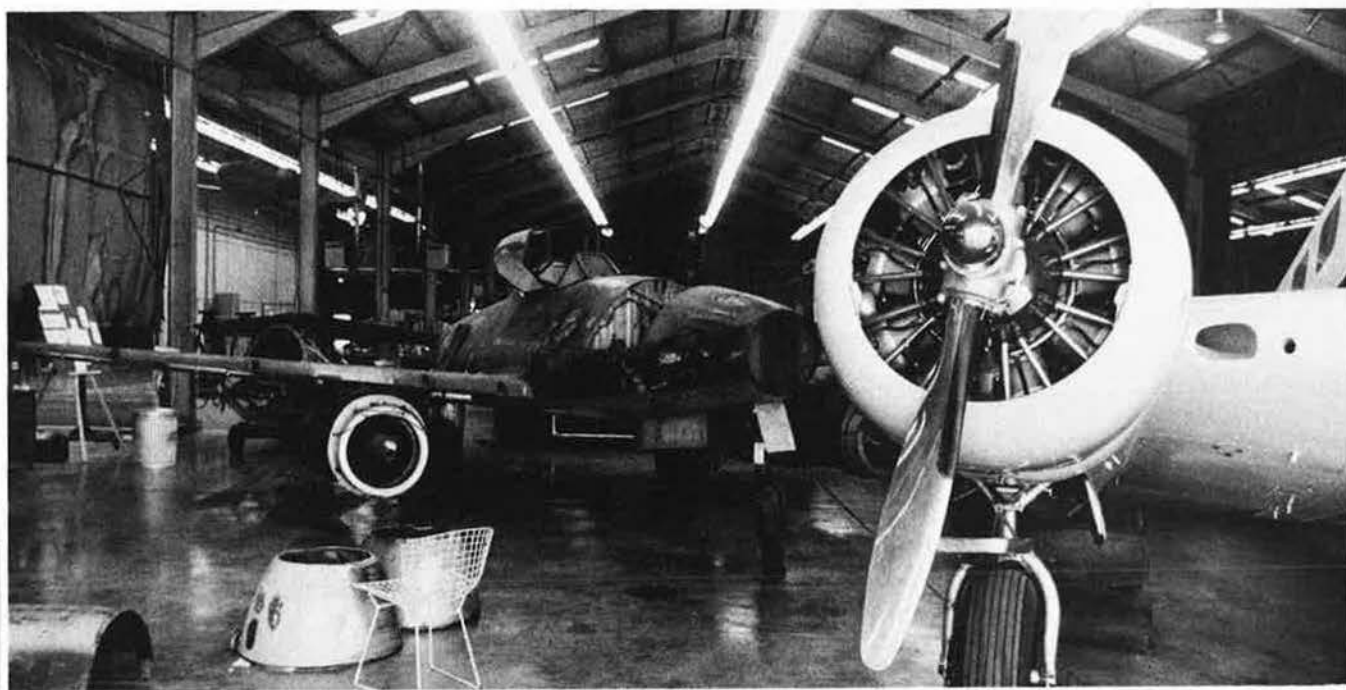


*A painstaking task: fabric resurfacing of a pioneer-era aircraft's fuselage.*





*Awaiting restoration, World War II's famous B-17D "Swoose." Right, a work area in the restoration shop. Below, an Me-262 jet fighter and a Twin-Beech, foreground, being restored.*





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# The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

## Doctor Shortage Worrisome

The Air Force medical service is more than 300 physicians short, and authorities are not encouraged about the future. The shortages are especially troublesome in such specialties as internal medicine, family practice, radiology, and pediatrics. Authorities reported, for example, that by next October, twenty-two USAF hospitals will be without an internal medical specialist.

These deficits, a medical service spokesman said, will curtail services at some military hospitals. More dependents and retirees can expect to be shuttled to the CHAMPUS program. Unfortunately, in some areas officials report that civilian physicians are heavily booked and aren't interested in taking on new patients.

Despite doctor bonuses and other special pays, military physician turnover remains high. The big procurement hope, in place of the defunct doctor draft, has been the Health Professions Scholarship Program. It is just now beginning to produce new physicians and other medical specialists.

But Air Force and other service medical authorities fear that competing federal medical scholarship programs will drain off HPSP applicants. Another drawback is that HPSP recipients now must pay federal income tax on their \$400 monthly stipend, which they receive over and above all medical school expenses.

The concern over the HPSP is at least partly responsible for the military medical leadership rallying to the support of the Uniformed Services University of the Health Sciences. This is the military medical college at Bethesda, Md., which has one class of thirty-two students enrolled. If and when it becomes fully productive, it will graduate only 175

new doctors a year. But the services will be happy to get even this small number. So, while they once held the school would be too expensive, they are now speaking out for it amid the political battle going on over the facility's future. Earlier, President Carter said, "Close it," because it's too costly. But Congress at press time was on its way to defying the President and keeping the school alive.

The Defense Department, meanwhile, was preparing for a "massive distribution" of new handbooks full of typical questions and answers about the CHAMPUS program. Also coming soon are large-size distributions of new CHAMPUS fact sheets. These steps are follow-ups to the recent distribution of the 272-page regulation that for the first time "tells all about CHAMPUS."



*Cadet 1st Lt. Heather Tennermann of the University of Washington AFROTC is also 1977's "Little Colonel" for her Angel Flight area. The twenty-year-old will graduate with a psychology degree in 1978 and hopes for active duty as an aircraft maintenance officer.*

## 1,238 New Chiefs Named

The annual Chief Master Sergeants promotion round resulted in 1,238 selections out of 5,733 considered, a substantial 21.5 percent rate. This compares to E-9 selection rates of 11.8 percent last year and 19.5 percent the previous year.

The new E-9 picks were the first ever made under the combined weighted factor ("report card") and board score system. Competitors now are told their relative standing within their respective skills. This arrangement is also being applied for the first time to the current E-8 round in which 21,000 master sergeants are competing. Results are due this month.

## AFA Councils Active

Members of AFA's advisory councils received first-hand reports on Air Force plans and problems from USAF leaders during a two-day meeting at the Sheraton-Park Hotel, Washington, D. C., in late April. Also at the event, the Enlisted Council and the Junior Officer Advisory Council completed plans for their annual projects.

The EM group, in its project, will highlight management efforts of the airmen force. The JOAC project will be a follow-on handbook to the well-received 1976 "Young Air Force Officer's Handbook," which provides excellent career development guidance. The 1977 handbook aims to help all young officers overcome personal obstacles and readily adapt to military life.

Both projects will be presented to the AFA Convention in Washington in September. The 1976 officer handbook, meanwhile, has been distributed Air Force-wide. CBPOs should have copies.

Lt. Gen. James A. Hill, USAF's DCS/Programs and Resources, kicked off the late April meeting with an address to members of the Total Force Council and the two groups cited above. Round-table discussions followed. They were led by Maj. Gen. Bennie L. Davis, who was recently nominated for three stars and the position of DCS/Personnel, Hq. USAF; Legislative Liaison Director Maj. Gen. Charles Blanton; Air Force Reserve Chief Maj. Gen. William Lyon; Acting Deputy Surgeon General Maj. Gen. Garth B. Dettinger; Civilian Personnel Director J. Craig Cumbey; ANG Director Maj.



# The Bulletin Board

Gen. John T. Guice; and CAP's Jack Sorenson, who discussed a new program aimed at bringing elements of the CAP and AFJROTC programs together. AFA Board Chairman Gerald V. Hasler spoke at the first-day luncheon, and Executive Director James H. Straubel served as toastmaster.

## BT Stripe a Recruiting Aid

Since promising enlistees in fourteen tough-to-fill skills an E-2 stripe at completion of basic training, USAF has found that enlistments in those specialties have increased more than 200 percent. That's the word from USAF Recruiting Service, Randolph AFB, Tex., in a report on the E-2 promotion project. It was laid on as a test late last winter.

Job areas that have been available under the E-2 option include aircraft fuels, munitions maintenance, printer systems, Morse systems, ground equipment mechanic, and cook.

The Recruiting Service added that many youths electing the early promotion option are also embracing another recruiting incentive, the "Initial Base of Choice" option. They have their choice of eight bases—for at least a year—following tech training.

In a related matter, Recruiting officials said that by the end of last month nearly 3,000 first-term airmen would have collectively spent some 45,000 days as participants in HASTY RAP. That's the unique recruiting project under which young airmen volunteers spend two weeks in their home towns, working with local recruiters to sign up promising new talent.

## Retirement Change Loses, But . . .

Rep. Les Aspin (D-Wis.) has tried—but without success—to overhaul the military retirement system. But his late-April attempt on the floor of the House of Representatives drew considerable support that carries serious implications for the future.

To spotlight his campaign to slow the growth of retirement outlays,

Aspin introduced a plan that would put future service members under the congressional retirement system. People now in uniform would not be affected. The change would delay full retired pay until age sixty-two, allow reduced pensions at age fifty-five, and require an eight percent contribution by future recipients. All this, he said, would save \$3 billion a year.

The overhaul proposal, which Aspin tacked onto the FY '78 military authorization bill, lost 247 to 148. That might appear a decisive defeat, but considering that the amendment was slipped in at the last moment without committee hearings, it was anything but.

The debate over the amendment included denunciations of the present retirement system and its spiraling costs. Rep. Ronald M. Mottl (D-Ohio), for example, said the system "is not just generous, it is lavish" and urged his colleagues to support the change. Others pointed out the obvious dangers of the Aspin proposal, and several lawmakers pressed for early, full-blown hearings on all phases of the retirement question. This is what the Wisconsin legislator wants. For more on the retirement pay controversy, see p. 32.

## Officer Hike Forecast

USAF is forecasting a total of 15,910 line officer promotions this fiscal year, which ends September 30, and 13,715 during FY '78. The general officer projections are identical for both years, while advancements to full colonel are slated to drop from 817 this year to 584 the following year. Hikes to the other field grades also will decline.

However, the promotion opportunity will remain unchanged, Hq. USAF personnel officials emphasized. Two actions are mainly responsible for the fewer promotions: a cut in overall officer strength during FY '78 from 96,098 to 94,923; and USAF's recent decision to require field graders (and E-7s through E-9s) to serve two years in grade before retiring.

For nearly eight years, Air Force, to meet mandated personnel reductions and ward off officer RIFs, has allowed members in the cited grades to retire with as little as six months in grade. That's ending starting October 1. USAF said that strength levels are tending to stabilize and

the "early retirements" are no longer justified. So, as people who normally would retire remain in, promotion slots are reduced.

USAF has also announced that service commitments resulting from overseas assignment and completion of government-sponsored education probably will not be waived as liberally in FY '78 as in previous years.

Here are the official USAF estimates of line officer promotions for the two years. These are actual "pin-on" promotions, not selections:

To	FY '77	FY '78
General	5	5
Lt. Gen.	13	13
Maj. Gen.	33	33
Brig. Gen.	43	43
Colonel	817	584
Lt. Col.	2,084	1,804
Major	2,597	2,275
Captain	5,219	4,799
1st Lt.	4,379	4,159
	<u>15,190</u>	<u>13,715</u>

Officials noted that the estimates, which are revised four times annually, are subject to change.

In related developments:

- The services are not happy with a recent move by Sen. Sam Nunn (D-Ga.) to reduce the number of generals and admirals by twenty percent over five years. As chairman of the Senate's military manpower subcommittee, he's got the muscle to pull it off. Not helping the services' cause was recent testimony of Adm. Hyman G. Rickover before the Nunn group. Rickover, lionized by many lawmakers, said that Nunn's plan didn't go far enough, that the star ranks should be halved within five years.

- Some 621 USAF officers were chosen recently for permanent colonel in the Regular Air Force. All are already temporary O-6s (or O-6 selectees) or higher.

## Standards Flap Surfaces

Memo to USAF: Reduce the physical standards of future recruits and enlist more young women. This in turn will enable the Army and Marine Corps to solve their recruiting problems and improve force quality by signing up those who otherwise would "go" Air Force.

So said the House Armed Services Committee in a report accompanying the FY '78 military authorization bill. Air Force officials were anything but elated at the "share-



the-wealth" declaration. The Senate reportedly was not going along with the House suggestion, so Air Force apparently won't have to comply in the near future. But if manpower problems worsen in the other services, will more pressure be brought on USAF to help bail them out? Air Force, of course, has stood four-square against reducing standards. Additionally, its carefully phased plan for increasing women recruits has been in operation for some time.

