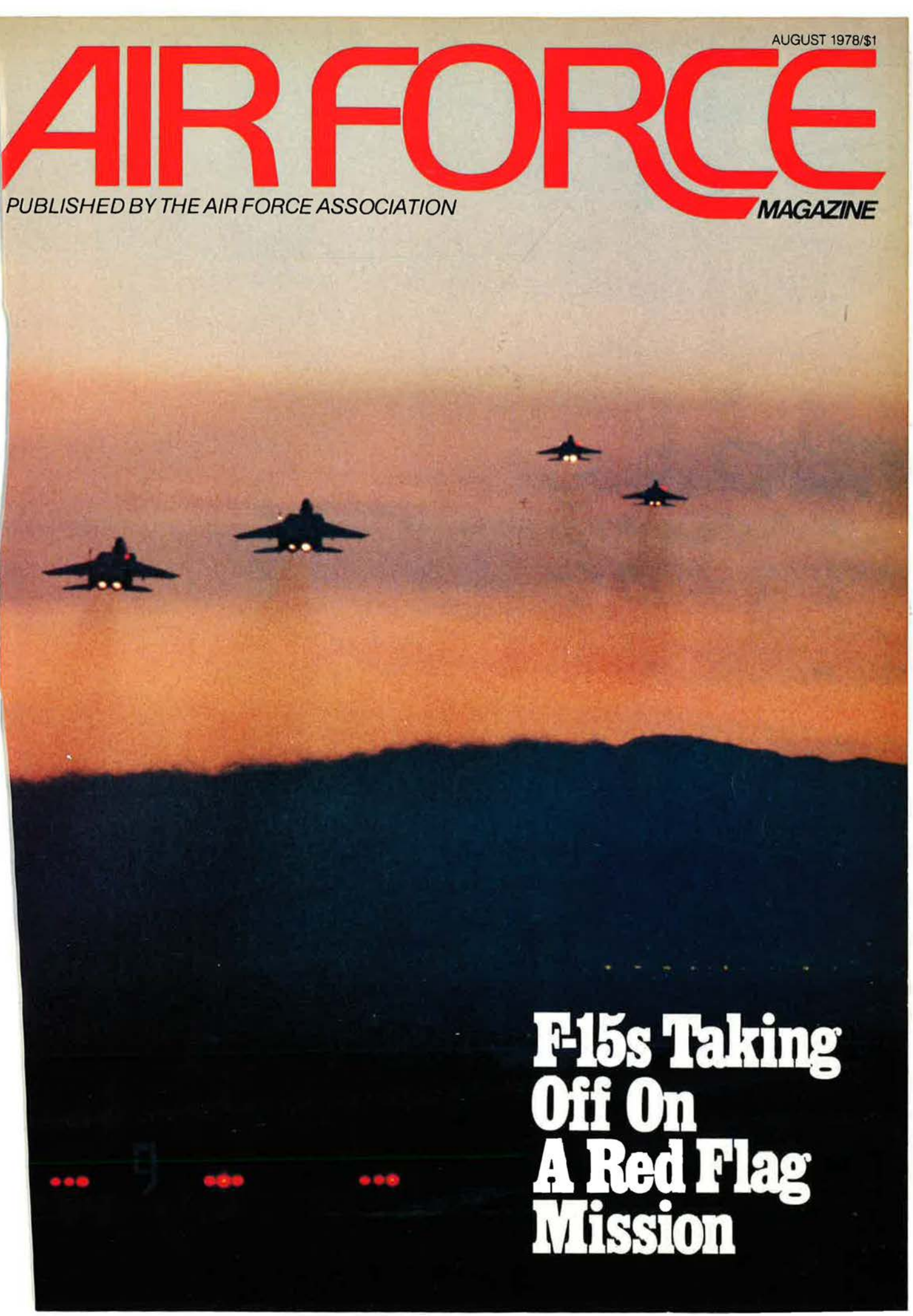
AUGUST 1978/$1

AIR FORCE MAGAZINE

PUBLISHED BY THE AIR FORCE ASSOCIATION



F-15s Taking Off On A Red Flag Mission

Technologies make the difference

In 1913, René Lorin invented the ramjet. But technologies at that time severely limited practical development of the idea. Now—65 years later, for missions requiring long-duration supersonic flight within the atmosphere—where cost is a major factor—ramjets are hard to beat.

In recent years, advances in the technologies of materials and air handling have greatly enhanced the capabilities of ramjet propulsion. The UTC team has made major contributions to these advances. For example, CSD is now demonstrating ramjet propulsion systems for the Air Force's Advanced Strategic Air-Launched Missile (ASALM). We are also advancing the state of the ramjet art through technology programs for both the Navy and the Army.

CHEMICAL SYSTEMS DIVISION

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AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

AUGUST 1978
VOLUME 61, NUMBER 8

This Month

OUT THE COVER

Getting airborne and about to enter very realistic simulated combat is this quartet of F-15 Eagles. Tactical Air Command's Red Flag training program aims to give US pilots—and those of allied nations—the edge in those first few critical missions at the beginning of a conflict. See story on p. 40.

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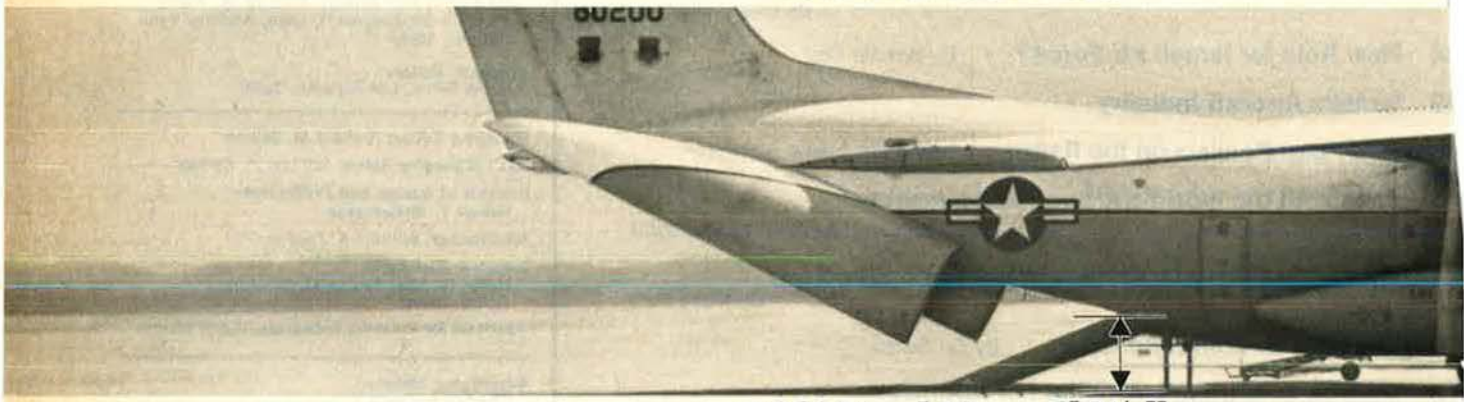
All great airlifters should

C-130 Hercules 4'0"



C-141 StarLifter 4'2½"

C-5 Galaxy 4'9"

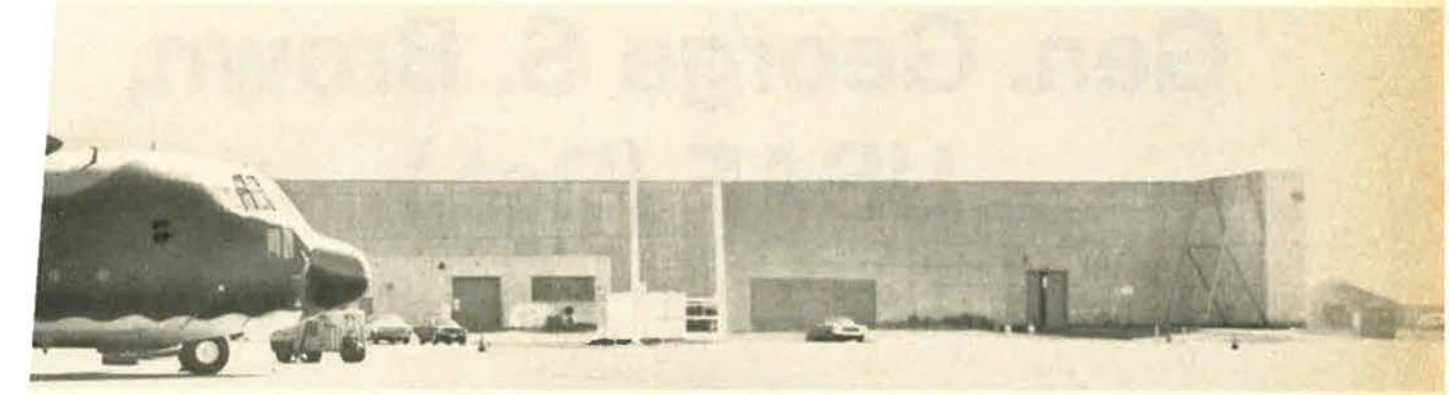
Lockheed airlifters come in many sizes and shapes, but they all offer shippers and military transport forces a number of down-to-earth advantages.

First and last, there's loading and unloading. All Lockheed airlifters have cargo decks low to the ground to permit fast loading and unloading without any sophisticated ground-handling equipment. Whether you're a commercial or military shipper, you can't always count on being around fancy facilities or long runways. The Lockheed airlifters—C-5 Galaxy, C-141 StarLifter, and C-130 Hercules—don't need them.

Even among Lockheed airlifters, the giant C-5 is unique. The largest airlifter in the world, it's t only one that can load and unload at both end the only one with drive-through capability.

And to speed cargo handling, the C-5 kneels its 28-wheel landing gear. The rear cargo open can be placed as low as 4'9" above ground, or

e down-to-earth.



front opening as low as 4'5" above ground.

The C-130 Hercules shown in the top photo has been chosen by 43 nations because of its sturdy simplicity and versatility. It comes in commercial and military versions and its fuselage has been stretched twice to increase cargo capacity.

The C-141 StarLifter—middle photo—is also having its fuselage stretched over 23 feet to increase its cargo capacity by 33%. And it has had in-flight refueling added to give it worldwide range.

The down-to-earth airlifters. They come from the airlift experts at Lockheed, the people who have more experience designing and building airlifters than anyone else.

Lockheed

Lockheed-Georgia Company

AN EDITORIAL

Gen. George S. Brown, USAF (Ret.)

The retirement from military service, on June 30, 1978, of Gen. George S. Brown, USAF, Chairman of the Joint Chiefs of Staff, was marked by the usual, but always heart-quickening, ceremonies—the honor guards of all the services, a nineteen-gun salute, an aircraft flyover, including a dazzling display by USAF's Thunderbirds, martial music, warm words of praise from Secretary of Defense Harold Brown—all before a crowd of dignitaries from the Pentagon, Capitol Hill, the embassies, from the retired ranks, and civilian life.

What made it different was the knowledge that an era was ending, that the baton was passing from the generation of World War II combat leaders to a new generation, seasoned in a vastly different operational environment that reflects enormous postwar changes in technology and the balance of world power. Hard problems lie ahead, which George Brown addressed in remarks that so well expressed concern, courage, and confidence that we reproduce them here:

EXPERIENCE has taught me that military strength ready, visible, controlled—is essential to the continued well-being of our nation. History has taught us that even though we prefer peace, we must be able to meet military challenge with military response. This means that the United States must have in-being adequate and credible military forces. . . . Our nation must also have political, economic, technological, and moral strength. And these strengths must complement each other.

Beyond strength, however, there must be will—the will to act decisively when necessary. Just as military strength must be perceived as credible by friend and foe alike, we must be seen as having the will to use that strength when our interests demand its use. This is not to suggest that our military power should be brought to bear automatically or frequently. Indeed, the case is strong that having military strength reduces the possible need for its use. But it is necessary to recognize that the will to use that strength is important; it reflects political commitment of our people, through their elected leaders, to act vigorously, when required, in defense of the national interest.

I am concerned that the United States will not have the fundamental military strength necessary to meet our security requirements for the future. We surely will not unless we recognize now the imperative need to strengthen our defenses. True, we must proceed at a pace we can afford. But having said that, given the riches of our nation, we can afford what is needed for its defense. We must be willing to make the necessary investments and bear the necessary costs. I know of no cheap substitutes for military strength. . . . The facts of the steady and deliberate across-the-boa improvement in Soviet military capabilities, which alreac appear to exceed recognized needs or recognizable need are the most important reflection of this reality. Others ca manifest themselves as challenges to our access to vit resources, as attempts to diminish our influence in th world, or as threats to our friends and allies. We must b aware what these challenges could portend. If we refus to do enough for our defenses today, we could place ou nation in jeopardy in the future.

Decisions that can affect military strength and its use require informed judgment. While many factors must be considered, military judgments bear special importance. The role of senior US military officers in making hard defense choices is, first of all, to advise our nation's leaders fully and frankly. The military professionals' job is to give civilian authorities the facts as we see them and our judgments as we reach them. Likewise, when a decision is made, our role is to execute that decision with professionalism, dedication, and dispatch.

I am confident that the current leaders of our armed forces are dedicated to fulfilling their responsibilities and are fully capable of doing so. The nation can take comfort in that fact.

As I leave active service, I am moved by the same deep feelings that have sustained me over the years:

- By love for this country, which continues to be the world's best hope for freedom.
- By gratitude for the opportunities of service and responsibility.
- By pride in our people in uniform—those who have gone before, those who remain—and those who make sacrifices willingly, and who do their arduous and at times dangerous tasks so magnificently.
- By faith in the American people who, when armed with the facts, will make difficult choices and do what is right. . . .

I am especially grateful to my family who have accepted the work, the inconveniences, and the demands of military life, and especially to Skip [Mrs. Brown], who has done so much to make life richer, not only for the Browns but for all with whom we have served.

- To good and faithful friends, who have lightened the burdens and shared the joys.
- To courageous comrades who have shared the sacrifices.

They deserve a full measure of the rewards and appreciation you have honored me with today. ■

"During my career at General Dynamics, I've worked on a variety of important programs, from the Atlas/Centaur to the reusable space shuttle. I've enjoyed them all. But the Tomahawk Cruise Missile is the big winner. It's shaping up as the most versatile performer for America's defense."
(Bernie Kuchta, Director Air Launch Program)

PROFILE OF A WINNER

hen vigorous, aggressive Bernie Kuchta d other engineers at General Dynamics' nvair take on a problem, they don't quit until ey've solved it. All of it. This kind of deter- nation is one reason why ship and submarine- unched versions of the Tomahawk Cruise ssile have already been test flown and are der development for the U.S. Navy. Now, nvair is readying ground and air-launched models for the U.S. Air Force that will also fly under radar and strike specific targets with the same unprecedented accuracy. The Tomahawk, with its large payload, long range and ability to meet either strategic or tactical requirements, is the latest example of Convair's advanced technology.

Success of Tomahawk is largely due to outstanding technical experts just like Bernie Kuchta who will fight the toughest engineering challenges until they win. It's the kind of achievement America has come to expect of General Dynamics.

If aerospace opportunity interests you, write:
R. H. Widmer, Vice President—Engineering
1519 Pierre Laclede Center
St. Louis, Missouri 63105.

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Airmail

Our New Army

I liked "This New Army of Ours" [by Gen. T. R. Milton], in the June magazine. The tone was exactly right. Sure we have problems making our volunteer Army work. But the Army has come a tremendous distance—a fact in which they should take justified pride—and we have every reason to think we can solve the problems remaining.

Thanks for an open-minded, perceptive article.

Robert B. Pirie, Jr.
Principal Deputy Assistant
Secretary of Defense (MRA&L)
Washington, D. C.

Plain Talk

I have just read John L. Frisbee's June editorial, entitled "Faith and the Gathering Storm," and, by coincidence, Kenneth Roberts's novel *Rabble in Arms*.

Mr. Frisbee spoke of faith in the military leaders to speak out . . . to shake off the politician's garb they must customarily wear in order to maintain their service's effectiveness. Kenneth Roberts described in fiction the problem of what an elected [Continental] Congress with no President, no Senate, no House of Representatives, could do to the military leaders trying to wage the Revolutionary War.

If we were taught only the fairy-tale version of the American Revolution, we wouldn't know the hardships the soldiers and sailors endured due to that Congress's lack of ability and foresight in getting money and supplies to those who needed them. We wouldn't see the parallels between that Congress, which tied those able military leaders' hands (while politicking and profiting for all they were worth) and today's Administrations that spend hundreds of thousands of dollars on "studies of effectiveness" instead of listening to the military men who *know* what is going on.

According to Roberts's novel, Gen. George Washington won out in the end only because he had the patience of a saint and was able to agree and appease the Congress while still waging war with few men and fewer materials. As the young officers Mr. Frisbee mentioned have questioned the "politicization" of the military, so too did the characters of *Rabble in Arms*. They said it aloud for all to hear. In our present society, it is only in the pages of AIR FORCE Magazine, the Naval *Proceedings*, and similar journals of limited audiences that such comments are made.

It seems time for the public to be alerted to this "gathering storm." It is time to make public the hazards our President and Administration in *their* "unwisdom, carelessness, and good nature" (to quote Churchill) are allowing us to face. This gathering storm frightens me more than any natural storm. Nature has no evil intent to her storms, but men's storms are born of jealousy and hatred and can bury the whole world.

Hopefully, today's officers will be able to perform the balancing act that General Washington did and have his admirable patience as well. The only thing against their achieving success is lack of public support and time. And time, gentlemen, does not ever wait for man to get his head out of the sand.

Jeanne N. Stys
South Milwaukee, Wis.

Apropos your editorial "Faith and the Gathering Storm," I don't believe we need faith. We need some loud and factual disagreement with the President and his Administration by the Joint Chiefs and their Chairman.

We need public debate and plain talk on the sorry state of national defense and conduct of foreign policy. Followed by resignation. The public may recall Senator Goldwater's remark on the recent disagreement between the President and General Singlaub: "The wrong man was forced to resign."

Col. George Prochoroff,
USAF (Ret.)
Universal City, Tex.

Potential Double-Cross?

As a member of the House Armed Services Subcommittee dealing with intelligence, I was surprised dismayed to read that a numbe "veteran intelligence officers" h told your reporter, Bonner Day, t because of public criticism and p sonnel reductions, there is a seri danger that some US intellige employees may become dou agents for the Soviet Union [May issue, p. 42, "The Battle Over Intelligence"].

Certainly, the public statemei of such former members of the int ligence community as Howard Hu and James Angleton have demo strated that this community includ people whose understanding of th American system of government nil, and whose affinity for it is nega tive. But it is quite another thing t say a man will go over to the othe side if the taxpayers do not grar him a lifetime sinecure.

We cannot run our intelligenc agencies as WPA programs. Eve less can we afford to cease expo sure of intelligence-agency activities which run counter to national policy. But apparently our intelligence agencies need to devote more effort in ensuring that crybabies and those whose loyalty is so thinly based it can be bought are not hired in the first place.

Bob Carr
Member of Congress
Washington, D. C.

• *Democrat Congressman Carr is from the 6th District of Michigan.*—THE EDITORS

Military History Symposium

"Air Power and Warfare" will be the theme of the Eighth Military History Symposium, sponsored by the United States Air Force Academy, on October 18–20, 1978. The symposium will bring together prominent historians and distinguished military aviators for an examination of twentieth century aerial warfare during the diamond jubilee anniversary of powered flight.

Scholars on the program include Horst Boog, the noted German military historian; Alvin Coox of San Diego State University; Edward Homze of the University of Nebraska; Charles Gibbs-Smith, who holds the Lindbergh Chair at the Smithsonian Institution; Ernest May of Harvard; I. B. Holley of Duke University; Forrest Pogue, Gen. George C. Marshall's biographer; Alfred Goldberg, the Department of Defense historian; Robin Higham of

as State University; [former] naut Michael Collins of the sonian Institution; and Theo- Ropp of Duke University.

special highlight of the sympo- will be the participation of a ber of prominent military figures anel members and discussants. se include Gens. Curtis LeMay, '. Weyland, Bryce Poe, T. R. Mil- and Edward G. Lansdale, and e Adm. William I. Martin. Ad- ssing the symposium during the nal banquet will be airpower neer Lt. Gen. Ira C. Eaker.

for further information write

Maj. John F. Shiner
Department of History
USAF Academy, Colo. 80840

Different Solution

noted that in the June edition of ur good magazine you permitted error by one of your authors to eep into print. Not that I can ame you, with the many authors nd possibilities. This pertains to The Berlin Airlift," by Gen. T. R. lilton.

Just prior to General Clay's death, . British writer of the Manchester *Guardian* interviewed me, as he did many others, on the origins of the airlift. This was Mark Arnold-Forster, who read all of Clay's wires to and from the Pentagon and from the British in Germany to the RAF staff in London in 1948.

Clay had nothing to do with the origins of the airlift as they came out. He wanted war—or some way to bluff the Russians. He definitely did not want to airlift supplies or people.

Lt. Gen. W. H. Tunner,
USAF (Ret.)
Ware Neck, Va.

• *General Tunner commanded the Berlin Airlift Task Force.*—THE EDITORS

On Hit List

Your June issue states Chanute Air Force Base, Ill., has been selected for closing. Out here we call the matter as being included on a "hit list."

The taxpayers of this community have launched an intensive campaign to forestall such a disaster, as probably is happening in the communities around the other bases nominated for closing.

In view of the Soviet intransigence dating from some forty or fifty years ago, and increasing with fervor, there would appear to be great possibilities that the Administration will see the light and restore the vital programs it has slashed. Thus, there will be no need to close the important and expensively endowed bases. It is only hoped that already the time is not too late.

Col. Roy W. Dart, USAF (Ret.)
Urbana, Ill.

Use Your Councils

The June issue of AIR FORCE Magazine carried photographs of AFA's Enlisted Council and Junior Officer Advisory Council Executive Committee. For those readers who might not be aware of our mission, this joint letter is both an explanation of the work these two groups do and an invitation to junior officers and enlisted people to make effective use of these councils.

The Junior Officer Advisory Council is composed of captains and lieutenants representing the major commands, separate operating agencies, the Air National Guard, and Air Force Reserve. Since 1967, the Council has served as the active voice on junior officer matters within the Association.

The Enlisted Council is made up primarily of the previous year's Outstanding Airmen, with other members selected to ensure an Air Force-wide representation. This Council is one of AFA's senior advisory groups, first formed in 1964.

Each of you—Active, Guard, Reserve, or a past member of the Air Force—is encouraged to use the Councils. Suggestions for topics to be addressed sent to us, c/o AFA Headquarters, may come from members of the Council, the AFA, the Air Staff, and the Air Force at large. Feel free to contact us to present your thoughts. Ideas and suggestions should apply Air Force-wide. For instance, the JOAC recently reviewed the format and content of the Squadron Officers School resident program and made suggestions that led to significant changes, such as an increased emphasis on communications skills at SOS. The Enlisted Council has been involved with studies on various aspects of leadership and motivation patterns.

The Enlisted Council, with the CMSAF serving as advisor, and the JOAC, with its advisor, the USAF Director of Personnel Plans, are particularly interested in the ideas you have concerning ways to make the force both more productive and career-rewarding.

The Councils meet during the AFA National Convention in September of each year. The Executive Committee of the JOAC and the Enlisted Council also meet periodically throughout the year to consider new projects and review completed studies. Additionally, the Councils work closely with each other on topics of mutual interest or concern.

The success of these efforts is directly dependent on your assistance. These are your Councils. *Use* them.

Capt. Raymond Head, Chmn.
Junior Officers Advisory Council
and
CMSgt. Walter Scott, Chmn.
Enlisted Council
Air Force Association
1750 Pennsylvania Ave., N. W.
Washington, D. C. 20006

Det. 320 Alumni

The Alvin Callender Squadron of AFROTC Detachment 320, which is composed of Tulane University and University of New Orleans students, is undertaking the task of compiling a short biography of each of its alumni. We need to find out what has happened to the alumni since they received their commissions. This would include duty assignments and promotions.

Cadet Brian J. Haddican
AAS Information Officer
Alvin Callender Squadron
AFROTC Detachment 320
University of New Orleans
New Orleans, La. 70122

Photo Collector

I am a serious collector of military aircraft slides and photos and am looking for new and unusual additions to my collection. My main interest is in fighters, especially little-known aircraft. Anyone who would like to sell or trade is invited to write me.

Cadet Robert W. Montgomery, Jr., AFJROTC
100 North Pond Lane
Roswell, Ga. 30076

Mission From Palawan

I am currently researching the military service of SSgt. George L.

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 interest of space or good taste. Names will be withheld on request, but unsigned letters are not acceptable.

Airmail

Winkler, who died while on a bombing mission over Cebu Island in the Philippines, on April 3, 1945. His B-25, piloted by Lt. L. E. Orcutt, crashed while preparing for their bomb run. There were nine other B-25s involved in the mission. They were from the 75th, 100th, and 390th Bomb Squadrons. Sergeant Winkler was assigned to the 100th BS as an engineer gunner.

All crew members were listed as KIA. The plane, B-25 J2-44-29760, was said to have broken apart on impact but didn't burn. The mission was flown from Palawan Field.

I am very interested in hearing from anyone who may have been assigned to the 100th BS at Palawan or has any knowledge of this particular mission. Also any gunners or other crew members who may have known "Rip" Winkler.

Richard M. Chapin
233 Tinker Dr.
Fort Worth, Tex. 76114

One of the Few

The Air Force Museum soon will be placing on exhibition a historic F-80C fighter (S/N 49-696), one which museum employees restored following its acquisition from the government of Uruguay. This aircraft is one of the few F-80s still in existence that flew combat missions during the Korean War. It was assigned to the 26th Fighter Interceptor Squadron, 51st Fighter Interceptor Group, during the early months of the conflict.

Museum officials are interested in hearing from any former members of the group, or others, who might have photos showing this aircraft during its assignment to the 26th. Anyone having such material should contact

Charles Worman
Air Force Museum
Wright-Patterson AFB, Ohio 45433

17s and 51s in the Pacific

I am currently researching the B-17G and P-51D used in the Pacific during WW II. I will be building scale models of these aircraft and am in need of photographs and information.

The B-17G was used by the 6th Emergency Rescue Squadron late in the war. The P-51D was used by the 75th Fighter Squadron of the 23d Fighter Group. Information on any unit that used these aircraft will be appreciated.

All materials will be handled carefully and returned if requested. Thanks to all who may contribute.

Bill Niemeier
6445 E. Highway 98
Panama City, Fla. 32401

More B-17 Research

To assist a research project into the history of the B-17 Flying Fortress, I am interested in contacting former personnel of the 7th and 19th Bomb Groups who served in these units when they received B-17s in the United States or who served in these units during the early days of the Pacific War against the Japanese. Also men who were with the 9th Squadron of the 7th Bomb Group in India, or when this squadron was detached to the Middle East in 1942.

I am also anxious to make contact with anybody involved in any way with Project X—the ferrying of B-17s to Australia via South America and Africa in early 1942.

Cliff Bishop
Lyndhurst
Station Road, Elsenham
Bishop's Stortford
Herts, CM22 6LG, England

And Two B-17ers

I recently wrote an article about the B-17 training base here in WW II and am now expanding it into a longer story. There are two men I would especially like to track down.

One is Robert C. "Pappy" Haynes, CO of the 49th Bomb Squadron, 2d Bomb Group (H), that saw action in North Africa and Italy.

The other is George W. Darnell, who was Base Commander of the Lewistown Air Base in 1942 and '43. He was seen in England the following year. His last known address was in Oklahoma City two years ago.

I would appreciate hearing from anyone who knows the whereabouts of these men. I'd also like to hear from anyone who was on this base in '42 and '43.

Jack Milburn
Giltedge Stage
Lewistown, Mont. 59457

A B-24 Called "Little Eva"

I would like to hear from anyone who has photos, maps, documents, or personal memorabilia related or pertaining to the B-24 named "Little Eva," which took part in the Pl raid, among others. Informatio to the crew members' names, would be appreciated.

Information provided will be plicated and returned if reques and all information will be retai for future reference by any in ested party.

2d Lt. Michael P. Thoma
172 Infantry Brigade
Bldg. 55, Box 76
Ft. Richardson, Ark. 9950

Past Grad Search

The Joseph J. Foss Squadron of t Arnold Air Society here at the U versity of Missouri-Columbia is i terested in locating past graduat of this Detachment. We are in t process of compiling an alum listing, along with a file on eac graduate's past and present acti ities.

An in-depth history is being pr pared, and we would like to he from anyone with information.

Cadet Kirby P. Hunolt
Joseph J. Foss Squadron, AAS
Det. 440, University of Missouri
Columbia, Mo. 65201

Lost ID Bracelet

Trying to find owner of WW II ID bracelet, SN 33634319, US Army Air Corps. Can readers help?

G. Dalwy
905 Mayfair Rd.
Arlington Heights, Ill. 60005

Delta Wing Research

Maybe the readers of AIR FORCE Magazine could assist me in some research for an article/book on delta wing aircraft. I am looking for any pictures, slides, unit patches, tech orders, etc., dealing with these aircraft, especially the F-102 and F-106. Would appreciate assistance from fellow readers.

Lt. Kaye N. Downing
5645 Golondrina Dr.
San Bernardino, Calif. 92404

Anyone Know Where He Is?

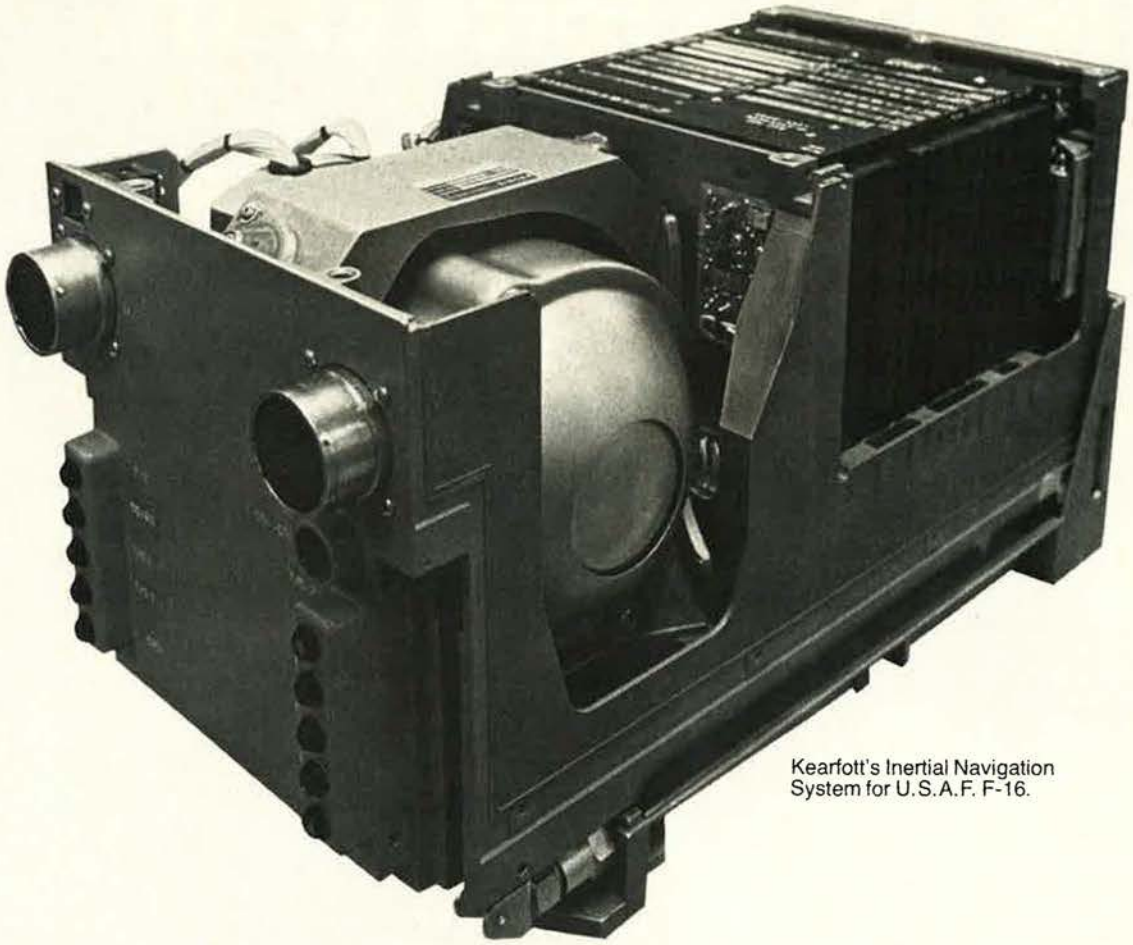
Am trying to locate Fred Klinkenberger, who was in Headquarters Squadron of the 60th Troop Carrier Wing at Rhein-Main AB in 1952. Any help would be appreciated.

Richard H. Behnke
17352 Cain Dr.
Artesia, Calif. 90701

Class 48-B Grads

I am seeking contact with any graduates of USAF Pilot School Class

THE STANDARD FOR INERTIAL NAVIGATION SYSTEMS



Kearfott's Inertial Navigation System for U.S.A.F. F-16.

Kearfott's Inertial Navigation System (INS) for the F-16 consists of two major line replaceable units—Inertial Navigation Unit (INU), and a Fire Control Navigation Panel (FCNP). It is a prime sensor for aircraft velocity, attitude, and heading, and a prime source of navigation information.

Navigational data are developed from self-contained inertial sensors consisting of a vertical accelerometer, two horizontal accelerometers, and two-axis displacement GYROFLEX® gyroscopes. The sensing elements are mounted in a four gimbal, gyro-stabilized inertial platform with the accelerometers, which are maintained in a known reference frame by the gyroscopes, as the primary source of information. Attitude and heading information is obtained from synchro devices mounted between the platform gimbals.

The system provides pitch, roll, and heading in both analog (synchro) and digital form. In addition, the following outputs are provided on a serial MUX channel (MIL-STD-1553):

- Present Position—Latitude, Longitude, Altitude
- Aircraft Attitude—Pitch, roll, Heading (True and Magnetic)
- Aircraft Velocity—Horizontal and Vertical
- Steering Information—Track Angle Error

In order to permit operation in aided-inertial configurations, the INS accepts the following digital inputs in MUX serial format (MIL-STD-1553):

- Position Update—Latitude and Longitude
- Velocity Update—Velocities in INS coordinates
- Angular Update—Angles about INS axes
- Gyro Torquing Update—Torquing rate to INS gyro axes

Significant features:

- MUX interface (MIL-STD-1553)
- Lightweight—33 pounds
- Small Size—7.5″h x 15.2″d x 7.5″w
- High Precision—better than 1 nm/h
- Rapid Align—9 minutes at 0° F
- Fast Installation/Removal—rack and panel-type mechanical interface
- Provides Back-up MUX Control in Event of Fire Control Computer Failure

For additional information write to: The Singer Company, Kearfott Division, 1150 Mc Bride Ave., Little Falls, N.J. 07424.

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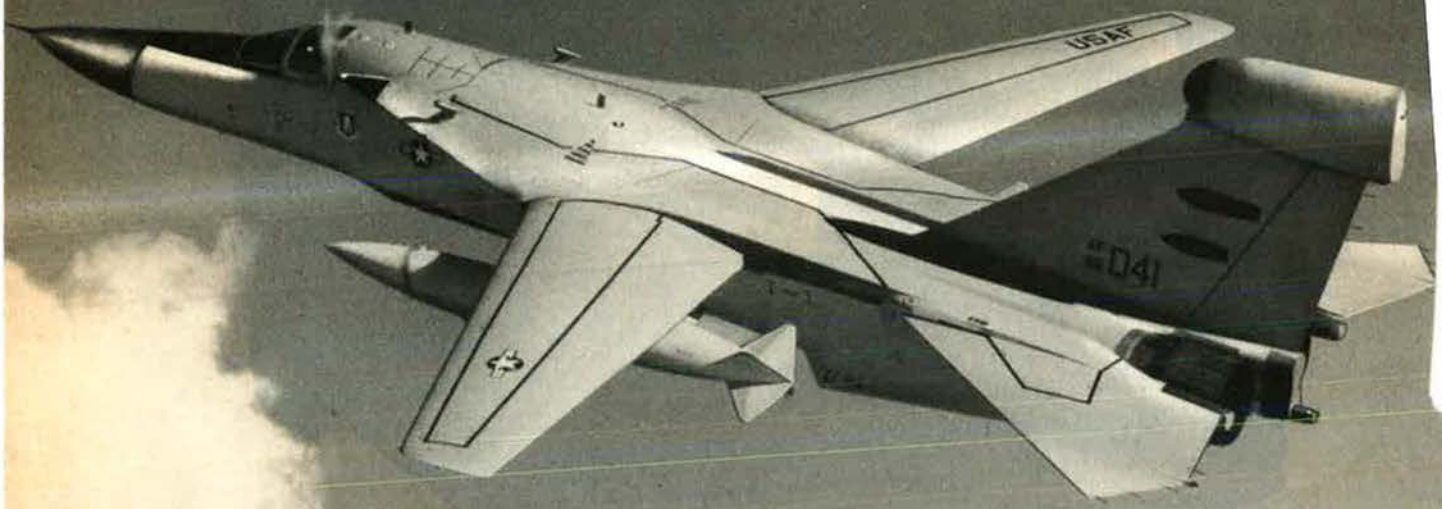

To defeat an enemy, first you have to reach him—undetected. The EF-111, the world's most powerful airborne ECM system, overwhelms and blinds ground radars to incoming aircraft.

And even if multiple, hostile radars switch to a variety of frequencies, the EF-111's broad range of jamming capabilities can handle them immediately.

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Airmail

I-B, Barksdale AFB and Williams FB. Please write to me about what ou have been doing in the past irty years. Also, if you know anyıing about any other members of ıe class, please include such inormation.

James T. Pace (Class 48-B)
1530 Dorsal St.
Merritt Island, Fla. 32952

esearching the F-13

am a member of the American viation Historical Society and am oing a research project for that roup on the photo-reconnaissance -29, the F-13.

Any type of information on the -13, whether it be pamphlet, book, notograph, documentation, or peronal story, will be gratefully accepted. Items loaned will be handled carefully and quickly returned to the donor, who will be duly credited.

David Morse
225 S. Arlington Ave.
Springfield, Ohio 45505

A-26 Veterans

Attention all A-26 Invader veterans. If you flew or serviced the A-26, I would like to hear from you. I am assembling a complete history of this long-lived bird and am in need of photos, recollections, logbooks, etc., to develop this book. Any material sent will be returned in original condition.

John Horne
15/20-22 Speed St.
Liverpool, N.S.W.
Australia 2170

UNIT REUNIONS

Air Weather Service

The annual reunion of retired AWS officers of Northern California (and associated SoCal and out-of-state members) will be held October 6–8, at Mather AFB, Calif. All ex/Ret./Recon./Res. AWS officers welcome. Please contact

Milt Sipple
2589 Dumbarton Ave.
San Jose, Calif. 95124
Phone: (408) 267-2555

Ex-POWs

Korean War ex-POWs will hold a 25th anniversary reunion in Denver, Colo., September 15–17. Contact

Col. J. B. Smith, USAF (Ret.)
4008 S. Wabash St.
Denver, Colo. 80237

Warton Air Depot

The 2d annual reunion of Warton Air Depot, Base Air Depot No. 2, will be held in Washington, D. C., October 19–22. For information send stamped, self-addressed envelope to

BAD 2 Association
811 East 16th Ave.
New Smyrna Beach, Fla. 32069

32d TC Sqdn.

A reunion of the 32d Troop Carrier Squadron, 314th TC Group, WW II, will be held October 20–21 in San Antonio, Tex. Contact

Vincent Chiodo
117 Laburnum
San Antonio, Tex. 78209
or
David Klarer
573 McIntire Dr.
Fairborn, Ohio 45324

66th Fighter Wing

The 66th Fighter Wing, Headquarters Squadron, formerly stationed at Duxford and Sawston, Cambridgeshire, England, will hold a reunion at the Quality Inn/Lake Wright, 6280 Northampton Blvd., Norfolk, Va., October 6–8. Details from

Carroll M. Bowman
Cambria
Phoenix, Md. 21131

92d Bomb Group

A reunion of the 92d Bomb Group, 8th AF, WW II, will be held in Kansas City, Mo., October 6–8. All former members of the 92d and supporting units stationed at Bovingdon, Alconbury, and Podington, England, are invited. Contact

Sheldon W. Kirsner
2603 Cathedral Dr.
St. Louis, Mo. 63129

96th Bomb Group (H)

All former members of the 96th Bomb Group (H) are invited to a 3d annual reunion (mini) in Washington, D. C., October 19–22. Please contact

Robert W. Owens
900 S. Western Ave., 2-R
Chicago, Ill. 60612

303d Bomb Group

A minireunion, in conjunction with the 8th AF, will be held by the 303d Bomb Group and attached units, WW II, Molesworth, England, October 19–22, in Washington, D. C. Contact

8th AF Reunion
P. O. Box 1304
Hallendale, Fla. 33009

315th Troop Carrier Group

A change in date and contact address for members of the 315th Troop Carrier Group: The reunion, which will be held at the Sheraton Hotel in downtown Dallas, Tex., is now scheduled for September 22–23.

Duncan McRae, Sr.
P. O. Box 7666
Shreveport, La. 71107

351st Bomb Group

The 4th annual reunion of the 351st Bomb Group, 8th AF, WW II, stationed at Polebrook, England, will be held in conjunction with the 8th AF reunion in Washington, D. C., October 19–22. Contact

Ben Schohan
398 Catawba Ave.
Westerville, Ohio 43081

390th Bomb Group (H)

A reunion of former members of the 390th Bomb Group (H), 8th AF, will be held in Washington, D. C., October 20–22. Contact

Patrick Rossi
59 Doat St.
Buffalo, N. Y. 14211

391st Bomb Group (M)

The 391st Bomb Group (M) will rendezvous at the Marriott Hotel, St. Louis, Mo., October 6–8. Details from

Don Fry
21 Asbury Lane
Matawan, N. J. 07747

456th Bomb Sqdn.

The 456th Bomb Squadron, 323d Bomb Group, WW II, will hold their reunion October 6–9, at Myrtle Beach, S. C.

Tom Curtin
116-13 103d Ave.
Richmond Hill, N. Y. 11419

482d Bomb Group

The 482d Bomb Group, Alconbury, England, WW II Station 102 (includes the 36th, 812th, 813th, and 814th Bomb Squadrons and attached units) are regrouping for future reunions and are putting together a periodic newsletter. A minireunion will be held in Washington, D. C., on October 19–22, in conjunction with the 8th AF reunion. Contact

Denny Scanlan, Jr.
200 West Plato Blvd.
St. Paul, Minn. 55107

868th Bomb Squadron (H)

The "Snoopers" of the 868th Bomb Squadron (H), 13th AF, will hold a 4th reunion November 2–4, 1978, at the Sheraton Fisherman's Wharf Hotel, San Francisco, Calif. Contact

Dr. Vince Splane
4320 W. Broward Blvd.
Plantation, Fla. 33317

908th Tac Airlift Group

All former and current members, spouses, and civilians are invited to the 4th annual reunion of the 908th Tactical Airlift Group (AFRES), to be held at VFW Post 49, 2222 Dauphin Island Pkwy., Mobile, Ala., August 12. Contact

George H. Lewis
5360 Cross Creek Dr.
Mobile, Ala. 36609
or
O. S. O'Rourke, Jr.
1111 W. Gimon Circle
Mobile, Ala. 36605

In Focus...

BY EDGAR ULSAMER, SENIOR EDITOR

Washington, D. C., July 5

New Space Policy

On May 11, 1978, President Jimmy Carter committed the nation to a new space policy by signing PDM (Presidential Decision Memorandum)-37. The policy statement breaks new ground in projecting the principle of sovereign rights—and the right to defend them—into space. Asserting that any nation's space systems are "national property" entitled to free passage and unhampered operation, PDM-37 commits the nation to "activities in space in support of its right of self-defense and thereby strengthen national security, the deterrence of attack, and arms control agreements."

While seeking verifiable, comprehensive limits on antisatellite capabilities and their use, the US, in the absence of such an agreement, "will vigorously pursue development of its own capabilities. The US space defense program shall include an integrated attack warning, notification, verification, and contingency reaction capability which can effectively detect and react to threats to US space systems." Though US and Soviet negotiators already have spent a week discussing possible approaches to a verifiable agreement barring space weapons, this column learned that realization of such an accord should be considered a distant goal.

Most senior Administration officials feel that a treaty "freezing" the US and the Soviet Union in their present positions regarding antisatellite weapons (ASAT) is out of the question. The Soviet Union has an operational ASAT launch complex and a fleet of ASATs in being. While these weapons have exhibited some deficiencies during test flights, such as occasionally failing to destroy test targets, and altitude limits below 600 miles, they provide the Soviet Union with a destabilizing lead over the US, whose ASAT program is not yet off the drawing board. Most experts believe, therefore, that the US must draw abreast of Soviet ASAT capabilities before a treaty banning development and deployment of space weapons can be entered into.

The incipient US ASAT program concurrently is developing a number of technological options, some of which involve capabilities attainable only at great technological risk. High-energy laser weapons, viewed as the most versatile long-term approach, fall in this category. A technologically more "mature" US ASAT design centers on a modified SRAM—equipped with a miniature homing device to be launched by high-flying aircraft. The Army's HIT (Homing Interceptor Technology) program, developed originally for ballistic missile defense, was transferred to USAF to serve as a forerunner of a miniature homing device. An aircraft-launched ASAT would be limited to operation against hostile spacecraft in low-altitude orbits.

For that reason, another design approach is being pursued, involving a missile booster that delivers a warhead/homing device combination to higher orbital altitudes. This basic concept is being explored in a variety of ways to provide the capability of intercepting across a wide range of altitudes and modes.

Lastly, advanced jamming and other countermeasure technologies to frustrate Soviet space weapons are being studied under the ASAT program. According to an Administration official who declined to be named, "If we want an ASAT capability, we can achieve one that is high quality, that is as good or better than theirs." President Carter, as yet, has not authorized go-ahead on an operational ASAT system, even though PDM-37 asserts that "the United States finds itself under increasing pressure to field an antisatellite capability of its own in response to Soviet activities in this area."

The new policy statement directs the Secretary of Defense to set up a space counterpart to the Civil Reserve Air Fleet (CRAF) through a program of integrating civil and commercial space resources into military operations during national emergencies. In the main, this means adding encrypting packages to important nonmilitary satellites to prevent the Soviets "from taking over these systems" in wartime. For the moment, such militarily important systems as the civilian US weather satellites are vulnerable to acts of space piracy. The only alternative would be their destruction by commanding these spacecraft to spin out of control. PDM-37 seemingly provides the option to place military payloads on nonmilitary satellites in "piggyback fashion," to increase redundancy. Hardening civilian satellites earmarked for military use during crises is also provided for.

While relaxing the limitation on remote earth sensing for civilian purposes by boosting permissible pictorial resolution to ten meters—compared to eighty meters at present—the US government will supervise and control all such information. The idea is to withhold such military information as the location of US or other naval forces from third countries.

Possibly PDM-37's greatest significance lies in a subtle change in relationship between the intelligence community, in near-absolute control heretofore of space-based intelligence and reconnaissance information, such as that produced by Lockheed's Big Bird satellites, and the military services. Much of this information has been so highly classified by the CIA that it rarely reached the operational level of the military. PDM-37 redresses this incongruity by reducing the classification of such information to assure adequate support of military requirements, especially at the unit level. USAF will continue to operate the nation's secret spacecraft for the CIA.

The Presidential directive sets up an intragovernmental arbiter and ombudsman, the National Security Council Policy Review Committee, to settle routine squabbles, or to channel especially thorny issues to the President for resolution. The committee is chaired by the Director of the Office of Science and Technology Policy, Dr. Frank Press, and includes representatives from DoD, NASA, the CIA, and other government agencies concerned with US space operations.

ghter Senate Shackles r Intelligence

Apparently to make up for a previ- s lack of congressional oversight er US intelligence operations, the enate recently passed legislation at could have disastrous conse- uences for national security. nown as the Foreign Intelligence urveillance Act of 1978, it is a evolutionary approach to foreign ntelligence-gathering that would ansfer responsibility for authoriz- ng such actions from the Executive ranch to a "Special Court." The isdom and constitutionality of the ew bill—now before relevant louse committees—seem to be awed on at least two counts: The xpertise of federal judges in con- olling foreign intelligence is lack- ng—and has never been sought; so the power to authorize—or re- se to authorize—foreign intelli- gence-gathering activities tradition- lly has been exercised by the President and seems granted him under the Constitution, which makes him responsible for all decisions regarding national security. To treat decisions on foreign intelligence as anything other than integral issues of national defense seems illogical.

As Congressman Robert McClory (R-Ill.), a member of both the House Judiciary Committee and the Permanent Select Committee on Intelligence, told this column: "To pass the buck on such decision-making to a special court might give an appearance of safeguarding individual rights or justifying Executive decision-making. However, it is inherently dangerous to our national security because of the delays and frustrations which might result, and it is an unjustified attempt to excuse the President from a Constitutional responsibility and accountability which he should be required to assume."

The stringent guidelines of Executive Order 11905, issued by President Ford in the wake of Watergate to preclude abuses by the intelligence community, and supplemental instructions by President Carter, according to comprehensive congressional testimony, have proved fully effective in controlling foreign intelligence collection. On the strength of this evidence, Representative McClory has introduced a new bill, H.R. 9745, that translates these guidelines into statutory form and makes the Executive Branch responsible for all intelligence activities involving foreign powers and foreign agents. Appropriate safeguards are incorporated in the proposed legislation, such as the requirement "for minimization or elimination and destruction of information regarding American citizens which might incidentally or accidentally be included in an electronic information-gathering operation," according to Mr. McClory.

It would seem absurd to deny the US the right to timely, secure surveillance of foreign agents at a time when the number and audacity of Soviet operatives in the US are at an all-time high.

The Test Ban Treaty

The Administration's policy on a "zero yield" Comprehensive Test Ban Treaty (CTBT), ostensibly cast in concrete when President Carter signed PDM-38 on May 20, 1978, without concurrence by either the Joint Chiefs of Staff or the Department of Energy (DOE), is undergoing an agonizing reappraisal.

Catalyst for reopening the case was a high-powered White House meeting in mid-June requested by Energy Secretary James R. Schlesinger. Billed as a fifteen-minute meeting, it went to an hour and a half and reportedly caused the President to comment, "You gave me a lot to think about."

Highly placed sources told this column that several participants reached the conclusion that essential information concerning the effects of halting all nuclear testing had not reached the President, even though that information had been briefed to congressional committees by Defense Department and DOE witnesses, including the then-acting Chairman of the Joint Chiefs of Staff, Gen. David C. Jones.

Specifically, the President did not appear read in on why DOE and the JCS consider a "zero-yield" test ban or moratorium unverifiable. Neither did he seem to be aware of the fact that the Soviet negotiators had rejected a central safeguard requested by the US as unacceptably intrusive. This would involve placing some thirty teleseismic arrays on Russian territory. The only monitoring scheme acceptable to the Soviets is sharing data from some five or six Soviet-built seismic detectors, an arrangement deemed wholly inadequate by most US experts. (Even the full complement of arrays coupled with on-site inspections could not detect low-yield Soviet testing in the view of congressional experts, and would have served mainly to dilute political opposition to a cessation of testing.)

The persuasiveness of the evidence presented by Dr. Schlesinger and two DOE laboratory directors appears to have caused changes in the Administration's position on this issue of pervasive importance to national defense. The White House—at a Special Coordinating Committee (SCC) meeting late in June—decided to limit any Comprehensive Test Ban Treaty to three rather than five years, and decreed that renewal thereafter would require the approval of both the Executive Branch and the Senate. The same cabinet-level meeting also decided to insist on the need of continued low-yield "controlled" testing—at the level of a few hundred pounds—even though Paul Warnke, Director of the Arms Control and Disarmament Agency, reportedly had threatened to resign if the Administration reneged on "zero yield."

Other proposed safeguards, viewed by congressional experts as of a more cosmetic than curative nature, include firm provisions for maintaining US R&D and production capabilities, and constant readiness to resume testing. The latter safeguard is important; it took the US more than a year to resume full-scale testing after the Soviets renounced the bilateral test moratorium in 1961.

Congressional opposition to a CTBT appears formidable and growing, a fact that the Administration seems to recognize. During recent congressional testimony, Defense Secretary Harold Brown disclosed that CTBT would not be concluded until after SALT II. In addition to questioning the wisdom of entering into an essentially unverifiable accord (*see p. 9, April '78 issue*), relevant committees of the House and Senate have urged that the Threshold Test Ban Treaty and the Peaceful Nuclear Explosion Treaty that went into effect more than two years ago should be ratified before the Senate considers CTBT, and that weapon systems allowed under SALT II should be tested adequately before a CTBT goes into effect.

The Senate Armed Services Committee, at the behest of Sen. Henry M. Jackson (D-Wash.), plans to hold hearings on the historic and technical aspects of test bans and nu-

InFocus...

clear weapons reliability and safety. The purpose is to compile an authoritative public record of the grave consequences of plunging headlong into a halt of nuclear testing. There is widespread concern that the Administration may bypass the Senate's seemingly strong opposition to a "zero-yield" test ban treaty by seeking a trilateral moratorium with the Soviets and the British. England's Prime Minister James Callaghan, during a US visit in June 1978, reportedly made clear that his politically hard-pressed labor government was keenly interested in going before the British voters at the coming elections in the role of a "peacemaker."

The PRC on Superpowers

The Foreign Minister of the People's Republic of China, Mr. Huang, unleashed a lengthy harangue against the "superpowers" during the recent United Nations' Special Session on Disarmament. His polemic was noteworthy since he reserved his most scathing language for the USSR, whose global strategy he described as being "to control and monopolize Europe, to weaken and squeeze out the influence of the other superpower [the US] in all parts of the world, and ultimately to supplant the other superpower and establish its own hegemony over the world. Facts show that this superpower flaunting the label of socialism is more aggressive and adventurous than the other superpower; it is the most dangerous source of a new world war and is sure to be its chief instigator."

In another comment—one that the US arms control lobby should heed—the PRC's foreign minister dissected SALT: "In the eight years of SALT, the Soviet Union has brought its once backward nuclear arsenal up to par with that of the other superpower." He held out no hope that the next round of SALT would slow "social-imperialism," (read the Soviet Union) in its rapid expansion of "armaments of all kinds with a view to achieving military supremacy over its rival."

A US MRBM?

The Senate Armed Services Committee, at the initiative of Sen. Thomas McIntyre (D-N. H.) and Sen. Jake Garn (R-Utah), recommended funding preliminary USAF design studies of a medium-range ballistic missile for theater forces. Alternatives, according to the committee, could "include modifications of current Pershing, Patriot, and Minuteman missiles, or the development of a new missile." Range of the proposed new theater ballistic missile could be anywhere from 700 to 1,500 miles. One of the candidate designs is a derivative of Minuteman III, using its second and third stages and guidance system.

Senator Garn sees a compelling incentive for deploying MRBMs—which are not covered by SALT—because such weapons, he told this column, "would significantly reduce the risk of surprise attack, provide a theater ballistic missile comparable to the Soviet camp's formidable SS-20 and older SS-4s and SS-5s, and provide the advantage of quick response and improved penetrability over the cruise missile."

The US Navy's Poseidon submarines assigned to the US European Command fail to provide "the combined advantage of accuracy and timeliness of a land-based mobile MRBM," according to Senator Garn. Also, these submarines, he warned, "might encounter severe communications problems in a complex electronic environment, thus further reducing their effectiveness to execute time-urgent attack on unplanned targets, unless they risked detection and exposure by two-way radio communications. Moreover, the mobile land-based MRBM is highly controllable, far more flexible and survivable, and is less costly than the SLBM."

Washington Observations

• Even though opposed by many senior CIA analysts, Adm. Stansfield Turner, Director of Central Intelligence, is bringing a new approach to the formulation of US intelligence estimates and assessments. In the past, the intelligence community confined itself to presenting military and other information pertaining to the Soviet Union and other foreign powers. These estimates served as a basis for "net assessments" done under the aegis of interagency groups that evaluated US vs. Soviet capabilities. Net assessments now are being made under the direction of the Director of Central Intelligence. Old-line intelligence experts are chary of this approach becaus it preempts the Defense Departmer in the area of its principal expertis the forecasting of US military capa bilities. Also, the new comparativ assessments usually rely on optimis tic long-term planning documents– unencumbered by budgetary real ities—for forecasting US capabil ities.

• A reportedly "very tough" let ter by Defense Secretary Harolc Brown has stiffened the Administration's stance regarding range limitations for air-launched cruise missiles (ALCMs) at the SALT negotiations in Geneva. Dr. Brown persuasively argued that the so-called "odometer" range of ALCMs must be pegged at forty percent above the straight line limit of these weapons. Reason is that cruise missiles must fly a zigzag path; in orde to penetrate 2,500 kilometers—the proposed SALT II protocol limit—their actual flying range must be at least forty percent greater.

• ACDA Director Paul Warnke's campaign—supported by key State Department figures—to declare a moratorium on producing Special Nuclear Materials (SNM—the principal element of nuclear weapons) has gone sour in light of forceful opposition by technical experts. Crux is that the half-life of some SNMs is twelve years. As warheads containing these SNMs reached the half-life point, weakening US deterrence capabilities would invite nuclear proliferation by allied nations and induce strategic instability. The FY '79 SNM budget request is about $904 million, compared to about $675 million last year.

• On May 18, 1978, a red-letter day in high-energy physics, the Lawrence Livermore Laboratory's twenty-laser Shiva system trained 26,000,000 watts of optical power in ninety-five trillionths of a second on a "heavy" hydrogen target the size of a grain of sand to achieve 7.5 billion fusions. The historic experiment points the way toward larger-scale, economically viable duplication of the continuous thermonuclear "burns" by which the sun and other stars generate essentially unlimited power. By the mid-1980s, follow-on US systems—Livermore's even larger Nova system and Los Alamos Laboratory's carbon dioxide laser—are expected to achieve a "break even," by producing as much fusion energy as the laser focuses on the target. ■

The Fairchild A-10 revolutionizes close air support tactics.

1977 saw the Fairchild A-10 perform in some of the most important and rigorous battle exercises ever developed.

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The A-10 flew against simulated armor threats and proved it can work with the Army to provide responsive, effective close air support against a variety of targets.

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FAIRCHILD INDUSTRIES

AFA'S JOHN GRAY RETIRES

There are retirements, and there are retirements.

Most are routine, events noted only briefly and significant mainly to the person concerned and to his immediate family.

A few are more than that—a few signify the culmination of a long career, marked by high accomplishments that leave a deep impression on the lives of many—colleagues, friends, associates.

The retirement, on June 30, 1978, of John O. Gray, as Assistant Executive Director of the Air Force Association, clearly falls in the second category.

John came to us at AFA early in 1957, straight from a four-year tour of Air Force active duty in the Office of Information in the Pentagon. He came, not as a stranger, but as a friend and coworker, having served as the Air Force Project Officer for AFA's 1956 National Convention. His first assignment was to coordinate AFA's multifarious activities in support of a nationwide observance of the Golden Anniversary of the Air Force.

In October 1957, John was named the Association's Administrative Director and, in short order, became Assistant Executive Director, with collateral duties as Director of Military Relations and Military Affairs Editor of AIR FORCE Magazine.

In April 1959 came another highlight—the week-long World Congress of Flight in Las Vegas, Nev., sponsored and staged by AFA. John's tireless and effective tying together of the many interwoven strands of these large and complicated events set the pattern for his long career. "John Gray takes care of that" became a stock phrase around the Headquarters.

In later years, relieved of large portions of his administrative workload, John turned the focus of his efforts on the important task of Military Relations and in the process became an acknowledged expert in defense-related legislation. In the last analysis, perhaps his greatest contribution was the confidence and respect he gained for himself and AFA from other organizations representing all constituencies of the national defense community. His inflexible integrity, high sense of duty, and consuming interest in the well-being of others have been the hallmarks of his career.

Meanwhile, John pursued still another life of service in the Air Force Reserve—from his Army ROTC commissioning at the University of Idaho, through four years of overseas duty (in wartime England with the Eighth Air Force and in postwar Germany), to a mobilization assignment as Assistant to the Deputy Director of Information of the Air Force. He retired as a brigadier general in December 1969.

This chronology can only feebly convey the real John Gray. This writer has been his friend for more than twenty-five years and a close colleague for more than twenty-one. I cannot say no disagreements ever occurred between us. John is a man of deeply held views, which he defends with passion but never with bitterness, or rancor, or recrimination. Our mutual boss, Jim Straubel, Executive Director of AFA, who has worked with John even more closely than I, put it this way in reporting John's impending retirement to the Board of Directors: "You don't replace a John Gray." But John is the first to say that AFA, which he calls his family, will carry on without a falter. He's right, but in large part the future of the Association will be forever marked with the indelible imprint of his labors.

John is retiring voluntarily on the advice of his doctors, having suffered a severe heart attack in November 1976. It would take that kind of reason to deflect John Gray from the ardent pursuit of what he has always thought was a mission, not just a job.

—J. F. L.

At a reception in his honor on June 23, John Gray received a handsome plaque from AFA President Gerald V. Hasler, on behalf of the Association, inscribed:

"To John O. Gray—with affection, gratitude, and respect from his Air Force Association family—Members, Directors, Officers, and Staff—for whom and with whom he worked so assiduously, loyally, and effectively over more than twenty-one years of devoted professional service."

For the Board of Directors, Chairman George M. Douglas presented an Air Force Anniversary sterling silver plate.

For the Headquarters Staff, Sen. Barry Goldwater, Chairman of AFA's Aerospace Education Foundation, presented a Jimmy Doolittle Fellowship.

Other honors, awards, and gifts came from colleagues, friends, and organizations, including: Arnold Air Society, Fleet Reserve Assn., Navy League, AF Sergeants Assn., National Guard Assn., The Retired Officers Assn., Reserve Officers Assn., Navy Reserve Assn., AFA State Orgns. of Idaho and New Jersey, Andrews and Northern Va. Chapters of AFA, Ad Hoc Committee of twenty-one defense-oriented organizations, Council of Military Organizations (12), Super Ad Hoc Committee (AFA, AUSA, NGAUS, Navy League); personal gifts, including an Air National Guard Heritage painting from Brig. Gen. Wm. W. Spruance; and more than 150 personal letters.

Aerospace World News, Views & Comments

By William P. Schlitz, ASSISTANT MANAGING EDITOR

All smiles in July were Soviet Cosmonaut Pyotry Klimuk and Polish Cosmonaut Miroslaw Hermaszewski after their return in Soyuz-30 from a double-docking with orbiting Salyut-6, the third in space history. The Soviet Soyuz-29 crew remained aboard the space station. Hermaszewski is the second Eastern bloc cosmonaut to fly in space, as the USSR continued to expand its manned spaceflight program.

Washington, D. C., July 5

★ Military Airlift Command has given the go-ahead in the form of a $407.5 million contract to "stretch" its fleet of C-141 StarLifter transports.

The agreement calls for Lockheed-Georgia Co., Marietta, Ga., to add twenty-three feet of usable space to each of MAC's 271 C-141s. The work is to begin in September with the last modified aircraft being delivered in July 1982.

Air Force Logistics Command, the contracting agency, awarded Lockheed-Georgia $84.6 million in early June to fund the FY '78 portion of the program.

The stretching will be accomplished by adding sections to the fuselage just ahead of and behind the wing and, in effect, will increase the C-141 fleet's cargo carrying capacity by one-third. This is equivalent to ninety new airplanes at 1963 prices, MAC officials said.

As part of the modification package, the aircraft will also be equipped for aerial refueling, thus lengthening their effective range.

A decision on the stretching program was based on the results of a recently concluded prototype test program by a joint Air Force/Lockheed team.

Useful life of the C-141 is projected to the year 2000.

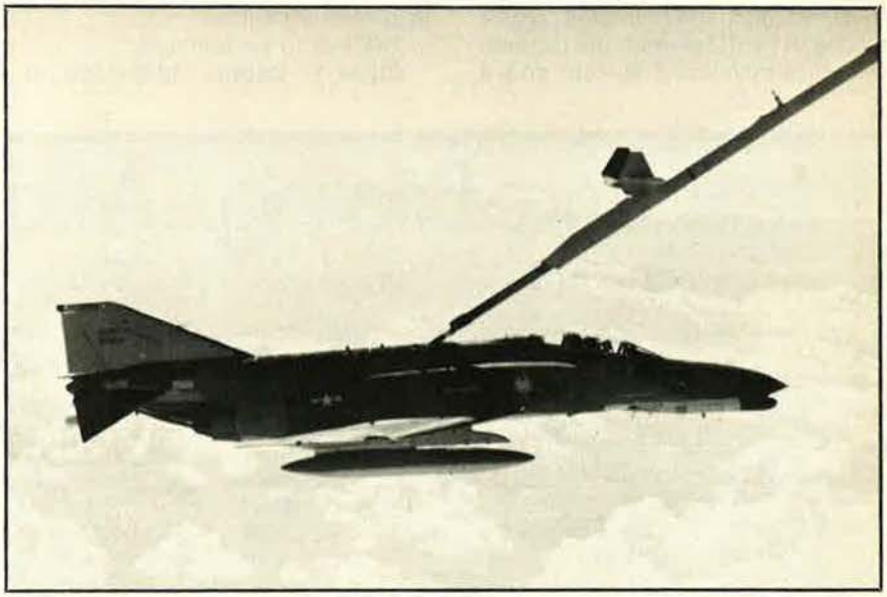
In another important modification program, USAF has authorized the production of inertial navigation systems for its B-52 fleet.

The system, to be built by the Honeywell Avionics Division, St. Petersburg, Fla., has a rather lengthy handle: Standard Precision Navigator-Gimballed Electrostatic gyro Aircraft Navigation System, or SPN-GEANS. But it promises extremely accurate navigation, and, also, according to the company, provides built-in self-testing, modular replacement of parts, and low maintenance costs.

Upgrading of the B-52 force will continue over the next several years, and Honeywell has options for more than 700 additional SPN-GEANS systems for production extending through 1986.

And, early in June, the first USAF F-4C Phantom scheduled for modification arrived at the McDonnell Douglas facility in Tulsa, Okla., from Europe.

The plan calls for a five-year pro-



An Air Force F-4 Phantom and KC-135 tanker test the Advanced Aerial Refueling Boom developed by McDonnell Douglas Corp. The new boom is longer, more controllable, and has greater capabilities than the current one. It has a digital computer fly-by-wire system for more precise hookups.

Aerospace World

gram estimated at $71 million or more under which McDonnell Douglas will undertake depot maintenance, modification, and inspection of the F-4Cs.

★ On June 21, the first public demonstration flight of a Tomahawk cruise missile at the White Sands Missile Range in New Mexico was described as "letter perfect."

The missile was launched from a Navy A-6 and flew a prescribed course as dictated by its onboard computer at altitudes as low as 100 feet (91 m) at about 500 mph (805 km/h).

The flight, witnessed by Defense Secretary Harold Brown and other top military and civilian brass, was to test the Tomahawk's evasiveness in the face of such weapons as the Soviet ground-to-air SA-10 missile, in this case simulated by the US's improved Hawk missile radar system.

Secretary Brown termed the test flight "well within the range of our expectations." The test was concluded in mid-flight and the missile dropped to earth by parachute after about a two-hour flight.

Tomahawk has already been selected to fill the role of ground-launched and sea-launched cruise missile; a flyoff between the General Dynamics-developed system and a Boeing contender for air-launched cruise missile is scheduled for next summer.

If the current schedule is kept, the cruise missile should be in production by 1980 and aboard the first B-52 carrier squadron by December 1982, whichever missile wins the flyoff.

Cessna

Gabreski

Lear

LeVier

Richardson

During mid-July ceremonies in Dayton, Ohio, these five aviation pioneers were to join other aeronautical greats enshrined in the Aviation Hall of Fame. See item below for biographical sketches of the five.

★ The Aviation Hall of Fame, Dayton, Ohio, plans to conduct enshrinement ceremonies for five aerospace notables in mid-July, as in previous years.

The five to be honored:

Clyde V. Cessna, 1880–1950, an early stunt flyer who went on to design and build a successful series of early light aircraft, including some of the first monoplanes. In 1927, he founded the company that bears his name and, except for a short period during the Depression, continued to design and build light planes that set standards for the aircraft industry. He is cited as an aviation pioneer who developed a line of aircraft "that helped bring the pleasure of private flying to millions around the world."

Francis S. "Gabby" Gabreski, the top living US ace, who downed an officially credited total of thirty-

Intelligence Briefing...A Roundup

According to *Foreign Report,* published by London's *Economist:*

• The Iraqi-Soviet alliance is in danger of falling apart, according to intelligence reports from the Middle East. The ostensible reason is the Iraqis' fear that the Russians might yet be persuaded to lend their full backing to the Ethiopian offensive against Eritrea—a move which the men in Baghdad vehemently oppose. But the Iraqi leadership is even more disturbed by events closer to home.

A substantial number of Iraqi army officers—some of senior rank—have been arrested. . . . The government is convinced that they had been organized in Communist-led cells to engineer a Soviet-inspired coup. . . .

Iraqi intelligence first got wind of the plot from a top member of the Iraqi Communist party who was picked up when he tried to slip into Baghdad after attending a secret conference of Arab Communist leaders. . . . The entire Iraqi Communist delegation was rounded up. Its members revealed, under interrogation, that the summit had also been attended by senior Communists from Egypt, Syria, Jordan, Lebanon, Saudi Arabia, and the Gulf states—most of them countries in which the Communist party is proscribed. . . .

The new Soviet strategy for the Arab world . . . [includes] mobilizing Communist groups to help displace existing Arab regimes . . . [and] includes terrorist compaigns that are separate from the operations of international terror groups focused on Israel and western Europe. . . .

Some of the confessions . . . appear to have confirmed the government's long-standing suspicion that Communists were behind some of the attempted assassinations of Iraqi leaders over the past two years. . . .

The Iraqi government was so enraged by this apparent evidence of Russia's double game that it summarily closed Iraqi airspace to Soviet military flights and announced that its naval bases would not be open to Soviet warships until further notice.

Arthur C. Storz
1890–1978

Arthur C. Storz, a permanent National Director of the Air Force Association, died of congestive heart failure at his home in Omaha, Neb., on June 23. He was eighty-eight. Surviving are his widow, Mony, two sons —Arthur C. Storz, Jr., and Robert Hart Storz—and a daughter, Mrs. Mony Markel.

Art Storz was a remarkable man—a loyal friend and supporter of the Air Force, its leaders, and its people. At his funeral, in Omaha's Cathedral of St. Cecilia, on June 27, Rev. Paul Peter told a revealing anecdote.

It seems that Father Peter rang Art Storz's doorbell one evening. The ring was answered by a slight, spry, somewhat elderly gentleman who invited him in. It was Jimmy Doolittle, whose close friendship with Art was exemplified by the fact that, over the past six years as failing health kept Art at home, General Doolittle wrote him every week.

Art Storz began his association with aviation during World War I as an aviation cadet. The war ended before his training was completed. Since then, in his own words, "I have been a lifelong booster of the Air Force and have done everything I could to help." He did plenty.

During World War II, he maintained a keen interest in what was then Offutt Field and in other Nebraska bases. He met and befriended hundreds of Air Force leaders and was a powerful force in community relations. A successful manager of the family brewery, he put his clout to work for airpower. Along with the late Sen. Kenneth Wherry of Nebraska, he was instrumental in placing Strategic Air Command Headquarters at Offutt—against the wishes of SAC's commander at the time, Gen. George C. Kenney, who was holding out for Colorado Springs. By the time SAC moved, late in 1948, General Kenney had been succeeded by Gen. Curtis E. LeMay, who became the personification of SAC much as Art Storz personified Omaha.

Arthur Storz, seated, receiving his plaque as a Jimmy Doolittle Fellow in 1975 from then AFA President Joe L. Shosid.

In support of the base, Art founded and organized the Ak-Sar-Ben Chapter of the Air Force Association. He set out to make it the biggest chapter in AFA—and succeeded. It held the title for many years.

Art served on AFA's Board for twenty-two years and won just about every honor the Association could bestow—"Man of the Year" (1955), Gold Life Member Card No. 3, and a Special Award in 1972 that designated him "AFA's Elder Statesman." The Air Force gave him its highest civilian award—the Exceptional Service Medal—in 1962.

Present at his funeral were Jimmy Doolittle and Gen. Richard Ellis, Commander in Chief, Strategic Air Command. Jim Straubel, Executive Director of AFA, represented President Hasler, and the Officers, Board, and National Staff of AFA. An Honor Guard from SAC Headquarters escorted the coffin, and a firing squad gave the last rites the military flourish Art would have loved.

The poignant notes of "taps" from an Air Force bugler ended it for Art Storz. He will long be remembered in Omaha, in the Strategic Air Command, and in the Air Force Association.

—J. F. L.

four and a half enemy aircraft during World War II and the Korean conflict. Retiring from the Air Force in 1967, holding nearly all US military medals awarded to airmen, Colonel Gabreski is currently assistant to the president of Grumman Aerospace Corp. He is a long-time AFA member and supporter.

William P. Lear, Sr., 1902–1978, pilot and inventor who founded the aircraft company that builds the famous corporate jet. Mr. Lear has been awarded three of the US's most distinguished honors: the Collier Trophy—the nation's top aviation award—for development of the jet autopilot; the Frank M. Hawks Memorial Award for design of the Learmatic Navigator; and the Horatio Alger Award for individual achievement. A pioneer in flight automation, Mr. Lear was granted more than 150 patents in the field of aviation.

Anthony W. "Tony" LeVier, one of the world's leading test pilots who began flying in 1930. During his career, primarily with Lockheed, Mr. LeVier made the first flight tests of twenty different aircraft and has flown more than 240 types—more than any other person, "adding immeasurably to aeronautical safety and knowledge."

Holden C. Richardson, 1878–1960, a naval aviation pioneer who became the Navy's first engineering test pilot. He developed the rotatable catapult that allowed aircraft to be launched from ships without their turning into the wind and also, while head of the Bureau of Aeronautics Design Branch, guided development of carrier aircraft and monoplane flying boats. Captain Richardson retired from the Navy in 1929, was recalled in 1934, and served until 1946.

★ An eleven-week flight test program of the E-4B Airborne Command Post began at Boeing Field, Seattle, in mid-June.

Objectives in testing the modified 747 will be to demonstrate the aircraft's primary mission capabilities, including communications and flight performance.

An improved version of the E-4A currently in operation, the E-4B is equipped with nuclear thermal shielding, advanced command and control electronics, a 1,200 KVA power generation system (the largest ever flown), and both super high frequency (SHF) and very low frequency/low frequency (VLF/LF) communications systems. (The VLF system requires trailing wire antennas up to five miles in length. Overall, the aircraft will carry thirteen external communications systems needing fifty antennas.)

Boeing has built three E-4Bs, and USAF plans to order an additional two while upgrading the "A" versions to the advanced configuration.

Aerospace World

★ Nearing completion on Mount Hopkins in Arizona is a unique new astronomical instrument that will combine six telescopes in one.

The light-gathering capability of the device—the Multiple Mirror Telescope—will make it the third most powerful in the world, behind that on Mount Palomar in California and the USSR's telescope in the Caucasus.