The Congressional Budget Office also has urged the services to reduce standards and increase the number of uniformed women.

The House in late April passed the authorization measure that provides nearly \$36 billion for R&D, hardware, and other items. One of the last is \$35 million in educational aid and reenlistment bonus money to help Reserve Forces manning. But the Senate was preparing to kill the incentives, insiders said.

One House member, Rep. Pat Schroeder (D-Colo.), said there's a better way to fill the Reserve ranks: "Ease the haircut regulations." This move, she told Congress, "would cost nothing, improve Reserve morale and recruitment, and decrease the isolation of the military from society."

### "We've Got a Union"

So says TAC's Gen. Robert J. Dixon. "The Air Force," he declared, "is a union—an inside union. We are a union of citizen-airmen, bound together by oath, code, custom, tradition, professionalism, a common understanding, dedication, and purpose."

Writing in the April 22 *TIG Brief*, General Dixon said that he is the "tenth president of the TAC Chapter" of the USAF union, and commanders down the line "are local chapter heads." He added that "if our union doesn't hold together, the fault is with the leadership and not the troops."

The heart of his message is that USAF leaders at all levels must firmly support just benefits and communicate their positions to the Defense Department, Congress, and the public.

"We must keep our people informed—provide them the confidence that comes from knowing the facts on actions by our leadership. . . . We need to counter rumor

## Kokojan Cops Photo Honors



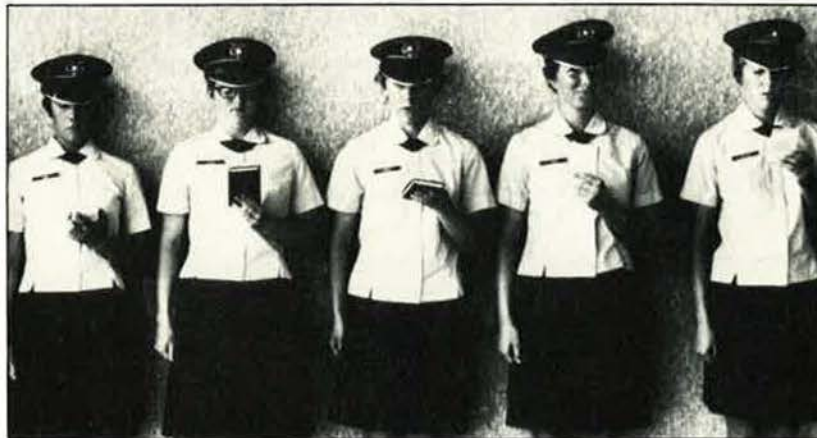
Ace photographer TSgt. Herman J. Kokojan.

TSgt. Herman J. Kokojan, a photojournalist with *Airman Magazine*, Bolling AFB, D. C., has been named the Military Photographer of the Year for the second consecutive year. Another USAF tech sergeant, Robert Wickley, was runner-up. Wickley, twenty-eight,

is a staff photographer for the *Pacific Stars and Stripes* in Tokyo.

They and other prize-winning military photographers were honored at the University of Missouri in April. The university and the National Press Photographers Association sponsored the annual competition in cooperation with the Defense Department.

Sergeant Kokojan, forty-three, was one of fifty-one military competitors in this year's event. He placed first in the Portfolio competition, the Military Feature category, and the Picture Story category, and third in the Pictorial competition. Sergeant Kokojan's photography has appeared in national newsmagazines, including *AIR FORCE*, the wire services, service publications, and network television. He was the pool photographer covering the Viet Cong release of American POWs at Loc Ninh, and the resulting photography was nominated for the Pulitzer Prize. He spent twelve of his nineteen active-duty years as a photo officer and currently holds a majority in the Air Force Reserve.



Kokojan's "Peek-A-Boo" won first place in Features photo category.



Another Kokojan entry, in Pictorial category, was "Sandpipers."

with hard facts that show our concrete concern for our people."

The TAC chief said, "We need to

listen, act, tell our people what we are doing. It must be clear that someone—at every level—speaks



# The Bulletin Board

for the troops." Otherwise, he indicated, they will look elsewhere for their "own spokesmen. . . ."

## Automatic VA Benefits Hit

Rep. John P. Hammerschmidt (R-Ark.) has introduced a bill to deny automatic extension of VA benefits to Vietnam-era deserters, draft dodgers, and others whose discharges are upgraded under the new Defense program. The measure would require VA to review the individual's service record and, if found not to be dishonorable, he would be eligible for the benefits, Representative Hammerschmidt said.

## VA Compensation Hike Moves

A House Veterans' Affairs subcommittee in late April endorsed

H. R. 1862, which provides a six percent boost in monthly compensation checks drawn by disabled veterans. The increase would become effective October 1. The subcommittee also okayed H. R. 6502 calling for an automobile assistance allowance and adaptive equipment for veterans of the first World War.

Another important bill before Veterans' Affairs, H. R. 6479, would permit service-connected disabled veterans who also are military retirees to receive both VA compensation and retired pay, without deduction. AFA supports dual payments for these persons.

Meantime, more new recomputation bills have been introduced in Congress. Several would delay recomputation until age sixty. Other recently introduced bills of interest include:

- **H. R. 4551.** It would repeal outright the remaining provisions of the Selective Service Act.

- **H. R. 4506.** It would provide that service in the Women's Army Auxiliary Corps shall be considered active duty in the US forces.

- **S. 1097.** It would exempt from

federal taxation the pay of enlisted members of the Reserve Forces that does not exceed \$1,500 per year.

- **S. 1353.** It would provide review by the US Supreme Court for decisions of the US Court of Military Appeals.

## Seniors Lose Flight Pay

On May 31 the three-year "save pay" clause of the 1974 Aviation Career Incentives Pay Act expired, and with it flight pay for flyers with more than twenty-five years of commissioned service. An estimated 1,800 officers will no longer receive their \$165 a month after May 31, an Air Staff official told AIR FORCE Magazine. Authorities were keeping a close check on whether the cut-off would trigger many retirement requests.

Most of those affected are full colonels and generals, but a few lieutenant colonels are also on the list. Officers generally do not regard the step as a "benefit erosion." The Act, which became law May 31, 1974, provided higher flight pay

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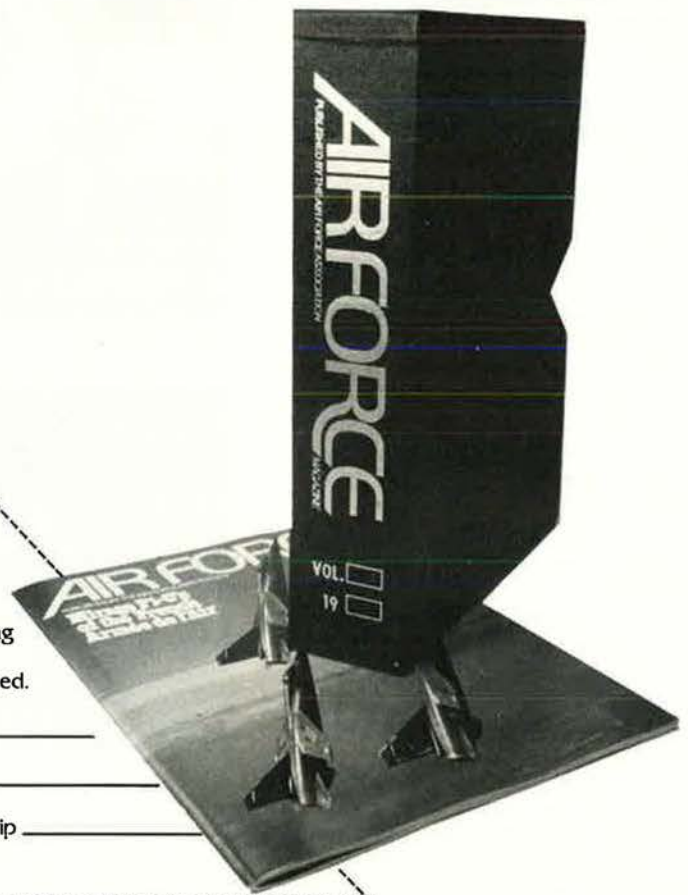
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during the early years of an aviator's career with a cutoff after twenty-five years, plus the initial three-year grace period, which has now expired.

Flying pay, no longer hitched to specific grades, ranges from \$100 to \$245 per month. Flyers with six years' service start drawing the maximum. Years ago flight pay was half of basic pay.

### Short Bursts

Veterans groups at a recent House Veterans' Affairs Committee hearing again scored the government for dragging its feet on **job programs for Vietnam veterans**. Bureau of Labor statistics show that the jobless rate among veterans aged twenty to twenty-four dipped from 18.3 percent in December to 16.8 percent in January, but by

March it inched back to 17.1 percent. Among non-vets in the same age category, the rate has been around ten percent.

Thirty-one retired USAF and US Army members who work at the USAF base at **Zaragoza, Spain** (their company does base maintenance), are protesting the \$1,835 tab they say they must pay this school year to send their kids to the base school. The group has fired off hot protest letters to various government agencies and officials.

Thousands more veterans became eligible for **burial in Arlington Cemetery** starting a few weeks ago. The privilege was extended to ex-service members separated with a physical disability of thirty percent or greater, plus recipients of the Distinguished Service Cross or the Air Force Cross, Distinguished Service Medal, Silver Star, or Purple Heart.

Spouses and dependent children of eligible veterans are also eligible. Acquisition of additional land made the expansion possible.

**CWO Gerald S. Maresh** retired March 31 at Los Angeles AFS, Calif., after thirty-seven years and three months' service, thereby just missing our list of the **last nine WOs on active duty** (April "Bulletin Board"). Mr. Maresh, who resides in Lancaster, Calif., received his warrant appointment in 1951 from his commander, Col. George S. Brown, who now is the JCS Chairman.

New editions of the popular **Uniformed Services Almanac, Reserve Forces Almanac, and National Guard Almanac** are available at exchange stores, book stores, and GSA self-service stores. Price: \$2 per copy. All are packed with up-to-date information on military pay and benefits. ■

## Senior Staff Changes

**RETIREMENTS:** L/G Maurice F. Casey; B/G Clyde R. Denniston, Jr.; Gen. Russell E. Dougherty; L/G Robert E. Hails; L/G Warren D. Johnson; B/G Paul A. Kauttu; L/G James M. Keck; L/G Winton W. Marshall; Gen. Louis T. Seith; B/G Leland C. Shepard, Jr.; L/G Ray B. Sitton; L/G Joseph G. Wilson.

**CHANGES:** L/G (Gen. selectee) James R. Allen, from Superintendent, USAFA, Colo., to C/S, SHAPE, Casteau, Belgium, replacing retiring Gen. Louis T. Seith . . . L/G (Gen. selectee) Lew Allen, Jr., from Dir., NSA, Washington, D. C., to Cmdr., Hq. AFSC, Andrews AFB, Md., replacing Gen. William J. Evans . . . Col. (B/G selectee) Jerome R. Barnes, Jr., from Cmdr., 2d BMW, SAC, Barksdale AFB, La., to DCS/Pers., Hq. SAC, Offutt AFB, Neb., replacing M/G Earl G. Peck . . . M/G (L/G selectee) Arnold W. Braswell, from Asst. C/S for Ops., SHAPE, Casteau, Belgium, to Dir. for Plans & Policy, J-5, JCS, Washington, D. C. . . . B/G (M/G selectee) Kelly H. Burke, from Asst. DCS/Plans, Hq. SAC, Offutt AFB, Neb., to DCS/Plans, Hq. SAC, Offutt AFB, Neb., replacing M/G Richard N. Cody . . . Col. (B/G selectee) William J. Campbell, from Asst. DCS/Plans for Spec. Programs, Hq. SAC, Offutt AFB, Neb., to Asst. DCS/Plans, Hq. SAC, Offutt AFB, Neb., replacing B/G (M/G selectee) Kelly M. Burke.

M/G Richard N. Cody, from DCS/Plans, Hq. SAC, Offutt AFB, Neb., to Dep. US Mil. Rep., NATO Mil. Committee, Brussels, Belgium . . . L/G Wilbur L. Creech, from Cmdr., ESD, AFSC, Hanscom AFB, Mass., to Asst. Vice C/S and Asst. for Readiness and NATO Matters, Hq. USAF, Washington, D. C. . . . M/G (L/G selectee) Bennie L. Davis, from Dir., Pers. Plans, DCS/P, Hq. USAF, Washington, D. C., to DCS/P, Hq. USAF, Washington, D. C., replacing L/G Kenneth L. Tallman.