MMT is being built jointly by the University of Arizona and the Smithsonian Astrophysical Observatory in Massachusetts. The MMT will rely on a revolutionary system of lasers and computers to align its mirrors and counter the earth's rotation during celestial observations. Without them, it wouldn't be practical.

MMT is expected to be operational by fall.

Already on the drawing boards are telescopes more powerful than even the biggest now in existence. MMT is seen by a number of astronomers as the prototype for the new breed of telescopes.

★ NASA technicians at the Johnson Space Center in Houston, Tex., in mid-June were successful in repositioning orbiting Skylab.

In effect, giant gyroscopes at either end of the eighty-five-ton space station were activated in order to tilt the smaller end of the craft forward and parallel to the earth's curvature. The maneuver produced the sought-after minimum drag attitude that will retard Skylab's decaying orbit and lengthen its lifespan.

Had the action not been taken, there was a good chance that huge Skylab would have been drawn by gravity into the atmosphere to its destruction before astronauts aboard the Space Shuttle can get to it. In a mission currently planned for October 1979 at the earliest, astronauts will attempt to equip the station's docking port with a small rocket engine to boost it into a higher orbit.

Meanwhile, studies are going forward on possible future uses of Skylab as part of the US's rejuvenated manned spaceflight program.

★ US Navy has ordered the first production unit of a unique electronic countermeasures system designed to protect carriers and other high-value ships from enemy cruise missiles and other intruders.

The EW system produces an electronic image of the target ship as it is sensed by the hostile guidance radar and then offsets the adversary radar so that the weapon is guided to a "ghost" target some distance from the real one. The system will be capable of detecting, tracking, identifying friend-or-foe, and then practicing its electronic deception if necessary.

Hughes Aircraft Co., which will build the system, has options for two or three more plus a partial

Dutch Resistance Workers Visit the US

In mid-May, a group of forty-eight men and women of World War II's Dutch Resistance was made welcome in Canada and the US. During the war, they helped almost 4,000 Allied airmen and paratroopers shot down or cut off behind enemy lines.

While in the US, the Resistance workers were the guests of members of the Air Forces Escape and Evasion Society. In years past, the AFEES has hosted groups from both the French and Belgium WW II undergrounds.

During their visit in the US, the Dutch stopped in Pittsburgh, where they were entertained by local citizens and attended a reception in their honor. Escorted to Washington, D. C., by Pittsburgh businessman and AFEES president Ralph K. Patton, the group met with President Carter at the White House and conducted a ceremony at the Tomb of the Unknowns, where a company of Honor Guardsmen was turned out to mark the occasion. This was followed by a three-day tour of New York, during which the Dutch were greeted by Mayor Koch and taken for a cruise around Manhattan Island, courtesy USCG.

While the visitors met many notables on their trip, they were disappointed in not seeing as many of their WW II charges as they had hoped.

The meeting with President Carter was arranged by Sen. Howard Cannon (D-Nev.), a long-time AFAer and retired Air Force Reserve major general. Senator Cannon and Frank Krebs, currently his legislative assistant for military affairs, were piloting a troop transport during the paradrop on Arnheim on September 17, 1944, when they were shot down, and, with the help of the Dutch, evaded capture for forty-two days until gathered in by an American patrol. Frank Krebs, a retired USAF colonel, ended a military career of thirty-two years in 1965 and became an aide to Senator Cannon. He was best man at the Senator's wedding thirty years ago.

Index to Advertisers

etrofit of an earlier version currently operating aboard the *USS Enterprise.*

The USAF has begun development of a new side-opening canopy system for the A-10 close support aircraft.

It will be thirty-seven pounds (17 kg) lighter than the current aft-hinged, clam-shell design, which in an emergency must be jettisoned before pilot ejection. The new system will contain a detonating cord to fracture the transparent canopy material and allow the pilot to eject through it; this feature, combined with the ACES II ejection seat, is to provide "the fastest ejection sequence ever incorporated in a USAF production aircraft," Air Force officials said.

Fairchild Republic Co., Farmingdale, N. Y., builder of the A-10, is designing the new canopy.

★ Two Americans have been named to the international group of five scientist payload specialists for the first Spacelab mission in late 1980: Dr. Michael L. Lampton, a space physicist at the University of California, Berkeley, and Bryon K. Lichtenberg, a vestibular researcher (matters of equilibrium and the inner ear), MIT, Mass. The European Space Agency has named: Germany's Ulf Merbold, of Max Planck Institute, Stuttgart; Claude Nicollier, a Swiss scientist and pilot at the European Space Technology Center, Netherlands; and Holland's Wubbo Ockels, a physicist at Groenigen University, Netherlands.

Of the five, two will be selected to fly the mission; the others will act as backup and support. The seven-day mission will orbit via Space Shuttle and investigate stratospheric and upper atmosphere physics, materials processing, space plasma physics, life sciences, astronomy, solar physics, earth observations, and space technology.

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★ **NEWS NOTES—USAF's Capt. Mary E. Walsh** has assumed duties as Assistant Air Attaché at the US Embassy in Paris, believed to be the first woman in history to serve as a military attaché.

In early June and for the first time, F-15 Eagles of **TAC's 49th TFW,** Holloman AFB, N. M., became part of **NORAD's peacetime air defense alert force.** TAC units have augmented NORAD forces since 1976 and now maintain alert aircraft at four of twenty-six CONUS alert sites.

DoD and the Interior Department have agreed to develop a plan for **increased public use of outdoor recreation resources** on military installations, including hiking, biking, nature trails, and canoeing. DoD administers 25,400,000 acres of federal lands; there are 433 principal military installations in CONUS, Hawaii, and Alaska.

At recent graduation ceremonies at the National War College, Washington, D. C., AIR FORCE Magazine Publisher and Editor in Chief **John F. Loosbrock** presented an AFA award for **excellence in research and writing** by an Air Force student to **Lt. Col. Charles L. Bishop.** ■

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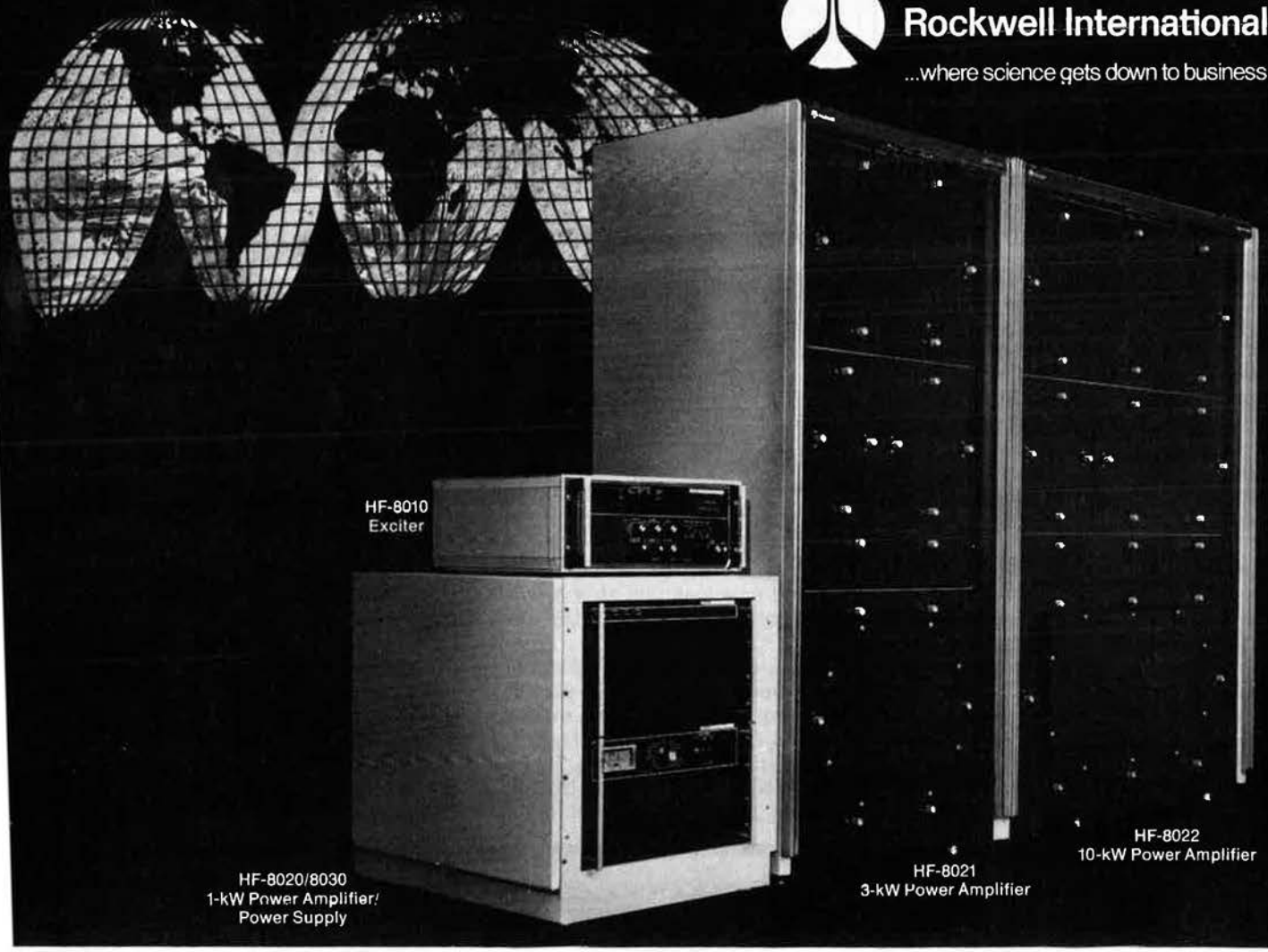

Mrs. Hap Arnold
1887-1978

Mrs. Arnold, from a photo taken at an unidentified AFA function.

Eleanor Pool Arnold, widow of the late General of the Air Force Henry H. (Hap) Arnold, died June 26, 1978, in a Sonoma, Calif., hospital. She was ninety-one.

Surviving are three sons—Col. Henry H. Arnold, Jr., USA (Ret.), of Sheridan, Wyo.; Col. William Bruce Arnold, USAF (Ret.), of Washington, D. C.; and Col. David Lee Arnold, USAF, stationed at McClellan AFB, Calif. A daughter, Lois, and a son, John, preceded her in death.

Mrs. Arnold was born in Rochester, N. Y., May 30, 1887, but grew up in Ardmore, Pa., on Philadelphia's "Main Line." She married 1st Lt. Henry Arnold, who was from nearby Gladwyne, in 1913. The following is a eulogy delivered on July 3, at the memorial service in the Fort Myer Post Chapel by John F. Loosbrock, Editor in Chief of this magazine and a close friend. She was buried in Arlington National Cemetery next to her late husband. Interred with her ashes were those of John Linton Arnold, the son who died in 1923 when not quite two.

* * *

What a lifetime it was!

We celebrate this year the seventy-fifth anniversary of powered flight. When the Wright brothers first flew at Kitty Hawk, Eleanor Arnold was sweet sixteen. Those same Wrights taught her future husband how to fly. For more than forty years, Hap Arnold's "darling Beadle" (his pet name for her) shared with him the vicissitudes and glories of the man who served superbly well the needs of the Air Force, the nation, and of free men everywhere at a time in history when anything less than success would have been tragic. Her life, in tandem with his, paralleled the innovative and pervasive growth of aviation—that revolutionary technological phenomenon that has touched the lives of all and continues to do so.

Now she is at rest, back where it all started—at Hap Arnold's side, after sixty-five years of devotion to the great man and to his memory.

She was a great lady, and we miss her sorely. ■

Left, with her five-star husband at war's end. Above, relaxing on the terrace at El Rancho Feliz, off Arnold Drive in Sonoma, Calif. The retirement years were all too short. General Arnold died in 1950, only three and a half years after quitting hectic Washington for the beauty and tranquility of the Valley of the Moon.

Capitol Hill

By the Air Force Association Staff

Washington, D. C., June 26

Funding Measures

The long, involved process of determining the defense budget for FY '79 continues, as the House grapples with defense appropriations and the Senate still wrestles with its version of the defense procurement authorization bill. But progress has been made on other funding measures.

The House Military Construction Appropriation, passed 278 to 13, provides $3.8 billion in new budget authority—$408 million less than President Carter requested. The Air Force took nearly thirty percent of that cut, primarily in areas related to the Space Shuttle and NATO projects. This reflected the warning of the Appropriations Subcommittee on Military Construction: ". . . the NATO allies should be carrying more of the responsibility for funding facilities that are operational in nature or are jointly used."

The Senate Armed Services Committee was even harsher with NATO. In its draft of the Military Construction Authorization Bill, the Committee cut the entire $373 million of combat-related NATO construction from the bill's $3.99 billion total. But the committee did recommend adding $60 million to the $90 million request for the US contribution to NATO's infrastructure program, thus emphasizing the need for cooperative effort.

Both the House and Senate have authorized $18.4 million for the Arms Control and Disarmament Agency. That is $2 million more than President Carter asked for.

The House has overwhelmingly approved an undisclosed amount—estimated to be in the $10 billion range—for US intelligence agencies.

But the House defeated an amendment by Rep. Richard C. White (D-Tex.) to increase Selective Service funding by nearly $10 million, and a similar amendment by Rep. Elwood Hillis (R-Ind.) to give Selective Service an extra $2.5 million.

Neutron Weapons

By wide margins, the House defeated two attempts to prohibit funding for enhanced radiation weapons —the so-called neutron warheads— in FY '79. Thus, President Carter retains the option to produce the weapons if he decides they are in the national interest.

The Senate Armed Services Committee said in a report that the Administration should stockpile components for neutron warheads for quick shipment to Europe. The alternative, the committee said, would be a delay of several years in deploying the warheads, should the President decide to use them as a deterrent to an attack by Warsaw Pact forces.

In April, President Carter deferred his decision on producing those neutron weapons.

Veterans' Preference

The current system for giving veterans a leg up in getting and keeping Civil Service jobs appears safe, despite President Carter's proposal to change it.

The President wants veterans' preference altered substantially as part of his Civil Service reform. But the Senate Governmental Affairs Committee has voted to leave vets' preference alone, and the House is likely to do the same.

Rep. Ray Roberts (D-Tex.), Chairman of the House Veterans' Affairs Committee, and Rep. John P. Hammerschmidt (R-Ark.), the Committee's ranking minority member, say Vietnam vets would be hurt most if the proposal becomes law. They note that unemployment among those veterans is about ten percent, and the rate is twice as high for black veterans. The House Post Office and Civil Service Committee is holding hearings on the proposal.

Bills Introduced

- **H.R. 12950,** Cederberg (R-Mich.), to allow a military person stationed overseas more time to avoid a tax on gains from sale of a home by purchasing another.
- **H.R. 12966,** Satterfield (D-Va.), to provide readjustment counseling to Vietnam-era veterans and their families.
- **H.R. 12981,** Steers (R-Md.), to require an environmental impact statement if a federal realignment would move 100 or more workers from a county.
- **H.R. 13275,** Gephardt (D-Mo.), to allow federal employees to elect to be covered by Social Security rather than federal retirement.
- **S. 1996,** Stafford (R-Vt.), and **S. 2856,** Morgan (D-N. C.), to permit participation in the Survivor Benefit Plan by military people who have completed the number of years required for eligibility for retired pay but who have not, because of age, become entitled to retired pay.
- **S. 3154,** Stone (D-Fla.), to overturn a Civil Service Commission ruling that military commissary store baggers be regarded as federal employees under the Fair Labor Standards Act. ■

The Budget Process

In the long, complicated budget process, it's easy to confuse authorizations and appropriations. Here's a brief description of how the system works with the defense budget. All of the following must be done within budget guidelines set by Congress early in the year, and finalized in September.

Authorizations come first. The Armed Services Committee in each house has jurisdiction. In their oversight role as defense experts, the committees examine the Administration's budget request to decide which projects are worthwhile and to set a rough funding ceiling for each. The committee's recommendations must be endorsed (or amended) by the full body. Differences between the House and Senate are worked out in conference committee. Authorizations deal only with procurement, R&D, and personnel levels, not operations and maintenance.

The Appropriations Committee in each house considers that authorization in deciding how the government's total budget will be spent. Again, the committee's recommendations must be approved by the full House or Senate, and differences between the two versions must be worked out. It is in the appropriations bill that Congress says to the Department of Defense, "Here's how much money we're giving you to develop these specific programs."

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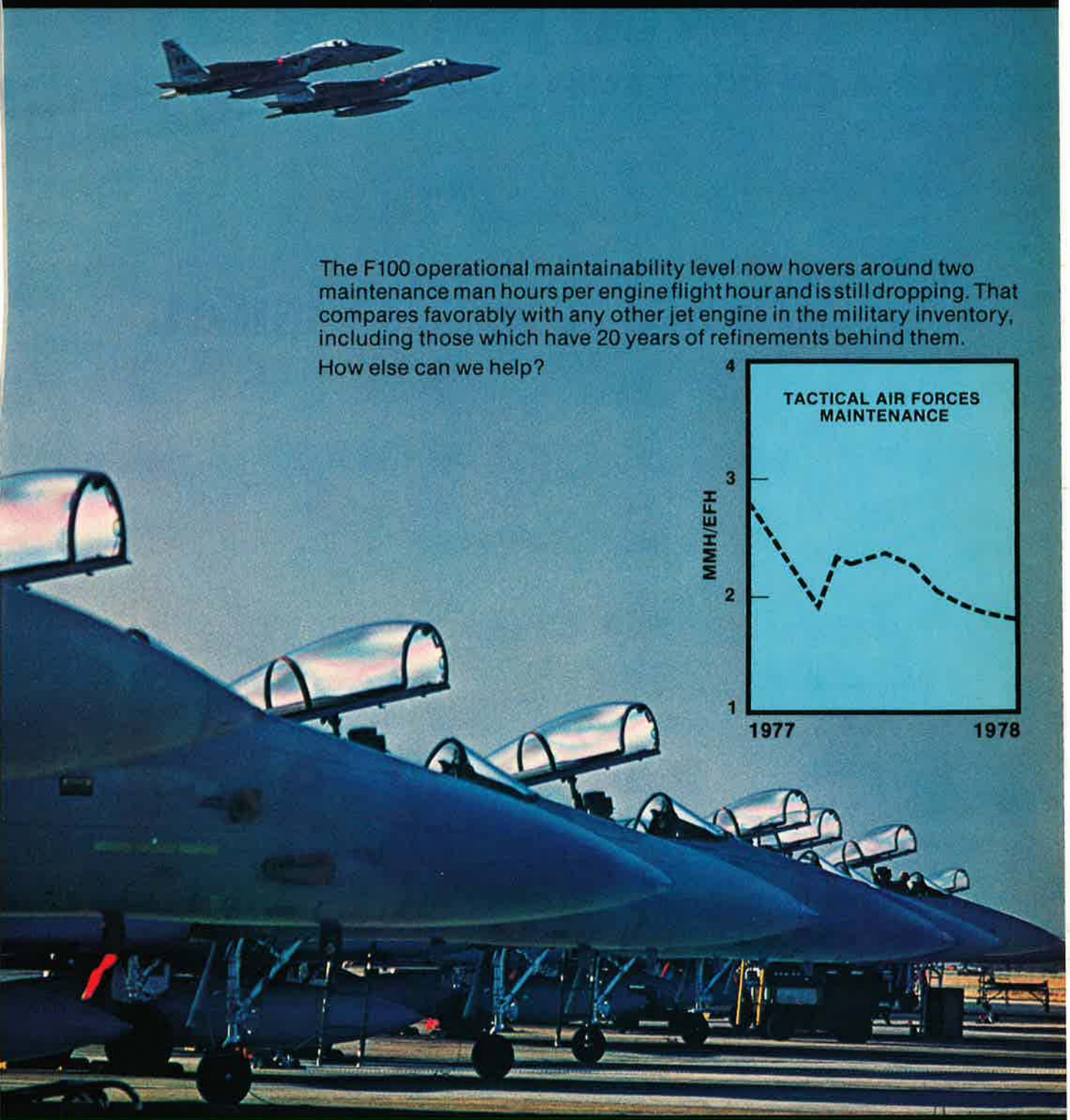

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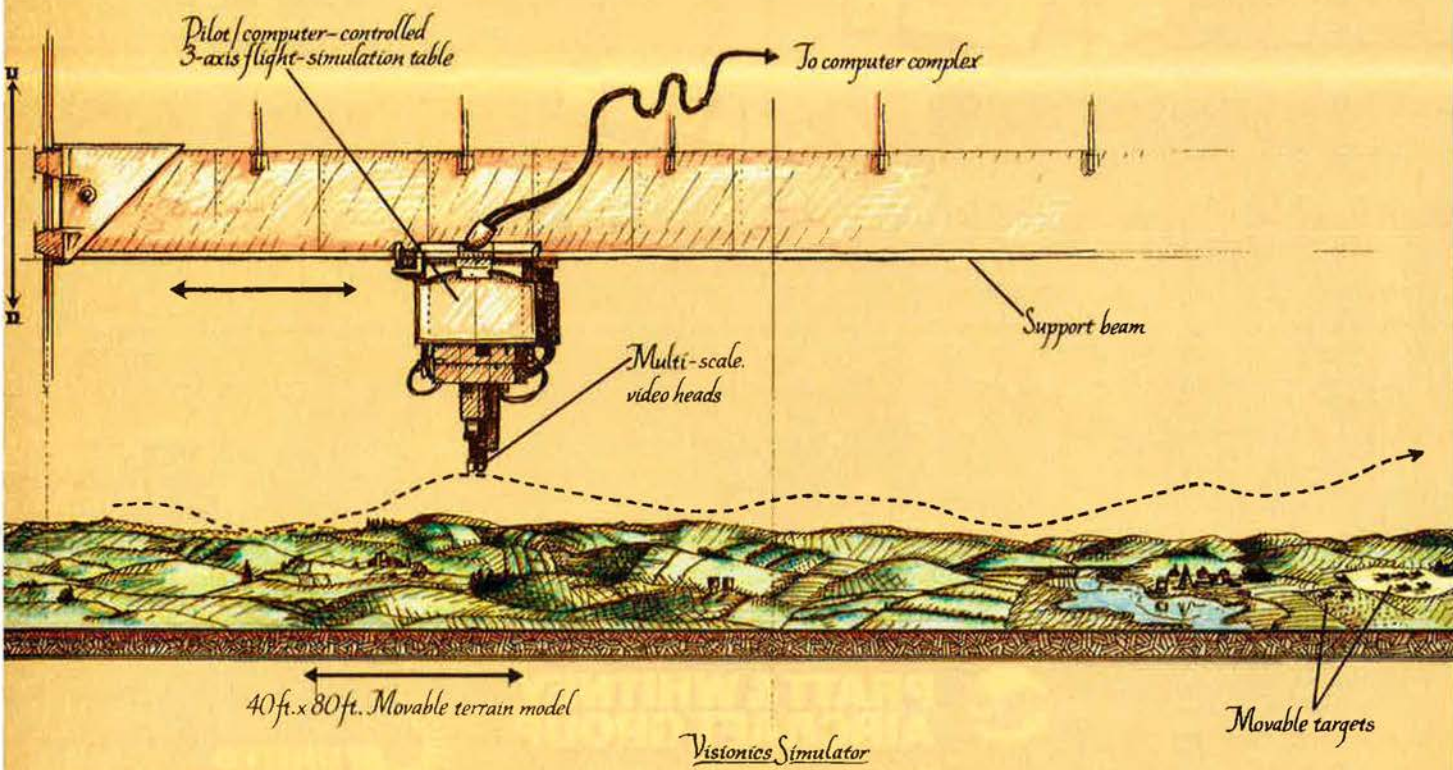

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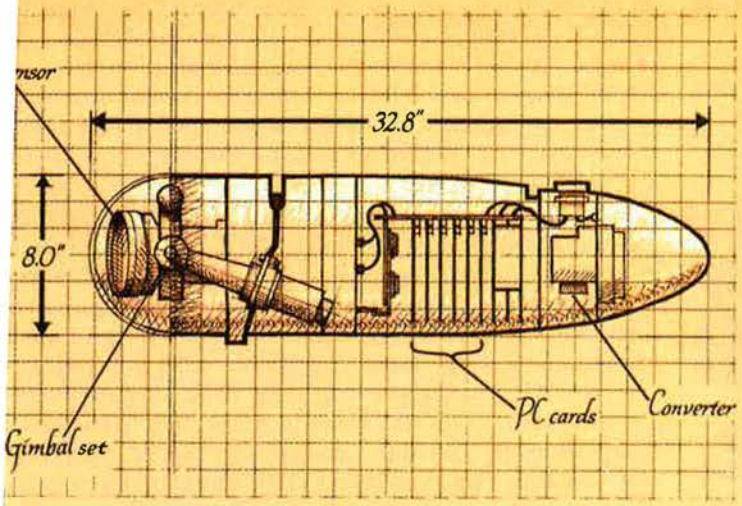

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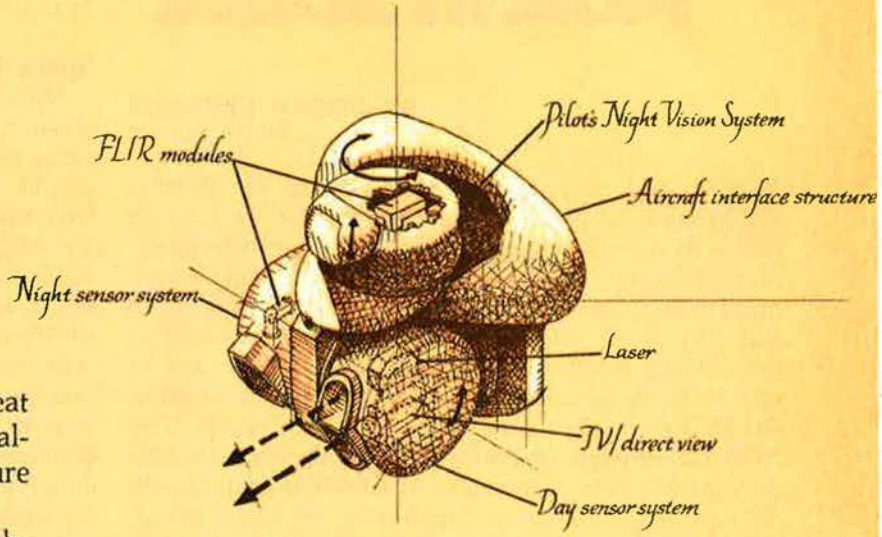

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In fact, a number of systems with vision of their own have grown out of this analytical approach. Paveway, an airborne laser designator, Pave Penny, an airborne laser tracker, and a Target Acquisition and Detection System known as TADS, for example, all required advanced electro-optics in order to search out, mark, and track targets day or night. Our Pilot's Night Vision System (PNVS) required new developments in forward-looking infrared technology.

When analyses also revealed a greater need for first-round accuracy, the military services called for weapons that could "see." Two such are Copperhead, a laser-guided artillery projectile, and Pershing II, a tactical missile that uses radar correlation, terminal guidance to point of impact.

To test systems with advanced technologies we've invested in some of the most sophisticated facilities in the industry. A unique and spectacular one is our multi-million dollar Simulation and Test Laboratory. Its electro-optical simulator includes a mammoth terrain model over which such systems can be "flown" by a pilot or missile.

Through vision, innovation and testing we've helped keep our country abreast of its defense needs. Without question, we're eminently qualified to help analyze and develop our country's future defense systems.

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Increasing US concern with space as an added dimension of national security, fostered in part by growing Soviet space warfare capabilities and the vast potential of the US Space Shuttle, is reshaping the orientation of NORAD and its principal component, USAF's Aerospace Defense Command.

NORAD/ ADCOM: A Growing Role in Space

BY EDGAR ULSAMER
SENIOR EDITOR

More and more, the North American Air Defense Command (NORAD) at Colorado Springs, Colo., is raising its sights to space as the possibly paramount operational medium of tomorrow. The joint US/Canadian command already is responsible for monitoring the presence and purpose of man-made objects in space, as well as for utilizing space to warn of ballistic missile attacks against North America and to detect nuclear detonations (NUDETS) on the earth's surface and in space. Now NORAD, through its principal US component, USAF's Aerospace Defense Command (ADCOM), is likely to pick up new, important space business in the years ahead. ADCOM's prime space prospect, its Vice Commander in Chief, Maj. Gen. William C. Burrows, believes, is operating the Space Shuttle for the Defense Department. The feeling is strong at NORAD/ADCOM that the role of military man in space will gain rapidly in importance with the advent of the Shuttle and that an operational USAF command should be in charge of its military operations. (As yet, the Air Force has not decided who will operate the system.)

NORAD's mission includes space and missile defense, but the weapons needed to do these jobs are conspicuous by their absence. If the US goes ahead and deploys an active antisatellite weapon (ASAT—possibly a variety of weapons that home on and disable a satellite that threatens essential US military spacecraft), ADCOM's 10th Aerospace Defense Squadron at Vandenberg AFB, Calif., is a prime candidate to operate it. That squadron, the only USAF space launch organization, is also the likely future operator of survivable US space systems launched to replace satellites destroyed on orbit.

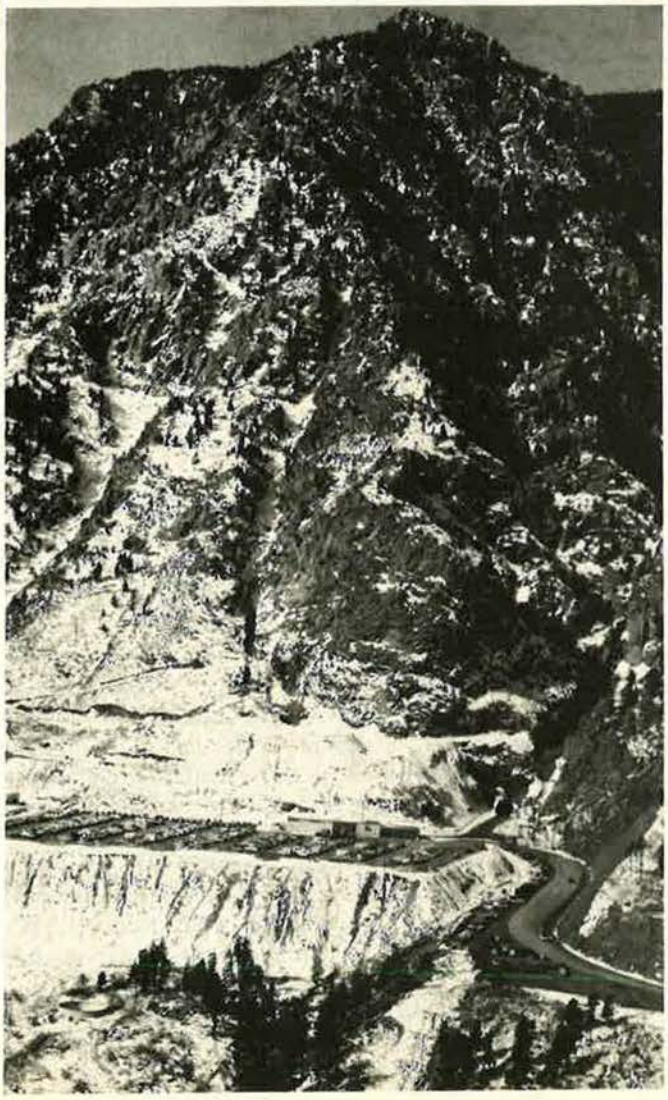
Possibly the most critical function for NORAD over the long term, in the view of its Assistant Deputy Chief of Staff for Operations, Maj. Gen. Bruce K. Brown, resides in its proposed Space Defense Operations and Command and Control Center, which is as yet in an early concept definition stage. Studies of this facility and its detailed tasks are to be completed early next year. NORAD brings an evolutionary approach to space defense, based on th economic necessity to build on existing capabilities an systems. If the command is authorized to deploy a ASAT weapon, it would, of course, become an integra element of the Space Defense Command and Contro Center. NORAD and other Defense Department agencie are working with other government organizations, such a NASA and the intelligence community, to establish th required interfaces. At the nub of NORAD's comprehensive space defense programs is the Satellite Attack Warning System, or SAWS, consisting of advanced computers supported by pertinent software in NORAD's Combat Operations Center inside Colorado's Cheyenne Mountain. SAWS correlates special data from various intelligence systems with information from the Command's Early Warning Satellite sensors and Space Detection and Tracking System (SPADATS), filters and processes this information, and then displays it to SAWS analysts in a rapidly usable form.

Space Detection and Tracking

NORAD's space watch involves keeping track of about 4,500 objects in space on a daily basis and monitoring changes in their orbital characteristics. SPADATS sensors must take about 20,000 sightings per day and feed data about orbital changes into NORAD's Space Defense Center computers, which then project future behavior including—when applicable—general information about when and where a space object will reenter the earth's atmosphere. (While the present capability is adequate for routine conditions, it is inadequate for thorough examinations of Soviet ASAT tests or such critical situations as the erratic behavior of the Soviet Union's nuclear-powered Cosmos-945 radar satellite prior to and during its reentry into the atmosphere. Since predetermining where the radioactive debris would impact was critically important—it landed in an isolated region of Canada —NORAD had to "borrow" sensors from other government agencies for a more precise tracking of Cosmos-945. SPADATS lacked the large number of sensors to provide the coverage needed for such precise tracking and impact prediction.)

SPADATS catalogs space objects ranging in size from a hand-held camera that an astronaut "lost" during a space walk to the 170,000-pound Skylab. It consists of a network of radars, optical devices, radio communications, and data-processing equipment located around the world. A key element is the phased-array radar and computer facility at Eglin AFB, Fla., which also serves as NORAD's alternate Space Defense Center. Other sensors include:

• The Cobra Dane phased-array radar on Shemya Island, Alaska, near the end of the Aleutian chain and less than 500 miles from the Soviet Union. By combining phased-array and advanced computer technologies, Cobra Dane, when operated in a surveillance mode, can detect an object the size of a baseball out to a distance of 2,000 nautical miles with ninety-nine percent probability of success. When used for tracking, the system can handle as many as 200 objects over ranges of more than 1,000 miles. Energy fed into the individual antenna elements of its radar array is steered electronically. Thus, the speed of the scanning operation is not impeded by moving



Above: NORAD's Space Defense Center, inside Cheyenne Mountain, records some 20,000 observations daily about space objects. Left: NORAD's Combat Operations Center in Cheyenne Mountain is staffed by some 1,700 people.

mechanical parts, the basic limiting factor of conventional radars.

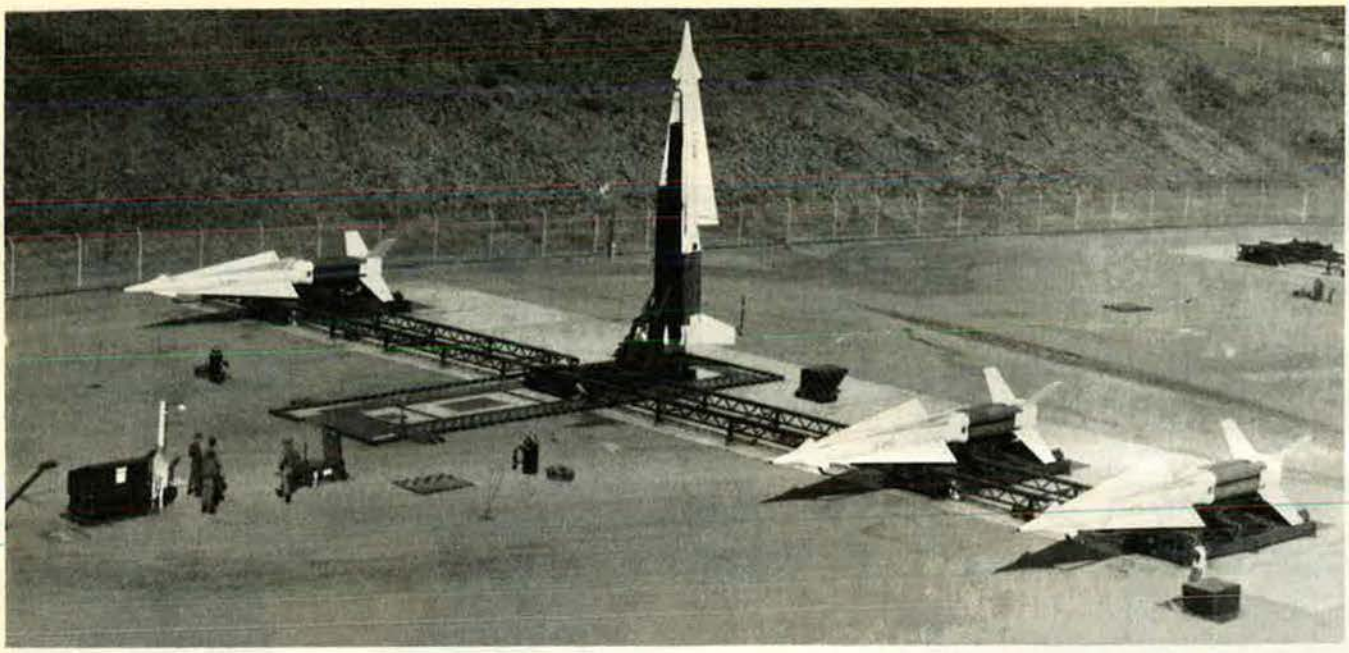
• PAR, the perimeter acquisition radar of the US Army's now defunct ballistic missile defense system at Concrete, N. D., joined SPADATS late last year for space tracking but also serves NORAD temporarily for ballistic missile attack assessment.

• Other radars that serve NORAD in the double role of ballistic missile attack warning and satellite tracking are those of the Ballistic Missile Early Warning System (BMEWS) at Thule, Greenland; Clear, Alaska; and Fylingdales Moor, England.