Gen. Richard H. Ellis, from CINCUSAFE and Cmdr., AAFCE, to CINCSAC and Dir., Joint Strategic Target

Planning Staff, Hq. SAC, Offutt AFB, Neb., replacing retiring Gen. Russell E. Dougherty . . . Gen. William J. Evans, from Cmdr., Hq. AFSC, Andrews AFB, Md., to CINCUSAFE and Cmdr., AAFCE, replacing Gen. Richard H. Ellis . . . M/G (L/G selectee) Abbott C. Greenleaf, from Dir. of Programs, DCS/Programs & Resources, Hq. USAF, Washington, D. C., to DCS/Programs & Resources, Hq. USAF, Washington, D. C. . . . B/G Patrick J. Halloran, from C/S, 15th AF, SAC, March AFB, Calif., to Insp. Gen., Hq. SAC, Offutt AFB, Neb., replacing retiring B/G Clyde R. Denniston, Jr.

L/G James E. Hill, from Cmdr., 8th AF, SAC, Barksdale AFB, La., to Vice CINC, Hq. SAC, Offutt AFB, Neb., replacing retiring L/G James M. Keck . . . M/G Lovic P. Hodnette, Jr., from Air Dep., AF North, Oslo, Norway, to ACS/Ops., SHAPE, Casteau, Belgium . . . M/G (L/G selectee) Richard L. Lawson, from Dir. of Plans, DCS/P&O, Hq. USAF, Washington, D. C., to Cmdr., 8th AF, SAC, Barksdale AFB, La., replacing L/G James E. Hill . . . L/G Robert T. Marsh, from V/C, Hq. AFSC, Andrews AFB, Md., to Cmdr., ESD, AFSC, Hanscom AFB, Mass., replacing L/G Wilbur L. Creech . . . M/G (L/G selectee) Robert C. Mathis, from DCS/Systems, Hq. AFSC, Andrews AFB, Md., to V/C, Hq. AFSC, Andrews AFB, Md., replacing L/G Robert T. Marsh . . . B/G Edward Mendel, from Cmdr., 64th FTW, ATC, Reese AFB, Tex., to Dep. for Readiness Development, Acquisition Logistics Division, AFLC, Wright-Patterson AFB, Ohio.

M/G Carl D. Peterson, from Cmdr., Air Defense Weapons Center, Tyndall AFB, Fla., to Air Dep., AF North, Oslo, Norway, replacing M/G Lovic P. Hodnette, Jr. . . . B/G Bobby W. Presley, from Dep. Cmdr., Army-AF Exchange Service, Dallas, Tex., to Cmdr., Army-AF Exchange Service, Dallas, Tex. . . . L/G Kenneth L. Tallman, from DCS/P, Hq. USAF, to Superintendent, USAFA, Colo., replacing L/G James R. Allen.



## The Problem of Eroding Benefits

A year ago, even with the commissary controversy boiling, who could have foreseen the "erosion of benefits" phenomenon and the heat it has generated? The gripes and charges are rolling in.

"The bottom has dropped out," some quarters say. "Our benefits are being systematically and deliberately destroyed," others contend. Even: "There'll soon be nothing left."

Well, of course, that kind of talk is nonsense. Individuals and groups who have fanned the fires with such rhetoric are getting carried away; they should know better. Yet there is considerable cause for concern—beside all the threats, some erosion has occurred. The services have documented it. And the leadership is flexing new muscles by pointing the finger at the specific agencies responsible for trimming particular benefits. The services are resisting further incursions.

Over the years, the services and the Defense Department traditionally acted as one, in concert with the Administration. When a policy change was under consideration, the participants advanced their views during behind-the-scenes deliberations. But once an official position was taken, all sides supported it. Similarly, the services didn't turn the spotlight on Congress when that body quashed or trimmed a benefit.

Times have changed. Stung by the intensity of the troops' concern over perceived erosions, the services have developed new resolve. They don't take attacks on benefits lying down. For example, the Joint Chiefs of Staff early this year urged the government to halt piecemeal changes in benefits. Never before had that august body jumped so directly into the troops' "pocketbook" matters.

About the same time, the Defense Department was readying a massive regulation on CHAMPUS, the government's health program for military dependents and retirees. But service officials feared the military community would view numerous sections of the regulation as representing more cuts in CHAMPUS. So they pressured Defense into modifying most of the disputed sections—and these were rewritten accordingly.

More recently, the service Secretaries demanded that the Administration place a moratorium on pay and benefits changes. They specifically denounced pending Pentagon proposals which, they said, "threaten to undermine the housing benefit that forms the cornerstone of the present pay and allowance compensation system."

One of the proposals, a long-time Defense favorite but strongly opposed by the services, would lay on a fair rental system for occupants of government quarters. Residents would pay the rents out of their quarters allowance. But if the allowance were less than the rental, they would have to dig into their pockets to make up the difference. Too many would be forced to dig, the services contend.

Another such proposal the services are openly protesting would boost rental fees for on-base trailer spaces from the present \$15 per month to "prevailing local rates." The Air Force says this means about \$100 a month, or an \$85 boost. Making matters worse, the huge increase would hit primarily lower ranking enlisted families, the group that can least afford it.

Military staffs, meanwhile, have compiled long lists of benefits they say have been eroded in recent years, plus others they fear may be cut, such as the ones cited above. These lists, apparently circulating freely throughout the Pentagon, are accompanied by hard-hitting commentaries. One pointedly identifies the agencies responsible—most frequently the Congress. Examples:

- "October 1974—Congress eliminated funding for enlisted education-commissioning programs. EM now must obtain education during their off-duty hours."

- "January 1975—Congress cut out separation travel for enlisted members who reenlist immediately. Average loss per member came to about \$110."

The Army constructed the most detailed listing; the largest section cites benefits it says were eroded since 1973. Army's personnel staff worked up its list in response to a request by Sen. Sam Nunn (D-Ga.), chairman of the Senate Manpower and Personnel subcommittee. Senator Nunn had challenged a Defense witness to identify "one benefit" that Congress has cut. When the witness fumbled the initial response, the services came back later with written reports.

Army's bluntly worded paper listed fifty-one "adverse" actions completed, fourteen adverse actions "under consideration," fifteen "favorable" actions completed, and ten favorable actions "under consideration."

Unfortunately, that service came on too strong. Its summary lost much impact and credibility by including several questionable—some very weak—items. For instance, it cited as erosions the elimination in 1974 of the ten percent overseas deposits program, and the enactment that same year of the Aviation Career Incentive Act. Yet it failed to note that the government was almost forced to end the deposits program because service people refused to participate. And the aviation measure, far from being a negative step, brought order to the tangled flying pay program and increased junior officers' flight pay.

As noted, the services have not hesitated to remind the troops of benefits gained. Examples include increases in such things as government insurance coverage, PCS mileage and local travel reimbursements, and do-it-yourself moves. Under the latter, members pocket cash that otherwise would go to moving companies. New benefits under serious consideration include family separation allowances for lower graders and restoration of BAQ and BAS payment for "cashed-in" leave.

So it is not the "one-way street" claimed by many quarters.

The Air Force, in explaining how the benefits erosion flap intensified so rapidly, uses 1972 as a benchmark. There were several pay raises during the preceding years. The big one, in 1971, doubled recruit pay and thereby helped make the all-volunteer force feasible. By 1972, military pay was comparable to wages in the private sector.

But since then, USAF holds, military pay has not kept pace with inflation. Active-duty members have experienced a 6.3 percent real loss in buying power. This, the services declare, impacts most heavily on people who have entered service since 1972—all they know is "losing purchasing power."

And how many of the 2,100,000 people in uniform today began their service since 1972? "Over fifty percent," says the Air Force. "About sixty percent," says the Army. In any case, it's well over half of the current force, and it helps explain why such large numbers are disturbed and protesting.

The Air Force, in taking a tougher stance on the benefits problem, is trying to reestablish itself as the "traditional spokesman" for its members. Through explicit actions it wants to reassure the membership that the leaders are in there pitching for the members' best interests. One such action is the hoped-for moratorium on adverse pay and benefits changes over the next year or so.

The benefits erosion problem can be defused, the Air Force says, if the moratorium gets broad governmental support and is honored by Congress, and if the President's Blue Ribbon Commission on compensation review leads to "orderly and coordinated" (and acceptable) pay-benefits changes within a reasonable period. Then, yes, it can be defused.

But those are awfully big ifs. ■



# What They're Saying...

## Confronting the Problems

*Walter Laqueur, in Commentary Magazine for March 1977. Excerpted by permission. A contributing editor of Commentary, Walter Laqueur is a professor of history at Harvard. He is also chairman of the Research Council of the Center for Strategic and International Studies in Washington, and is the author of several books on European and Middle Eastern affairs.*

The constant and rapid growth of Soviet power over and above what could be explained away even by the most charitable observers as needed for the defense of Russia has also caused disenchantment among some arms controllers who used to believe that once a low level of deterrence is assured there is no longer any connection between military strength and political influence. This illusion—and several others as well—also figured in the debate in the 1930s over German rearmament, as can be seen from the recently published fifth volume of Martin Gilbert's excellent biography of Churchill. . . .

In retrospect, one can discern four distinct stages in public reaction to Churchill's constant warnings. In stage one (1933-34), it was claimed that the reports about German rearmament were grossly exaggerated or altogether untrue. In stage two (1935), it was admitted that Germany was investing vast resources in rearmament, but not that Germany was catching up with Britain. Some said that Germany was big but inefficient, others claimed that it was not as big as it looked, and others used both arguments at the same time. In stage three (1936-

37), it was conceded that Germany had reached parity or had even overtaken Britain, but it was also contended that such superiority was meaningless in military terms, that the specific geopolitical situation of Germany had to be taken into account (the need to "defend" itself against potential enemies in the West as well as in the East), and that there was no reason to assume that Germany wanted war.

Eventually, the full extent of German superiority could no longer be denied, but it was precisely because the Germans were so much stronger that the counsels of appeasement prevailed in stage four. Survival, it was then said, had to be the overriding consideration, Britain would never be ready to fight in view of its vulnerable position, a "moribund people such as ours is not equipped to deal with a totalitarian state" (Lord Rothermere). Hence Chamberlain's policy of trying gradually to remove "hostility between nations until they felt they could disregard their weapons."

All this will sound eerily familiar to anyone who has followed the debate in America in recent years over Soviet military capabilities and intentions. The historical context changes, but the psychology of appeasement remains fairly constant. . . .

There is, of course, one basic difference between the 1930s and the situation today—which is that nuclear weapons have made a major war far less likely. The aggressors in the 1930s could hope for a quick and easy victory, but this is no longer so today (provided, of course, the West does not invite aggression by neglecting its defenses, both strategic and conventional). Hitler wanted war; the Soviet leaders do not. But precisely because the mili-

tary issues are no longer that straightforward, confusion tends to be even more widespread than in the 1930s. Not only have the arguments and illusions of the 1930s returned in full force, but they have been compounded by others suitable to the nuclear age.

Thus we hear it said that the Soviets are slow learners who have not as yet mastered the essentials of strategy in the nuclear age and are merely squandering money and resources on arms that cannot possibly give them a military or political advantage. Others in a more familiar spirit point to Russia's geopolitical situation and its feeling of insecurity because it has to defend itself on two fronts. Still others stress tradition and culture—the Russians have always been great believers in quantity.

It is useful to keep the historical parallels in mind at this moment when the pressure to sign another SALT treaty is becoming so strong. That pressure is coming from Washington as well as from Moscow. On the Soviet side, the policy has all along been to weaken the American position slowly and to avoid sudden shocks. Soviet leaders know from bitter experience that the US, once threatened or challenged, is still capable of gigantic efforts, such as happened after the launching of Sputnik-1 and on several other occasions. Hence the urgency with which Brezhnev—mindful of the growing realism in the US over the Soviet buildup—now insists on the completion of the SALT talks.

On the American side, some say that even a meaningless treaty is better than no treaty, or that this is the last chance before the moderate Brezhnev is succeeded by younger leaders believing in a winnable war. The logic is curious: After all, if such leaders should materialize, they would obviously not feel bound by agreements entered into by their predecessors. Those who warn that the race to control strategic arms is being lost admit that their own cures are "complex, messy, and unbearably difficult." But arrangements that are messy and unbearably difficult are usually also ineffective.

In the short run, there is no alternative to effective arms control but the threat to match every effort undertaken by the other side. ■

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# US Air Force Anniversary Issue

September 1977 will mark the 30th anniversary of the US Air Force.

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# 30



# Airman's Bookshelf

## Combat Commanders

*The War Lords: Military Commanders of the Twentieth Century*, edited by Field Marshal Sir Michael Carver. Little, Brown and Co., Boston, Mass., 1976. 624 pages, including index. \$17.95.

The price tag on this book will serve to separate the serious-minded military buffs from the sunshine patriots of that estimable gang, but those willing to pony up the eighteen dollars will not be disappointed. Sir Michael's earlier books (*Second to None: History of the Royal Scots Greys; El Alamein; and Tobruk*) were not widely noticed on this side of the Atlantic, but the recently retired Field Marshal and Chief of Defence Staff (equivalent to our Chairman, JCS) has put together a collection that will attract international interest and commentary.

*The War Lords* contains forty-three short biographies, each treating a man who exercised command of a considerable force—land, sea, or air—in an important campaign. Therefore, Eisenhower, Spaatz, and Nimitz are included; Marshall, Arnold, and King are not. A secondary criterion was to see that as many campaigns as possible of the two world wars were covered while avoiding duplication; thus Spaatz but not Eaker and Twining, Bradley but not Hodges and Devers. Of the forty-three who made the cut, five are airmen (Spaatz, Trenchard, Dowding, Harris, and Tedder); eight are naval officers (Nimitz, Spruance, Halsey, Cunningham, Mountbatten, Jellicoe, Dönitz, and Yamamoto); and thirty are ground forces commanders—eight from the UK, seven from Germany, six from the US, four from France, two from Russia (Zhukov and Koniev); and one each from Turkey (Kemal), Australia

(Monash), and New Zealand (Freyberg). The Americans include Pershing, Stilwell, MacArthur, Bradley, Patton, and Eisenhower.

Among the ground commanders are many we can all profit from learning more about, such as Viscount Slim, Sir Ian Hamilton, the Earl Wavell, Marshal Juin, General Guderian, the Earl Alexander, along with Field Marshals Auchinleck and Rommel. And there's still room for Montgomery, Foch, Pétain, Hindenburg, Ludendorff, and Haig—among others. One can quarrel with who's been left out—Mao, Kenney, LeMay, Galland, Giap, Dayan—easy enough in any such compilation. But the argument loses force when it is directed against those who have been included.

Air-minded readers will be especially appreciative, despite holding only five of forty-three slots. The chapter on General Spaatz, for one example, is the best single piece yet available on that grand shunner of public attention. Alfred Goldberg, presently the Chief Historian, DoD, demonstrates a particular skill, not always evident in his earlier work, for revealing the day-to-day gutsiness and turbulence surrounding Spaatz's decisions as Commander, USSTAF, especially in the period leading up to Overlord. Martin Middlebrook's chapter on Sir Arthur ("Bomber") Harris is right on the mark; Air Chief Marshal Sir Christopher Foxley Norris does the best piece on Tedder since Ike's Deputy Commander did his own thing in *With Prejudice*; and Gavin Lyall's chapters on Trenchard and Dowding are almost by themselves worth the price of the book.

From Lyall's chapter on Air Chief Marshal the Lord Dowding of Battle of Britain fame: "He opted for the army class [at Winchester] largely, on his own admission, to avoid learning Greek; on such small pivots

can careers, and possibly world events, turn." And, later, in discussing how Dowding's growing interest in spiritualism did nothing to help his service reputation in the late thirties: "The British appreciate eccentricity in their military leaders, but they prefer it to be something [rather more] tangible, like womanising or model railways." Or take Charles Douglas-Home on Rommel and a point perennially difficult to make with young men under twenty-one: "Rommel's main impact on the war arose perhaps not so much from the results of his generalship, as from the manner of it."

In the end, if one is congenial enough to forgive Sir Michael some peculiarly obtuse asides about airpower—his Introduction nudges old shibboleths, one of them to the effect that bombing "probably hardened rather than softened the morale of the enemy population"—then one will have at hand some forty-three accounts of those who marked the pages of history. For just one volume, that registers in the bargain category. One can only hope that the editor's retirement from active service will provide an opportunity to revert to his original "short list [of] a hundred names" for a sequel, whether directed one level higher or lower. Hollywood sequels are busts. Sir Michael's would be another gem.

—Reviewed by Lt. Col. David Maclsaac, Department of History, Air Force Academy.

## Segregation—Lessons from World War II

*Blacks in the Army Air Forces During World War II*, by Alan M. Osur, Office of Air Force History, Government Printing Office, Washington, D. C., 1977. 227 pages. \$2.40.

The author, an Air Force major and an associate history professor at the Air Force Academy, provides an authoritative, well-written analysis of black participation in the AAF during World War II. It is not a detailed accounting of heroic feats by black aviators described in many previous studies. Rather, it is an extremely well documented analysis of the racial bias, wanton discrimination, and segregation at its worst found in the wartime policies of the War Department and the military services.



# Airman's Bookshelf

Based on information gathered while preparing his doctoral dissertation, the author concludes that the AAF did achieve some success in race relations, but only in spite of itself. It did not establish an integration policy, nor did it attempt to adopt policies to offset the inevitable problems inherent when large numbers of blacks were brought into wartime service.

Major Osur concludes that segregation was the official War Department policy. Separate but equal facilities and opportunities were a sham; racial harmony depended on the amount of leadership displayed by commanders, and, even after the war, Air Force leaders were still ambiguous about the future of blacks. This conundrum was finally resolved—officially at least—when President Truman signed his executive order in 1948 outlawing segregation within the military.

This book should be read, and remembered. "... the AAF learned that active commitment, vital leadership, and equal opportunity produced a more viable military organization than did segregation and unequal treatment. . . . If the United States Air Force and the Department of Defense continually apply the notions of efficiency and social justice implicit in the World War II experience, the military," reasons the author, "will be able to move ahead of society in solving America's race-relations problems."

—Reviewed by Maj. Terry A. Arnold, Contributing Editor.

## The Wooden-Crate Warriors

*The Glider Gang*, by Milton Dank. J. B. Lippincott Co., New York, N. Y., 1977. 273 pages with bibliography and index. \$10.95.

It was dawn on May 10, 1940, when the silent winged machines appeared out of the sky to alight atop Fort Eben Emael, the massive fortification built at enormous cost by the Belgians and considered impregnable.

Fewer than ninety German troops

spilled from the gliders and gunned down everyone in their path. Seizing control of the structure's upper surface, they trapped the 850-man garrison within. The assault, brilliantly conceived and executed with élan, was a stunning success. When the German land armies arrived the next day, the fort capitulated, clearing the way for a German blitzkrieg of Belgium and France. German casualties in the airborne assault: six killed.

On May 20, 1941, began Hitler's airborne invasion of Crete, occupied by 30,000 Commonwealth and Greek troops. The fighting in the days that followed was savage. German losses—especially among glider troops—were horrendous. But Crete fell.

These two battles gave strong impetus to a buildup of Allied airborne forces—parachute and glider troops. And although after Crete Hitler never again ordered a large-scale airborne attack, the Allied leaders were faced with the eventual mass movement of men across the channel to France. Thus, a giant airborne envelopment loomed large in planning the coming invasion.

This book—by a former US glider pilot and billed as "an eyewitness history of World War II glider combat"—is based on official histories, Air Force archives, interviews with commanders and troops who served in the glider arm, and the author's own experiences. It is a fascinating saga of those courageous souls who piloted the fragile canvas and plywood craft and of the men they carried into battle. In all, Allied glider forces took part in the Sicily, Normandy, southern France, Holland, and Rhine campaigns, and the glider troops faced not only enemy fire but foul weather, inexperienced tow pilots, and the tendency of the gliders to shed parts in flight. (Observed a British sergeant major inspecting the uncrating and assembly of some US-built Wacos: "Burn the bloody gliders and fly the bloody crates!")

*The Glider Gang* describes the history, organization, and training of the glidermen and how the balky machines were flown, and contains numerous first-person accounts of men in combat. Its author served with the 439th Troop Carrier Group in Europe in 1944 and 1945 and flew on the southern France, Holland, and Rhine missions.

The role of glider forces in World War II has long been slighted by

military writers. This book richly and colorfully fills the gap.

—Reviewed by William P. Schlitz, Assistant Managing Editor.

## New Books in Brief

*Airman's Information Manual, 1977*, edited by Walter P. Winner. Most useful to student and professional pilots, this latest edition covers flight procedures, operational data, US flight requirements, a pilot-controller glossary, and sections from FAA's airman information manual. Aviation Book Co., 555 W. Glenoaks Blvd., Glendale, Calif. 91202, 1977. 216 pages. \$3.25.

*Air Power at Sea, 1939-45*, by John Winton. This book examines airpower's influence at sea and the myriad roles it assumed throughout World War II. Photos, selected bibliography, notes, index. Thomas Y. Crowell Co., New York, N. Y., 1977. 185 pages. \$12.95.

*Artillery of the World*, by Christopher F. Foss. Revised to include improvements in towed artillery and fire-control systems that have been developed since its first printing in 1974, this book describes in text and photos the artillery of nineteen nations. Bibliography, index. Charles Scribner's Sons, New York, N. Y., 1976. 202 pages. \$7.95.

*The Chinese Communist Party in Power, 1949-1976*, by Jacques Guillermez. Updated to include the 1972-76 period, this comprehensive study covers China's phenomenal rise in power and prestige in less than a generation. The author, a noted French statesman, teacher, soldier, and scholar, spent twenty years in various diplomatic and military posts in East Asia, sixteen of which were in China. Bibliography, index. Westview Press, Boulder, Colo., 1977. 614 pages. \$24.75.

*Federal Aviation Regulations*. Selected federal air regulations that pilots must understand and comply with are printed here. These include certification of pilots and instructors, general operating and flight rules, aircraft accidents and reporting, safety investigations, definitions, and abbreviations. Aviation Book Co., 555 W. Glenoaks Blvd., Glendale, Calif. 91202, 1977. 57 pages. \$2.25.



*Helicopters of the World*, by Michael J. H. Taylor and John W. R. Taylor. Here in all shapes and sizes are the world's helicopters, grouped by country, with specifications and photos. Index. Charles Scribner's Sons, New York, N. Y., 1977. 128 pages. \$7.95.

*Missiles of the World*, by Michael J. H. Taylor and John W. R. Taylor. This new edition includes data on Soviet and US missiles made public after SALT I. Missiles known to be in service or under development throughout the world are listed by country, with specifications and photos. Index. Charles Scribner's Sons, New York, N. Y., 1977. 159 pages. \$7.95.

*Oil, Divestiture and National Security*, edited by Frank N. Trager, National Strategy Information Center. Contributors examine thoroughly proposals to break up US oil companies. They conclude that the consequences of divestiture would be worse than the problems to be solved. Crane, Russak & Co., Inc., New York, N. Y., 1977. 135 pages. \$4.95.

*Slow to Take Offense: Bombers, Cruise Missiles, and Prudent Deterrence*, by Francis P. Hoerber. A timely, comprehensive monograph on major issues facing the US in any potential strategic nuclear confrontation with the Soviet Union. Center for Strategic and International Studies, Georgetown University, Washington, D. C., 1977. 136 pages. \$3.95.

*Soldiers and Power: The Development Performance of the Nigerian Regime*, by Victor Olorunsola. A scholarly analysis of Nigeria's Gowon regime and its growth and development as viewed from various vantage points—by Nigerian society, by the military rulers, and by objective data. Bibliography, notes. Hoover Institution on War, Revolution and Peace, Stanford, Calif. 94305, 1977. 168 pages. \$8.95.

*Trial in Africa: The Failure of US Policy*, by William P. Yarborough. "In the mid-1970s, the US suddenly discovered a great void in its foreign policy. . . . It was the size and shape of the African continent," begins the author. A former commander of the Green Berets' Special Warfare Center, Yarborough com-

brates the social and political history of Africa with the essentials of Soviet strategic thought, and describes the developing crisis that looms as a major failure in American foreign policy. While the Com-

munists have a sense of overall strategy, the US does not, he says. The Heritage Foundation, 513 C St., N. E., Washington, D. C. 20002, 1976. 86 pages. \$3.