• NORAD's huge radar site at Diyarbakir, Turkey, is another key element of SPADATS. The system's two large detection radar antennas and a tracking radar emit radar energy into space in the shape of a large fan. A satellite passing through this cosmic fan is detected automatically and causes the tracking antenna to lock on the target and provide data about its orbital characteristics.

• The US Naval Space Surveillance System, which operates an electronic fence across the southern United States from California to Georgia, is another key tool of NORAD's Space Defense Center. This system uses radio energy beamed into space by several transmitters to detect satellites out to altitudes of several thousand miles.

• SPADATS optical devices, three-ton, ten-feet-tall telescopic Baker-Nunn cameras, are the most sensitive and precise sensors of NORAD's Space Defense Center. Operated by ADCOM in Korea, California, New Zealand, and Italy as well as by Canadian forces in Alberta and New Brunswick, these systems—under clear weather,



Top: Army Forces Command operates seven batteries of high-altitude Nike-Hercules SAMs in Florida and Alaska. Right: Eight batteries of low-altitude Hawk SAMs remain operational in Florida.

twilight, or darkness conditions—can photograph basketball-size space objects illuminated by the sun out to a distance of 20,000 nautical miles. Since targets are photographed against stellar backgrounds, identification of stars and correlation of their positions make it possible to calculate the position of satellites with great precision.

• Several other sensors, although not assigned to NORAD, provide information to SPADATS under special agreements. These systems include an MIT Lincoln Laboratory deep-space radar tracker in Massachusetts that uses advanced technologies to ferret out detailed performance information about Soviet satellites at high altitudes, and several USAF and US Army radar and optical tracking and identification systems in the Atlantic and Pacific.

Near- and Long-Term Improvements

The steadily growing number of satellites and the increasing use of maneuverable spacecraft combined with greater Soviet emphasis on geostationary or geosynchronous military satellites have brought out serious deficiencies in SPADATS. Included here are major geographical gaps and severe limitations in the detection and tracking of objects above 3,000 nautical miles. Obviously, there is a fundamental need for any modern space defense system to provide rapid, complete, and, preferably, all-weather around-the-clock coverage up to geosynchronous (22,300 miles) altitudes and beyond.

The importance of space attack, warning, and assessment capabilities was emphasized to this writer by Dr. William Perry, Under Secretary of Defense for Research and Engineering. Efficient alerting and diagnostic systems "that could tell us if our satellites are under attack," he stressed, would provide the National Command Authorities (NCA) with the option of either proceeding diplomatically or "with retaliation." Such a capability also would reduce the requirement to burden every military US satellite with various survivability features that curtail its payload while enhancing the spacecraft's resistance to various technical "contingencies which might not develop."

Under Secretary Perry views as solvable two forms of threats against US satellites that have been given extensive press coverage. The notion that a technically sophisticated adversary might be able to "spoof" US satellites into self-destruction by sending them spurious command signals is, he said, "very, very difficult" because the US takes "reasonable precautions with the command links." Nevertheless, Dr. Perry believes that "this is one of the areas of vulnerability reduction worth incorporating as you go along, not waiting until something happens." Further, once the US finds that attacks on satellites by Soviet laser weapons is possible, it is equally possible to protect military spacecraft with "various sorts of heat shields." Two general classes of satellite protection against Soviet ASAT attacks that come "to mind quickly are maneuvering the satellite and jamming the sensor of the antisatellite, or a combination of those two," he said. In both areas, the Space Shuttle's ability to lift larger payloads at lower cost than current launch systems can be expected to ease present constraints.

A pivotal, near-term improvement of NORAD's Space Defense Center is GEODSS, for Ground-based Electro-Optical Deep-Space Surveillance, a clear-weather, night-time system scheduled to achieve operational status in the early 1980s *(see p. 47, July '78 issue)*. Three of the ultimately proposed five GEODSS sites have just been selected, at White Sands, N. M., Hawaii, and Korea. The remaining sites will involve a Middle East and an Eastern Atlantic location to provide full coverage of the so-called "geosynchronous belt."

But GEODSS, like the current Baker-Nunn camera network, is an interim system. NORAD's other top priority, therefore, is "to get more of our sensors into space to reduce our dependence on and limitations by ground-based systems." While NORAD is considering the possibility of obtaining deep-space coverage through a series of long-range ground-based radars, solutions using space-based systems clearly appear more attractive and enduring. Three long-range concepts are under close examination: LWIR (Long Wave Infrared), space-based radar, and visible light systems. There can be no doubt, however, that whether one or more of these technologies are chosen, it will be years—even under ideal conditions—before they can reach operational status. In the case of infrared systems—probably the most "mature" of the three techniques—the first actual demonstration of the TEAL RUBY sensors *(see p. 49, July '78 issue)* will have to wait until the Space Shuttle becomes available for Defense Department use in 1981. Demonstration of LWIR aboard a "guest satellite" could occur shortly thereafter.

Toward Improved Ballistic Missile Warning

The three geostationary satellites of the Early Warning Satellites serve as the backbone of NORAD's ballistic missile warning system. Two aspects of the Early Warning Satellite system need improvement. One area involves the satellite itself. Programs under way will enhance the resolution and sensitivity of the on-board infrared sensors to expedite and increase the information flow concerning hostile missile launches and to detect smaller targets. (The Early Warning Satellites also carry sensors that detect nuclear detonations on the earth's surface and in space, called the NUDET system. NUDET is to be improved by placing similar sensors aboard the twenty-four satellites of the NAVSTAR Global Positioning System to obtain an around-the-clock three-dimensional detection capability for any point at or near the surface of the globe.)

Other work centers on reducing their vulnerability to attacks by a Soviet killer satellite. Lastly, on-orbit life of these satellites is to be boosted through a series of technical refinements. Dr. Perry says these improvements are to be designed into future satellite buys as well as retrofitted into existing spare satellites. The Defense Department expects the evolutionary changes will enable the system to provide the NCA with essential warning information well into the 1980s. There also is indication that the chances of systems error due to such nonhostile occurrences as sunglints off clouds and pipeline venting, as well as jamming by ground-based high-energy lasers, are being reduced.

Enhancement of the Early Warning Satellite system ground terminals, heretofore its most vulnerable element, was also deemed essential by NORAD and is in progress.

In the coming year, NORAD expects to put a prototype Simplified Processing Station (SPS) into operation and, concurrently, to start development of an austere command and status capability for this new element. Two key advantages are the ability to provide warning information directly to user commands and agencies—thus obviating the need to go through ground-based communications systems—and the option of enhancing survivability through proliferation.

The SPS is a transportable, simplified version of the system's existing fixed ground stations that can serve as their backup, can double as terminals for additional satellites—if the deployment of more than three spacecraft becomes necessary—and provide information directly to additional users of the system.

Other improvements of the Early Warning Satellite system now under way include modifying new satellites to make them compatible with payload constraints of the IUS (inertial upper stage—under USAF development that will boost military spacecraft from the Space Shuttle's low earth orbits to geosynchronous and other high-energy orbits) and refinements of the system's communication features.

Longer-term improvements of the space-based early warning network include the Sensor Evolutionary Development (SED) program and USAF's Missile Surveillance Technology Program. The latter, according to Dr. Perry, is a unique mosaic sensor that "would be sufficiently sensitive for fine grain attack characterization. Further, with this sensor deployed on a space platform, surface-to-air and air-to-surface missiles could be detected and tactical surveillance of theater battlefield events would be possible."

Mosaic sensor satellites probably could be made small, produced at low cost, deployed in large numbers at relatively low altitudes (thus cutting deployment costs), and, by their very nature, are less vulnerable to laser-jamming than other space-based sensors. Two even more ambitious missile detection programs—that could also serve in the space surveillance mission—are TEAL RUBY and HALO (High Altitude Large Optics). Both programs are being carried out by DARPA (Defense Advanced Research Projects Agency) in conjunction with the Air Force. Both represent high-risk technologies.

BMEWS Upgrade

The Ballistic Missile Early Warning System (BMEWS), deployed in 1961, continues to provide NORAD with reliable, overlapping coverage of the Sino-Soviet ICBM launch corridors, potential launch areas for mobile ballistic missiles, and northern Atlantic and Pacific patrol areas of Soviet submarines carrying the SN-8 SLBMs. BMEWS, designed to provide warning of massive ICBM attack, is being upgraded to cope with what NORAD analysts term new and sophisticated threats. Involved is the ability to go beyond mere warning to provide attack characterization through more accurate tracking and impact predictions of Soviet MIRVs.

The resolution of the system's detection and tracking radars is being upgraded concurrently with the acquisition of new computers, display consoles, and attendant soft-

ware. This enhancement program is scheduled to be completed by the early 1980s. In the interim, NORAD is relying on perimeter acquisition radars (PAR) for attack characterization information. USAF is evaluating the possibility of changing PAR's scan pattern to increase its range, thus providing warning between one and a half to three minutes earlier than is the case now. Even enhanced PAR will lag behind the improved BMEWS, however.

The PAVE PAWS phased-array radar system, currently scheduled for two sites—one on each coast—may have to be expanded to four locations because of improved Soviet SLBM capabilities. NORAD has "regenerated" the original requirement for a four-site PAVE PAWS system to cover a southeast and southwest arc. The two sites approved so far won't provide adequate coverage in those areas. While PAVE PAWS's detection range is below the range of the newest Soviet SLBM, the 5,000-mile-plus SSN-18, NORAD does not consider this factor critical since the Early Warning Satellites would provide initial warning information. The same condition would obtain if the Soviet Union were to develop SLBMs capable of flying depressed trajectories to take advantage of the line-of-sight "blind spots" of PAVE PAWS or any other ground-based radar system.

Information from all NORAD warning sensors is integrated and correlated to give an overall assessment of missile attacks against the US. This job will be performed by a new system, the Warning Information Correlation program that is under development.

Even though in need of upgrading, NORAD's ability to detect launches of either ballistic missiles or spacecraft anywhere in the world appears to be comprehensive: Of about 400 launches last year of spacecraft and ballistic missiles—the latter for flight tests—that the intelligence community has evidence of, there was none that NORAD failed to detect through one or more of the command's sensor systems. This record is all the more remarkable since the bulk of these launches were Soviet ballistic missile tests on which NORAD had no advance information.

Atmospheric Defense

NORAD, mainly through ADCOM and Canadian Forces, is responsible for passive as well as active air, or more properly atmospheric, defense against hostile aircraft and cruise missiles. Three functions make up this mission: Management of relevant command control and weapon systems, tactical warning, and atmospheric surveillance.

Peacetime surveillance, on an average day involving about 1,500 aircraft entering US airspace from abroad, will gain considerably through the US Joint Surveillance System and an equivalent Canadian network. In the continental US, this joint USAF/Federal Aviation Administration system will consist of forty-four long-range radar sites covering the perimeter of the CONUS. Thirty-five sites will be operated by FAA, with USAF personnel required there only to operate height finder radars. The remaining nine sites will be operated by ADCOM. One of them, the SEEK SKYHOOK radar system in the Florida keys, is located on special tethered balloons kept at an altitude of 12,000 feet to cover the Florida Strait and northern Cuba.

In Alaska, JSS will consist of fourteen radar sites, most of them USAF-operated. In Canada, the Ministry of Transport and the Ministry of National Defense are building a similar system. The Canadian net, however, will be under direct military supervision and, therefore, secure, and provided with electronic counter-countermeasures (ECCM). The US system lacks these qualities. Linked to the US and Canadian radar nets are seven Region Operations Control Centers (ROCC)—four in the CONUS, one in Alaska, and two in Canada—to provide command and control for the peacetime airspace sovereignty mission.

Another NORAD atmospheric defense modernization program involves replacing the aging radars of the twenty-year-old Distant Early Warning (DEW) Line with unattended, automatic systems. The present system's ability to detect low-altitude penetration is limited. The DEW Line upgrading will correct this deficiency by providing rapid detection down to 100-foot altitude with the help of as many as seventy new radars.

The upgraded DEW Line is to be linked to another detection system, the OTH-B, or Over-the-Horizon Backscatter radar, if the latter is approved for operational deployment. An experimental OTH-B radar is under construction in Maine to demonstrate technical feasibility. By reflecting radar energy between the ionosphere and the ground, OTH-B eliminated the line-of-sight range limitations of conventional radars—thirty to fifty miles for low-flying and 200 to 250 miles for high-flying aircraft and cruise missiles. OTH-B is expected to have a range of more than 1,000 nautical miles and, if deployed in Maine and the Pacific Northwest, would provide warning coverage in a 180-degree arc to seaward from each location. This system is, however, of only marginal utility in the northern, auroral, direction and therefore must be augmented by the northward-looking DEW Line. Over the long term, NORAD planners expect space-based radar systems to provide the most effective and reliable form of atmospheric warning to replace or augment ground-based systems.

Linchpin of the wartime warning and command control capability is the E-3 AWACS. Of the programmed thirty-four aircraft, six are to be available for the atmospheric defense role. These aircraft are scheduled to include some special enhancements whose precise nature has not yet been decided. Aircraft assigned to NORAD will be taken from the second production group—the "A" run is to end with the twentieth aircraft off Boeing's production line. NORAD doctrine envisions that the six systems earmarked for air defense would be located at ROCCs and would update the onboard computer with the latest information available to the center's computers prior to takeoff. A NORAD battle staff would be aboard some of these aircraft. The system's job, in case of an impending attack, is to direct the air battle from a forward position and to provide a survivable airborne command and control platform.

NORAD Weapon Requirements

NORAD's meager arsenal of atmospheric weapons consists of six ADCOM and three Canadian Forces interceptor squadrons, operating F-106 Delta Darts and CF-101 Voodoos, respectively. In addition, ten Na-

Top: Canadian Forces' CF-101 is to be replaced by a fighter/ interceptor of either US or European origin. Left: NORAD operates ninety-three long-range radars, plus those of the DEW Line. This is Mill Valley AFS, Calif.

tional Guard squadrons flying F-106, F-101, and F-4 aircraft stand alert along with the active-duty force. In an emergency, NORAD's fighters would be augmented by aircraft from the US Navy and Marine Corps, the Tactical Air Command, and from Canadian Forces training and tactical squadrons. Primary armament of the CF-101, F-101, and F-106 is the Genie nuclear air-to-air ballistic rocket, augmented by Falcon air-to-air guided missiles. The F-106s are being modified to include a 20-mm cannon.

Air Force witnesses have told Congress that the Department of the Air Force has studied the possibility of assigning the CONUS air defense mission to TAC. In March of this year, the then TAC Commander, Gen. Robert J. Dixon, informed the Senate Armed Services Committee that under USAF's proposal—as yet not ruled on by the Defense Department—the ADCOM interceptor units would be absorbed into TAC to "effect economies of management" but without losing their unique expertise.

He also acknowledged under questioning that the F-106 is obsolescent and that the F-15 is a "much better interceptor . . . provided the F-15s are additional F-15s" and not taken out of TAC's tactical air inventory to eventually replace the F-106s. The "preferred solution," he said "would be to increase the F-15 production and convert [replace] the F-106s now."

For a number of years, NORAD has advocated replacing the F-106 with a dedicated interceptor force of modified F-15 aircraft known as the FOIs, or follow-on interceptors. Although approved by USAF, this program has been deferred by the Defense Department.

Canada, meanwhile, has announced that it will purchase new fighter aircraft for the continental air defense mission. The Canadian government has earmarked funds for the purchase of more than 100 aircraft, at least thirty-six of which will be assigned to air defense. Negotiations are under way with four US and one European aircraft companies. The aircraft involved are the F-14, F-15, F-16, F-18, and the European Consortium Panavia Tornado, formerly known as the MRCA. The winner, or winners (more than one type may be selected), is expected to be named late this year.

Another new weapon system sought by NORAD under its future objectives plan is a modified version of the US Army's new surface-to-air Patriot missile. NORAD's objective is to use this point defense weapon to protect such key targets as the NCA command centers.

At present NORAD's surface-to-air missile (SAM) forces, operated by Army Forces Command, consists of seven batteries of high-altitude Nike-Hercules—in Florida and Alaska—and eight batteries of low-altitude Hawk SAMs in Florida. The combined total of NORAD SAMs is slightly above 400 missiles.

While NORAD and ADCOM continue to bolster the atmospheric defense capabilities of the nation, Gen. James E. Hill, Commander in Chief of the two commands, told this writer that "it has become increasingly obvious that the future of the Aerospace Defense Command and its premier challenge are in the space arena. No other single agency has the operational space expertise found in ADCOM. We expect our role in space to grow at an accelerating pace in the years ahead." ■

The C-2 improved version of the Kfir, the jet fighter built in Israel.

Report From Tel Aviv

New Role for Israeli Air Force?

Israel and the Arab states continue to build their military might amidst US efforts to bring a lasting peace to the area. Meanwhile, Israel's leaders are debating how best to use the Israeli Air Force, following heavy losses in the 1973 Middle East War.

BY BONNER DAY, SENIOR EDITOR

Tel Aviv, Israel

IN THE midst of a massive arms race between Israel and the Arab states, Israeli leaders are rethinking the role of the Israeli Air Force.

There is no question about the value of a modern, well-trained air force for the Jewish nation, surrounded as it is by historically hostile Arab neighbors.

Israeli leaders, civilian and military, are involved rather in a debate over how their Air Force should be used. Serious questions have been raised about the heavy losses in aircraft during the 1973 Yom Kippur War and the growing sophistication of air defenses in the Arab states.

The debate has intensified as Israel and its neighbors seem to be moving closer either to the long-awaited peace settlement or another war. What the future will bring is not clear, but there are some disturbing trends:

- Peace initiatives by Egypt's President Sadat and the US have been stalled by intransigence in Syria and suspicions of Arab sincerity in Israel.
- The Israeli government, despite raging inflation and a growing national deficit, is buying and building aircraft and other war equipment at a crisis rate.
- The Arab states also are building up their armed forces, outspending and outequipping Israel through the use of oil money, improved relations with the US, and, in some cases, continuing links with the Soviet Union.

The result is an entire region that has more arms, and more sophistication in its arms, than ever before. If there is another war in the Middle East, it promises, because of this rearmament, to be the most lethal in both arms and lives that the area has experienced since the creation of the State of Israel in 1948.

At the same time, there also is rising concern over the Soviet Union's willingness to incite war and to expand its influence in the Horn of Africa and the Arabian Peninsula.

In Egypt, which has broken its ties with Moscow, and in Saudi Arabia, long a foe of Soviet influence in the Middle East, the Soviet Union's activities have created a climate of anxiety, and a widely shared concern that differences with Israel should be resolved, at least temporarily, so the Soviet threat can be addressed without distractions.

In Israel, there is a growing consensus that the Arabs are not the principal foe, but rather the tool of the real enemy, the Soviet Union. As evidence, Israeli leaders point to the Soviet arming of the Arab states before the Yom Kippur War, Soviet arms deliveries during the war, and the massive rearming following the war, again by the Soviet Union.

Soviet aggressiveness is responsible in part for pessimism in Israel about the prospects for a peace settlement in the near future. Says one Israeli political leader: "How can we have true peace as long as the Soviet Union is willing to arm the Arabs with no regard for the survival of Israel?"

Despite the historic trip of Egypt's President Sadat to Jerusalem in December 1977, Israelis also are skeptical of Arab diplomacy and fearful that the Arab states, including Egypt, would scrap any agreement if they thought they could defeat Israel militarily.

A New Era

Still, here in Israel, people talk of a new era. For the first time, the two principal protagonists, Israel and Egypt, are both to be supplied with American warplanes —and to be subject to Washington restrictions. For the first time, it is Egypt that is offering peace terms and Israel that is avoiding the bargaining table until the essential parts of an agreement can be resolved. And, for the first time, it is the Arab armies that are confident almost to the point of overconfidence, and it is the Israeli government that is questioning the efficacy of war.

The repercussions of the US decision to supply both Israel and Egypt are still being felt. It was after the 1967 war that Israel first was permitted to buy American com-

at planes. Jordan and Saudi Arabia already had been ›ld American planes, but in limited numbers and with ›sser sophistication.

Now a new benchmark has been reached, in which ›oth sides will be flying the latest American planes. The ›ackage agreement approved by Congress in June calls or seventy-five F-16s and fifteen F-15s for Israel, sixty ?-15s to Saudi Arabia, and fifty F-5Es to Egypt.

This led Israeli Defense Minister Ezer Weizman re-›ently to say: "I hope that in this new era, we will both ly, but not shoot down, American planes."

For the Arabs, the US decision to sell modern fighters to Egypt and to let Saudi Arabia buy the high-performance F-15 Eagle represent a major breakthrough. At least on the surface, two Arab states are made the equal of Israel in US eyes, and the clear US favoritism Israel enjoyed during the Johnson, Nixon, and Ford Administrations has ended.

For Israel, the planes add considerable stress to its defenses. Israeli Air Force commanders are frank in the belief that the US builds the best jet fighters in the world. While these planes were limited to Israel in the Middle East, Israeli pilots enjoyed a qualitative edge over Arab opponents flying Soviet planes. Now that Egypt is to have American planes, that edge is disappearing.

Israelis still believe they enjoy a qualitative edge in pilot proficiency, but they are concerned that the edge may shrink in the light of Arab experience in the Yom Kippur War and of the sheer numbers of pilots and planes the Arabs are massing.

Air Force commanders also are concerned about reports of the steady number of American and other mercenary pilots Saudi Arabia and other peninsula states are hiring.

Says Maj. Gen. David Ivry, the current Israeli Air Force commander: "We train all the time, but in every war we also train those who fly against us. And while we could afford adverse ratios of one to three, four, or even five when the Arabs were flying MiGs, we cannot accept those ratios when they fly the F-5E, much less the F-15."

Already, the total Arab fighter and attack plane force poised against Israel totals more than 1,700 planes. Several hundred more are on order from the US, the Soviet Union, and Western Europe. Israeli military leaders estimate that this air armada is roughly the same in number and types of aircraft under NATO's Northern and Central Commands.

The leading edge of the Arab force is 500 fighters and bombers in the Egyptian Air Force, including Russian MiG-23s, and 450 fighters and bombers in the Syrian air fleet. Other Arab air forces include 100 fighter-bombers in the Royal Jordanian Air Force, 140 fighter-bombers in Saudi Arabia, 370 attack and fighter jets in Iraq, and 150 combat planes in Libya.

Israel, by contrast, is thought to have about one-third as many combat planes as the Arab states combined, fewer than 600 fighters and attack aircraft. This includes one F-15 squadron, six F-4 and six A-4 squadrons, and six squadrons composed of Mirage and Israeli-built Kfir aircraft.

The Israeli Air Force, though small in comparison with the combined air might of the Arab countries, is almost twice as large as it was when the fighting broke out in 1973. The Arab countries, similarly, have about doubled their military strength in planes, tanks, and other military equipment.

AIR FORCE Magazine Senior Editor Bonner Day views bunker on the Golan Heights. This strategic high point, scene of some of the region's biggest battles, controls approaches to both the Syrian capital and Israeli farms.

The Buildup Logic

One major reason for this arm buildup is the heavy losses both sides incurred during the '973 fighting.

The Arabs lost an estimated $4 billi in military equipment during the war. Israeli intelligen mates the Arab states are spending $40 billion to replace losses and increase their military strength, which, discounting inflation, represents at least six times as much military might as before the Yom Kippur War.

Israel's Air Force lost 102 planes in the 1973 fighting, or thirty-seven percent of a total force estimated at 270 fighter and attack aircraft. The Arab air forces suffered heavier losses, a total of 450 planes. Egyptian and Syrian aircraft losses alone were 172 and 222 respectively.

The lesson of the war was not lost on Israel or its Arab opponents: modern war causes high losses, and the eventual winner could be the country with the biggest stockpile.

Syria, Iraq, and Libya have been getting large numbers of aircraft from the Soviet Union since the 1973 war. The recent crackdown on Iraqi Communists *(see also p. 18)* apparently has not affected the flow of arms to Iraq. Until 1976, Egypt also was receiving aircraft from the

Soviet Union. Since the rupture with Moscow, however, Cairo has turned to the US and Europe.

Israel has been buying US planes, at a discount rate through the US government, since the Yom Kippur War, and has F-15s and F-16s on order for several years ahead. In addition, Israel Aircraft Industries has been building Kfir fighters since at least 1973, at a closely held production rate estimated by aeronautical experts at up to six a month.

Replacements became a critical issue in the midst of the Yom Kippur War, as both Israel and its Arab opponents found they had lost a major portion of their aircraft and other military equipment and were at the mercy of their suppliers.

The Arab states had little to complain about. The Soviet supply of its Arab friends, Egypt, Syria, and Iraq, started even before the war began. Replacement equipment was loaded on ships in the Black Sea and pushed off to sea about the moment the shooting started. Tanks, airplanes, ammunition, and other war goods were being unloaded at Syrian seaports within days.

A major Soviet airlift also was under way only a few days after the outbreak of war, as giant Antonov An-22 cargo carriers began landing in Damascus and Cairo.

US Supply Problem

By contrast, the US resupply of Israel was slower to start. The first flight of C-5 Galaxy aircraft to Tel Aviv was not until October 13, a week after the fighting had started.

What caused the delay is still a matter of debate. The two principal US cabinet officers at the time, Secretary of State Henry Kissinger and Defense Secretary James Schlesinger, have both denied they were responsible for the delay in supply flights.

Rather than fixing blame, Israeli leaders say they are more concerned that in the future the nation's survival not be subject to US red tape. Two courses of action have been taken, with mixed results:

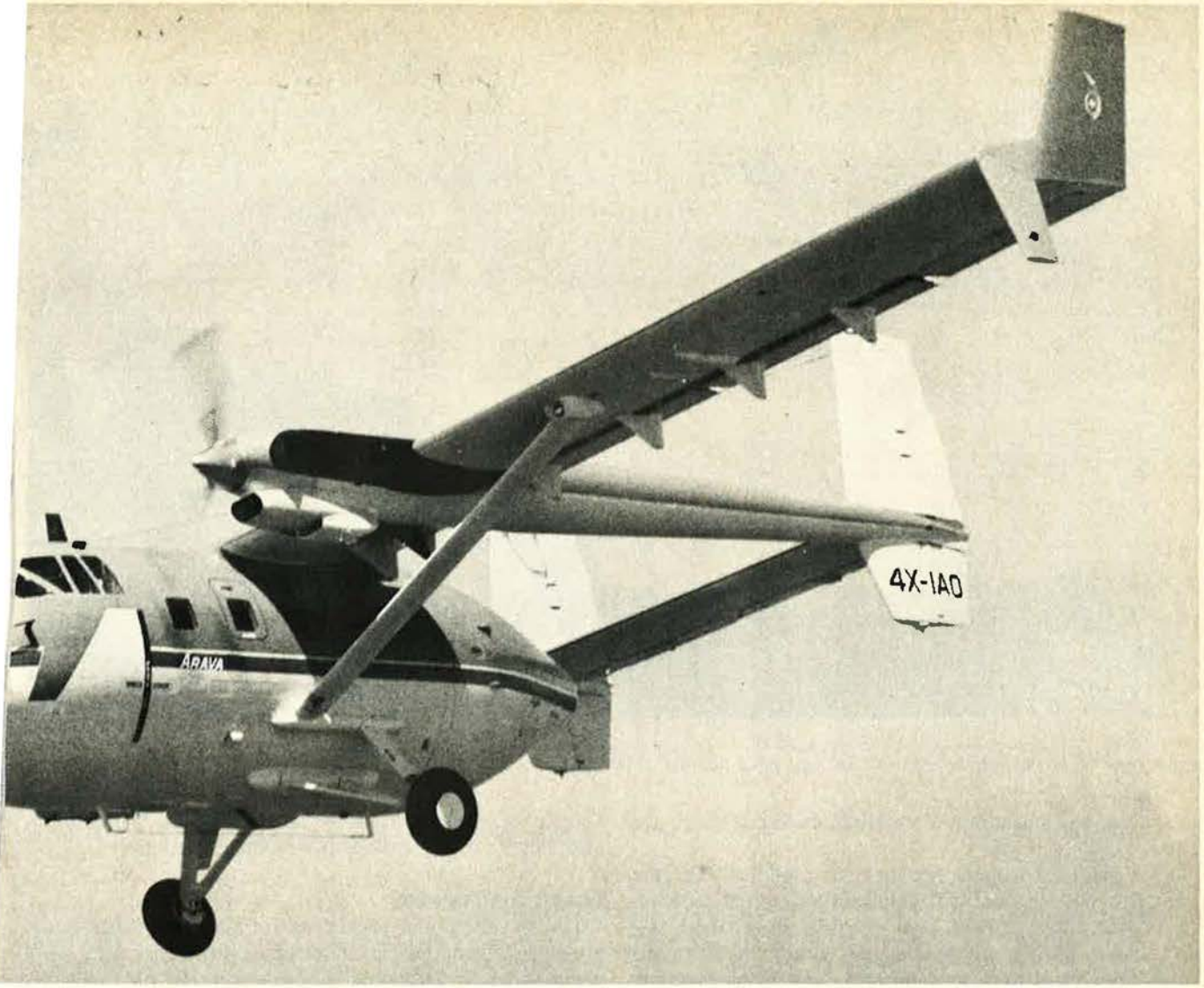
Two Israeli-built planes have found export markets. The Westwind, left, is sold as an executive or coast guard reconnaissance plane, while the Arava, above, is used to haul cargo and troops to primitive fields.

- The Israeli Defense Force is buying more airplanes, tanks, and the other sinews of war than ever before, and stockpiling them.
- Israeli military industry is being encouraged to make the country as independent of foreign suppliers as possible. Says one general: "We want the Israeli armed forces to be equipped, as much as possible, with Israeli arms."

With a sufficient stockpile and independent sources of supply, it is felt, the country will be protected from defeat because of a lack of arms, and from unreasonable diplomatic demands in the midst of the fighting.

This independence has been hard to achieve, however. Israel's efforts to expand its modest aircraft industry through export sales have been stymied by US restrictions on the sale of US components to third countries.

Israel Aircraft Industries, the one firm building aircraft in Israel, thus has been unable to sell its small fighter, the Kfir (Lion Cub), in spite of interest in almost



a dozen countries. The plane, though assembled in Israel, uses a jet engine licensed by General Electric, and so is dependent on US approval for third-country sales.

One foreign sale, eighteen to twenty-four planes to Ecuador, already has been turned down by the US. A second sale, to Taiwan, has been delayed by the US.

A follow-on plane, already named the Arie (Lion) is now in the early stages of design. The Israeli government is torn between directing its subsidiary, Israel Aircraft Industries, to use another US engine and risk continuing export interference, or investing up to $2 billion to design an Israeli engine. Israeli aeronautical experts consider other engine builders, in France, Britain, and Sweden, too far behind technologically to be considered.

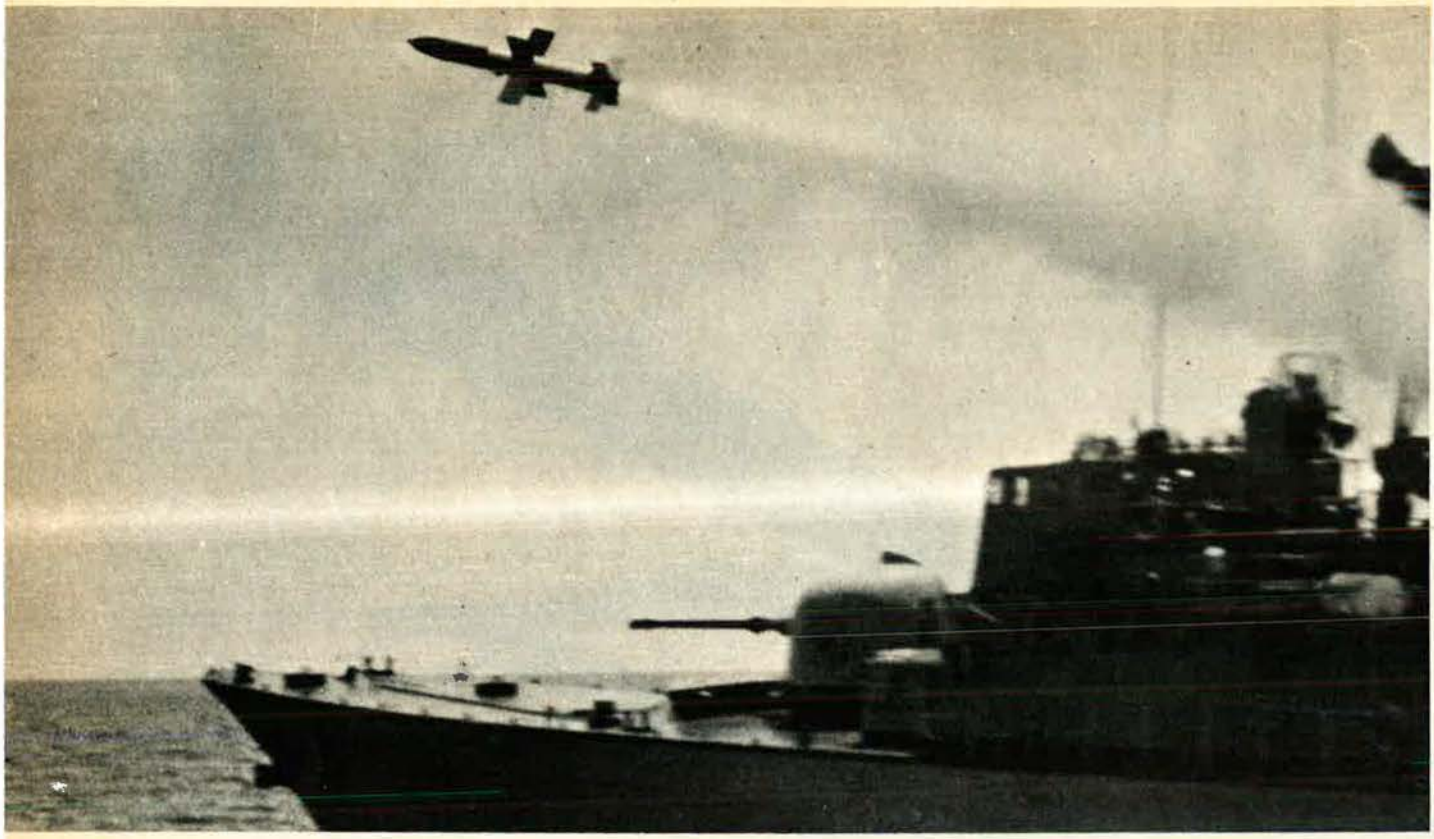
Israeli Air Strategy

Israeli policymakers are having an even greater debate over how to employ the planes, the Israeli-built Arie as well as American aircraft, when they do get them. Military leaders are still sensitive to the general opinion that the massive US airlift of planes, tanks, and other military equipment in the middle of the Yom Kippur War was the difference between defeat and another historic victory over the Arabs. Gen. Moshe Dayan, now Foreign Minister, has said that Israeli forces had actually run out of certain types of ammunition and that, but for American supplies, the country would have been in a very serious situation.

Israeli military leaders now say that Dayan, who was Defense Minister at the time, overstated the gravity of the situation. These officers, including the present Defense Minister, Ezer Weizman, insist that a closer count of military stocks later showed the Israelis would have been successful on the battlefield without the US supply effort.

Israeli Air Force officers also are sensitive about aircraft losses in 1973, which amounted to two and a half times the number lost in 1967.

Pilots point out that the losses came from Soviet antiaircraft missiles and guns rather than Arab aircraft. Benjamin Peled, commander of the Israeli Air Force during the Yom Kippur War, argues that the war, rather than demonstrating a missile superiority over aircraft, proved that the trend is in favor of aircraft over antiaircraft defenses. According to Peled, even though overall losses were greater in 1973, Israeli pilots flew more missions per loss of aircraft than in 1967. It is Peled's conviction that aircraft losses of twenty-five percent or more are acceptable if the mission is achieved. Says the blunt Peled, now a civilian heading an electronics firm: "Those



The Gabriel surface-to-surface missile, because of its popularity among lesser-developed countries, has become a major Israeli export item. Gabriels were responsible for sinking a number of Arab ships in the 1973 war.

who raise questions about Yom Kippur aircraft losses are yellow."

Other military leaders are not as confident that the country, deeply in debt and suffering an annual inflation rate of thirty-five percent, can so easily absorb high aircraft losses, particularly if cheaper combinations of infantry, antiaircraft missiles, and tanks can be as effective.

Already, they point out, the 1973 losses have put Israel heavily in debt to the US economically and diplomatically. The effectiveness of Russian antiaircraft missiles against aircraft also was impressive to many military leaders, and has caused some to argue for a more balanced mix of equipment that will make greater use of infantry troops in future engagements, and avoid the heavy aircraft and tank losses of the Yom Kippur War. Arab defenses are expected to improve over their 1973 performance, they point out, posing additional problems for Israeli pilots.

Some Israeli critics say the Israeli Air Force depended too much on the bravery of the Israeli pilots and ignored intelligence reports of dramatic improvements in Egyptian and Syrian antiaircraft defenses. Air Force commanders have also been faulted for relying too much on the maneuverability of aircraft and not enough on sophisticated electronic countermeasure devices that are routinely used by US and NATO pilots.

At the strategic level, Israeli leaders now say that the 1973 decision to let the Arabs attack first, despite intelligence warning signals, was probably unwise, and in any event a luxury Israel can no longer afford. In the future, most military leaders argue, Israel must retain the option of attacking first. Many officers fault General Dayan for not activating the reserves earlier, when Syria and Egypt were massing in simulated maneuvers.

Israeli Air Training

Doubts about the proper use of the Israeli Air Force are reflected in the current training programs. The wing commander at Hazor Air Base, near Hebron, says his F-4 and Kfir fighter pilots have changed tactics five times since the 1973 war.

Some changes reflect a growing appreciation of, and adjustment to, the antiaircraft defenses being deployed by Egypt and Syria. Other changes are the result of continuing improvements in electronic countermeasure equipment supplied to Israel by the US since the Yom Kippur War.