—Reviewed by Robin Whittle

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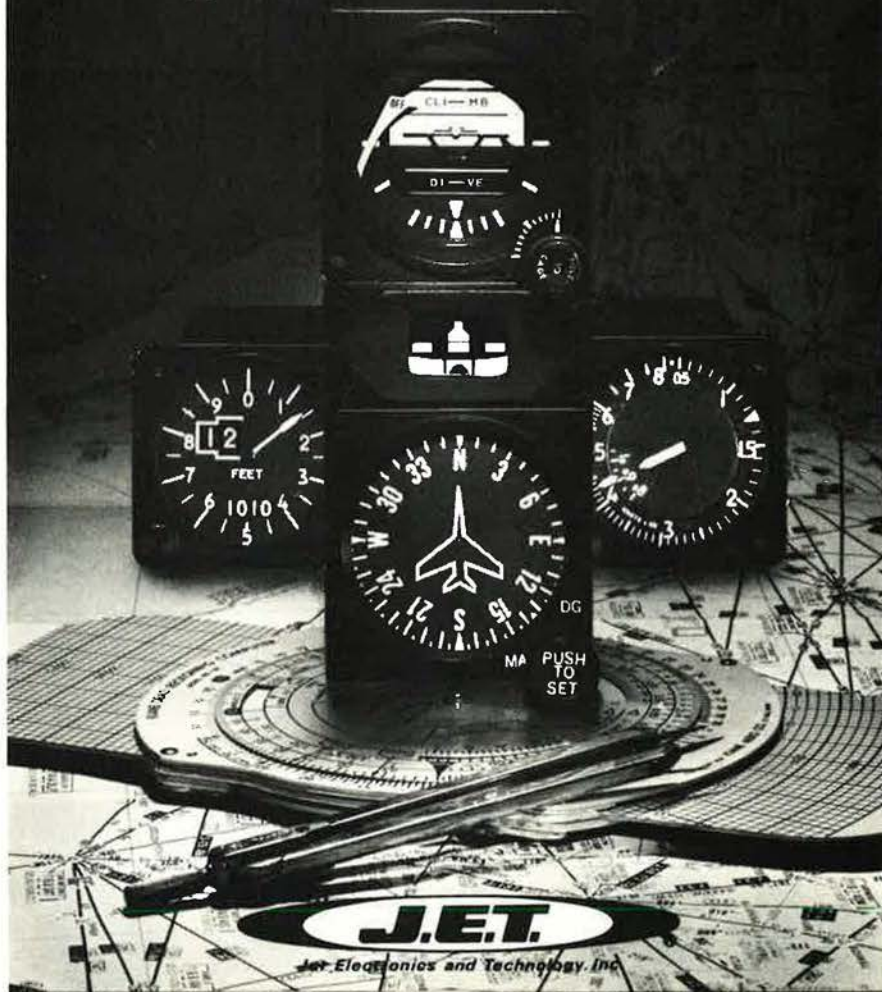
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# AFA's 1976-77 Committees and Councils

In the January issue, we introduced the members of AFA's Organizational Advisory Council and of the Executive, Finance, Constitution, Convention Site, Resolutions, and Membership Committees. Here are the members of the remaining committees and councils, which advise AFA's President in their areas of specific responsibility. The Air Force Association salutes the dedicated men and women of all these advisory bodies for their volunteer service to AFA and to the security and well-being of this nation.

## Total Force Advisory Council



Schroeder



Diab



Waxman



Brown



Rowe



Farr



Morley



Zipp



Hudson



Strzemieczny



Haug

Members represent elements of the total force or are Chairmen of a specialized Council. Individually they advise the AFA President on matters affecting their areas of expertise. As a Council, they take a broad view of the total force, advising

the President across the spectrum. Members are: Brig. Gen. Darrol G. Schroeder, Davenport, N.D., Air National Guard Advisor, Chairman; Brig. Gen. Thomas A. Diab, AFRES, Boston, Mass., Air Reserve Advisor; David Waxman, M.D., Kansas City, Kan., Medical Advisor; Maj. Gen. I. G. Brown, USAF (Ret.), Annandale, Va., Retiree Advisor; Kenneth A. Rowe,

Richmond, Va., Civil Air Patrol Advisor; Col. John W. Farr, USAF (Ret.), Forest Park, Ga., Air Force Junior ROTC Advisor; Lt. Col. William G. Morley, USAF (Ret.), Washington, D.C., Air Force Senior ROTC Advisor; John Zipp, Denver, Colo., Civilian Personnel Advisor; CMSgt. Alton G. Hudson, Tyndall AFB, Fla., Chairman, Enlisted Council; Capt. Alan L. Strzemieczny, Offutt AFB, Neb., Chairman, Junior Officer Advisory Council; and Roy A. Haug, Colorado Springs, Colo., Chairman, Organizational Advisory Council.

## Junior Officer Advisory Council



Strzemieczny



Downey



Sanders



Barrick



Cochran



Collins, F.



Head



Kolp



Lindberg



McMinn



Nelson



Sconyers



Slate



Smith



Davis

The Junior Officer Advisory Council includes at least one representative from each Air Force major command and separate operating agency. The officers pictured here constitute the Council's Executive Committee. This Council advises the AFA President on matters of interest to this particular constituency, and gives younger officers a chance within AFA to introduce and discuss matters affecting them. Members are: Capt. Alan L. Strzemieczny, Offutt AFB, Neb., Chairman; Capt. Clyde J. Downey II, Washington, D.C., Deputy Chairman; Capt. Cindy Sanders, Randolph AFB, Tex., Recorder; Capt. Samuel L. Barrick, Jr., Scott AFB, Ill.; Capt. Mary Ann Cochran, Washington, D.C.; Capt. Fredric Collins, APO San Francisco; Capt. Raymond L. Head, Jr., Langley AFB, Va.; Capt. Terry J. Kolp, Washington, D.C.; Capt. Craig Lindberg, Maxwell AFB, Ala.; Capt. Eddie-Jo McMinn, Washington, D.C.; Capt. Gary A. Nelson, Randolph AFB, Tex.; Capt. Ronald Sconyers, Lowry AFB, Colo.; Capt. Conrad L. Slate, Richmond, Va.; and Capt. Robert P. Smith, Offutt AFB, Neb. Maj. Gen. Bennie L. Davis, USAF Director of Personnel Plans, Washington, D.C., is advisor.



# Scientific Advisory Council



Schenk



Collins, M.



Eckels



Grazioso



Haire



Harris



O'Brien



Stearn



Wilkins



West

This Council recommends action AFA might take to support Air Force research and development programs, and suggests ways AFA might emphasize to the public the importance of military R&D to America's future security. Members are: Peter J. Schenk, Vienna, Va., Chairman; Michael Collins, Washington, D.C.; Robert E. Eckels, Golden, Colo.; James P. Grazioso, West New York, N.J.; John Haire, Huntsville, Ala.; Martin H. Harris, Winter Park, Fla.; Thomas H. O'Brien, Syosset, N.Y.; Edward A. Stearn, San Bernardino, Calif.; Sherman W. Wilkins, Bellevue, Wash.; and A. A. West, Newport News, Va.

## Ad Hoc Committee



Harris



Allison



Gisel



Larson



Nelson



Ritchie



Spruance



Sterrett

The Ad Hoc Committee is AFA's newest advisory group, established this year to recommend to the AFA President directions the Association might take in the future. Members are: Martin H. Harris, Winter Park, Fla., Chairman; John R. Allison, Arlington, Va.; William G. Gisel, Buffalo, N.Y.; Jess Larson, Washington, D.C.; Thomas R. Nelson, Dillon, Mont.; Steven Ritchie, Golden, Colo.; William W. Spruance, Marathon, Fla.; and J. Deane Sterrett, Beaver Falls, Pa.

## Enlisted Council



Hudson



Anderson



Chism



Eyer



Hansberry



Hardy



Heimrich



Inzunza



Krasko



Lema



Lucas



Mickelson



Miller



Roberts



Ryan



Schaeffer

The Enlisted Council, one of AFA's oldest and most productive groups, was reorganized this year to include Air Force's twelve Outstanding Airmen for 1976. The Enlisted Council advises the AFA President on all matters of interest to Air Force enlisted people, and includes both active-duty and Reserve-component representation. Members are: CMSgt. Alton G. Hudson, Tyndall AFB, Fla., Chairman; CMSgt. Willard P. Anderson, Maxwell AFB, Ala.; MSgt. Douglas D. Chism, Paramount, Calif.; Sgt. Randy Eyer, Hickam AFB, Hawaii; A1C Marno J. Hansberry, Nellis AFB, Nev.; SMSgt. Joseph L. Hardy, Andrews AFB, Md.; SMSgt. George B. Heimrich, Robins AFB, Ga.; MSgt. Ricardo Inzunza, Washington, D.C.; MSgt. Ronald J. Krasko, Castle AFB, Calif.; CMSgt. Richard A. Lema, McClellan AFB, Calif.; MSgt. Dale A. Lucas, Randolph AFB, Tex.; SSgt. David P. Mickelson, APO New York; TSgt. Donald E. Miller, Eglin AFB, Fla.; SSgt. Michael C. Roberts, Washington, D.C.; MSgt. Donald Ryan, Randolph AFB, Tex.; and TSgt. Robert V. Schaeffer, Jr., March AFB, Calif. ■



# Iron Gate Chapter's Fourteenth National Air Force Salute

On Saturday evening, March 26, AFA's Iron Gate Chapter presented its Fourteenth National Air Force Salute at the New York Hilton Hotel in New York City. One thousand military, civilian, and aerospace leaders attended, including many dignitaries from the Congress and the Department of Defense. These Salutes have raised more than \$800,000 for Air Force-oriented charities. Here are some photographic highlights of the Salute.



Chapter President Burl W. McLaughlin presented the Chapter's prestigious Maxwell A. Kriender Memorial Trophy to retired Lt. Gen. and Mrs. James H. Doolittle, in recognition "of sixty years of dedicated service to their country and its people, matched only by their devotion to each other." Shown with the trophy are, from left, General Doolittle; General McLaughlin; Mrs. Doolittle; and Tennessee Ernie Ford, the master of ceremonies.



During the reception, Tennessee Ernie Ford, center, visited with Jimmy and Joe Doolittle, left, and Acting Secretary of the Air Force and Mrs. John J. Martin, right.



Air Force Chief of Staff Gen. David C. Jones visits with three of the program principals, from left, Harry J. Gray, Honorary Cochairman of the Salute, and Chairman and President, United Technologies Corp.; General Jones, Tennessee Ernie Ford, the master of ceremonies; and retired Brig. Gen. Richard A. Knobloch, the Salute's General Chairman.



Most of the out-of-town guests attended a Sunday Brunch hosted by the Iron Gate Chapter at the headquarters of the United States Delegation to the United Nations. During the brunch, Air Force Chief of Staff Gen. David C. Jones, left, visited with Sen. Howard W. Cannon (D-Nev.). AFA's Dottie Flanagan is in the background between the two gentlemen.



AFA's Thomas B. McGuire, Jr., Chapter hosted a group of NCOs from McGuire AFB, N. J. Shown at the McGuire table are, from left, CMSgt. George L. Morman, Sr. Enlisted Advisor, 438th ABGP; Maj. Gen. Aiden G. Glauch, 21st AF Commander; Gen. David C. Jones, USAF Chief of Staff; Lt. Col. Alfio J. Call, AFRES; McGuire Chapter President William J. Demas; Maj. John O. Kiser; and AFA President George M. Douglas.



Plan Now To Celebrate . . .

# USAF's 30th Anniversary at AFA's 1977 National Convention and Aerospace Development Briefings & Displays

September 18-22 Washington, D. C.

AFA's 1977 National Convention and Aerospace Development Briefings and Displays will be held at the Sheraton-Park Hotel, Washington, D. C., September 18-22. Hotel accommodations are available at the Sheraton-Park, and a limited block is available at the nearby Shoreham-Americana Hotel.

All reservations requests for rooms and suites at the Sheraton-Park should be sent to: Reservations Office, Sheraton-Park Hotel, 2660 Woodley Road, N.W., Washington, D. C. 20008. The Shoreham-Americana Hotel's address is: 2500 Calvert St., N.W., Washington, D. C. 20008. We urge you to make your reservations as soon

as possible. To assure acceptance of your reservation request, refer to the AFA National Convention.

Convention activities will include a Sunday



evening visit to the popular National Air and Space Museum, AFA business sessions, luncheons honoring the Secretary of the Air Force and the Air Force Chief of Staff, the annual Salute to Congress, and the Air Force Anniversary Reception and Dinner Dance, featuring a salute to the Air Force on its 30th Anniversary.

Again, we urge you to make your reservations at the Sheraton-Park or Shoreham-Americana as soon as possible to ensure obtaining your reservations. Arrivals after 6:00 p.m. require a one-night deposit or guarantee for the night of arrival.



## Advance Registration Form

Air Force Association National Convention and Aerospace Development Briefings & Displays  
September 18-22, 1977 • Sheraton-Park Hotel • Washington, D. C.

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AF 30th Anniversary Reception  
& Dinner Dance Tickets  
@ \$35.00 per person \_\_\_\_\_ \$ \_\_\_\_\_

Amount enclosed \_\_\_\_\_ \$ \_\_\_\_\_

\* Current Registration Fee (After Sept. 9): \$70



# AFA News

Unit of the Month

THE THOMAS B. McGUIRE, JR.,  
CHAPTER, N. J. . . . cited for  
consistent and effective programming  
in support of the missions of the  
Air Force and AFA.

By Don Steele, AFA AFFAIRS EDITOR



The guest of honor and speaker at a recent breakfast meeting sponsored by AFA's Thomas B. McGuire, Jr., Chapter was Lt. Gen. William G. Moore, Assistant Vice Chief of Staff, USAF. Since the meeting, General Moore has received his fourth star and been assigned as Commander in Chief of the Military Airlift Command. During the program, Chapter President William J. Demas, left, presented a Chapter check for \$1,000 to General Moore for the Air Force Assistance Fund. Some 600 members and guests, including many civilian and enlisted personnel, attended the meeting in the Base Recreation Building. In recognition of this innovative meeting format, its generous support of Air Force-oriented charities, and its outstanding support of Air Force enlisted personnel, AFA President Douglas names the McGuire Chapter as AFA's "Unit of the Month" for June.



AFA's Alamo Chapter, Tex., participated in the No Greater Love organization's Fourth National Salute to Hospitalized Veterans by providing 500 carnations to the Audie Murphy Veterans Hospital in San Antonio. The flowers were distributed to patients by VIP visitors throughout the day. San Antonio Mayor Lila Cockrell and Alamo Chapter Executive Vice President Tim Glasgow distributed flowers during their visit. They were accompanied by Hospital Director Jose R. Coronado, left, and Dr. Ralph H. Forrester, right.



Officers of the New Mexico State AFA, together with members of the Angel Flight and Arnold Air Society at the University of New Mexico, participated in the National Salute to Hospitalized Veterans on February 14 by visiting with patients of the Veterans Hospital in Albuquerque. The Salute, which was sponsored by No Greater Love, a national, nonprofit organization that sponsors programs of friendship and care for groups of often-forgotten Americans, was recommended to AFA state organizations and chapters by AFA President George M. Douglas. Shown following their visit are, from left, Geri Martinez, Mary Jo Maestas, Allan Jojola, Dan Gueths, Tim Wise, Pam Kelly, Brett Badgett, all from the University of New Mexico; and New Mexico State AFA Treasurer Leo Huffman.



Air Force Secretary Thomas C. Reed was the guest speaker at a late December meeting of the Chicago No. 1 Rotary Club at which AFA's Chicagoland Chapter President Al Field presented SSgt. John R. Farrel III, USAF Recruiting Det. 501, the Chapter's "Top Support Recruiting NCO Award." Shown following the presentation are, from left, Capt. John J. Mannion, Commander, USAF Recruiting Det. 501; Secretary Reed; Sergeant Farrel; Col. Edward N. Giddings, Commander, 3505th USAF Recruiting Group, Chanute AFB; and Mr. Field.



# chapter and state photo gallery



During the San Bernardino Area Chapter's 1977 Honors Luncheon at the Norton AFB NCO Club, sixteen members of the local Air Force, business, and political communities were honored. Among the award recipients was Frank E. Moore, left, Redlands Daily Facts, shown receiving an AFA Certificate of Appreciation from Chapter President Jim Sivelle.



—OFFICIAL USAF PHOTO

More than 600 members and guests attended a dinner meeting at the Fort Lewis NCO Club which was cosponsored by AFA's Tacoma Chapter and the Tacoma chapters of the Association of the United States Army and the Navy League. The guest of honor and speaker was Washington State Gov. Dixy Lee Ray. Head-table guests included, from left, Col. Robert L. Campbell, McChord AFB Commander; Theodore O. Wright, Washington State AFA Executive Committee Chairman; Brig. Gen. Elwood Kees, Jr., 25th NORAD Region/25th Air Division Commander; Governor Ray; Washington State AFA President Margaret (Peg) Reed; Col. Allan K. Andreason, 62d Military Airlift Wing Commander; and AFA's Tacoma Chapter President Edward V. Hudson.

## COMING EVENTS

**Colorado State AFA Convention**, Denver, June 3-5 . . . **Pennsylvania State AFA Convention**, George Washington Motor Lodge, Allentown, June 3-5 . . . **Ninth Annual Bob Hope AFA Charity Golf Tournament**, March and Norton AFBs, Calif., June 4-5 . . . **Alabama State AFA Convention**, Airport Holiday Inn, Mobile, June 9-11 . . . **Washington State AFA Convention**, Davenport Hotel, Spokane, June 17-19 . . . **AFA Wright Memorial Chapter and Dayton Chapter, NSIA Symposium**, "Trends in Systems and Logistics," Wright-Patterson AFB, Ohio, June 28 . . . **New York State AFA Convention**, Dutch Inn, Long Island, July 15-17 . . . **Oklahoma State AFA Convention**, Altus, July 22-23 . . . **Texas State AFA Convention**, St. Anthony Hotel, San Antonio, July 30-31 . . . **Academy of Model Aeronautics' 1977 National Model Airplane Championships**, March AFB, Calif. (AFA's Riverside County Chapter is a cosponsor), August 6-14 . . . **AFA's 31st Annual National Convention**, Sheraton-Park Hotel, Washington, D. C., September 18-21 . . . **AFA's Aerospace Development Briefings and Displays**, Sheraton-Park Hotel, Washington, D. C., September 20-22 . . . **Sixth Annual Air Force Ball**, Century Plaza Hotel, Los Angeles, Calif., October 28.



Head-table guests at the Northern Virginia Chapter's recent dinner meeting, held as a "Salute to the Royal Air Forces of the British Commonwealth," included, from left, Richard O. Emrich, Vice President for AFA's Central East Region; Mrs. Hughes; Air Commodore Henry Alfred Hughes, Air Attaché for Australia; Mrs. Dyer; Chapter President Laurence S. Dyer; Mrs. Howlett; Air Commodore Neville S. Howlett, Commander of the Royal Air Force Staff and Air Attaché, British Embassy, who was the guest speaker; Mrs. Smith; and Group Capt. Russell V. Smith, Air Attaché for New Zealand.



Principals at the Bethpage, N. Y., H. H. Arnold Chapter's 1977 Annual Awards Banquet included, from left, Chapter Executive Council Chairman Frank Battersby; Louis H. Pighi, Vice President and Group General Mgr., Federal Systems Group, Fairchild Camera & Instrument Corp., "Most Significant Achievement Award"; "Man of the Year" Thomas O'Brien, Vice President and General Mgr., PRD Electronics, Harris Corp.; "Cadet of the Year" Midshipman Daniel W. Kabel, US Merchant Marine Academy; Helen Tomaszewski, Chapter Secretary, "Service Award"; and Chapter President Del Casino. More than 500 members and guests attended the banquet in the Huntington Town House.



# AFA News

—HARRISBURG, PA., PATRIOT-NEWS PHOTO



During a recent dinner sponsored by AFA's Olmsted Chapter of Harrisburg, Pa., CAP Cadet Col. Konrad Trautman, Jr., right, received the Chapter's \$350 scholarship and citation, and the CAP's prestigious Gen. Carl A. Spaatz Award. William T. Lunsford, Jr., left, a Past State and Chapter President, presented the chapter awards, and Pennsylvania Lt. Gov. Ernest P. Kline presented the Spaatz award. Cadet Trautman, a freshman at the Pennsylvania State University, was recognized for his significant achievements in the CAP's Pennsylvania Wing.



AFA's Blue Barons Chapter, Colo., in conjunction with the CAP's Rocky Mountain Liaison Region, sponsored an Aerospace Education Workshop Directors Symposium for Colorado Aerospace Education Workshop Directors, including AFRQTC, AFJROTC, US Air Force Academy, NORAD, CAP Senior Members, and the US Navy. During one of the Symposium sessions, Noel Bullock, standing, Aerospace Education Director for the Colorado State AFA and a Past President of the Chapter, explains the benefits of membership in the Air Force Association and the Blue Barons Chapter.



AFA National President George M. Douglas recently addressed a luncheon meeting cosponsored by AFA's Mt. Clemens Chapter and the Base-Community Council of Selfridge ANG Base, Mich. President Douglas, right, is shown congratulating TSgt. Kraig Haynes, 191st Fighter Interceptor Group, Michigan ANG, the first ANG graduate from the Community College of the Air Force.



John F. Loosbrock, Editor and Assistant Publisher of AIR FORCE Magazine, was a guest at the Alamo Chapter's kickoff luncheon for its annual membership drive. Shown with Mr. Loosbrock, right, are, from left, Lt. Gen. John W. Roberts, Commander, Air Training Command, the luncheon speaker; and Chapter President Bill Roth.



A recent program sponsored by AFA's Ute Chapter highlighted the F-16 program and featured three outstanding speakers—Neil R. Anderson, chief F-16 test pilot for General Dynamics; Norman Robbins, Vice President, General Dynamics, and deputy program director for F-16 integrated logistics; and Lt. Col. Joseph Spiers, Chief of Acquisition Division, Directorate of Materiel Management at Hill AFB, Utah. During the program, Mr. Robbins, center, presented Ogden Mayor Stephen A. Dirks, right, a model of the F-16. Maj. Gen. E. A. Rafalko, Commander, Ogden Air Logistics Center, is at left.



# chapter and state photo gallery



More than 200 members and guests attended the Illinois Chapter's recent banquet in the Fanmarker Officers' Club at Chanute AFB, Ill., at which Lt. Gen. John W. Roberts, Commander of the Air Training Command, was the guest speaker. In the photo, General Roberts, left, is shown accepting an anniversary flag from Lewis Tanner, Chairman of the Chanute 60th Anniversary Commission.



—PHOTO BY CHARLES E. SKIDMORE, JR.

Maj. Gen. Robert A. Rushworth, Vice Commander, Aeronautical Systems Division (AFSC), Wright-Patterson AFB, Ohio, was the guest speaker at the Mid-Ohio Chapter's annual dinner dance, held recently at the Moundbuilders' Country Club in Newark, Ohio. General Rushworth, right, is shown at a news conference prior to the dinner dance. With the General are, from left, Chapter President Robert J. Puglisi and Col. William H. Bush, Commander, Newark Air Force Station.



—OFFICIAL USAF PHOTO BY SSGT. JAY HOLM

While visiting Scott AFB, Ill., during his two-week active-duty tour, USAF National President George M. Douglas, a major general in the Air Force Reserve, presented an AFA plaque to Gen. Paul K. Carlton, then Commander in Chief, Military Airlift Command, on the occasion of his retirement from active duty. AFA's Scott Memorial Chapter presented

General Carlton an AFA Life Membership in appreciation of his great support and participation. Shown following the presentations are, from left, Chapter President C. W. Scott; President Douglas; General Carlton; and Illinois State AFA President Hugh Enyart.



# AFA State Contacts

Following each state name, in parentheses, are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

**ALABAMA** (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma): **James B. Tipton**, 3032 Hill Hedge Dr., Anchorage, Ala. 36111 (phone 205-263-6944).

**ALASKA** (Anchorage, Fairbanks): **Edward J. Monaghan**, 2401 Telequana Dr., Anchorage, Alaska 99503 (phone 907-279-3287).