A third, and major cause for the changes, however, is the debate among Israeli military leaders about the role of the Air Force in future wars.

Traditional Air Force leaders, such as General Peled, argue that the Air Force should remain the primary element of the Israeli Defense Force, with the primary mission of stopping an Arab invasion and punishing the invading countries for their aggression.

Against this argument are ground commanders who say a more balanced defense, using tank and infantry units, can defend the country better and cheaper. Rather than lead the battle, according to this argument, the Air Force should concentrate more on cooperating with, and supporting, the ground forces.

For security reasons, Israeli commanders will not say what specific changes are being made in the Air Force's tactics as a result of the Yom Kippur War. But they

point out that switching the Air Force to a support role would be a 180-degree turn for the Israeli Defense Force, and would not be the most effective use of airpower, particularly when the ground forces depend heavily on activated reservists.

Individual Emphasis

The Israeli Air Force's training, in comparison with the US Air Force, stresses individual ability over the teamwork that has become an increasing part of air operations in a modern electronic warfare environment.

Within the Israeli Air Force there also is a reluctance to specialize in missions. Instead, Israeli pilots train and are prepared to perform every mission their plane is capable of flying. The more versatile the plane, the more missions the pilot must practice.

After initial flight training, pilots are trained by squadron commanders, who have a great deal of latitude in preparing training programs and developing tactics.

Israeli pilots fly six days a week. Transferring some training to flight simulators is under study, but flying hours have not been cut as yet. This gives Israeli pilots flight experience that few other air forces can match.

In training, the emphasis is on air superiority, rather than ground support and ground attack missions. The result is that Israeli pilots achieved a 55 to 1 kill ratio when flying against Arab pilots in 1973, but their performance in attacking heavily defended ground targets was something less than that achieved by US pilots in Southeast Asia.

Air Achievements

Still, with all the criticism the Israeli Air Force has been subjected to, there is no denying its achievements in the Yom Kippur War.

Its mission was different from the preemptive strike role in the 1967 Six-Day War. Instead, the Israeli Air Force was held back until the Arab states attacked, then was charged with holding off a massive tank assault on the country's northern and southern borders for two days until the reserves could be called up and deployed.

And even though it suffered heavy losses to Arab antiair defenses, the Israeli Air Force eventually overcame those Soviet-supplied missiles and guns, opening the way for Israel's counterattack on both the Syrian and Egyptian fronts.

In short, despite lapses in intelligence, delays in reacting, and disregard for advances in electronic countermeasures, the Israeli Air Force still was responsible for preventing the Arab world's first victory over Israel.

As for the prospects of another war in the Middle East, General Ivry, the current Air Force commander, says:

"The next war depends upon the planes the Arabs get. [Defense Secretary Harold] Brown knows how many planes he is selling to the Arabs, but no one knows for sure how many the Russians are providing." ■

Israel's Growing Aircraft Industry

From a small repair and overhaul station in 1953, Israel Aircraft Industries (IAI) has grown to become Israel's biggest single industrial enterprise.

Total sales are projected at $400 million in 1978, of which fifty percent is expected to be sold overseas, principally in Latin America. In 1977, IAI overhauled 300 aircraft, 1,000 engines, and more than 60,000 components.

The IAI labor force has grown to more than 19,500, and is expected to top 20,000 by the end of the year.

In addition to being a major repair and overhaul center for civilian and military aircraft, the firm now produces three different lines of planes and a wide assortment of military equipment. Its electronics division builds missiles, sensors, electronic warfare aids, computers, navigation aids, and communications equipment.

IAI is a government organization, with government officials serving on its governing board. But the company has been a commercial success, with a solid record of consecutive years of profits and business growth.

Among IAI's major products are:

- The **Kfir (Lion Cub)** jet fighter-bomber, a Mach 2.3 multimission plane powered by the General Electric J79 jet engine. The Israeli Air Force has between fifty and 100 Kfirs in operation, and is adding to the number. The later model, the Kfir C-2, is distinguished by canards on either side of the air intakes. Export models are offered for $5 million each, but US restrictions on third-country sales of the American-licensed engine have blocked efforts to expand production.
- **Arava** is a short-takeoff-and-landing cargo plane designed to carry twenty-four troops, or haul 2.3 tons of cargo. The rear half of the body swings open for easy loading. More than fifty have been sold in Latin America, in addition to Israeli Air Force purchases. Current production rate is five a month. Sale price is $1.2 million each.
- **Westwind,** the company's series of business jets, has been sold in the US and in Latin America. The latest model, the 1124, is equipped with two Garrett TFE 731-3 turbofan engines and is designed to carry eight passengers. A military model has been developed for coastal and naval reconnaissance. Sale price ranges from $1.4 to $2.3 million, depending upon electronic accessories.
- **Gabriel,** a shipborne surface-to-surface missile that was proven in the Yom Kippur War, sinking or damaging a number of Egyptian and Syrian vessels. A third-generation model is now being designed. Overseas sales of the Gabriel missile system so far have totaled more than $300 million.
- On the horizon is a new jet fighter-bomber, already named the **Arie (Lion).** The Israeli Air Force wants 200 and expects to pay up to $7 million a copy. The plane is in the early design stages, while IAI and government officials ponder whether to equip it with a US engine or take the next big step in aircraft manufacture and develop the first Israeli jet engine. Development costs without the engine are estimated at $600 million, and more than $2 billion if a domestic engine is chosen. The plane is being designed to compete against the Northrop-McDonnell Douglas F-18 in the international market, say IAI officials.

One of Tactical Air Command's Red Flag training exercises is among the most complex and sophisticated of USAF's peacetime operations. Here is a report on the many elements that go into a Red Flag—and on what comes out of it.

Red Flag: Realism on the Range

BY JOHN JOSS

Nellis AFB, Nev.

ALMOST three years after its inception in November 1975, Tactical Air Command's Red Flag is delivering on its early promises.

The Red Flag training program, managed by the 4440th Tactical Fighter Training Group at Nellis AFB, is TAC's simulation of a realistic combat environment, including the aircraft and tactics of the Warsaw Pact countries. The program pits Air Force Regular, Reserve, and National Guard operational units as well as units from the other services and an increasing allied participation against teams at Nellis organized and equipped to push them to the limits of their capabilities and readiness.

TAC's goal is aircrew survival beyond the critical, high-loss-rate first ten missions of a war, taking into account that fewer than a quarter of TAC's aircrews have flown in combat. The objective is to save aircrews and airframes by skilled performance earned through an intense, realistic training program.

A Remarkable Record

At the end of March 1978, there had been more than twenty Red Flag operations with almost 30,000 sorties flown—a total of about 50,000 flight hours. More than 8,500 crew members have flown in these Red Flags, which have also involved some 16,000 maintenance people and almost 1,000 Search and Rescue (SAR) personnel. In TAC alone, nine wings have sent twenty-three squadrons; the Air National Guard and Air Force Reserve have sent units from eleven wings; an additional seventy-five support units have participated. Eight Red Flag operations are scheduled for 1978. Allied activity is intensifying.

Worldwide Significance

A Red Flag command team recently deployed to Cold Lake, Canada, for a joint US-Canadian exercise. British and Canadian units have already deployed to Nellis to participate in full four-week exercises. In addition, exchange pilots from both those countries, plus aircrews from Australia, New Zealand, and West Germany have flown in Red Flag exercises. Observers from other nations including France, Israel, Japan, Korea, Sweden, Pakistan, Mexico, Colombia, Norway, Denmark, Portugal, and Italy have visited Nellis. In addition, the NATO chiefs and NATO Parliamentary Committee, as well as top representatives from the Allied Air Force, Central Europe, have spent time with Red Flag.

Intrinsic to the overall concept is the availability of aircraft to fly as adversaries, or "Aggressors," against the US and allied fighters. Close simulation of the small, minimum-radar-profile MiG-21 is provided by the Northrop F-5E, and four Aggressor squadrons are already in service—two at Nellis AFB, one at RAF Alconbury in the United Kingdom, and the fourth at Clark AB in the Philippines. Aggressor squadrons use tactics and doctrine that simulate closely the known methods of the Warsaw Pact nations, providing invaluable training to TAC pilots that transcends mere flight characteristics of the MiG-21.

Massive Buildup Threatens Allies

Sustained buildup by the USSR and other Warsaw Pact nations in tactical and strategic aircraft and weaponry has been reported frequently in AIR FORCE Magazine. The buildup has put the allies at a severe and increasing numerical disadvantage in almost every weapons category, including aircraft. The allies' previous technological advantages have become much less marked, as the Warsaw Pact nations have upgraded their radar, navigation, ordnance-carrying and -delivery, and associated systems and subsystems, deployed in dual-capable aircraft that

are gaining substantially in range, payload, and electronic sophistication.

Comparable production rates in virtually every weapons category except helicopters, according to DoD analysts, show numerical disparities of as high as 6:1 (tanks), 3:1 (APCs), 8:1 (artillery), and 2:1 (fighters) between the USSR and the US. The lead time in development and procurement cycles ensures that numerical disparities cannot rapidly or easily be countered even with increased funding.

Red Flag training is an effective response to these realities through countering quantity with superior training. Such readiness was emphasized at TAC under its recent Commander, Gen. Robert J. Dixon, and this policy remains the watchword under its new Commander, Gen. W. L. Creech, a fighter pilot and ex-Thunderbird.

Opposite page, F-4s and F-15s taxi out for a Red Flag mission. Left, Army units participate at nearby Fort Irwin. Above, F-5E "Aggressors."

Red Flag 78-4

This reporter was present for nine days of the fourth 1978 Red Flag, involving twenty-eight units operating fifteen types of aircraft from bases in sixteen states. From the Air Force alone, there were TAC, SAC, MAC, and Reserve Forces units, plus Navy, Marine Corps, and Army participants. Aircraft ranged from fighters to bombers, from transports to helicopters. Each unit deployed with its own maintenance and support personnel, aided where necessary by local logistics support at Nellis.

Overall Red Flag Management

Col. Martin H. Mahrt commands the 4440th Tactical Fighter Training Group, which manages Red Flag. A veteran of more than 100 F-105 missions in Southeast Asia, he supervises a team of fifty-five officers and enlisted personnel. He calls Red Flag "the turning point in the history of fighter pilot training. Since eighty percent of TAC's current pilots have never flown in combat, and since combat losses drop precipitously after the first ten missions, we effectively simulate and thus remove the major problems of those first dangerous ten missions," Colonel Mahrt says.

"Mere technical proficiency is not our goal," he stresses. "That used to be the way we trained. Today, pilots coming to Red Flag already have basic weapons skills. We make them put these skills together in training that's as realistic as possible. Simply put, Red Flag delivers better pilots, faster, at much lower cost. Pilots who can fight, fly, and survive. We judge that typical unit effectiveness, after two weeks and eight to ten missions here, improves fifteen to twenty percent. For example, initial missions are full of problems. By the end of Red Flag, the entire situation has turned around. Learning by doing really works.

"It's tough to create the right working/flying/fighting environment. In ten working days, with eight to ten missions scheduled, we must assemble fighter squadrons, reconnaissance groups, SAC, MAC, AFRES, National Guard, Army, Navy, and Marine units, SAR activities, ECM, and allied operations, along with their support personnel. It takes a lot of planning and programming to maintain control and get results. But we're creating some extremely useful and realistic scenarios. We start six weeks or more before each Red Flag, with planning conferences increasing the detail right up to the start of the exercise when we 'frag' the entire set of missions.

"After each Red Flag, we send every unit a classified summary message after forty-eight hours, a videotape on lessons learned after ten days, and a 200-page final report after forty-five days that is a mission-by-mission summary of each day's work."

Lessons Learned

"Lessons learned are the payoff," says Colonel Mahrt. "We encourage safe innovation from every participant, even if it looks like it won't work, and each unit is expected to develop its own tactics. What have we learned? There is no area where we haven't made progress. Examples? Well, we've seen the revealing nature of ground shadows in disclosing incoming aircraft; we've seen the need for camouflage—you should have seen the Brits repainting their Buccaneers for our desert ranges, after just one day on the job! We let pilots see for themselves the varying effectiveness of two-, three-, and four-ship formations in getting the job done.

"We've found that participants quickly learn about fuel management; how to develop alternate plans that work—for example, if they have a tanker abort; how to get out as well as into a target in air-combat and multithreat circumstances such as would be encountered in a real-world situation. There is no way to come to grips with such problems

At the end of each day, all Red Flag aircrew members gather for a review of the missions flown (top). This mass debrief, supported by range data and camera film, is rated one of the most effective learning devices of Red Flag. Below, an F-4 is "killed" by ground fire with simple optical tracking.

unless we simulate them realistically. That's what Red Flag is all about—lessons learned. It works."

The Red Flag Ranges

The ranges available to Nellis, as well as to other organizations such as the Department of Energy, are the largest restricted and controlled segments of military airspace in the US. Yet even their huge extent—3,000,000 acres restricted and another 3,500,000 controlled—is none too large. Col. Joe Salvucci, an experienced combat pilot with more than 300 missions in Southeast Asia to add to his Korean experience, runs the ranges. He has 640 personnel under him, of whom 480 work out on the range. He is responsible for providing realistic targets, an effective Warsaw Pact-style air-defense environment, and ground/air threats integral to realistic simulation. The smaller Fort Irwin range to the southwest, just north of Barstow, Calif., permits integration of Army units and FAC support to the basically air-combat and ground-threat environment of the Nellis ranges.

Targets and Threats

Colonel Salvucci describes his domain: "Targets include plywood and polyurethane tanks, trucks in convoy, airfields with aircraft deployed —derelict F-86s—trains, and, of course, air defense systems that simulate much of the known Soviet capability. It's a manual integrated air-defense system now, but the Soviets are working on semiautomatic and automatic followups, and we will upgrade to match. An essential part of our system is authentic reproductions of Warsaw Pact radar, optical, ECM, and jamming systems that provide complete realism to incoming fighters. We can supply a broad array of simulated environments from day to day. Range Group has twenty-seven systems in place, and plans have been made for 170 by 1985."

Range Instrumentation System (RIS)

Colonel Salvucci also manages the range instrumentation: "Command and control is effected primarily through a large-screen color display —about fifteen feet on each side— that uses IFF and altimeter data, taken as a by-product from the FAA's Western Region traffic control system, as the display source for all aircraft on and near the range.

"All aircraft tracks and altitudes are plotted throughout a mission, providing a permanent computer record of actual engagements in a manner similar to but less precise than the Air Combat Maneuvering Instrumentation (ACMI). Our optical threats are coupled to videotape recorders for permanent record. All range activities are logged to provide detailed records for the mass aircrew debriefs. Current manual logs will be automated in the future, funding permitting.

"When pilots see the effectiveness of even simple optical tracking, their evasive tactics improve. Once a previously confident pilot has seen his supposedly effective ingress 'jinking' being tracked move for move, all the way to a confirmed 'kill,' by one of our experienced operators, he realizes he'll have to work much harder to survive. Even the MAC C-130s and C-141s fly evasive maneuvers and shift formation tactics to foil our ground threats."

The Aggressor Units

Why does TAC spend so much effort on realistic simulation? The effort stems directly from the "Red

John Joss is a graduate of Britain's Royal Naval College and a former Royal Navy pilot. An aviation writer and photojournalist, he now lives in Los Altos, Calif.

Baron" report on air-to-air engagement in Southeast Asia. It showed that the Air Force was not fully effective. The need for improved training, emphasizing the skills and philosophies of potential adversaries, was clear.

Lt. Col. Rod Gunn, CO of the 65th Aggressor Squadron, tells it: "The Aggressor concept was established in October 1972, starting with T-38s. First sorties were flown by the 64th Squadron against F-4s from Homestead AFB, Fla., in February and March '73. Transition to the F-5E came as the 65th was established in the summer of '75. Deployed to RAF Alconbury, the new squadron flew first against the British at Leuchars, in Scotland, then against NATO aircraft in Sweden. New engines and maneuvering flaps on the F-5E make the aircraft an effective MiG-21 simulation, and of course we camouflage like the MiG. Competitive? You bet!

"Squadron content? Well, a typical Aggressor squadron consists of a commanding officer, operations officer, and twenty pilots, with eighteen working aircraft and two spares. Six GCI weapons controllers simulate actual Warsaw Pact methods. Our pilots must have fighter experience, at least 300 hours (average now is about 1,700), and be instructor-qualified. Pilot training is done in thirty-six missions over a ninety-day period—seven for transition to the F-5E; eight for basic fighter maneuvers; seven air combat maneuvering; three air-combat tactics; then three for air combat vs. dissimilar aircraft, including multibogey, three vs. four; finally eight missions on 'enemy' (USAF) tactics. Oh yes, and seventy-five academic hours covering Soviet pilot training and aircraft, their avionics and weapon systems, formation tactics, their GCI techniques, and future threats as they develop.

"A typical training deployment will involve, say, six aircraft, seven pilots, two GCI controllers, a Fighter Weapons School instructor, seventeen maintenance staff, and a comprehensive maintenance supply kit carried by a MAC C-130 or -141. We might deploy for one to two weeks, and fly twelve missions a day against allied aircraft.

"Today's Aggressor squadrons have flown against every fighter in the US inventory, and most of the allied types as well. We constantly upgrade our methods, using lessons from 'Red Baron' as well as Middle East experience."

The bottom line: Colonel Gunn believes that the Warsaw Pact nations are not yet superior in weaponry or tactics, but that their increasing numerical advantages pose a major and growing threat. He concludes: "If we can't be better trained than our potential enemy, with the huge numerical disparities we face, and with the technology gap closing visibly, we're going to be in trouble. That's why the Aggressor concept is essential. It gets results."

ACMI (Air Combat Maneuvering Instrumentation)

Whereas Red Flag's Range Instrumentation System (RIS) takes IFF and altimeter data from FAA radars to generate a large-screen command and control display of all participants, the ACMI works with precision telemetry pods to provide fine-grain detail of air combat maneuvers. Where the RIS's only readout is a two-dimensional plot map with aircraft routes, expanded to a side view on the pen plotter, the ACMI generates many different pseudo-three-dimensional screen displays—pilot's-eye views; range scale from macro to close up; terrain that can be rotated from ground level to ninety degrees above, and swiveled 360 degrees; plus bar-chart and alphanumeric readout of essentially all relevant real-time aircraft and such weapons data as airspeed, angle of attack, G-loads, altitude, Mach, weapon launch, and track flown. The result,

The 3,000,000 acres of ranges provide space for a variety of realistic targets such as the simulated enemy SAM site at left and train, above. Note F-4 "give-away" shadow.

for pilots who need to know their skills, and weapon system managers who need solid engineering data, is a laboratory whose potential is only now coming to be exploited fully.

The Nellis ACMI generally is not used in Red Flag, but represents a logical next step of which current squadrons are well aware. ACMI/R ranges are also in place at Tyndall AFB, Fla.; Marine Corps Air Station at Yuma, Ariz., with links to Naval Air Station Miramar, Calif., for debrief; and NAS Oceana, Va., with debrief links to TAC's Langley AFB, Va.

We looked at an ACMI engagement in which four F-15s were pitted against four MiG-21s (F-5Es) during a special training mission, all with air-to-air missiles. The result: a draw, with all eight killed. The strategic and tactical methods and mistakes of all four protagonists could be seen in detail.

The FAC Mission

Surviving FAC pilots from Southeast Asia will note with relief a shift away from over-the-target observation and marking to a three-tier approach that puts a ground FAC up front with the troops, a low-level FAC back behind the lines for close support, and a higher-level mission-control FAC further back. Ground FAC staff work directly with Army forces on the line, to select targets and brief the low-level airborne FAC. The latter marks from a pop-up "lob" by Willie Pete (white phosphorus) rocket, with the actual target called for incoming air-to-ground units as a range/bearing from the marker. FAC units are also expected to pick incoming courses and "pop" points that maximize potential terrain masking and permit safest ingress and egress from the target.

The O-2 aircraft, historic FAC workhorse (along with the OV-10), are now being phased out and replaced by A-37s that are faster and more maneuverable but have less loiter time. The O-2, replete with more than 1,000 pounds of radios and burdened with markers and fuel, is not the most lively aircraft, but pilots speak with respect of its past accomplishments. This reporter worked with the 27th Tactical Air Support Squadron out of Davis-Monthan AFB, Ariz., to view the mission from the cockpit, then with the ground FACs from the same unit.

Search and Rescue (SAR)

"Downed" pilots, as verified by range confirmation, are taken by helicopter to "enemy territory" on remote sections of the range, with a survival instructor who monitors the effectiveness of their efforts to be rescued and to avoid detection by ground troops. These "intruders" on the ground, from the Survival School staff, try to thwart rescue attempts, to the extent of shooting down (in simulation) SAR forces trying to recover crews. Downed pilots may be required to simulate wounds or ejection injuries. Every Red Flag crew member knows that he may be placed in just this position, and post-mission reports underscore the reality of the training situation.

Mass Debrief

At the end of each day's work, all Red Flag mission aircrews gather at the 4440th for an overview of the entire operation. Candor is the key, with each flight's representative front and center stating his goals, his experience in the actual mission, and the lessons that were learned. Supporting data, including confirmed aircraft "killed" either by ground or air threats, is supplied by the RIS and aircraft gun cameras, and shown on twin large screens that also permit routes, actual tracks, and associated mission data to be displayed in detail. Each briefer is videotaped for the record and detailed interchanges are encouraged between, for example, air combat adversaries, in which the specific engagements are discussed in depth. No quarter is given, none expected, and the "lessons learned" aspects are self evident. Red Flag participants rate the mass debrief one of the most useful and effective aspects of the entire exercise.

A "downed" pilot, left at a remote spot on the range, calls for help from search-and-rescue forces.

Safety

Realistic combat training can never be 100 percent accident free. Pilots must be pushed as hard as reasonably possible, and under genuine stress, if Red Flag is to achieve its combat readiness goal. Nevertheless, despite the fact that nearly every TAC unit has flown in a Red Flag exercise under closely simulated combat conditions, TAC's overall accident rate, including Red Flag missions, is slightly lower than in previous years.

Throughout a Red Flag operation, there is continuous emphasis on safety. Initial missions are geared to acquainting pilots with complex scenarios and the unfamiliar terrain of the Nellis ranges. Such a hostile environment is alien to many pilots coming from the eastern US and Europe. Strict adherence to the rules for crew rest as well as the rules of engagement have established a framework for safe operations, commensurate with realistic training. Every crew member accepts the challenge of learning his personal safety envelope and that of his aircraft. A delicate balance between realism and safety.

* * *

The growing multirole threat of the Warsaw Pact nations can only be met, as Red Flag officers see the problem, by emphasizing quality over quantity at every operational phase. Better results with lower expenditures are the bottom line; they make a persuasive equation for observers, no matter what their military or political vantage point. ■

JANE'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT

Pre-production Rockwell International OV-10D night observation surveillance aircraft (NOS) for the USMC

ROCKWELL INTERNATIONAL
ROCKWELL INTERNATIONAL CORPORATION, NORTH AMERICAN AIRCRAFT OPERATIONS, Columbus Aircraft Division: 4300 East Fifth Avenue, Columbus, Ohio 43216, USA

ROCKWELL INTERNATIONAL BRONCO
US military designation: OV-10

This aircraft was North American's entry for the US Navy's design competition for a light armed reconnaissance aeroplane (LARA) specifically suited for counter-insurgency missions. Nine US airframe manufacturers entered for the competition and the NA-300 was declared the winning design in August 1964. Seven prototypes were then built by the company's Columbus Division, under the designation YOV-10A Bronco. The first of these flew on 16 July 1965, followed by the second in December 1965.

A number of modifications were made as a result of flight experience with the prototypes. In particular, the wing span was increased by 3.05 m (10 ft 0 in), the T76 turboprop engines were uprated from 492 kW (660 shp) to 534 kW (716 shp), and the engine nacelles were moved outboard approximately 0.15 m (6 in) to reduce noise in the cockpit.

A prototype with increased span flew for the first time on 15 August 1966. The seventh prototype had Pratt & Whitney (Canada) T74 (PT6A) turboprops for comparative testing.

The following versions have been built:

OV-10A. Initial production version ordered in October 1966 and first flown on 6 August 1967. US Marine Corps had 114 in service in September 1969, of which 18 were on loan to the USN; used for light armed reconnaissance, helicopter escort, and forward air control duties. At the same date the USAF had 157 OV-10As for use in the forward air control role, as well as for limited quick-response ground support pending the arrival of tactical fighters.

Production of the OV-10A for the US services ended in April 1969; but 15 aircraft were modified by LTV Electrosystems Inc,

under the USAF Pave Nail programme, to permit their use in a night forward air control and strike designation role in 1971.

Equipment installed by LTV included a stabilised night periscopic sight, a combination laser rangefinder and target illuminator, a Loran receiver, and a Lear Siegler Loran coordinate converter. This combination of equipment generates an offset vector to enable an accompanying strike aircraft to attack a target or, alternatively, illuminate the target, enabling a laser-seeking missile to home on to it. These specially configured aircraft reverted to the OV-10A configuration in 1974 by removal of the LTV-installed equipment.

Under the designation **YOV-10A,** a single OV-10A was equipped with rotating cylinder flaps for evaluation in a STOL flight test programme by NASA.

OV-10B. Generally similar to the OV-10A; six supplied to the Federal German government for target-towing duties.

OV-10B(Z). Structurally similar to the OV-10B, except that a General Electric J85-GE-4 turbojet engine of 13.12 kN (2,950 lb st) is mounted above the wing, on a pylon attached to existing hoisting points, to increase performance for target-towing duties. First flown on 21 September 1970. Delivery of 18 OV-10B(Z) aircraft to the Federal German government was completed in November 1970. The jet pods were fitted by RFB, in Germany, following the prototype installation by Rockwell.

OV-10C. Version of the OV-10A for the Royal Thai Air Force. Deliveries of 32 completed in September 1973.

YOV-10D/OV-10D. Two YOV-10Ds were OV-10As modified under a 1970 contract from the US Navy to provide a new concept in night operational capability for the US Marine Corps. Distinguishing features of the YOV-10D Night Observation/Gunship System (NOGS) are a 20 mm gun turret mounted beneath the aft fuselage, and a forward-looking infra-red (FLIR) sensor installed beneath the extended nose. A laser target designator is incorporated within the FLIR sensor turret. Two wing pylons are installed at the Sidewinder missile wing stations which are capable of carrying a variety of rocket pods, flare pods, and free-fall stores. In 1974, Rockwell received a US Navy contract to establish and test a production OV-10D configuration.

As a result, delivery of 17 OV-10As of the US Marine Corps to Rockwell's Columbus Division began in the Spring of 1978, for conversion to the Night Observation Surveillance (NOS) role. In addition to retention of the basic weapon system capability, the OV-10D NOS will have an uprated 775.5 kW (1,040 shp) power plant and will be able to carry a 568 litre (150 US gallon) drop tank on the underfuselage centreline attachment point when extended radius/loiter time is required. The Texas Instruments FLIR sensor and laser target designator are installed in a rotating ball fairing beneath the nose, and are linked with a turret-mounted General Electric M-97 20 mm cannon beneath the rear fuselage. First-phase testing of the FLIR system was completed by a preproduction OV-10D in March 1978. First deliveries of modified aircraft are scheduled for the Spring of 1979.

OV-10E. Version of the OV-10A for the Fuerzas Aéreas Venezolanas. Sixteen ordered through the US Department of Defense foreign military sales programme. The first of these aircraft was delivered in March 1973.

OV-10F. Version of the OV-10A for the government of Indonesia. Sixteen aircraft ordered through the US Department of Defense foreign military sales programme. The first of these was delivered in 1976.

The following details apply to the standard OV-10A, except where stated:

TYPE: Two-seat multi-purpose counter-insurgency aircraft.

WINGS: Cantilever shoulder-wing monoplane. Constant-chord wing without dihedral or sweep. Conventional two-spar structure of light alloy. Manually-operated ailerons, of light alloy construction, are supplemented by four small manually-operated spoilers which are mounted forward of the outboard trailing-edge flap on each wing. Hydraulically-operated two-section double-slotted trailing-edge flaps of light alloy construction on each wing, separated by tailbooms. In the event of hydraulic failure, the flaps can be operated electrically. Trim tab on each aileron (one spring, one geared on each wing).

FUSELAGE: Short pod-type fuselage of conventional light alloy semi-monocoque construction, suspended from wing. Glassfibre nosecone.

TAIL UNIT: Cantilever light alloy structure carried on twin booms of semi-monocoque construction. Fixed-incidence tailplane mounted near tips of fins. Manually-operated rudders and elevator. Trim tabs in rudders and elevator.

LANDING GEAR: Hydraulically-retractable tricycle type, with single wheel on each unit. Nosewheel retracts forward into fuselage nose, main units rearward into tailbooms. Free-fall emergency extension. Two-stage oleo-pneumatic shock-absorbers. Forged aluminium wheels. Main wheel tyres size 29 x 11-10, pressure 4.48 bars (65 lb/sq in). Hydraulically-steerable nosewheel with tyre size 7.50-10, pressure 5.52 bars (80 lb/sq in). Cleveland hydraulic disc brakes.

POWER PLANT: Two 533 kW (715 ehp) Garrett AiResearch T76-G-416/417 turboprop engines, each driving a Hamilton Standard three-blade metal constant-speed, reversible, and fully-feathering propeller. (OV-10D has 775.5 kW; 1,040 shp engines, each driving a similar Hamilton Standard propeller, but which has glassfibre blades.) Five self-sealing bladder type fuel tanks in wings, with combined capacity of 954 litres (252 US gallons). Gravity refuelling point above each tank on wing upper surface. Provision for carriage of one 568 litre (150 US gallon) drop tank on underfuselage pylon. Oil capacity 11.4 litres (3 US gallons).

ACCOMMODATION: Crew of two in tandem, on type LW-3B zero-zero ejection seats, under canopy with two large upward-opening transparent door panels on each side. Dual controls optional. Cargo compartment aft of rear seat, with rear loading door at end of fuselage pod. Rear seat removable to provide increased space for up to 1,452 kg (3,200 lb) freight, or for carriage of five paratroops, or two stretcher patients and attendant. Accommodation is heated and ventilated by a combination of ram and engine bleed air. Windscreen defrosting and electric windscreen wiper standard.

SYSTEMS: Heating and ventilation system combines engine bleed air and cold ram air to provide temperature controlled conditions. Engine bleed air is used also for windscreen defrosting and to supply crew's anti-*g* suits. Hydraulic system of intermittent-duty type, powered by an electrically-driven hydraulic pump at a pressure of 103.5 bars (1,500 lb/sq in), for actuation of trailing-edge flaps, landing gear, and nosewheel steering. Wheel brakes, which have two independent manually-driven brake units, are fed directly from the hydraulic system reservoir. Electrical system powered by two 30V 300A starter-generators and two 24V 22Ah nickel-cadmium batteries. AC power derived from two 750VA inverters which supply 115V at 400Hz three-phase; single-phase AC of 115V or 26V at 400Hz can be tapped from the bus system. External power sockets for engine starting and utility services; the latter can be used to provide 28V DC to other aircraft for engine starting or servicing. Demand-regulated oxygen system supplied from two 0.008m³ (0.3 cu ft) oxygen cylinders at a pressure of 124.2 bars (1,800 lb/sq in). Independent fire warning system for each engine, compris-

The YOV-10D has a 20 mm gun turret mounted beneath the aft fuselage

ing control unit, sensing elements, and warning lights. USAF aircraft only have an electrically-fired fire extinguishing system installed in each engine nacelle. No pneumatic system.

ELECTRONICS: USAF aircraft are equipped with AN/AIC-18 intercom; AN/ARC-51BX UHF, Wilcox 807A VHF, dual FM-622A VHF, and HF-103 HF com radios; nav system includes AN/ASN-75 compass, AN/ARN-52(V) Tacan, AN/ARA-50 UHF-ADF, AN/ARN-83 LF-ADF, 51R-6 VOR, and 51V-4A ILS glideslope; identification system includes AN/APX-64(V) IFF/SIF, and SST-181-X radar beacon. USMC aircraft are equipped with AN/AIC-18 intercom; AN/ARC-51AX VHF, AN/ARC-54 VHF, and AN/ARC-120 HF com radios; nav system includes AN/ASN-75 compass, AN/ARN-52(V) Tacan, and AN/ARA-50 UHF-ADF; AN/APX-64(V) IFF/SIF for identification. OV-10D NOS aircraft will have a FLIR sensor system package, comprising FLIR, a laser target designator, and an automatic video tracker.

ARMAMENT: Four weapon attachment points, each with capacity of 272 kg (600 lb), under short sponsons extending from bottom of fuselage on each side, under wings. Fifth attachment point, capacity 544 kg (1,200 lb) under centre-fuselage. Two 7.62 mm M-60C machine-guns, each with 500 rounds of ammunition, carried in each sponson. USMC aircraft only have provision also for carrying one AIM-9D Sidewinder missile under each wing. Stores which can be carried on the underfuselage and sponson stations include Mk 81, 82, 83, and 117 GPLD bombs, Mk 81 and 82 GP (Snakeye) bombs; Mk 77 Mod 2/Mod 3 and Mk 122 Mod 0 fire bombs; LAU-3/A, LAU-10/A, and LAU-32/A rocket packages; SUU-11A/A (7.62 mm Minigun), SUU-12/A (0.50 in), and Mk 4 Mod 0 (20 mm) gun pods; MLU-10B mines; CBU-9A, SUU-25A/A (Mk 24) flares, Aero 7E (Lazydog) and Mk 5 Mod 0 (Sadeye) dispensers; Mk 12 Mod 0 (Padeye) smoke tank; XM13 (XM-75) grenade launcher; A/A37B-3 MBR Mk 106, and A/A37B-3 MBR Mk 76 practice bombs. Max weapon load 1,633 kg (3,600 lb).

DIMENSIONS, EXTERNAL:

Wing span	12.19 m (40 ft 0 in)
Length overall	12.67 m (41 ft 7 in)
Height overall	4.62 m (15 ft 2 in)
Tailplane span	4.45 m (14 ft 7 in)
Wheel track	4.52 m (14 ft 10 in)
Wheelbase	3.56 m (11 ft 8 in)
Propeller diameter	2.59 m (8 ft 6 in)
Rear loading door:	
Height	0.99 m (3 ft 3 in)
Width	0.76 m (2 ft 6 in)

DIMENSIONS, INTERNAL:

Cargo compartment	2.12 m³ (75 cu ft)
Cargo compartment, rear seat removed	3.14 m³ (111 cu ft)

AREA:

Wings, gross	27.03 m² (291 sq ft)

WEIGHTS AND LOADING:

Weight empty	3,127 kg (6,893 lb)
Normal T-O weight	4,494 kg (9,908 lb)
Max T-O weight	6,552 kg (14,444 lb)
Max wing loading	242.4 kg/m² (49.6 lb/sq ft)

PERFORMANCE (at weights stated, A: OV-10A/C/E/F; B: OV-10B; C: OV-10B(Z)):

Max level speed at S/L, without weapons:
A 244 knots (452 km/h; 281 mph)

Max level speed at 3,050 m (10,000 ft) at AUW of 4,536 kg (10,000 lb):
B 241 knots (447 km/h; 278 mph)
C 341 knots (632 km/h; 393 mph)

Max rate of climb at S/L at max T-O weight:
A 790 m (2,600 ft)/min

Max rate of climb at S/L at AUW of 5,443 kg (12,000 lb):
B 701 m (2,300 ft)/min
C 2,073 m (6,800 ft)/min

T-O run:
A at normal T-O weight 226 m (740 ft)
B at 5,443 kg (12,000 lb) AUW 344 m (1,130 ft)
C at 5,443 kg (12,000 lb) AUW 168 m (550 ft)

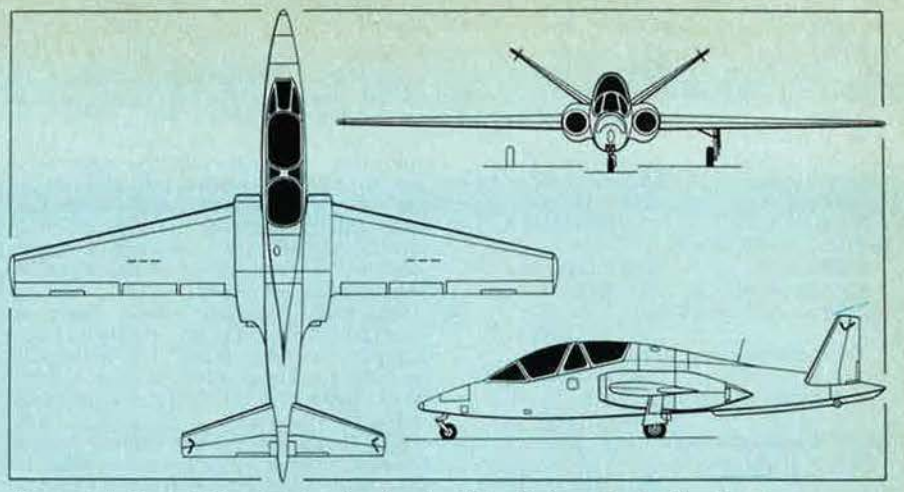
T-O to 15 m (50 ft):
A at normal T-O weight 341 m (1,120 ft)
A at max T-O weight 853 m (2,800 ft)

Landing from 15 m (50 ft):
A at normal T-O weight 372 m (1,220 ft)

Landing run:
A at normal T-O weight 226 m (740 ft)
A at max T-O weight 381 m (1,250 ft)

Combat radius with max weapon load, no loiter:
A 198 nm (367 km; 228 miles)

Ferry range with auxiliary fuel:
A 1,200 nm (2,224 km; 1,382 miles)



Aérospatiale Fouga 90 (two Turboméca Astafan IIG turbofan engines) (Pilot Press)

AÉROSPATIALE

SOCIÉTÉ NATIONALE INDUSTRIELLE AÉROSPATIALE; Head Office: 37 boulevard de Montmorency, 75781-Paris Cédex 16, France

In an effort to meet worldwide requirements for a new jet trainer, Aérospatiale is offering a modernised version of its widely-operated CM 170 Magister. Advantages claimed for the uprated design, known as the Fouga 90, include well-proven aerodynamics, use of twin engines in a lightweight aircraft, low initial and operating costs, and overall simplicity for easy maintenance.