**ARIZONA** (Phoenix, Tucson): **Robert J. Borgmann**, 2431 E. Lincoln Cir., Phoenix, Ariz. 05010 (phone 602-955-7845).

**ARKANSAS** (Blytheville, Fort Smith, Little Rock): **Jack Kraras**, 120 Indian Trail, Little Rock, Ark. 72207 (phone 501-225-5575).

**CALIFORNIA** (Apple Valley, Edwards, Fairfield, Fresno, Hawthorne, Hermosa Beach, Long Beach, Los Angeles, Marysville, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Mateo, Santa Barbara, Santa Monica, Tahoe City, Vandenberg AFB, Van Nuys, Ventura): **Dwight M. Ewing**, P. O. Box 737, Merced, Calif. 95340 (phone 209-722-6283).

**COLORADO** (Aurora, Boulder, Colorado Springs, Denver, Ft. Collins, Grand Junction, Greeley, Littleton, Pueblo, Waterton): **Edward C. Marriott**, 11934 E. Hawaii Cir., Aurora, Colo. 80012 (phone 303-934-5751).

**CONNECTICUT** (East Hartford, North Haven, Stratford): **Margaret E. McEnerney**, 1476 Broadbridge Ave., Stratford, Conn. 06497 (phone 203-377-3517).

**DELAWARE** (Dover, Wilmington): **George H. Chabbott**, 33 Mikell Dr., Dover, Del. 19901 (phone 302-697-6943).

**DISTRICT OF COLUMBIA** (Washington, D. C.): **James M. McGarry**, 2418 N. Ottawa St., Arlington, Va. 22205 (phone 703-534-2663).

**FLORIDA** (Bartow, Broward, Cape Coral, Ft. Walton Beach, Gainesville, Jacksonville, New Port Richey, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tampa): **John H. deRussy**, 529 Andros Ln., Indian Harbour Beach, Fla. 32937 (phone 305-773-2339).

**GEORGIA** (Athens, Atlanta, Rome, Savannah, St. Simons Island, Valdosta, Warner Robins): **James D. Thurmond**, 100 Cherokee St., N.E., Marietta, Ga. 30060 (phone 404-422-7452).

**HAWAII** (Honolulu): **James Dowling**, 2222 Kalakaua Ave., Honolulu, Hawaii 96815 (phone 808-923-0492).

**IDAHO** (Boise, Pocatello, Twin Falls): **Larry L. Leach**, 6318 Bermuda Dr., Boise, Idaho 83705 (phone 208-344-1671).

**ILLINOIS** (Belleville, Champaign, Chicago, Elmhurst, O'Hare Field): **Hugh L. Enyart**, 112 Ruth Dr., O'Fallon, Ill. 62269 (phone 618-398-1950).

**INDIANA** (Logansport, Marion, Mentone): **William Pfarrer**, 604 Groon Hilllo Dr., Logansport, Ind. 46947.

**IOWA** (Des Moines): **Ric Jorgensen**, 4005 Kingman, Des Moines, Iowa 50311 (phone 515-255-7656).

**KANSAS** (Topeka, Wichita): **Albin H. Schweers**, 7221 Woodward St., Overland Park, Kan. 66204 (phone 816-374-4267).

**KENTUCKY** (Louisville): **Charles R. Head**, 9412 Habersham Dr., Louisville, Ky. 40222 (phone 502-425-9237).

**LOUISIANA** (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Shreveport): **Norman L. Gunn**, 4510 Willowick Blvd., Alexandria, La. 71301 (phone 318-487-2431).

**MAINE** (Limestone): **Alban E. Cyr**, P. O. Box 160, Caribou, Me. 04736 (phone 207-492-4171).

**MARYLAND** (Andrews AFB, Baltimore): **James W. Poulney**, P. O. Box 31, Garrison, Md. 21055 (phone 301-363-0795).

**MASSACHUSETTS** (Boston, Falmouth, Florence, Hanscom AFB, Lexington, Taunton, Worcester): **Frederick J. Gavin, Jr.**, 38 Tremlett St., Boston, Mass. 02124 (phone 617-282-2059).

**MICHIGAN** (Detroit, Kalamazoo, Lansing, Marquette, Mount Clemens, Oscoda, Petoskey, Sault Ste. Marie, Southfield): **Dorothy Whitney**, 3494 Orchard Lake Rd., W. Bloomfield, Mich. 48033 (phone 313-682-4550).

**MINNESOTA** (Duluth, Minneapolis, St. Paul): **Joseph J. Sadowski**, 1922 Malvern St., St. Paul, Minn. 55113 (phone 612-631-2781).

**MISSISSIPPI** (Biloxi, Columbus, Jackson): **Billy A. McLeod**, P. O. Box 1274, Columbus, Miss. 39701 (phone 601-328-0943).

**MISSOURI** (Kansas City, Knob Noster, Springfield, St. Louis): **Robert E. Combs**, 2003 W. 91st St., Leawood, Kan. 66206 (phone 913-649-1863).

**MONTANA** (Great Falls): **Jack R. Thibaudeau**, P. O. Box 2247, Great Falls, Mont. 59403 (phone 406-727-3807).

**NEBRASKA** (Lincoln, Omaha): **Lyle O. Remde**, 4911 S. 25th St., Omaha, Neb. 68107 (phone 402-731-4747).

**NEVADA** (Las Vegas, Reno): **Dale O. Smith**, 3055 Heathridge Ln., Reno, Nev. 89502 (phone 702-786-7791).

**NEW HAMPSHIRE** (Manchester, Pease AFB): **William W. McKenna**, RFD #5, Strawberry Hill Rd., Bedford, N. H. 03102 (phone 603-472-5504).

**NEW JERSEY** (Andover, Atlantic City, Belleville, Camden, Chatham, Cherry Hill, E. Rutherford, Forked River, Fort Monmouth, Jersey City, McGuire AFB, Newark, Trenton, Wallington, West Orange): **Leonard Schiff**, 246 Franklin Ave., Cliffside Park, N. J. 07010 (phone 201-861-2950).

**NEW MEXICO** (Alamogordo, Albuquerque, Clovis): **William J. Denison**, 2615 Vista Larga Ave., N. E., Albuquerque, N. M. 87110 (phone 505-264-1733).

**NEW YORK** (Albany, Bethpage, Binghamton, Buffalo, Catskill, Chautauqua, Griffiss AFB, Hartsdale, Ithaca, Long Island, New York City, Niagara Falls, Patchogue, Plattsburgh, Riverdale, Rochester, Staten Island, Syracuse): **Kenneth C. Thayer**, R. D. #1, Ava, N. Y. 13303 (phone 315-827-4241).

**NORTH CAROLINA** (Charlotte, Fayetteville, Goldsboro, Greensboro, Raleigh): **Dozier E. Murray, Jr.**, 1600 Starbrook Dr., Charlotte, N. C. 28210 (phone 704-523-0045).

**NORTH DAKOTA** (Grand Forks, Minot): **Leo P. Makelky**, 611 16th Ave., S. W., Minot, N. D. 58701 (phone 701-839-5186).

**OHIO** (Akron, Cincinnati, Cleveland, Columbus, Dayton, Newark, Toledo, Youngstown): **Edward H. Nett**, 1449 Ambridge Rd., Centerville, Ohio 45459 (phone 513-461-4823).

**OKLAHOMA** (Altus, Enid, Oklahoma City, Tulsa): **David L. Blankenship**, P. O. Box 51308, Tulsa, Okla. 74151 (phone 918-835-3111, ext. 2207).

**OREGON** (Corvallis, Eugene, Portland): **Philip G. Saxton**, 15909 N. E. Morris, Portland, Ore. 97230 (phone 503-254-0145).

**PENNSYLVANIA** (Allentown, Beaver Falls, Chester, Dormont, Erie, Harrisburg, Homestead, Horsham, King of Prussia, Lewistown,

Philadelphia, Pittsburgh, State College, Washington, Willow Grove, York): **Lamar R. Schwartz**, 390 Broad St., Emmaus, Pa. 18049 (phone 215-967-3387).

**RHODE ISLAND** (Warwick): **Charles H. Collins**, 143d TAG (RIANG), Warwick, R. I. 02886 (phone 401-737-2100).

**SOUTH CAROLINA** (Charleston, Columbia, Greenville, Myrtle Beach, Sumter): **Roger K. Rhodamer**, 412 Park Lake Road, Columbia, S. C. 29204 (phone 803-788-0188).

**SOUTH DAKOTA** (Rapid City): **James Anderson**, 913 Mt. Hushmore Rd., Rapid City, S. D. 57701 (phone 605-342-3128).

**TENNESSEE** (Chattanooga, Knoxville, Memphis, Nashville, Tullahoma): **Thomas O. Bigger**, ARO, Inc. (SE/WA), Arnold AFS, Tenn. 37389 (phone 615-455-2611, ext. 247).

**TEXAS** (Abilene, Austin, Big Spring, Commerce, Corpus Christi, Dallas, Del Rio, El Paso, Fort Worth, Houston, Kerrville, Laredo, Lubbock, San Angelo, San Antonio, Waco, Wichita Falls): **E. F. Faust**, 1422 E. Grayson, San Antonio, Tex. 78208 (phone 512-223-2981).

**UTAH** (Brigham City, Clearfield, Ogden, Provo, Salt Lake City): **James H. Taylor**, 629 N. 1st E., Farmington, Utah 84025 (phone 801-825-9511, ext. 2373).

**VERMONT** (Burlington): **Ronald R. Corbin**, 204 Staniford Rd., Burlington, Vt. 05401 (phone 802-862-2847).

**VIRGINIA** (Arlington, Danville, Harrisonburg, Langley AFB, Lynchburg, Norfolk, Petersburg, Richmond, Roanoke): **John Pilot**, 807 Whitney Rd. N. W., Apt. A306, Roanoke, Va. 24012 (phone 703-563-5879).

**WASHINGTON** (Port Angeles, Seattle, Spokane, Tacoma): **Margaret A. Reed**, P. O. Box 88850, Seattle, Wash. 98188 (phone 206-575-2875).

**WEST VIRGINIA** (Huntington): **Evelyn E. Richards**, 10 Berkley Pl., Huntington, W. Va. 25705 (phone 304-529-4901).

**WISCONSIN** (Madison, Milwaukee): **Charles W. Marotske**, 7945 S. Verdev Dr., Oak Creek, Wis. 53154 (phone 414-762-4383).

**WYOMING** (Cheyenne): **Tom Watson**, 908 Arapahoe, Cheyenne, Wyo. 82001 (phone 307-638-3348).



# photo gallery



Shown at the recent Military Ball in Dallas, Tex., are, from left, Troy Sampley, President of AFA's Dallas Chapter; Mrs. Sampley; Mrs. Jones; Gen. David C. Jones, USAF Chief of Staff; John W. Dixon, Honorary Chairman of the Ball and Chairman and President of E-Systems, Inc.; and Mrs. Dixon. More than 700 attended this year's Ball, which honored the United States Air Force. Appearances by the Eighth Air Force Band, the Air Force Strolling Strings, and the USAF Academy's Cadet Chorale highlighted the program. Proceeds will be distributed to worthy charitable organizations.



Four Hurlburt Field personnel and the President of the Eglin Chapter were honored at the Chapter's biannual dinner meeting in Fort Walton Beach, Fla. Honorees were, from left, Capt. Ben Pitman, named "Junior Officer of the Year"; MSgt. Willie T. Owens, "Senior NCO of the Year"; Dr. Malcolm Crotzer, President of the Chapter; TSgt. Larry Wilkes, "Junior NCO of the Year"; and A1C Chester J. Snowden, "First Term Airman of the Year."



AFA National President George M. Douglas was the principal speaker at a luncheon that signaled the start of the San Bernardino Chapter's 1977 civilian membership drive. More than sixty key members of the San Bernardino-Redlands, Calif., communities attended as chapter guests. Head-table guests included, from left, Chapter President Jim Sivelle; Norton Booster Club Chairman Chuck Obershaw; Chapter Vice President for Membership David C. Noerr; Mr. Douglas; AFA National Director Ed Stearn; San Bernardino Chamber of Commerce President Lowell V. Trask; California State AFA Vice President Jay Golding; and AFA National Director William R. Berkeley.

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Declared for 1976!**  
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Dependable Protection from You

# Air Force Association

## Important Benefits!

**COVERAGE YOU CAN KEEP.** Provided you apply for coverage under age 60 (see "ELIGIBILITY") your insurance may be retained at the same low group rates to age 75.

**FULL TIME, WORLD WIDE PROTECTION.** The policy contains no war clause, hazardous duty restriction, combat zone waiting period or geographical limitation.

**DISABILITY WAIVER OF PREMIUM.** If you become totally disabled at any time prior to age 60 for at least a 9-month period, your coverage will be continued in force without further payment of premiums as long as you remain disabled.

**FULL CHOICE OF SETTLEMENT OPTIONS.** All standard forms of settlement options, as well as special options agreed to by the insured and United of Omaha, are available to insured members.

**CONVENIENT PAYMENT PLANS.** Premium payments may be made by monthly government allotment (payable to Air Force Association), or direct to AFA in quarterly, annual or semi-annual installments.

**DIVIDEND POLICY.** AFA's primary policy is to provide maximum coverage at the lowest possible cost. Consistent with this policy, AFA has provided year end dividends (20% for 1976) to insured members in twelve of the past fifteen years, and has increased the basic amount of coverage on four separate occasions.

## Additional Information

**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, and 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 trustees 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 will 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.

## Eligibility

All active duty personnel of the Armed Forces of the United States and members of the Ready Reserve\* and National Guard\* (under age 60), Armed Forces Academy cadets\*, and college or university ROTC cadets\* are eligible to apply for this coverage provided they are now, or become, members of the Air Force Association.

\*Because of restrictions on the issuance of group insurance coverage, applications for coverage under the group program cannot be accepted from cadets or Reserve or Guard personnel residing in Florida, New York, Ohio or Texas. Members in these states may request special application forms from AFA for individual policies which provide coverage quite similar to the group program.

## Please Retain This Medical Bureau Prenotification For Your Records

Information regarding your insurability will be treated as confidential. United Benefit Life Insurance Company may, however, make a brief report thereon to the Medical Information Bureau, a nonprofit membership organization of life insurance companies, which operates an information exchange on behalf of its members. If you apply to another bureau member company for life or health insurance coverage, or a claim for benefits is submitted to such a company, the Bureau, upon request, will supply such company with the information in its file.

Upon receipt of a request from you, the Bureau will arrange disclosure of any information it may have in your file. (Medical information will be disclosed only to your attending physician.) If you question the accuracy of information in the Bureau's file, you may contact the Bureau and seek a correction in accordance with the procedures set forth in the federal Fair Credit Reporting Act. The address of the Bureau's information office is P.O. Box 105, Essex Station, Boston, Mass. 02112. Phone (617) 426-3660.

United Benefit Life Insurance Company may also release information in its file to other life insurance companies to whom you may apply for life or health insurance, or to whom a claim for benefits may be submitted.

## CURRENT BENEFIT TABLES

### AFA Standard Plan

PREMIUM: \$10 per month

Insured's Attained Age	Coverage*	Extra Accidental Death Benefit*	Total Benefit
20-24	\$75,000	\$12,500	\$87,500
25-29	70,000	12,500	82,500
30-34	65,000	12,500	77,500
35-39	50,000	12,500	62,500
40-44	35,000	12,500	47,500
45-49	20,000	12,500	32,500
50-54	12,500	12,500	25,000
55-59	10,000	12,500	22,500
60-64	7,500	12,500	20,000
65-69	4,000	12,500	16,500
70-75	2,500	12,500	15,000

### AFA High Option Plan

PREMIUM: \$15 per month

Insured's Attained Age	Coverage*	Extra Accidental Death Benefit*	Total Benefit
20-24	\$112,500	\$12,500	\$125,000
25-29	105,000	12,500	112,500
30-34	97,500	12,500	110,000
35-39	75,000	12,500	87,500
40-44	52,500	12,500	65,000
45-49	30,000	12,500	42,500
50-54	18,750	12,500	31,250
55-59	15,000	12,500	27,500
60-64	11,250	12,500	23,750
65-69	6,000	12,500	18,500
70-75	3,750	12,500	16,250

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

### Coverage For Flyers—Aviation Death Benefit

Personnel on flying status pay the same low premium as all other insured persons. When death is caused by illness or ordinary accident, appropriate benefits shown in the table above are paid. However, when death is caused by an aviation accident in which the insured is serving as pilot or crew member of the aircraft involved, a total sum of \$15,000 is paid under the Standard Plan, or \$22,500 under the High Option Plan. Under this condition, the Aviation Death Benefit is paid in lieu of all other benefits of this coverage.

### OPTIONAL FAMILY COVERAGE

(Add to either the Standard or High Option Plan)

PREMIUM: \$2.50 per month

Insured's Attained Age	Coverage for Spouse	Coverage for Each Child **
20-24	\$10,000	\$2,000
25-29	10,000	2,000
30-34	10,000	2,000
35-39	10,000	2,000
40-44	7,500	2,000
45-49	5,000	2,000
50-54	4,000	2,000
55-59	3,000	2,000
60-64	2,500	2,000
65-69	1,500	2,000
70-75	750	2,000

\*\*Each child, regardless of number, is provided \$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.



# Military Group Life Insurance



**APPLICATION FOR  
AFA MILITARY GROUP LIFE INSURANCE**



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

Name and relationship of primary beneficiary

Please indicate category of eligibility and branch of service.

Name and relationship of contingent beneficiary

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

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
<input type="checkbox"/> \$ 15.00	<input type="checkbox"/> \$ 17.50	<b>Monthly</b> government allotment. I enclose 2 months' premium to cover the period necessary for my allotment (payable to Air Force Association) to be established. <b>Quarterly.</b> I enclose amount checked. <b>Semiannually.</b> I enclose amount checked. <b>Annually.</b> I enclose amount checked.	<input type="checkbox"/> \$ 10.00	<input type="checkbox"/> \$ 12.50
<input type="checkbox"/> \$ 45.00	<input type="checkbox"/> \$ 52.50		<input type="checkbox"/> \$ 30.00	<input type="checkbox"/> \$ 37.50
<input type="checkbox"/> \$ 90.00	<input type="checkbox"/> \$105.00		<input type="checkbox"/> \$ 60.00	<input type="checkbox"/> \$ 75.00
<input type="checkbox"/> \$180.00	<input type="checkbox"/> \$210.00		<input type="checkbox"/> \$120.00	<input type="checkbox"/> \$150.00

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

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 hereby authorize any licensed physician, medical practitioner, hospital, clinic or other medical or medically related facility, insurance company, the Medical Information Bureau or other organization, institution or person, that has any records or knowledge of me or my health, to give to the United Benefit Life Insurance Company any such information. A photographic copy of this authorization shall be as valid as the original. I hereby acknowledge that I have a copy of the Medical Information Bureau's prenotification information.

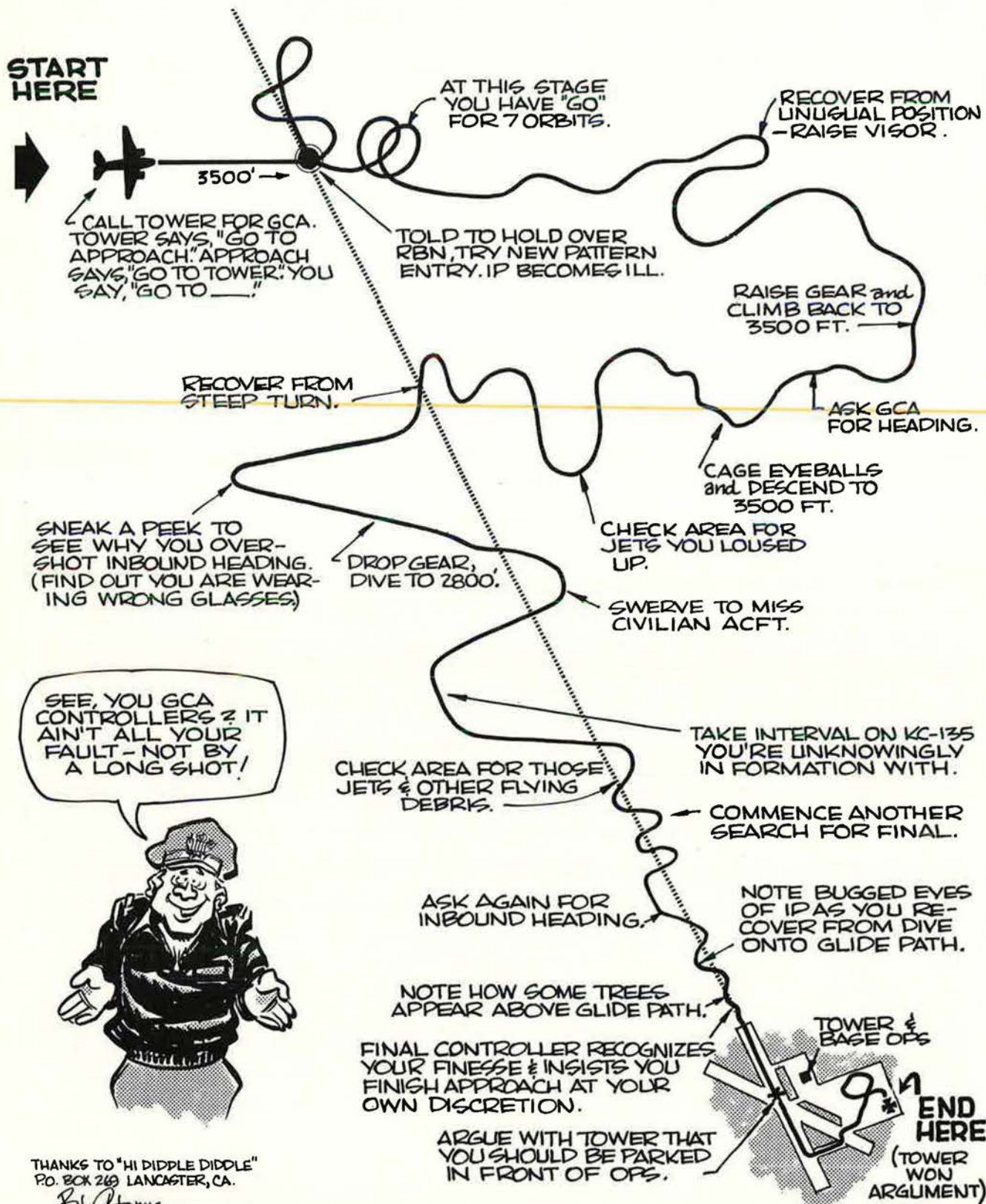
Date \_\_\_\_\_, 19 \_\_\_\_\_ Member's Signature \_\_\_\_\_



Bob Stevens'

# "There I was..."

WE CONTINUE WITH OUR TREATISE ON INSTRUMENT FLYING THIS MONTH BY DEMONSTRATING—VIA A BIRDS-EYE VIEW—THE FLIGHT PATH OF A TYPICAL G-47 PRACTICE GCA. (GROUND-CONTROLLED APPROACH)



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P.O. BOX 269 LANCASTER, CA.  
*Bob Stevens*



# What's our mild-mannered civilian turbofan engine doing in a tough bird like this? Just proving a point, just proving a point.

The bird is the new CASA C-101 trainer/light attack aircraft.

The engine, Garrett's TFE 731 turbofan.

And the point is this:

Our TFE 731 has what it takes to perform as efficiently and reliably in the combat environment as it does in the world of the business jet.

The C-101, being developed by CASA (Construcciones Aeronauticas S.A.) for the Spanish Air Force, is a basic and advanced trainer, with an air-to-air and air-to-ground weapons delivery capability. Armed recon, ECM and photo recon missions are also planned because of the CASA's maneuverability and long endurance at low level.

Its Garrett engine will be essentially the same fuel-saving, low-pollution turbofan now used by four leading business jet builders—Dassault, Israel Aircraft Industries, Learjet and Lockheed. The TFE 731 is also the conversion engine for AiResearch Aviation's 731 JetStar.

The CASA 101. As the forerunner of a new breed of economical, virtually smokeless combat aircraft, it makes sense to power it with the turbofan that powers the economical clean-flying business jets.



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# GARRETT'S TFE 731 TURBOFAN The only one in its class

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**At any altitude, at any speed,  
in any weather, at any time,  
against any threat, the best  
fighter in the world today  
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**MCDONNELL DOUGLAS**