AÉROSPATIALE FOUGA 90

The Fouga 90 is a modernised version of the CM 170 Magister trainer, of which close to 1,000 were built between 1952 and 1970. Of these, about 650 are believed to continue in service in 16 countries, and accumulated flying time on the type totals several million hours.

When designing the Fouga 90, Aérospatiale retained the aerodynamics of the wing and of the tail unit of the Magister. The centre-fuselage has been redesigned and deepened, to accommodate pilot and instructor in the now-preferred stepped positions, to give the occupant of the rear seat an optimum forward view. More modern electronics and systems are installed; and the original Marboré turbojets are replaced by turbofans, offering much reduced specific fuel consumption and noise characteristics. Limiting load factors are +7*g* and −3*g*, permitting all standard aerobatic manoeuvres. Like the Magister, the Fouga 90 is suitable for weapon training and light attack roles.

A prototype Fouga 90 is scheduled to fly in summer 1978.

TYPE: Light twin-turbofan transition trainer.

WINGS: Cantilever mid-wing monoplane. NACA 64 Series wing section. Thickness/chord ratio varies from 19% at root to 12% at tip. No dihedral. Incidence 2°. Leading-edge sweepback 13°. Single-spar aluminium alloy stressed-skin structure. Servo-control ailerons. Hydraulically-operated all-metal slotted flaps. Retractable airbrakes in upper and lower surfaces.

FUSELAGE: All-metal semi-monocoque stressed skin structure.

TAIL UNIT: All-metal single-spar V structure, with included angle of 110°. Statically and aerodynamically balanced elevators. Long narrow-chord ventral fin, enclosing small tail bumper.

LANDING GEAR: Retractable tricycle type. Hydraulic actuation, Goodyear main wheels, diameter 25.4 cm (10 in), with hydraulic brakes. Nosewheel, diameter 10.2 cm (4 in), fitted with anti-shimmy device.

POWER PLANT: Two Turboméca Astafan IIG turbofan engines, each rated at 6.76 kN (1,520 lb st). Main fuel in two fuselage tanks, with total capacity of 710 litres (156 Imp gallons). Optional wingtip tanks containing a total of 250 litres (55 Imp gallons).

ACCOMMODATION: Two seats in tandem, under large individual rearward-hinged canopies. Martin-Baker F10KX zero-zero ejection seats in prototype. Rear seat raised to give instructor clear view forward over head of pupil. Forward field of view 10° up and 15° down from front seat, 13° up and 5° down from rear seat.

SYSTEMS: Modernised by comparison with CM 170 Magister. Cockpits pressurised and air-conditioned. Individual oxygen supply with regulator in each cockpit.

ARMAMENT (optional): Four underwing attachments for external stores; each inboard station has capacity of 250 kg (551 lb), each outboard station has capacity of 150 kg (331 lb). Weapon loads can include four 125 kg or 50 kg bombs; two 50 kg bombs and two pods each containing eighteen 68 mm rockets; or two AS.11 or AS.12 air-to-surface missiles and two 30 mm gun pods.

DIMENSIONS, EXTERNAL:
Wing span, with tip-tanks 12.15 m (39 ft 10¼ in)
Wing span, without tip-tanks 11.96 m (39 ft 3 in)
Wing aspect ratio 7.6
Length overall 10.38 m (34 ft 0½ in)
Height overall 3.078 m (10 ft 1¼ in)
Tailplane span 4.38 m (14 ft 4½ in)
Wheel track 4.35 m (14 ft 3 in)
AREAS:
Wings, gross 18.38 m² (197.8 sq ft)
Ailerons (total) 1.10 m² (11.84 sq ft)
Trailing-edge flaps (total) 2.10 m² (22.60 sq ft)
Horizontal tail area (projected) 3.71 m² (39.93 sq ft)
Vertical tail area (projected) 2.60 m² (28.00 sq ft)
WEIGHTS AND LOADINGS:
Weight empty, equipped 2,600 kg (5,732 lb)
Normal T-O weight, clean 3,500 kg (7,716 lb)
Max T-O weight, with armament 4,200 kg (9,259 lb)
Normal wing loading 190.4 kg/m² (39.00 lb/sq ft)
Normal power loading 258.9 kg/kN (2.54 lb/lb st)
PERFORMANCE (estimated, at normal T-O weight):
Max level speed at 4,600 m (15,000 ft) 345 knots (640 km/h; 398 mph)
Max rate of climb at S/L 1,158 m (3,800 ft)/min
Service ceiling 12,195 m (40,000 ft)
T-O to 10.7 m (35 ft) 610 m (2,000 ft)
Landing from 15 m (50 ft) 670 m (2,200 ft)
Range with max fuel 1,000 nm (1,850 km; 1,150 miles)

AERITALIA

AERITALIA SpA; Transport Aircraft Group Headquarters: Via Vespucci 9, 80125 Naples, Italy

AERITALIA G222

A detailed description of the standard G222 troop transport aircraft appeared in the December 1976 *Supplement*, and a shorter item on the G222 SAMA water bomber version in the August 1977 issue. Aeritalia is currently developing an electronic warfare version, has flown a flight inspection (radio/radar calibration) version, and has proposed a maritime patrol, search, and rescue version of the G222. Dimensions, weights, and performance of all three are similar to those of the standard troop transport.

Carrying a pilot, co-pilot, and up to 10 systems operators, the electronic warfare version has a modified cabin fitted with racks and consoles for detection, signal processing, and data recording equipment, and an electrical system providing up to 40kW of power for its operation. Externally, it is distinguishable by a small 'thimble' radome beneath the nose and a larger 'doughnut' radome on top of the tail-fin. A prototype has been flown.

The flight inspection version, which is externally similar to the standard troop transport, has also flown. This version is equipped for flights below 3,050 m (10,000 ft) to calibrate airport flight paths and radio assistance, enabling it to check VOR, ILS, DME, Tacan, PAR, NDB, marker beacon receivers, and air traffic control systems, in addition to VHF and UHF radio transmissions. Onboard equipment includes separate receivers and displays, a central computer to collect inertial navigation data (updated continually by DME), and data on the state of the radio aid(s) being calibrated. Only one equipment operator is necessary, in addition to the two-man flight crew, and ample space remains in the rear of the hold to carry a Jeep for ground-based operations. This version has an optional secondary capability to perform survey missions, at altitudes between 6,100 and 7,620 m (20,000 to 25,000 ft), for multiple control of flight path assistance, using SAF 1 screened flight path equipment.

CANADAIR

CANADAIR LIMITED; Head Office and Works: Cartierville Airport, St Laurent, Montreal, Quebec, Canada

In April 1976, Canadair acquired from the late Mr William P. Lear Sr the worldwide exclusive rights to design, manufacture, market, and support the latter's LearStar 600; this concept envisaged an aircraft with an advanced technology wing and two high bypass ratio turbofan engines. With 53 firm orders supported by deposits in hand on 29 October 1976, the programme was launched. In March 1977, major design changes were announced, and the aircraft became known as the Canadair Challenger.

CANADAIR CL-600 CHALLENGER

Construction of three pre-production Challengers began in April 1977, and the first of these was rolled out from the company's plant at St Laurent, Quebec, on 25 May 1978. Canadian DoT and FAA certification is anticipated during 1979.

By the rollout date, firm orders had been received for 102 executive Challengers; a letter of intent had also been received from Federal Express Corporation for 25 of a stretched cargo version, design of which was to begin in the latter part of 1978.

The following description applies to the basic passenger version:

TYPE: Twin-turbofan business, cargo, and commuter transport.

WINGS: Cantilever low-wing monoplane, built in one piece. Advanced-technology wing section. Thickness/chord ratio 14% at root, 12% at leading-edge sweep break, and 10% at tip. Dihedral 2° 20'. Incidence 3° at root. Sweepback at quarter-chord 25°. Two-spar structure, primarily of aluminium alloy; spars covered with skin-stringer panels to form rigid torsion box. Two-section double-slotted trailing-edge flaps. Hydraulically-powered aluminium plain ailerons and outboard roll-control spoilers. Single inboard spoilers for descent control and ground lift dumping. No tabs. Thermal anti-icing of leading-edges by engine bleed air.

Electronic warfare version of Aeritalia G222 twin-turboprop transport

Model showing cabin layout of G222 equipped for electronic warfare

Interior layout of flight inspection version of Aeritalia G222

Prototype Canadair CL-600 Challenger twin-turbofan executive transport, rolled out on 25 May 1978

FUSELAGE: Aluminium alloy fail-safe semi-monocoque pressurised structure of circular cross-section, with clad frames, stringers, and chemically-milled skins.

TAIL UNIT: Cantilever multi-spar aluminium alloy T-tail, with swept vertical and horizontal surfaces. All control surfaces powered. Tailplane incidence adjusted by electric trim motor. No tabs. Tailplane leading-edges anti-iced by engine bleed air.

LANDING GEAR: Hydraulically-retractable tricycle type, with twin wheels and Dowty Rotol oleo-pneumatic shock-absorbers on each unit. Main wheels retract inward into fuselage, nose unit forward. Nose unit steerable and self-centering. Main wheels have Goodyear 26 x 6.65 tyres, pressure 11.38 bars (165 lb/sq in), nosewheels have Goodyear 18 x 4.4 tyres, pressure 8.27 bars (120 lb/sq in). Goodyear hydraulically-operated multiple-disc brakes. Fully-modulated anti-skid system for main units.

POWER PLANT: Two 33.4 kN (7,500 lb st) Avco Lycoming ALF 502L turbofan engines, one pylon-mounted on each side of rear fuselage, fitted with cascade-type fan-air thrust reversers. Integral fuel tank in centre-section and two in each wing; total capacity 8,305 litres (1,827 Imp gallons).

ACCOMMODATION: Pilot and co-pilot side by side on flight deck, with dual controls. Blind-flying instrumentation standard. Upward-opening door on port side, forward of wing. Cabin can accommodate up to 30 passengers or 3,400 kg (7,500 lb) of freight. Entire accommodation heated, ventilated, and air-conditioned.

SYSTEMS: AiResearch pressurisation and air-conditioning system, max pressure differential 0.65 bars (9.45 lb/sq in). Three independent hydraulic systems, each of 207 bars (3,000 lb/sq in), for actuation of flaps, ailerons, spoilers, landing gear extension/retraction, and main-wheel brakes. AC electrical system includes two 30 kVA engine-driven generators. AiResearch gas turbine APU is standard, and will be certificated for in-flight operation. Bleed air from APU starts engines. Bleed air anti-icing system.

ELECTRONICS: Radios and radar standard. Other electronics and equipment to customer's requirements.

DIMENSIONS, EXTERNAL:

Wing span	18.85 m (61 ft 10 in)
Wing chord at root	4.89 m (16 ft 0½ in)
Wing chord at tip	1.27 m (4 ft 1.9 in)
Wing aspect ratio	8.5
Length overall	20.85 m (68 ft 5 in)
Fuselage: Max diameter	2.69 m (8 ft 10 in)
Height overall	6.30 m (20 ft 8 in)
Tailplane span	6.20 m (20 ft 4 in)
Wheel track	3.18 m (10 ft 5 in)
Wheelbase	7.99 m (26 ft 2½ in)
Passenger door (port, fwd):	
Height	1.78 m (5 ft 10 in)
Width	0.91 m (3 ft 0 in)
Height to sill	1.61 m (5 ft 3½ in)
Baggage door (port, aft):	
Height	0.84 m (2 ft 9 in)
Width	0.71 m (2 ft 4 in)
Height to sill	1.61 m (5 ft 3½ in)
Overwing emergency exits (two, each):	
Height	0.91 m (3 ft 0 in)
Width	0.51 m (1 ft 8 in)

DIMENSIONS, INTERNAL:

Cabin:	
Length, excl flight deck	7.85 m (25 ft 9 in)
Max width	2.49 m (8 ft 2 in)
Max height	1.85 m (6 ft 1 in)
Floor area	8.52 m² (91.67 sq ft)
Volume (freight)	26.56 m³ (938.0 cu ft)

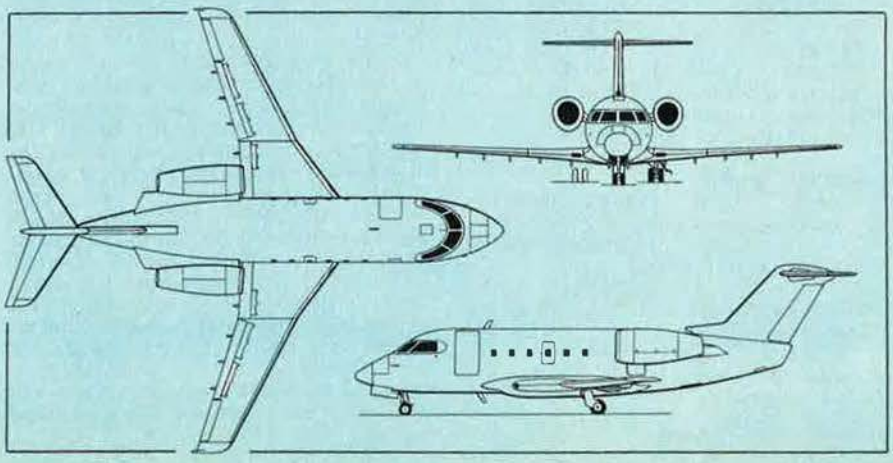
WEIGHTS AND LOADING (estimated):

Basic operating weight empty (executive)	7,756 kg (17,100 lb)
Max payload	3,400 kg (7,500 lb)
Max T-O weight	14,742 kg (32,500 lb)
Max ramp weight	14,810 kg (32,650 lb)
Max landing weight	14,061 kg (31,000 lb)
Max zero-fuel weight	11,702 kg (25,800 lb)
Max power loading	221 kg/kN (2.17 lb/lb st)

PERFORMANCE (estimated, under ISA conditions, at max T-O weight except where indicated):

Max operating speed	Mach 0.88
Long range cruising speed	Mach 0.80
Max rate of climb at S/L	1,844 m (6,050 ft)/min
Certificated ceiling	14,935 m (49,000 ft)
Service ceiling, one engine out	7,315 m (24,000 ft)
Balanced field length	1,433 m (4,700 ft)
Landing from 15 m (50 ft)	1,402 m (4,600 ft)
Min ground turning radius	11.40 m (37 ft 5 in)
Runway LCN	25
Range with max fuel, no reserves	4,450 nm (8,246 km; 5,124 miles)

Canadair CL-600 Challenger (two Avco Lycoming ALF 502L turbofan engines) (Pilot Press)



NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION: Washington, DC 20546, USA

NASA/BOEING QSRA

Under a $21 million contract, The Boeing Company has carried out for NASA the conversion of a de Havilland Canada C-8A Buffalo into a Quiet Short-haul Research Aircraft (QSRA). This aircraft will be used to develop the technology for quiet short-haul commercial airliners of the future, with short take-off and landing capabilities, as well as to explore the operating procedures of such aircraft in the airport terminal environment. Additionally, the QSRA provides NASA with an alternative powered-lift system for evaluation alongside the NASA/DITC XC-8A augmentor wing jet STOL research aircraft, which is described in the 1977–78 *Jane's*.

On 31 March 1978, the QSRA aircraft was rolled out by Boeing at Seattle. Not only was this on schedule, but the $10 million manufacturing phase of the programme had been completed by Boeing at 20% under budget. This company has been responsible for the construction of a new wing; new engine nacelles to provide for Upper Surface Blowing (USB) of the inboard Coanda flaps; cross-ducting to supply Boundary Layer Control (BLC) air to the wing leading-edge and ailerons; construction of a new tail, similar in configuration to that of the original; and the installation of new instrumentation. The first flight of the QSRA aircraft was scheduled for 30 June 1978. Following a short flight test programme to be carried out by Boeing, the aircraft was to be delivered to NASA's Ames Research Center, at Moffett Field, California, where a 'proof of concept' flight test programme will be carried out initially. During this phase of testing the operating envelope of the QSRA is to be expanded to its full potential, and add-on features will be considered to improve the research capabilities of this aircraft, such as operation at higher gross weight or with increased speed capability. It is intended also to conduct flight evaluation without leading-edge BLC, as wind tunnel tests have suggested that this major potential design simplification might result in only relatively small performance losses. Such flight tests will provide a direct in-flight comparison of an optimised blown leading-

NASA/Boeing QSRA quiet short-haul research aircraft

edge against an optimised unblown leading-edge.

Upon completion of this initial programme, leading to selection of the best QSRA configuration, the aircraft is to be used for an advanced flight research programme, to be followed by a series of flight experiment activities.

Of primary importance in this project is that the noise shielding inherent in the upper surface blowing concept, combined with the high climb and descent angles which result from the advanced techniques being explored, will result in a 90 EPNdB 'footprint' area of only three-tenths of a square mile (0.78 km²). This means that the noise level would be unobtrusive even at small, secondary airports.

The description which follows applies to the QSRA as configured for its initial NASA flight test programme:

TYPE: Powered-lift research aircraft.

WINGS: Cantilever high-wing monoplane. Supercritical wing section. Dihedral 0°. Incidence 4° 30'. Sweepback at quarter-chord 15°. Conventional two-spar structure of light alloy with machined upper and lower skins. Structure designed for limited-life research. Boundary layer control provided by leading-edge and aileron blowing. Hydraulically-actuated ailerons, of light alloy honeycomb construction, operate differentially for roll control, and can be drooped symmetrically to augment the trailing-edge flaps for take-off and landing. Leading-edge variable-camber type flaps, fixed in the high-lift position. USB Coanda type trailing-edge flaps aft of the engine nacelles; double-slotted trailing-edge flaps between the USB flaps and ailerons; all of light alloy construction. Two spoiler panels of light alloy construction on each wing forward of double-slotted flaps, for use as speed brakes or for roll control; pilot-selectable for lift dumping after touchdown and for initiation of Direct Lift Control (DLC). All trailing-edge control surfaces, including the spoilers, are independently hydraulically-operated, but are controlled by electrical (fly-by-wire) techniques. No anti-icing provisions.

FUSELAGE: Standard Buffalo fuselage.

TAIL UNIT: Buffalo type, but with hydraulically-actuated elevators.

LANDING GEAR: Non-retractable tricycle type, with twin wheels on each unit. Oleo-pneumatic shock-absorbers. The main units are attached to a truss structure beneath the new wing, and new metering pins are installed in these units. Main wheels with tyres size 32 x 11.5-15, as used on Boeing 727 nose unit. Nosewheel tyres size 27.5 x 8.9-12.50 Type III. Anti-skid braking system.

POWER PLANT: Four 33.4 kN (7,500 lb st) Avco Lycoming YF102 turbofan engines, in pods mounted on the leading-edge of the wing. One fuel tank in each wing, with a total capacity of 4,627 kg (10,200 lb) of JP-5 fuel. Pressure refuelling point on starboard side of fuselage; gravity refuelling points on wing upper surface. Circular air inlets of reinforced plastics.

ACCOMMODATION: Two pilots only, seated side by side on 20g crash-load-absorbing seats. Heating and cooling of ventilation air by main engine compressor bleed.

SYSTEMS: Two independent hydraulic systems, each powered by two pumps, with one pump on each engine. Pneumatic system uses fan and compressor bleed for boundary layer control and environmental system. Electrical system is powered by four 15kVA alternators, driven by standard constant-speed drive systems. Standard C-8A oxygen system.

ELECTRONICS AND EQUIPMENT: Standard electronics include VOR, ADF, and Tacan for navigation, with VHF and UHF communications. Standard IFR instrumentation, including HSI and radar altimeter. Three-axis stability augmentation system, with longitudinal stability provided by use of a digital computer, and analog implementation for the other two axes.

DIMENSIONS, EXTERNAL:

Wing span	22.40 m (73 ft 6 in)
Wing chord at root	3.83 m (12 ft 6¾ in)
Wing chord at tip	1.15 m (3 ft 9¼ in)
Wing aspect ratio	9
Length overall	28.42 m (93 ft 3 in)
Height overall	8.43 m (27 ft 8 in)
Elevator span	9.75 m (32 ft 0 in)
Wheel track	7.04 m (23 ft 1¼ in)
Wheelbase	8.90 m (29 ft 2½ in)

AREAS:

Wings, gross	55.74 m² (600 sq ft)
Ailerons (total)	2.99 m² (32.2 sq ft)
*Trailing-edge flaps (total)	11.02 m² (118.6 sq ft)
*Leading-edge flaps (total)	4.79 m² (51.6 sq ft)
Spoilers (total)	3.05 m² (32.8 sq ft)
Fin	8.47 m² (91.2 sq ft)
Rudder	5.65 m² (60.8 sq ft)
Tailplane	14.06 m² (151.4 sq ft)
Elevator, incl tabs	7.58 m² (81.6 sq ft)

WEIGHTS AND LOADINGS (estimated):

Operational weight empty	16,692 kg (36,800 lb)
Max T-O weight:	
normal	22,680 kg (50,000 lb)
overload (external ballast)	27,215 kg (60,000 lb)
Mission zero-fuel weight	18,053 kg (39,800 lb)
Max landing weight	21,772 kg (48,000 lb)
Max wing loading:	
normal	406.7 kg/m² (83.3 lb/sq ft)
overload	488.2 kg/m² (100.0 lb/sq ft)

**Theoretical retracted area*

Close-up of the flap mechanisms and engine bleed air cross-ducting under the starboard wing of the QSRA. No attempt was made at streamlining, as this would not affect the data required from the programme

PERFORMANCE (estimated):

Design max diving speed	190 knots (352 km/h; 219 mph)
Design cruising speed	160 knots (296 km/h; 184 mph)
Approach speed	65.5 knots (121 km/h; 75 mph)
Take-off field length (at AUW of 22,680 kg; 50,000 lb)	404–1,219 m (1,325–4,000 ft)
Landing field length	434–1,219 m (1,425–4,000 ft)
Ferry range	315 nm (583 km; 363 miles)

OPERATIONAL NOISE CHARACTERISTICS (estimated at 152 m; 500 ft sideline):

T-O	91 EPNdB
Approach	89 EPNdB

AGUSTA

COSTRUZIONI AERONAUTICHE GIOVANNI AGUSTA SpA; Head Office and Works: Casella Postale 193, 21017 Cascina Costa, Gallarate, Italy

Under licence from US manufacturers, Agusta has produced for some years a succession of highly-specialised anti-submarine helicopters that have been put into service by the Italian Navy and foreign customers. Details of two of the latest helicopters of this type follow:

AGUSTA-BELL 212ASW

Deliveries of the basic Agusta-Bell 212 twin-turbine utility transport helicopter, built under licence from Bell Helicopter Textron, have been under way since 1971. The AB 212ASW is an extensively modified version of the AB 212, intended primarily for anti-submarine search and attack missions, and for attacks on surface vessels, but suitable also for search and rescue, and utility roles. It benefits from considerable naval operational experience gained with the single-engined AB 204AS, and because of its similarity in size to the 204AS can operate from the same small ship decks.

The AB 212ASW is produced at a rate of approximately four to five per month and is being delivered to meet orders from the Italian Navy (48), Turkey (6), Iran (6), and other foreign operators, including Peru. Those of the Italian Navy entered service in 1976 with the 5° Gruppo Elicotteri, based at Luni.

Apart from some local strengthening and the provision of deck-mooring equipment, the airframe structure remains essentially similar to that of the commercial Model 212 and military UH-1N, described under the Bell Helicopter Textron entry in the US section of the current *Jane's*. Main differences are as follows:

TYPE: Twin-engined anti-submarine and anti-surface-vessel helicopter.

POWER PLANT: One Pratt & Whitney Aircraft of Canada PT6T-6 Turbo Twin Pac, rated at 1,398 kW (1,875 shp) T-O power (5 min) and at 1,249 kW (1,675 shp) for continuous operation. Added protection against salt water corrosion. Fuel capacity 813 litres (215 US gallons; 179 Imp gallons). Provision for one internal or two external auxiliary fuel tanks, and for in-flight pressure refuelling from a ship at sea.

ACCOMMODATION: Normal crew of three or four. Volume of cabin is 6.1 m³ (215 cu ft), with floor area of 5 m² (54 sq ft). With sonar installed, volume is reduced to 5.1 m³ (180 cu ft). Naval 212 can accommodate two pilots and seven passengers; or two pilots, four stretcher patients, and an attendant. Single sliding door, with jettisonable emergency exit panel, on each side.

SYSTEMS: Standard duplicated hydraulic systems for flight controls. The hydraulic system operates the automatic flight control system. Self-contained hydraulic system for operation of sonar, rescue hoist, and other utilities. Electrical system capacity increased to cater for higher power demand (28V DC, and three-phase 200/115V or single-phase 26V AC at 400Hz); the two standard generators are integrated with a 20kVA alternator.

ELECTRONICS AND EQUIPMENT: Complete instrumentation for day and night sea operation in all weathers. Electronics installed are AN/ARC-159 UHF transceiver, Collins SSB/DSB 718 U-5 HF transceiver, and Agusta AG-03-M intercom, for communications; Marconi-Elliott AD 370B ADF, Hoffman AN/ARN-91 Tacan, and Collins AN/ARA-50 homing UHF, for navigation assistance; Aeritalia (Honeywell) AN/APN-171 radar altimeter, Canadian Marconi AN/APN-208(V)2 Doppler radar, Canadian Marconi CMA-708B/ASW navigation computer, and automatic flight control system with General Electric SR-3 gyro platform, Agusta ASE-531A automatic stabilisation equipment, and Agusta AATH-547A automatic approach to hover, for automatic navigation; Siemens AN/APX-77 IFF/SIF transponder; SMA/APS series search radar and Motorola SST-119X radar transponder; and Bendix AN/AQS-13B sonar for ASW search.

ARMAMENT AND OPERATIONAL EQUIPMENT: Weapons may consist of two homing torpedoes, depth charges, or two air-to-surface missiles. Rescue hoist, capacity 270 kg (600 lb), standard. Provisions for auxiliary installations such as a 2,270 kg (5,000 lb) capacity cargo sling, inflatable emergency pontoons, internal and external auxiliary fuel tanks, according to mission.

ASW MISSION: The basic sensor system employed for the ASW search and attack mission is a low-frequency variable-depth sonar, with a max operating depth of 137 m (450 ft). The automatic navigation system permits the positioning of the helicopter over any desired 'dip' point of a complex search pattern. The position of the helicopter, computed by the automatic navigation system, is integrated with sonar target information in the radar tactical display where both the surface and the underwater tactical situations can be monitored continuously. Additional navigation and tactical information is provided by accurate UHF direction-finding equipment, from an A/A mode-capable Tacan and from a radar transponder. The automatic flight control system (AFCS) integrates the basic automatic stabilisation equipment with signal output from the radar altimeter, the Doppler radar, sonar cable angle signals, and outputs from the dry cable transducer. The effectiveness of this system results in hands-off flight from cruise condition to sonar hover in all weathers and under rough sea conditions. A specially designed cockpit display shows the pilots all flight parameters for each phase of the ASW operation. The attack mission is carried out with two homing torpedoes, or with depth charges.

ASV MISSION: For this mission the AB 212ASW carries a high-performance long-range search radar, with a very efficient scanner design and installation possessing high discrimination in rough sea conditions. Provisions have also been made to permit incorporation of future radar system developments. The automatic navigation system and the search radar are integrated to permit a continuously updated picture of the tactical situation. Provisions are also incorporated for the installation of the most advanced ECM systems. The surface attack is performed with air-to-surface wire-guided missiles. In operation, the co-pilot aims and 'flies' the missiles to the target through a gyro-stabilised sight system of the XM-58 type.

STAND-OFF MISSILE GUIDANCE MISSION: In this mission the AB 212ASW, with special equipment, can provide mid-course passive guidance for the ship-launched Otomat 2 surface-to-surface missile. Equipment includes an SMA/APS series search radar and a TG-2 real-time target data transmission system for guidance of the missile.

DIMENSIONS, EXTERNAL:

Diameter of main rotor	14.63 m (48 ft 0 in)*
Diameter of tail rotor	2.59 m (8 ft 6 in)
Length overall, rotors turning	17.46 m (57 ft 3¼ in)
Fuselage length	14.02 m (46 ft 0 in)
Height to top of cabin roof	2.34 m (7 ft 8 in)
Height overall, tail rotor turning	4.40 m (14 ft 5 in)
Elevator span	2.86 m (9 ft 4½ in)
Width over skids	2.64 m (8 ft 8 in)
Max width:	
with torpedoes	3.95 m (12 ft 11½ in)
with missiles	4.17 m (13 ft 8¼ in)

*14.69 m (48 ft 2¼ in) with tracking tips.

WEIGHTS (A: ASW mission with Mk 46 torpedoes; B: ASV mission with AS.12 missiles; C: search and rescue mission; all at S/L, ISA):

Weight empty, equipped:	
A, B, C	3,420 kg (7,540 lb)
Crew of three:	
A, B, C	240 kg (529 lb)
Mission equipment:	
A (two Mk 46 torpedoes)	490 kg (1,080 lb)
B (AS.12 installation and XM-58 sight)	180 kg (396 lb)
C (rescue hoist)	40 kg (88 lb)
Full fuel (normal tanks)	1,021 kg (2,250 lb)
Auxiliary external tanks	32 kg (70 lb)
Auxiliary fuel	356 kg (785 lb)
Mission T-O weight:	
A	5,070 kg (11,177 lb)
B	4,973 kg (10,963 lb)
C	4,937 kg (10,884 lb)

PERFORMANCE (at max T-O weight, except where indicated, ISA):

Never-exceed speed	130 knots (240 km/h; 150 mph)
Max level speed at S/L	106 knots (196 km/h; 122 mph)
Max cruising speed with armament	100 knots (185 km/h; 115 mph)
Max rate of climb at S/L:	
A	396 m (1,300 ft)/min
Rate of climb at S/L, one engine out:	
A	61 m (200 ft)/min
Hovering ceiling in ground effect:	
A	3,200 m (10,500 ft)
Hovering ceiling out of ground effect:	
A at AUW of 4,763 kg (10,500 lb)	396 m (1,300 ft)
Search endurance (A) with 50% at 90 knots (167 km/h; 103.5 mph) cruise and 50% hovering out of ground effect, 10% reserve fuel	3 h 12 min
Search range (B) with 10% reserve fuel	332 nm (615 km; 382 miles)
Endurance (B), no reserves	4 h 7 min
Endurance (C) at 90 knots (167 km/h; 103.5 mph) search speed	5 h 4 min
Max range with auxiliary tanks, 100 knots (185 km/h; 115 mph) cruise at S/L, 15% reserves	360 nm (667 km; 414 miles)

Agusta-Bell 212ASW of the Italian Navy, armed with two homing torpedoes

AGUSTA-SIKORSKY SH-3D

During 1967, Agusta began the construction under licence of an initial batch of 24 Sikorsky SH-3D anti-submarine helicopters for the Italian Navy. Deliveries began in

Agusta-Sikorsky SH-3D of the Italian Navy, with main rotor blades folded

1969. Additional orders have since been placed, both for the Italian armed forces and for the Imperial Iranian Navy, in various configurations including ASW, VIP transport, and rescue. The VIP transport version is designated SH-3D/TS (Trasporto Speciale), and serves with the 31° Stormo of the Italian Air Force.

Apart from some local strengthening and an improved horizontal tail surface, the Agusta-built airframe remains essentially similar to that of the SH-3D described under the Sikorsky heading in the US section of the current *Jane's*. The Agusta SH-3D is capable of operation in the roles of anti-submarine search, classification, and strike; anti-surface vessel (ASV); anti-surface missile defence (ASMD); electronic warfare (EW); tactical troop lift; search and rescue (SAR); vertical replenishment; and casualty evacuation.

POWER PLANT: Two 1,118 kW (1,500 shp) General Electric T58-GE-100 turboshaft engines, mounted side by side above the cabin. An optional anti-ice/sand shield can be provided. Fuel in underfloor bag tanks with a total capacity of 3,180 litres (840 US gallons). Internal auxiliary fuel tank may be fitted for long-range ferry purposes. Pressure and gravity refuelling points.

ACCOMMODATION: Crew of four in ASW role; accommodation for up to 31 paratroops in troop lift role. In the casualty evacuation configuration the Agusta SH-3D is equipped with 15 stretchers and a seat for medical attendant. Accommodation for up to 25 survivors in SAR role.

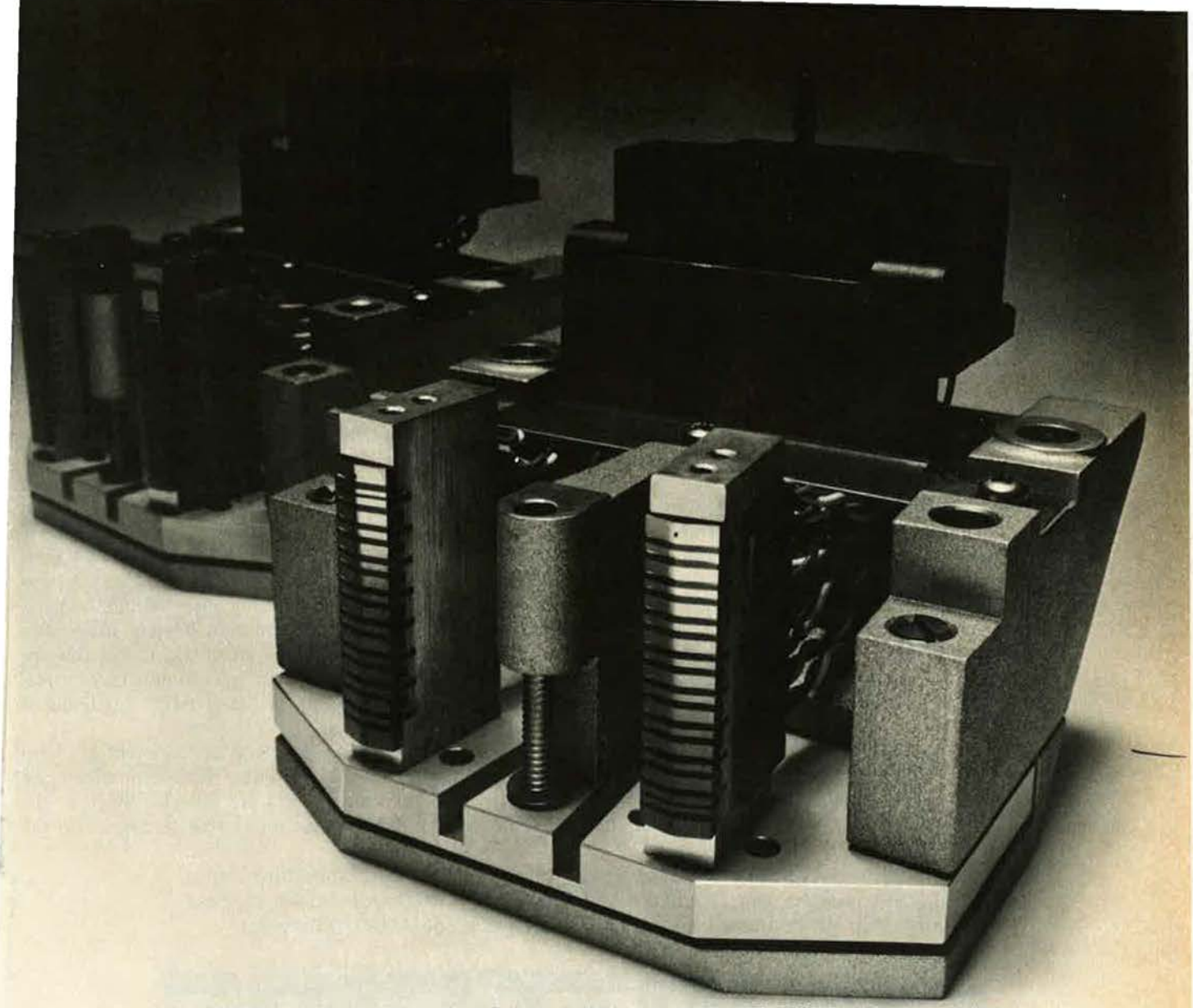
SYSTEMS: Three main hydraulic systems. Primary and auxiliary systems operate main rotor control. Utility system 207 bars (3,000 lb/sq in). Electrical system includes two 20kVA 200V three-phase 400Hz engine-driven generators, a 26V single-phase AC supply fed from the aircraft's 22Ah nickel-cadmium battery through an inverter, and DC power provided as a secondary system from two 200A transformer-rectifier units.

OPERATIONAL EQUIPMENT: (ASW/ASV role): As equipped for this role the Agusta SH-3D is a fully integrated all-weather weapon system, capable of operating independently of surface vessels, and has the following equipment and weapons to achieve this task: low-frequency 360° depth sonar; Doppler radar and ASW automatic navigation system; SMA/APS series radar with one or two transceivers, with ventral radome for 360° coverage; radio altimeter; AFCS; marine markers and smoke floats; four homing torpedoes or four depth charges. The AFCS provides three-axis stabilisation in pilot-controlled manoeuvres, attitude hold, heading hold, and height hold in cruising flight; controlled transition manoeuvres to and from hover; automatic height control and plan position control in the hover; and trim facility. According to the threat, the Agusta SH-3D can be equipped with medium-range (four AS.12 air-to-surface wire-guided) missiles or long-range (two Sea Killer Mk 2 or Exocet AM-39/Harpoon type) missiles. The Sistel Sea Killer Mk 2 is an all-weather day and night anti-ship missile with a range of 13.5 nm (25 km; 15.5 miles); guidance: sea skimming in elevation; radar in azimuth. The SMA/APS series radar has been specially designed to operate in a dense electronic emission environment and has a special interface to draw out target data to feed the computer for the long-range missiles. Provisions are also incorporated for the installation of the most advanced EW systems. (Search and rescue and transport roles): The Agusta SH-3D has a variable-speed hydraulic rescue hoist of 272 kg (600 lb) capacity mounted above the starboard side cargo door. With search radar fitted, a total of 25 survivors and medical staff can be seated. In the casualty evacuation role, 15 stretchers and medical attendant can be accommodated. In the troop transport role the Agusta SH-3D can accommodate 31 troops and carry this load over a range of 314 nm (582 km; 362 miles). As a cargo transport the aircraft has an internal capacity of 2,720 kg (6,000 lb) or a max external load capacity of 3,630 kg (8,000 lb) when a low-response sling is fitted.

PERFORMANCE (at max T-O weight of 9,525 kg; 21,000 lb):

Never-exceed speed
144 knots (267 km/h; 165 mph)
Max rate of climb at S/L
670 m (2,200 ft)/min
Service ceiling 3,720 m (12,200 ft)
Hovering ceiling in ground effect
2,500 m (8,200 ft)
Hovering ceiling out of ground effect
1,130 m (3,700 ft)
Range with max standard fuel
680 nm (1,260 km; 783 miles)

Agusta-Sikorsky SH-3D ASW/ASV helicopter, armed with two homing torpedoes and four AS.12 air-to-surface missiles



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WE'LL SHOW YOU A BETTER WAY.

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This article is based on a study presented to a seminar on military analysis at the Johns Hopkins University School of Advanced International Studies in Washington, D. C. The author interviewed nineteen US government officials to find out how they felt the US should react to growing Soviet military activity in the Third World. Among those interviewed were senior officials of the National Security Council, Office of the Secretary of Defense, Air Force, Navy, State Department, Arms Control and Disarmament Agency, and Congress. Their views are summarized here and presented along with the author's analysis of the problem.—The Editors

SINCE the beginning of this decade, the Soviet Union has become more and more active militarily in the Third World. While in the 1950s and 1960s the USSR relied primarily on diplomatic activity and arms transfers to enhance Soviet influence in these regions, in the 1970s the Russians have relied increasingly on more overt military means to attain their foreign policy goals.

Beginning in 1973, the Soviet leaders for the first time threatened to intervene militarily outside of the acknowledged Soviet sphere of influence in East Europe when they gave warning that they would send Soviet forces to the Middle East if Israel did not halt its advance against the Arab states. They have used Cuban troops to emplace in power a guerrilla movement in Angola that would not necessarily have won the civil war in that country by itself, and have used Cubans in Ethiopia to strengthen that government's ability to combat two powerful irredentist movements there. Further, the Soviet Union has increased massively its level of arms transfers and has actively sought to establish military bases in the Third World.

Since the enunciation of the Truman Doctrine, a basic premise of American foreign policy has been that the spread of Soviet influence is antithetical to the security interests of the US. The strategy of containment was meant to discourage the USSR from attempting to extend its politico-military influence. Where the Soviets did indeed attempt to extend their influence militarily, the United States would use force to halt such an attempt. The Vietnam experience has shown, however, that the US is no longer willing to undertake high-cost, long-term efforts at containment, especially when Soviet forces are not directly involved and the aggressor does not launch an outright invasion, as the North Koreans did, but conducts a guerrilla insurgency instead.

Even so, it is apparent that a repetition of the Angola experience is hardly in America's interests. The US undertook only a low-cost, short-term effort at containment in Angola where, once again, the US faced a situation in which Soviet forces were not directly involved and the aggressor did not launch an outright invasion but conducted a guerrilla war instead. While the MPLA was much weaker than the Viet Cong, the Vietnam experience made the US fearful of becoming heavily involved in Angola, and so only a minimal effort was made. But because the MPLA was supported by a large Cuban force, superior to any other group in the country, this minimal US effort failed.

If high-cost, long-term efforts at containment are considered infeasible, and if low-cost, short-term efforts are ineffective because the Soviets are able to direct to the disputed region large Cuban forces that do not alarm the

The author examines US perceptions of the Soviet threat in the Third World, analyzes lessons the Kremlin has drawn from US involvement in post-World War II conflicts, and outlines elements of a US policy for . . .

COUNTERING SOVIET INFLUENCE IN THE THIRD WORLD

BY MARK KATZ

US in the way that similar Soviet forces would, how can the US respond effectively to the spread of Soviet influence in the Third World? Since an unambiguous response does not manifest itself, crucial to any analysis are the *perceptions* of American policymakers as to the nature of Soviet politico-military activity in the Third World and as to what an appropriate response should be.

Varying Perceptions of the Threat

To get some idea of the relevant perceptions of American policymakers, nineteen US government officials responsible for directing and implementing American foreign policy were interviewed. Their names may not be revealed, but they included a number of top-level decision-makers and advisors. Opinions varied quite markedly concerning the degree to which Soviet actions should be considered threatening and the kind of US response that would be appropriate. On the one hand, a senior official at the State Department said, "The USSR is less active now than it used to be. The Soviets have made little headway. Their actions, especially in the Horn of Africa, have been more detrimental to their own interests than to ours. There they exchanged a secure relationship with Somalia for an insecure one with Ethiopia. They suffered an unnecessary loss in Somalia and have displayed great ineptitude."

A Soviet expert at State added, "In general, Soviet influence should be countered by trade, aid, and economic leverage, if the domestic situation permits, and the use of force should be ruled out."

A ranking member of the House Committee on Foreign Affairs said, "Our commitments in the Third World will be firm to the extent that we help those who are willing to make efforts on their own behalf. There is no possibility for the use of US forces, even in UN-type operations. Because of the War Powers Resolution, Congress would not approve American use of force unless absolutely vital."

On the other hand, several officials took a dimmer view. One Air Force general remarked, "Soviet actions show that they are attempting to spread their influence. The first requisite to effectively countering this is that American political leaders have the declared goal of halting the growth of Soviet influence."

Another Air Force general commented, "Compared to the end of World War II, Soviet influence is now much greater. Our influence has diminished over the years. Where the spread of Soviet influence is not in our interests, we cannot halt it, but we can counter it by extending our own."

Somewhat similar views were expressed by two civilian authorities.

Clearly, the government is divided on whether Soviet actions threaten US interests, and how the US should respond to these actions. No one denies that the Soviets are attempting to spread their influence in the Third World through participation in conflicts there. The main point of disagreement among those interviewed is whether their attempts have been successful enough to threaten American security interests. Some characterized Soviet activity as being undertaken with the express purpose of gaining hegemony in the Third World to the detriment of the US. Others characterized Soviet activity as the natural, though maladroit, behavior of a great power seeking to enhance its own influence without necessarily harming our own.

The growing fleet of Soviet heavy transports has enhanced the USSR's ability to project its power to Third World areas. This An-22 can lift a 99,000-pound payload about 6,800 miles.

Upon reflection, however, it will be seen that the resolution of this debate is meaningless. Although Soviet action in the Third World may not *at the moment* be consciously directed at harming the US and establishing Soviet political hegemony, the risk of that happening is high. Hence, the US has no choice but to regard Soviet activity as directed against American interests. Nor is it sufficient for the US government to recognize this, while discounting the Soviets' ability to spread their influence because they have suffered setbacks in recent attempts. Their continuing activity shows that they have not given up, and the US cannot count on Soviet inability to learn how to be effective in the future. Not only, then, does Soviet politico-military activity in the Third World pose a threat to the US, but the US must actively respond.

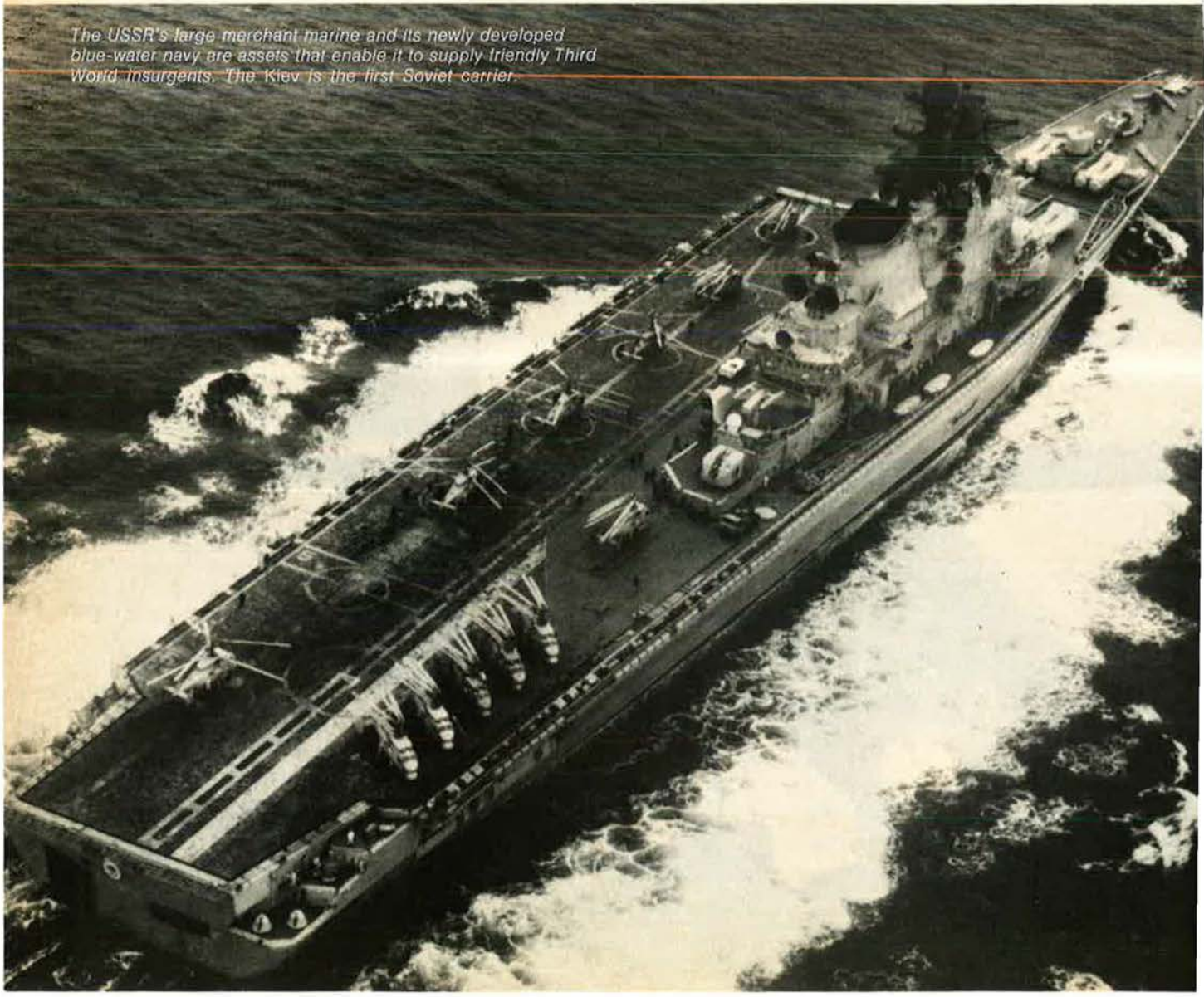
Varying Views of US Response

How can the US respond effectively? Many people interviewed emphasized the importance of economic means, pointing out that the USSR is largely unable to compete with the US in this area. There are, however, some problems with a purely economic strategy. First of all, it is not possible in the short run for economic assistance to raise standards of living enough to alleviate the causes of insurgency. Second, these causes are not always economic, but rather political. Indeed, recent civil war in the Third World has usually been the result of attempts to attain national liberation for certain groups. Their goals are political, not economic, and thus economic means are not a suitable response. Third, when a nation is actually facing an insurgency backed by Soviet arms, and perhaps Cuban troops, Soviet influence will not be countered by US projects for building power plants, sending tractors, or buying raw materials. Whatever long-term benefits such actions might have under peaceful conditions, they would be ineffective against immediate Soviet politico-military activity. Thus, the Soviets could always outmaneuver the US with short, decisive military action if the US relied upon a much longer term economic strategy alone.

Of those who felt that a military response might be necessary, there was much vagueness as to what form such a response should take. People disagreed as to what the role of US forces should be, or even if they should have one at all. The reasons for this, it should be obvious, stem from the American experiences in Vietnam and Angola.

What the Soviets Have Learned

If both Vietnam and Angola failed, it would appear that any coherent strategy directed against Soviet activity in the Third World would have to evaluate these two events. But rather than examine the lessons that the US



The USSR's large merchant marine and its newly developed blue-water navy are assets that enable it to supply friendly Third World insurgents. The Kiev is the first Soviet carrier.

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learned, or should have learned, a more useful approach might be to look briefly at what the Soviets have learned.

Beginning with Korea, the Russians learned that the US would respond actively to a Soviet-sponsored invasion of another country outside the Soviet bloc. The proof is that they have not tried it again.

In Vietnam, the Soviets learned that, for domestic political reasons, the US could not effectively respond to a guerrilla insurgency if the insurgency could be kept alive long enough to frustrate a quick American military victory. In time, inner tensions within the American polity would surface if only because the American people prefer a crusade to a realpolitik notion of limited war, and because Americans simply could not envisage Vietnamese Communists as their mortal enemies. Had the Soviets sent their own armed forces to Vietnam, the perception of the Soviet threat in Indochina undoubtedly would have been greater. Given the proximity of North Vietnam, and the bases that the insurgents could use in Cambodia and Laos, all the Soviets had to do was to supply enough arms to keep the insurgency alive.

In the 1973 Middle East War, the Soviets threatened to intervene on the side of Egypt unless the Israelis halted their advance. The US responded immediately by placing on alert all armed forces, including nuclear armed elements. The Soviets learned quickly that an armed intervention with Soviet forces would not be tolerated by the US.

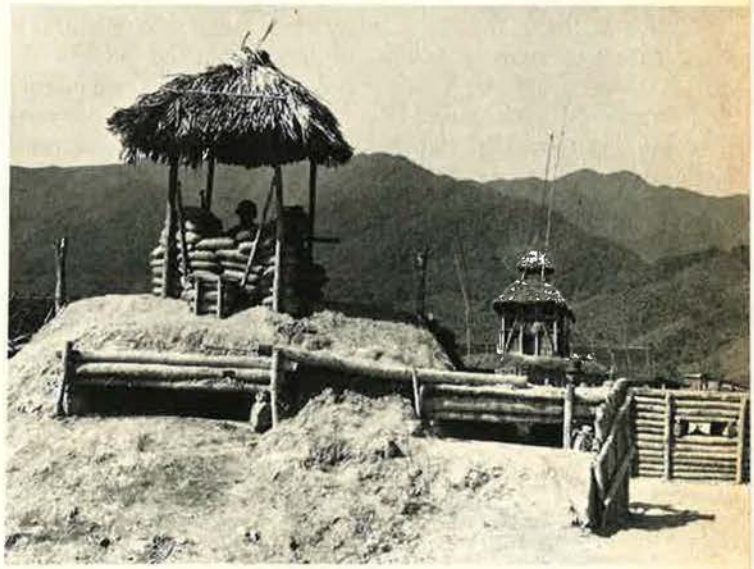
In Angola, there were three competing guerrilla groups, of which the USSR supported one. This group, the MPLA, was not especially strong, and was certainly less capable of maintaining an insurgency against a powerful opponent than were the Viet Cong, even with Soviet weapons. To deny the US a quick victory, outside forces would obviously be needed to support the MPLA. The use of Soviet forces was out of the question, as that would assuredly elicit a strong American military response. What to do? The Soviets gambled that Cuban intervention in Angola would not unify the American polity and evoke a strong military response, and that Cuban forces would be strong enough to forestall a quick US victory, or at least convince key American decision-makers that this was the case. The gamble paid off, and now the USSR is attempting to spread its influence through arms transfers and the use of Cuban troops elsewhere. The American response to Angola signaled that they could do so with relative impunity.

Elements of a US Strategy

If these are indeed the lessons that the Soviets have learned, what, then, should US strategy be? In an era when the US does not wish to countenance the spread of Soviet influence through Soviet-supported insurgencies, and when the US is less willing to use its own forces abroad, security assistance is one of the few means by which the US can reconcile these two desires. Security assistance to those nations where the US would not like to lose its influence signals the Soviets that the US does indeed consider those countries important. Refusal to sell weapons to a given nation could quite possibly be read as an indication that the US would be unwilling to take strong measures on that nation's behalf should it be threatened. Security assistance is politically useful, then, in that it does not offer the Soviets an ambiguous opportunity to test US willingness to respond militarily in places where doubts may otherwise exist. Further, it provides nations with the means to deal with threats where the US itself does not want to become militarily involved. Security assistance thus may prevent Soviet-sponsored insurgencies from occurring, and save costly US military involvement where they do occur. Strategic reality, then, does not allow the US to reject security assistance on the basis of abstract moral principles that can do little in themselves to halt the spread of Soviet influence.

Nearly everyone interviewed agreed with one National Security Council official who said, "The most appropriate response to an insurgency situation would be to encourage other countries to play a role. Now that other countries have significant interests and capabilities, we should allow them to deal with these situations."

Foreign troops could indeed be quite useful, especially



In Vietnam, the Soviets learned that American staying power is limited where US vital interests are not directly threatened or Soviet forces directly involved.

where the foreign powers involved have a strong interest in halting the spread of Soviet influence, as do the French, Belgians, and Moroccans in Zaire's Shaba Province. This method, however, cannot be seen as a panacea that will both halt the spread of Soviet influence and completely spare the US from military involvement in the Third World. Since America's allies are not as strong as the US, they are militarily less able to deal with a strong opponent. This might cause the polities of our allies to have an even lower tolerance for fighting a protracted insurgency than the American polity displayed in Vietnam. The French experiences in Indochina and Algeria show

that the US is not the only nation susceptible to domestic unrest caused by foreign wars. Relying upon foreign troops, then, is not the best way to protect American interests.

Finally, one must address the question of how the US itself should respond to a situation in which a Third World government that, both internally and externally, is considered legitimate, is threatened with a Soviet-backed insurgency by a minority whose success would cause serious damage to US influence throughout the world and correspondingly increase Soviet influence, and yet where a long-term military involvement might create divisiveness within the US. To this observer, the following strategy appears to be the best solution:

If the Soviets decide to support an insurgency and we find this action inimical to our interests, the US should warn the Soviets directly that their misbehavior will have serious consequences across the entire spectrum of our bilateral relations. If the USSR proceeds with sending arms or Cuban troops or both to aid the insurgency, the US must take decisive military action, as well as follow through with the warnings given. The primary target of American forces, however, should not be the insurgents, but rather the Soviet assistance effort.

Political uses of force such as alerts and repositioning of forces should be tried first, and could be graduated if necessary. Soviet weapons and Cuban troops sent by ship should be met by a naval quarantine. Those sent by air may require a more active use of force. Since the Soviets do not have the same capacity to sustain conventional forces overseas in hostile conditions that the US has, the Soviets could not hope to succeed through the use of conventional arms alone. By raising the cost of supporting an insurgency in this manner, the traditionally cautious Soviet leaders probably would back down or forego such an attempt completely. *It must be emphasized, though, that the US must have at least equivalence in strategic nuclear weapons for such a strategy to work.* Otherwise, the US itself might be forced to back down.

Meanwhile, the US should help the Third World government to defeat the insurgency by providing security assistance. The task of fighting the insurgents, though, should be left to that government. Without assistance from the USSR or Cuba, the insurgents should be readily defeatable, or at least containable; if not, the government in question may not be worth supporting.

A continuing US advantage is its ability to support bare-base operations worldwide. Here TACS elements load aboard a C-141.

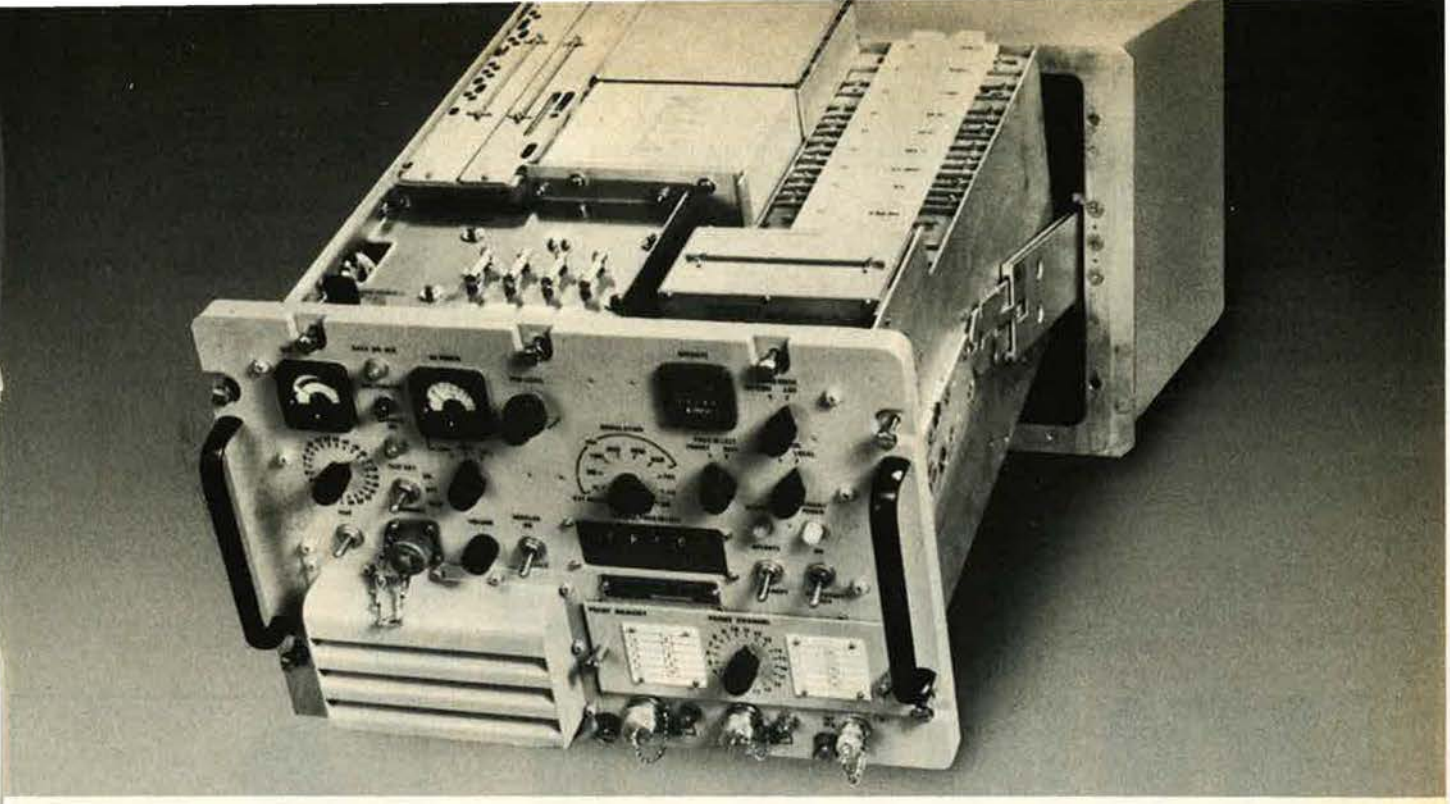
Leadership, Public Opinion, and Policy

Some may feel that the aspects of this strategy directed toward the USSR amount to a formula for World War III. This is not so. First of all, such a strategy is not at all similar to massive retaliation, wherein if the Soviets pursue an unacceptable action, the US has only the choices of launching all-out war or doing nothing. The response is only on a local level, and thus more credible. Second, if the Russians believed that the US would move forces into an area to halt their activities, a prudent Soviet government would realize that the costs involved are too high. Third, and most important, if the cost of expanding its politico-military influence is not made high now, the Soviet Union may very well achieve a position whereby later on it may threaten American interests much more easily from its acquired bases.

As the Soviets develop a greater confidence in their ability to expand, the US would face a much more difficult, and necessary, task, and World War III may become all the more probable. If the US could convince the USSR now of the inadvisability of expansionism, while the US is still in a relatively strong position in the Third World and not on the defensive, and while the USSR is not yet overconfident by virtue of too easily gained success, the chances for maintaining both relative international peace and American interests would be rather good compared to doing so in a situation where Soviet politico-military influence was continuing to expand. As the events of the late 1930s show, an ambitious state that is allowed to gain victories too easily is not appeased, but is likely to pursue recklessly further victories under the conviction that its adversaries are weak-willed. Above all, the US must not allow the USSR to doubt American determination to oppose Soviet expansion.

A final comment must be made about the role of American public opinion in US foreign policy. Nearly all the people interviewed intimated that American public opinion rigidly limits the choices available to decision-makers. Yet, as Hans J. Morgenthau wrote in the conclusion of *Politics Among Nations,* the government should be the leader of public opinion and not its slave. To regard public opinion as an immutable constant is wrong, for public opinion is subject to change. After Vietnam, public opinion is seen as being unalterably opposed to intervention in Third World insurgencies, but before Vietnam public opinion was seen as demanding nothing less than intervention. What this probably means is that the American public would support successful interventions but not unsuccessful ones, success being the rapidity with which US objectives are attained.

Above all, however, the most crucial factor in effectively responding to the spread of Soviet influence in the Third World and in gaining active public support for such efforts is a government with leaders who are keenly aware of what American interests are, who have the intelligence and courage necessary to respond appropriately and effectively when American interests are threatened, and who are not afraid to take the risk of telling the public what America should do to protect its interests. ■



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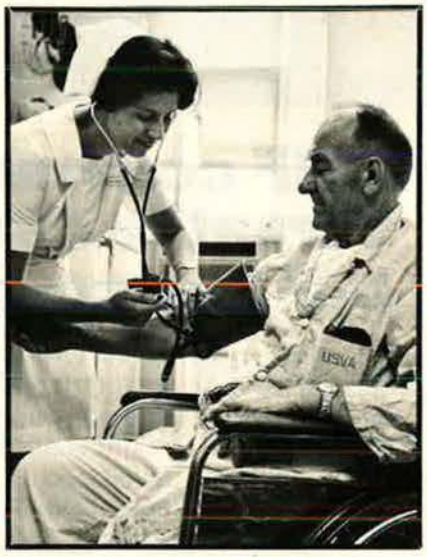
ECI's AN/WSC-3 (Whiskey-3) UHF terminal,
another element of total communications systems capability at E-Systems.

The Veterans Administration is doing an increasingly efficient job of managing more than seventy-five benefits programs—some of them little-known to veterans or their survivors—at an annual cost of some $20 billion. Here are details on many of the programs, new and old, that are among . . .

THE VA'S BOUNTIFUL BENEFITS

BY ED GATES
CONTRIBUTING EDITOR

To care for him who shall have borne the battle and for his widow, and his orphan.
—ABRAHAM LINCOLN



The VA operates the largest health-care system in the nation, with a total of 172 hospitals—at least one in each of the CONUS states.

IT HAS become popular in recent years to accuse the government of neglecting its Vietnam-era veterans. "Inadequate GI Bill." "Vets Suffer in Job Search." "VA Indifferent to Returnees." So go typical headlines decorating a spate of columns, feature stories, and articles that paint Uncle Sam as a tightfisted ogre who at best is apathetic toward veterans, at worst is actually hostile toward them.

A typical diatribe, for instance, appears in the March 1978 issue of *The Atlantic* Magazine, titled "Soldiers of Misfortune." At one point the article declares: "It seemed as if the military were bent on punishing men for having gone to war." At another, it charges that "VA bureaucrats have

managed personally to insult a great many Vietnam veterans." There are more quotes in this vein.

While such irresponsible salvos generally miss the mark, a few contain slivers of truth; the accumulation of such charges tends to tarnish the image of the government's benefits projects for all veterans. These benefits make up a huge package that includes all kinds of health care, cash for schooling and training, loans, low-cost insurance, job aid, survivor benefits, pensions, disability compensation, burial services, and much more for veterans and survivors of the last eight US wars. That figure includes benefits for the 117 remaining widows of Civil War veterans and the 16,829 still-living widows of Spanish-American War vets.

All told, there are about 30,000,000 living veterans, of whom 13,000,000 participated in World War II. Fewer than 750,000 of the original 5,000,000-plus World War I veterans are still living, and their ranks are fast being depleted.

Of all living veterans, the Veterans Administration reports, 2,250,000 draw disability compensation ranging from $41 to $1,875 per month, for service-connected ailments. Another 1,000,000 receive monthly pensions ranging from $5 to $197 with no dependents, more with dependents. These pensions are based not on any service-connected disability but on the fact that they are elderly, in poor health, in financial straits, or otherwise cannot adequately support themselves and their families. Congress is in the process of overhauling this program and increasing the pensions.

In the first three months of this year, more than 1,000,000 veterans participated in the GI Bill educational program, receiving up to $422 per month (more with multiple dependents) for as many as forty-five months.

VA's vast medical program accommodates an average of 75,000 inpatients daily, and each month about 1,400,000 veterans make free outpatient visits to VA hospitals, clinics, and private physicians (at VA expense).

The benefits list includes such diverse items as an annual $203 clothing allowance, guide dogs and their training and medical costs, educational loans of up to $2,500 annually, up to $351 per month (extra for more than two dependents) for four years of vocational rehabilitation, trailer loans, "wheelchair homes," and insurance plans. Service-connected vets living in many foreign locations will receive medical care paid for by Uncle Sam.

Many of the benefits provided, of course, are for widows, wives, children, and in some cases parents. Approximately 1,262,000 low-income survivors receive nonservice-connected death pensions ranging to $133 per month, for example. A widow with one dependent may receive a maximum of $159. This particular project will cost the government an estimated $1.4 billion this year.

The major benefit provided survivors is Dependency-Indemnity Compensation (DIC), paid when death is linked to a service-connected disability. Payments range from $277 to $708 per month, plus extra dollars for children. Rates are based on the deceased's highest military rank. Already, there are more than 61,000 service-connected death cases of Viet-era veterans; DIC recipients, including 147,000 parents, number 471,000.

VA has a warning for surviving widows receiving DIC but who are "living in sin": Payments may be stopped, though should "the relationship terminate, she may reapply for benefits."

Other benefits for survivors include a $3,000 death gratuity (service widows only), commissary and exchange privileges where the disability is rated 100 percent, home loan eligibility, and educational payments of up to $311 per month (for forty-five months) when the death or total disability resulted from service, and insurance.

A valuable new pamphlet, "Federal Benefits for Veterans and Dependents," lists seventy-five separate benefits programs. Persons not sure about their entitlements or where to apply would do well to invest the $1 required to buy a copy. Write the Superintendent of Documents, GPO, Washington, D. C. 20402.

Big and Growing Business

Looking after veterans' and survivors' needs is big business, and it's growing every year. The Administration's FY '79 budget submission called for a record-high VA outlay of $19.2 billion. But Congress is in the

Significant progress has been made in improving rehabilitation for the seriously injured, including the blind.

process of raising that to about $21 billion, to accommodate congressionally-sponsored boosts in pensions, disability compensation, medical care, and other programs.

Even assuming no more wars, the government's role with veterans will expand in coming years. The aging process alone will severely tax the vast VA medical establishment with its 172 hospitals and scores of nursing homes and other facilities. Currently, VA reports, veterans comprise forty-five percent of all American males over twenty years of age. By 1990, because of the aging World War II and Korean War vets, more than half of all US males over sixty-five will be veterans, placing large new health care demands on Uncle Sam.

Furthermore, VA has told Congress that by the year 2010, more than 1,000,000 veterans will be over eighty-five, compared to only 130,000 today. The agency sees that triggering a need for an extra 250,000 nursing home beds. That will carry a hefty price tag.

More than $5.5 billion of VA's FY '79 budget is earmarked for medical programs. Officials expect an average of 185,000 people will receive medical services and treatment each day during the year. This would be nearly 3,800 above the actual count last year.

Another half billion dollars is slated to be spent next year on VA hospital construction. Also a record high, this will provide replacement hospitals at Seattle, Wash., and Portland, Ore.

Once a special project for veterans gets established, getting rid of it becomes extremely difficult, even if it has little justification. An example is the VA flight training program, which the Administration wants to drop, a move that would save $50 million annually. But Congress won't hear of it. The lawmakers have also rejected Administration bids to erase VA correspondence training, another $50 million annual project that many critics say should disappear.

The President has angered the veterans establishment by demanding, in his Civil Service reform bill, an end to job preference for nondisabled veterans in government hiring. This long-time preference, critics contend, finds veterans blocking the top of most Civil Service job rosters. This, the Chief Executive holds, works to bar the hiring of women and minorities. Veterans organizations, AFA included, strongly oppose the Administration's position.

And the Veterans Administration? Dorothy Starbuck, its chief benefits director, told AIR FORCE Magazine she has "no quarrel" with the plan to phase out hiring preference.

Congress, meanwhile, continues to pour more veterans bills into the hopper than any other type. Many would heap expensive new programs on top of the present substantial lineup. One recent new bill would give the 8,500,000 Vietnam-era vets up to $350 each in mustering-out pay. Most such bills, for obvious reasons, don't get anywhere, but their cumulative weight and the strong message they convey to any Administration in office is clear: "Don't skimp on veterans. They're special, so be generous with them."

Improving Old Programs

If brand-new programs aren't every-day affairs, improvements in old ones come along frequently. Last year, for instance, the lawmakers extended the $3,300 automobile assistance plan to World War I vets; raised disability compensation, DIC rates, and GI Bill payments each 6.6 percent; improved the GI bill in other respects; and boosted pension rates 6.5 percent.

The legislators also opened the benefits door to World War II WASPs

Dorothy Starbuck, an experienced VA hand, is Max Cleland's choice as director of VA benefits.

and other "similarly situated groups" who, though civilians, rendered service to the armed forces. Air Force, acting for all the services, is drawing up a directive that will soon implement the new law and spell out eligibility rules. Possibilities include certain Red Cross workers and merchant seamen.

The House Veterans Affairs Committee recently approved new bills that will improve veterans benefits on several fronts. They include increased dependency-indemnity compensation for survivors, larger home loan guarantees, larger burial allowances, extra disability compensation, and a doubling of the monthly pensions (from $100 to $200) for Medal of Honor holders.

The biggest new plum coming up, however, is a reform package for non-service-connected disability benefits, which will enhance that program for the 2,000,000 participating veterans, widows, and other survivors. Both the House and Senate Veterans Affairs Committees recently approved similar bills improving the program. The House Committee voted a $5,200 annual guaranteed income for income-less veterans with one dependent, and the Senate Committee approved $4,284. The present ceiling is $2,544. Sharp increases for low-income single vets were also voted.

The Committee actions are in tune with what VA calls the government's long-standing determination to "keep veterans and their survivors from want and degradation. Veterans with

Vietnam veteran and triple amputee Max Cleland epitomizes the VA's new leadership.

honorable wartime service are in a special class to be treated differently from the general population." Hence the many special programs.

The loose criteria employed for pension eligibility blankets in all non-service-connected veterans sixty-five or older earning less than $3,800 ($5,070 if there is a dependent), regardless of their physical condition or employment status. Younger veterans who "cannot follow a substantially gainful occupation" are also eligible. Payments, which start at $5 a month, are based on the amount of other income a vet or widow has.

The Committee pension bills, likely to be meshed in later Capitol Hill action this year, also include automatic cost-of-living boosts for the pensioners. And they eliminate the problem of veterans facing a pension cut because of annual Social Security increases. Under the bills, when Social Security checks increase, the pension will rise by the same percentage. It's another example of Uncle's benevolence toward veterans.

However, the pension reform legislation would cost up to $1 billion the first year, depending on the final version. The promise of this extra outlay emerging as the President talked of vetoing numerous bills authorizing new federal spending raised some doubts about final action this year. A Presidential veto was held possible. An informed congressional source, however, said, "We believe pension reform legislation will go through."

Earlier, before the sudden economy drive, the Administration seemed ready, almost eager, to endorse the congressional pension reform proposal. As Miss Starbuck told AIR FORCE Magazine, "We find more to agree with than to disagree with in the bills. They should improve the pension system." And she sees a favorable spin-off: a dampening of the constant demand of various lawmakers that the government give a bonus to all remaining World War I veterans.

New Leadership at VA

As the agency running virtually all veterans programs, the VA has taken the brunt of the flak from war critics, the media, and other quarters. Over late arrival of GI Bill checks. Over educational assistance overpayments (a new General Accounting Office report puts total VA overpayments since mid-1972 at $2.5 billion, of which $462 million remains uncollected). A large and vocal group has chastised the government's discharge review program for Vietnam-era vets with "bad paper." There have been squawks that the flat monthly GI Bill payments prevent vets from enrolling in "high-tuition" states. According to other charges, VA officials were indifferent to inquiring veterans and did little to spread the word on benefits throughout the veterans' community.

But some of this static now seems to have faded. New leadership took over the Veterans Administration early last year in the person of Max Cleland, himself a veteran of 'Nam combat where he lost both legs and an arm. Just thirty-five, and relating more closely than his predecessors to young veterans and their problems, Cleland personifies the government's concern for all its ex-service members, particularly those disabled in combat. Cleland has shaken up many programs and improved agency communications with the people it serves.

In appointing Miss Starbuck as the director of VA benefits, he came up with what insiders consider probably the best-qualified person in the country to run the many programs that can affect 30,000,000 veterans, 62,000,000 members of their families, and 3,800,000 survivors of deceased vets.

A former Army captain, she served thirty-two years throughout the VA system, from clerk to director of its largest area (northeastern states and Washington, D. C.) before her new assignment.

Miss Starbuck cited initiatives she and her associates are pushing to better serve the veterans population.

Veterans, Dependents Drawing VA Compensation or Pensions

(as of March 31, 1978)

	Veterans	Widows	Children	Parents
Civil War	—	117	158	—
Indian Campaigns	—	45	12	—
Spanish-American War	354	16,829	1,211	—
Mexican Border	271	602	22	—
World War I	297,492	561,527	24,346	221
World War II	1,920,971	492,605	436,294	90,269
Korean War	311,991	56,463	211,963	21,411
Vietnam Era	520,971	46,828	111,572	22,109
Between Wars *	213,864	34,960	17,274	13,049
Total	3,265,914	1,209,976	802,852	147,059

*No wartime service

The Veterans Administration calculates that 45,702,000 persons have participated in the US military services. However, those who served in more than one war, such as the 1,476,000 people who served in both World War II and the Korean War, are counted as participants in each. Total deaths in service are put at 1,103,000, the number of living veterans at 29,844,000.

"Outreach," for instance, finds VA staffers actively looking for nonparticipating veterans, to ease their way into vocational training, college, or other programs. "We're especially after the educationally disadvantaged and aging veterans," she told AIR FORCE Magazine. "Many aren't getting all they're entitled to, and some are unaware of program changes that would benefit them."

VA representatives, she explained, also are visiting federal and state prisons at least twice a year to assure that incarcerated vets get what they're entitled to.

"Service" Is the Watchword

Toll-free phone service to the fifty-eight VA regional offices is now provided. This accounted for 19,000,000 calls last year, and officials are bracing for an expected 21,000,000 this year. Region phone numbers are listed in local directories under US Government, Veterans Administration, and in the Federal Benefits pamphlet cited above.

VA is bombarding the media with details of program changes, explanations of new procedures, key dates for applications, questions and answers, etc. It's part of the drive to spread the word about benefits to all eligibles.

"Make a Date, Avoid a Wait" is an example of a people project VA is taking directly to the veterans community. It urges vets to make appointments for VA hospital outpatient service. Doing so, Administrator Cleland says, reduces waits. VA's objective is to get each patient—about 17,500,000 visits are expected this year—in and out of the doctor's office within half an hour. That would have been unheard of a few years ago.

The readily apparent improvement in administration of VA programs, such as fewer complaints about stray checks and faster responses to queries and claims from beneficiaries, is linked to a new nationwide computer network the agency is installing.

VA authorities have kept their cool in the face of charges, now diminishing, that the government has failed the people who responded to calls to arms, particularly those who returned from Vietnam with drug, educational, and job problems. "One must consider the source of those charges," Miss Starbuck said.

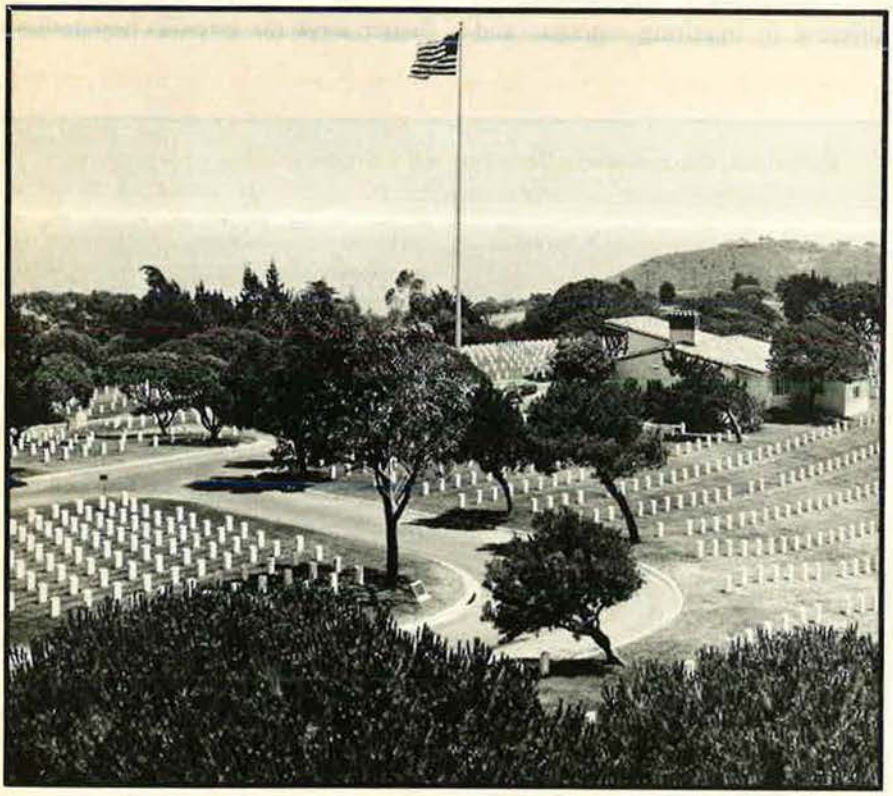
And what about the charges that the flat monthly GI Bill payments are unfair to veterans eyeing private schools? "Those complaints don't hold water," she replied. "The GI Bill was never intended to provide other than educational assistance, not a full subsidy." She added that participation in the present GI Bill program is higher than under earlier GI bills and that the troublesome Vietnam-era employment picture is improving.

Miss Starbuck also could have noted that all the major veterans organizations support the present system of educational benefits for Vietnam-era vets as established in the "Veterans Education Improvements Act" passed late last year. With this new law, the American people make available to the married veteran with one child in excess of $30,000 to help complete five years of education ($18,900 in monthly educational checks, up to $14,500 in loans). The scale is adjusted comparatively for single vets and those with more than two dependents.

Far from treating veterans shabbily, as some quarters would have the country believe, Uncle Sam appears to remain a generous provider. As one VA official put it: "No nation does as much for its veterans as the United States, nor does it for so long. As proof, we're still taking care of widows of Civil War veterans, and that conflict has been over for 113 years!" ■

HOW THE STATES TREAT THEIR VETERANS

Programs to help military veterans are not the exclusive province of the federal government. The states do pretty well too. Assistance ranges from trivial items like free fishing licenses to matters of substance: bonuses, tuition waiver at state colleges, privileges and preferences for all kinds of state and county jobs, and various kinds of tax relief. A few states exempt veterans from jury duty. New Jersey gives each blind veteran an annual $750 pension. California, with about 100 separate benefits, appears the most generous of any state. It even provides pardons for state prisoners released for military service upon being honorably discharged.



VA's Department of Memorial Affairs administers 108 national cemeteries in the United States and Puerto Rico. Here, the Fort Rosecrans National Cemetery in San Diego, Calif.

In this second of a series of articles on the men who developed the concepts, structure, and technology of airpower, the author tells how a distinguished Infantry officer, more than any other man, was responsible for "our mighty surge to airpower that dominated the world." That man was . . .

George C. Marshall, Architect of Airpower

BY GEN. LAURENCE S. KUTER, USAF (RET.)

General Marshall (left) with Gen. H. H. Arnold at one of the wartime Combined Chiefs of Staff planning conferences.

N 1939, when Gen. George C. Marshall became the rmy's Chief of Staff, the rmy Air Corps consisted f a few partially manned roups of obsolescent air- raft and the first B-17 quadron of about a dozen easonably combat-worthy ircraft and crews.

On April 3, 1940, the Iouse Committee struck rom the appropriations for 66 airplanes funds for all ut fifty-seven. Only sixty nonths later, the Army Air 'orces had exploded to 286 roups, thousands of supe- ior fighting airplanes; tens f thousands of trained rews, all supported by everal hundred thousand round personnel.

Germany surrendered and ne Japanese gave up before ur ground forces had to :orm ashore on their home :lands.

If only one man could be redited with pioneering our ighty surge to airpower nat dominated the world, nat man would have to be ieorge Catlett Marshall.

Throughout the world, ieneral Marshall is known s the great Secretary of tate who initiated the Mar- nall Plan. The Allied world new him as architect of the reatest fighting force the orld had ever seen. Americans think of him as VMI's distinguished graduate, a career Infantry officer of highest distinction but primarily as the Chief of Staff who almost singlehandedly faced the America Firsters, the isolationists, the Roosevelt haters, and a lethargic public, but nevertheless built our victorious fighting forces for World War II.

Few recognize him as the man who pioneered in building the largely autonomous Army Air Forces and who supported for years the eventual emergence of the separate US Air Force.

One action in early 1940 typified General Marshall's role in developing American airpower. A working group on his staff prepared a plan for the first of the successive expansions of the Army Air Corps. The group proposed at least a tenfold expansion in the size of the Air Corps and an enormous improvement in its combat capability. The plan had been laboriously processed through the personnel, intelligence, training, operations, and materiel divisions of the General Staff and the related divisions in the Office of the Chief of the Air Corps. Each of the plan's massive undertakings—expanding the industrial base, developing and building the planes, creating new airfields, recruiting and training many thousands of crew members and support people—had been challenged during the process.

When coordination had been finally, although sometimes begrudgingly obtained, this fifty-four-group program was ready for presentation to the Chief of Staff. As a project officer in this staff group, I made the presentation to General Marshall, who had his Assistant Chiefs of Staff, General H. H. Arnold, and several of his senior Air Corps staff officers with him.

When the presentation was finished General Marshall asked the following: "Why is this a fifty-four-group program? Why not fifty-six, or sixty-four, or more?"

I responded, "Sir, while presenting this program to the many agencies involved we have had to answer countless questions. Yours is the only one that has never before been asked. All others have been suggestive of less ambitious efforts. In answer, fifty-four is the largest number of groups we believe can be produced within this time frame. Once the expansion

base has been completed and is operating, it will be possible to enlarge that number with relatively minor extensions of time."

General Marshall's last words were, "The program is approved. Let's get on with it." His was the basic and bold decision that initiated and later pressed on with the spectacular growth of American airpower.

General Marshall recognized the requirement for airpower long before World War II. He told me that one of his disappointments as a younger officer was his failure to convince his friend Billy Mitchell to work within established channels. He was sure that Mitchell could, in the long run, do more to advance airpower that way than by his spectacular publicity drives.

General Marshall endorsed the objective of separate departments of Army, Navy, and Air and questioned only the timing and Mitchell's tactics. He continued to urge patience and decorum up to the beginning of Billy Mitchell's unhappy court-martial. He always regretted that this was one of his few efforts that failed. It is worth noting that only two Army officers made the trip to Milwaukee on a winter day in 1936 to attend Billy Mitchell's funeral. They were Maj. Gen. Frank McCoy and Col. George C. Marshall.

Elevating Airpower Influence

When General Marshall was transferred to Washington in 1938 to be the Deputy Chief of Staff of the Army and then its Chief, he was distressed to find so little airpower influence or representation in the War Department General Staff. In an overwhelming preponderance of ground officers there were few officers from the Air Corps, none of them in prominent positions. The record is full of instances of his efforts to correct this discrimination.

Most of the General Staff officers had ground force service and were graduates of the Army War College and the Command and General Staff School. Many were approaching retirement. While General Marshall was the Deputy Chief of Staff he told the Assistant Chief of Staff, Personnel, that he wanted on his staff some officers from the Air Corps, some younger officers, and some who had not been indoctrinated by the Army's school system.

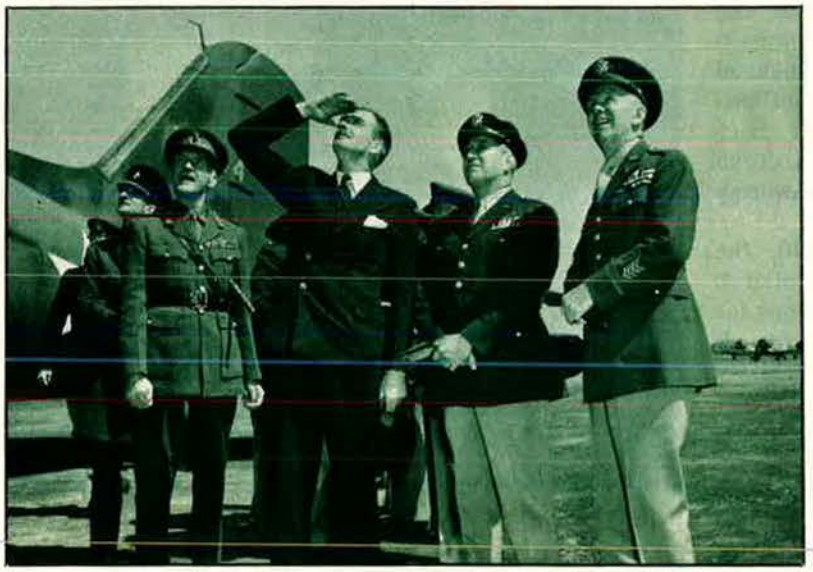
One of his first actions as Deputy Chief of Staff was to insist that Col. Frank M. Andrews be recalled from a minor aviation assignment in Texas, promoted to brigadier general, and assigned to the key position of Assistant Chief of Staff, Operations, in the War Department General Staff.

The Chief of Staff, Gen. Malin Craig, and the Secretary and Assistant Secretary of War, Harry H. Woodring and Louis A. Johnson, all opposed the promotion and the assignment of a strong and vigorous airman to so prominent a position, but General Marshall demanded that appointment in another of his successful one-man stands.

When Major General Strong, Chief of the War Plans Division of the General Staff, and Vice Adm. Robert Ghormley, representing the Chief of Naval Operations, were sent to England to report on the ability of the British to hold out against the Axis, General Marshall ordered Lt. Gen. Delos Emmons of the Air Corps to participate. After the American-British Conversations (ABC) in Washington in early 1941, it was decided to send a joint party to London to continue the dialogue. The Navy sent Admiral Ghormley, and General Marshall sent Maj. Gen. James E. Chaney of the Air Corps as "Special Army Observer."

When General Marshall became Chief of Staff, in September 1939, Maj. Gen. William Bryden was the Deputy Chief of Staff. General Marshall instructed him to focus his attention on the ground forces. General Marshall insisted on two more deputies. Maj. Gen. Richard C. Moore was appointed to handle supply, and Maj. Gen. H. H. Arnold to handle air matters. General Arnold also retained his position as Chief of the Air Corps and thus was the only one of many chiefs of branches or services to serve also as a deputy chief of staff and to sit in on meetings of the War Council.

The reorganization of the War Department after Pearl Harbor provided that the G-1, -2, -3, and -4 Divisions of the War Department General Staff would be small units of ten or twelve senior officers to establish policies governing personnel, intelligence, operations and training, and supply and logistics respectively. To be assistant Chiefs of Staff G-1 and G-3 General Marshall selected Maj Gens. Donald Wilson and I. H. Edwards, both from the Air Corps.



General Marshall, at right, watching an aerial review at Maxwell Field, Ala., with, from left, Field Marshal Sir John Dill, Chief of the British Joint Staff Mission to the US; British Foreign Minister Anthony Eden; and Maj. Gen. Ralph Royce, Commander of the AAF's Southeast Training Center.

There are many more instances of General Marshall's initiative in elevating airpower to stature parallel to ground and naval power. His actions were limited only by his judgment as to the capability of our airmen to plan, operate, and work in parity with our experienced soldiers and sailors.

Evolving Autonomy

It was one thing to advocate a great increase in the size and strength of the Air Corps and to obtain better presentation of the airmen's views and experience in high staff positions. It was

quite another thing for a senior career ground officer not only to tolerate, but to advocate, the concept of a separate air force.

It seemed only normal for senior Army officers and the successive Army Chiefs of Staff to abhor the idea of a separate air force, which would deprive them of a growing branch of the Army at a time when other branches, notably the Cavalry and Coast Artillery, were shrinking.

With few exceptions, senior officers applauded the Infantry as the "Queen of Battle," supported the airplane only as an experimental vehicle that might aid the man on the ground, and scorned or were actively hostile to the concept of airpower as a new fighting force that could operate beyond the range of surface forces.

The conspicuous exception among senior ground force officers was George C. Marshall. His earlier support of the need for a separate air force became explicit in 1939 and 1940, and particularly just after Pearl Harbor.

In several private conversations during that period, I heard General Marshall say that the Air Corps should have all the autonomy it could properly manage. He said that creating a separate air force while we were expanding in all areas would be impossible because the Air Corps was dependent on the Corps of Engineers, the Signal Corps, the Judge Advocate General's Department, the Quartermaster Corps, the Army Medical Corps, and myriad lesser supporting agencies.

Immediately after Pearl Harbor he named an able Air Corps officer, Maj. Gen. Joseph T. McNarney, to head up a major reorganization of the War Department and establish the Army Ground Forces, Army Air Forces, and Army Service Forces.

General Marshall had many conversations with General Arnold concerning the broadly experienced staff that a separate air force would need. He urged General Arnold to reach down below his layers of "antique staff officers and passé flyers" and promote promising younger officers to positions in which they could gain experience. In at least one instance General Marshall reached way down himself and picked an Air Corps officer, a newly promoted temporary lieutenant colonel, made him a brigadier general, and told General Arnold to put him in a senior staff position. [That officer was the author.] General Marshall said that "when they came back after the war, the Air Corps had a nucleus of very able staff officers, but that wasn't true at all at the start."

In the interest of putting the Air Forces on a par with the Army and Navy, General Marshall singlehandedly convinced President Roosevelt's then Secretary, Marvin McIntyre, to include General Arnold along with himself and Adm. Ernest King as US military chiefs when they went to the Argentia Conference in August 1941 to meet with the Joint Chiefs of Staff Committee of Great Britain.

Thereafter, General Arnold remained as one of the three members of the US Joint Chiefs of Staff Committee, with the apparent grudging acceptance of Admiral King. The leader of our Navy was never happy facing two Army uniforms at Joint and Combined Chiefs of Staff meetings.

General Marshall's last association with the US armed forces began in September 1950, when he was recalled from retirement to become Secretary of Defense. It must have been gratifying to him to head up a unified Department that embraced three independent, coequal, and cooperating Departments of the Army, Navy, and Air Force. Thirty-five years after Billy Mitchell tried publicly and failed, the establishment that he and General Marshall envisioned had been attained through established channels and was a firm component of the government of the United States.

General Marshall was one of the few pioneers who lived to see their programs come to full fruit. ■

Gen. Laurence S. Kuter served on the War Department General Staff under General Marshall from July 1939 to February 1942. When General Marshall promoted him from lieutenant colonel to brigadier general, he was the youngest US general officer since William T. Sherman. In October 1942, General Kuter became commander of an Eighth Air Force bombardment wing and later served in the Pacific as Deputy Commander of the AAF in that area. After the war, he commanded MATS (now MAC), Air University, Far East Air Forces, PACAF, and NORAD. For several years after his retirement in 1962, he was Executive Vice President of Pan American World Airways.

LUCKY IN LOVE

In late 1942, while stationed at Randolph Field, I was going on leave to be married in New York. Passing the transient hangar, I saw a C-53 with Bolling Field markings. On impulse, I went into Operations to see if I could pick up a ride to Washington. As luck would have it, the aircraft was assigned to Lt. Gen. Millard Harmon, who was TDY in the States from his command in the Southwest Pacific, and he would take me.

We climbed to altitude, and as we leveled off, the General motioned to me. He smiled as I reached his seat and asked, "Lieutenant, do you play gin rummy?" I did, and he waved me to a seat opposite him.

The General proved to be an uncommonly good card player. By the time we arrived at Bolling, he had given me a thorough shellacking. As we landed and got up from our seats, he chuckled and said, "I don't know what you're going to do on your honeymoon, Lieutenant, but the way your luck is running, you'd better take me along."

—Contributed by Col. Fred E. Bamberger, Jr., USAFR (Ret.)

(AIR FORCE *Magazine will pay $20 for each anecdote accepted for publication.*)

It lacks the excitement of Cape Kennedy—no huge spacecraft thunder skyward from here. It can't match Houston's glamour, with that space center's corps of astronauts in training. Seldom do newsmen congregate here to witness the lastest space shot. Yet, despite its low profile, the multiple roles it plays are essential to the nation's continuing success in space . . .

Goddard Space Flight Center: NASA's Jack-of-All-Trades

BY WILLIAM P. SCHLITZ, ASSISTANT MANAGING EDITOR

TO THE casual visitor, the Goddard Space Flight Center in Greenbelt, Md., is not unlike a college campus, with its buildings scattered in broad green fields. The people on its walkways could be students sauntering to and from classes.

But appearances are deceiving, for Goddard is the jack-of-all-trades among NASA's space centers. Goddard is the space agency's communications hub, with a system of land lines, undersea cables, and satellites that stretches around the world. This net ties together the twenty-one sites of the Spaceflight Tracking and Data Network (STDN), an element that plays a key role in all of NASA's spaceflight activities (including June's repositioning of the Skylab space station, see p. 20).

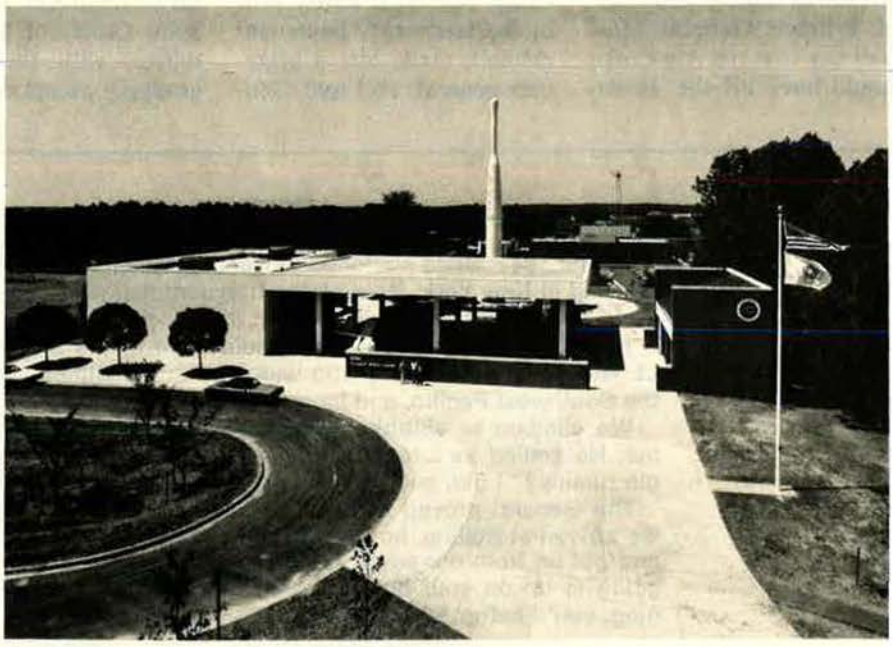
What's more, Goddard, located some fifteen miles from the nation's capital and NASA Headquarters, has among its work force of 6,000 one of the largest assemblies of scientists in the world. This pool of talent, in the several decades of Goddard's existence, has been in the forefront of the effort to make the US investment in space pay hefty dividends.

Goddard was established in May 1959 as NASA's first major scientific laboratory devoted entirely to the exploration of space, and it has come a long way from the shock of Sputnik-1 on October 4, 1957, and the first successful US satellite launch, Explorer-1, on January 31, 1958.

The US manned spaceflight program is in somewhat of a hiatus these days—following cessation of the Apollo, Skylab, and Apollo/Soyuz missions. But the Goddard communications and tracking machinery is kept active through the continuing series of satellite and spaceprobe launches. With the commencement of operational Space Shuttle flights the middle of next year, Goddard, as NASA nerve center, faces an exciting and productive future.

The Satellite Factory

Aside from spacecraft tracking and communications, Goddard has



Contributing to the college campus atmosphere at the Goddard Space Flight Center is its Visitor Center. See box on p. 71.

a corollary responsibility as the nation's satellite factory. In their utilization of space-age technology, scientists at the space center theorize missions for satellites that are of either a scientific or applications nature.

On the scientific side, the staff probes into such disciplines as astronomy, planetary atmosphere, solar activity, and near-earth physics. About a third of all scientific experiments flown in US spacecraft have been conceived, designed, and/or built by Goddard scientists. About half the orbital satellites launched by NASA are managed by Goddard personnel.

The applications satellites—the meat-and-potatoes elements in the quest for greater control of environment and resources—are of more immediate benefit to mankind: weather, earth resources, communications, navigation, and the like.

Once a decision to build a given satellite is made, Goddard takes a cradle-to-grave approach. This process extends from theory through experimental design and development, fabrication, testing, launch participation, tracking and communications, and data acquisition until the satellite (or sounding rocket) is shut down or burns up upon reentry in the atmosphere. Goddard has the facilities and experienced manpower to build, in house, satellites from scratch (and has built about twenty-five major ones), but generally it contracts out components. Of Goddard's work force, 2,500 are contractor personnel of the aerospace industry.

Before launch, a Goddard-built satellite is thoroughly tested in the center's own facilities, which include vacuum chambers that duplicate the extreme cold and other conditions of space.

In orbit, the satellite comes under the control of two teams of Goddard operators. One—a "housekeeping" group—is concerned with the satellite's care and comfort in such essential details as temperature control and station keeping. To keep it functioning properly, the satellite's systems are monitored around the clock.

The second team retrieves and processes a particular satellite's data. While all this may sound routine, Goddard technicians have "worked" up to forty satellites simultaneously. To this end—along with tracking, communications, and data-storage—Goddard manages one of the largest computer complexes in the world: all told, some 300 computers grouped into forty-five systems. Of these, the Spaceflight Tracking and Data Network accounts for 126 located at twelve stations around the world. These computers are capable of everything from controlling tracking antennas to processing information for transmission to Goddard computers for readout.

Through the years, the space center has been involved in creating a broad range of satellites and missions that have included interplanetary monitoring platforms (like the current International Sun-Earth Explorer series), astronomical, geophysical, and solar observatories, and the launch of other nation's hardware, for which expenses are reimbursed. One such project was the recent launch and orbit of a Japanese experimental broadcasting satellite that will pave the way for the transmission of high-quality color television to remote island and mountain regions. And, last August, an Italian and US team handled operations from the mission control center at Goddard on the launch of SIRIO, the first Italian experimental communications satellite.

It is no idle boast that Goddard-managed satellites have revolutionized the fields of communications and meteorology. And satellites with even greater sophistication and capabilities are on the drawing boards or being produced. For example, GOES-C, a key element in the Global Weather Experiment, was orbited in June. This satellite, sponsored by the UN and international scientific organizations, will contribute weather information from a data-sparse area of the world centered in the Indian Ocean.

Goddard is not only involved in vast, worldwide satellite undertakings; it has the capability of focusing on a single individual. As Japanese adventurer Naomi Uemura made his great trek alone by dogsled from Canada's Northwest Territories to the North Pole, signals from a device he carried bounced off the Nimbus-6 research satellite and were relayed to a tracking station in Alaska and thence to Goddard *(see May '78 issue, p. 25)*. Thus, his whereabouts were monitored every step of the way.

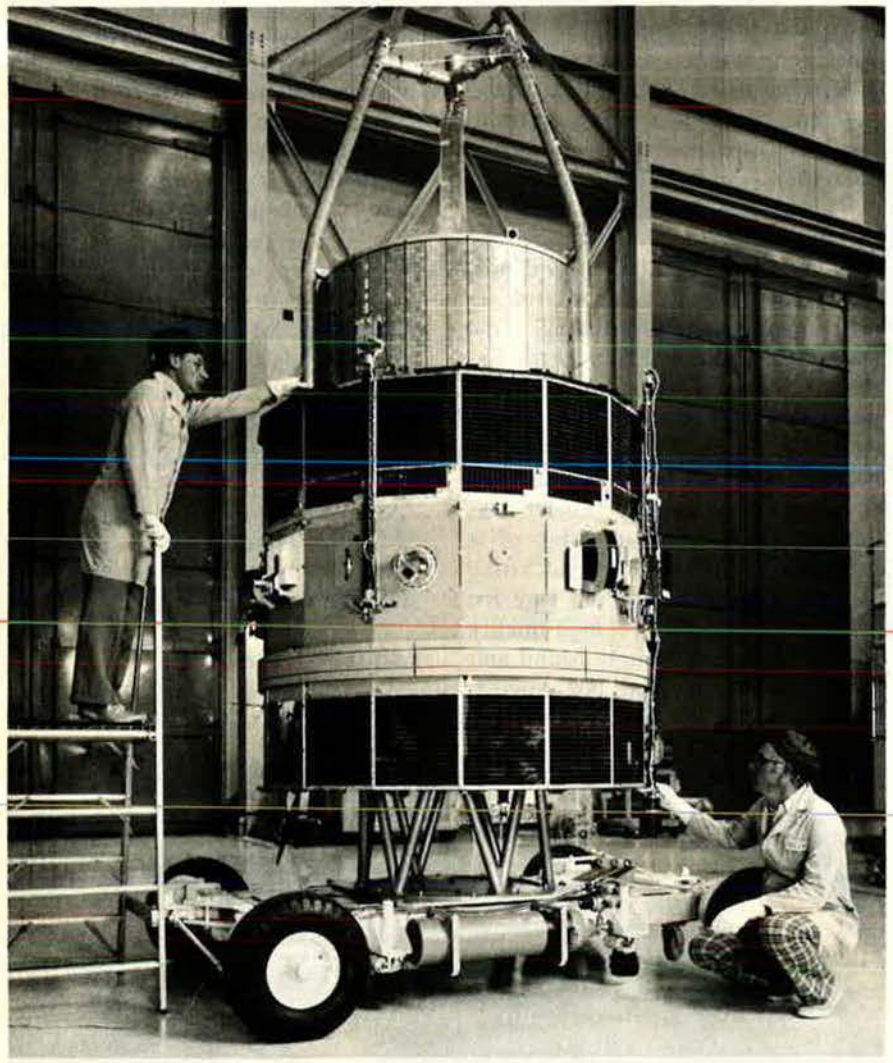
Landsat Unlimited

Of worldwide significance, how-

Viewing an ultraviolet star image returned by an Explorer spacecraft are project manager Jerry Longanecker, standing, and telescope operator Fred Espaneak.

ever, is the on-going Goddard-developed Landsat (formerly Earth Resources Technology Satellite) survey programs. The benefits are limited only by man's imagination.

The orbiting Landsats are capable of scanning the planet (except for the polar regions) every nine days. The photographic images they provide allow study in detail of huge portions of the earth faster, cheaper, and more accurately than aerial photography.



A European Space Agency test spacecraft mounted aboard a NASA flight vehicle is prepared for vibration trials at Goddard Space Flight Center preliminary to launch toward the sun from Cape Canaveral, Fla.

In agriculture, the impact of this technology could be enormous. For example, Landsat made possible the inventory in California's Imperial Valley of more than twenty-five separate crops in nearly 9,000 fields scattered over 458,800 acres. Not only can Landsat data identify specific crops, but can indicate their condition as well, making possible very accurate agricultural produce forecasts. (Landsat-developed agricultural and much other imagery and data in a variety of formats and sizes are available to the general public for a small fee. This data is stored at various centers and locations around the country. For further information, contact the User Services Unit, EROS Data Center, Sioux Falls, S. D. 57198. Phone: [605] 594-6511.)

Technically, worldwide crop management is now possible, although for political and other pragmatic reasons it isn't likely to be achieved anytime in the near future.

But prospective agricultural benefits merely scratch the surface. Landsat has mapped drought areas and water resources; pinpointed forest fires in near and remote areas; located geological faults and possible mineral resources; assessed flooding and resulting damage.

(This year, NASA's Jet Propulsion Laboratory, Pasadena, Calif., will orbit Seasat, an oceanographic counterpart to Landsat that will report on such ocean dynamics as wave height and direction, wind conditions, ocean temperatures, and current patterns. Seasat will be able to keep tabs on icebergs, and gauge the effect and dimensions of oil spills and pollution of oceans and other bodies of water.)

At Goddard is located the National Space Science Data Center, where scientific information obtained from satellites is stored in computers for ready availability to the scientific community.

Multimission Modular Spacecraft

Aside from the series of manned orbital flights, during which a tight schedule of many experiments and practical space tasks was accomplished, past NASA launches usually have been aimed at orbiting a single piece of hardware—a communications, weather, or other type of satellite (with occasional piggybacking).

NASA officials have deemed this a far too expensive method of doing business. Already into the "proto-flight" construction stage under the direction of Goddard technicians is the Multimission Modular Spacecraft (MMS).

MMS is being designed to act more or less as a permanently orbiting spacecraft "bus," into which standard modules performing a wide assortment of missions can be integrated.

The first MMS launch is scheduled for October 1979, with a Solar Maximum Mission payload aboard. MMS will be compatible for launch aboard a Delta rocket (NASA's primary launch vehicle and a successful Goddard program of long duration), or placed in orbit via the Space Shuttle. The plan calls for the Shuttle to service orbiting MMS, either replacing or repairing modules aboard them or returning them to earth if need be. Thus, the Shuttle is an essential element in the MMS program.

Goddard officials believe that MMS will be able to meet up to seventy-five percent of low-earth orbit space mission requirements.

The MMS bus is to be equipped with solar power arrays of a size, orientation, and control demanded by whatever missions are called for. It will also have aboard propulsion systems for orbital adjustment.

Tracking by Satellite

In another new program, NASA plans to launch in the early 1980s a pair of Goddard-developed satellites containing space tracking equipment.

The two satellites will replace all but six of the current worldwide net of ground-based tracking stations, each of which can acquire tracking data only fifteen percent of the time. The two satellites, on the other hand, will be able to supply data eighty-five percent of the time. Along with greater efficiency, savings in manpower and other resources should be substantial.

An entirely new ground tracking facility is planned for White Sands, N. M., to function as a principal tracking and relay station. The existing station at Cape Kennedy, Fla., will be retained because of the launch support it provides. The Deep Space Network stations managed by the Jet Propulsion Lab in Spain, Australia, and California will continue their activities. Goddard's tracking station located at the center will remain in service in support of Landsat and other programs.

Laser Technology

A team of Goddard scientists is currently involved in experimental and practical applications of that intriguing and versatile relative newcomer to the sciences—laser technology.

One of their programs concerns the eventual establishment of laser-satellite systems on all the earth's continents to measure the most minute movements of the plates that form the earth's crust.

To that end, a geophysics research satellite managed by the Marshall Space Flight Center, Huntsville, Ala., was launched over the Pacific coast in 1976. LAGEOS, for Laser Geodynamic Satellite, provides a table point in the sky to reflect laser pulses from ground stations, which can be timed to one ten-billionth of a second. Measuring the relative positions of such laser tracking stations as the one at Goddard to within a few centimeters, or about an inch, scientists can develop accurate models of earth's crustal features and their motion—a concrete step toward earthquake prediction.

An interesting sidelight of LAGEOS is that it is expected to remain in orbit for millions of years. Within it is a plaque on which are printed three earth maps: one showing the continents grouped together as it is believed they were eons ago; a second indicating their positions now; and a third showing projected future separation (with that part of California west of the San Andreas Fault as an island in the Pacific), 8,000,000 years from now. The maps —if found by intelligent beings sometime in the future—depict the satellite's purpose. ■

THE VISITOR CENTER—GODDARD'S ROCKET LAUNCH COORDINATOR

Rocket launches are conducted at the Goddard Space Flight Center every first and third Sunday of the month. *Rocket launches at Goddard?* Yes, complete with countdowns, crowds of spectators, and occasional misfires.

The rockets are small and homemade, built by members, including teenagers, of half a dozen rocketry clubs in the area. The launches are sponsored by the Goddard Visitor Center, whose personnel monitor weather and safety factors and control the "launch pad"—a six-foot-long rack in an open field.

Many of the amateur rocketeers have achieved better results than did the late Dr. Robert H. Goddard, the "father of modern rocket propulsion" for whom the space center is named, when he fired the first liquid-fueled rocket only fifty-three years ago. A full-scale replica of Dr. Goddard's rocket launcher is on display at the Visitor Center.

Also at the Visitor Center, now in its third year of operation, are other displays and space hardware that trace NASA progress and activities through the years. It presents film exhibits on such subjects as aeronautics research, the planets, manned spaceflight, and astronomy. A moon rock is on display.

A short stroll from the Visitor Center is Goddard's Building 14, also containing areas open to the public. There, technicians can be seen manning the consoles of the Projects Operations Control Center, which, through computer linkups, has instantaneous communication with stations in seventeen countries around the world. Also in Building 14 are a number of actual satellites, and displays showing what they do.

Besides the usual paraphernalia, the Visitor Center gift shop sells such educational materials as books on space, spacecraft model kits, and astronomical charts.

The Visitor Center is open Wednesday through Sunday. For hours and other information call (301) 982-4981. There is a snack bar.

A rocket launch in miniature from a field adjacent to Goddard's Visitor Center. Somewhat more than toys, they're built by rocketry club members.

The Bulletin Board

By James A. McDonnell, Jr., MILITARY RELATIONS EDITOR

Enlisted, Officer Retention Woes Mount

The Air Force is enjoying a forty-nine percent first-term reenlistment rate, by far the highest in the last ten years. But the figures are deceptive; officials are concerned about being able to maintain high airman quality in the coming years. And recruiting problems are increasing.

On the officer side, procurement and retention of scientist-engineer types is a big problem brought on by the increasing demand—and much larger salaries—for these people in the civilian community. And there's a large new headache for USAF personnel officials: the current and projected hiring spree of military pilots by the airlines.

Headquarters recently spelled out these manpower difficulties for AIR FORCE Magazine.

A decade ago, fewer than twenty percent of USAF's first termers reenlisted, but the service was much larger and many more people were eligible to stay in. In FY '69, for instance, more than 101,000 first termers were eligible to re-up, and 15,400 did so. Two-thirds through the current fiscal year, only 15,000 first termers have been eligible to reenlist. Thus, the forty-nine percent acceptance rate translates into fewer than 7,400 staying aboard.

Improved employment in the civilian sector threatens to hurt retention, though Air Force officials are more concerned about the reduced purchasing power it says military people are experiencing. Military members have suffered real earnings losses of eight to fourteen percent since 1972, which officials say places the services at a disadvantage in their efforts to maintain high recruiting and retention standards.

Also working at cross purposes with the retention effort is the December 1989 cutoff of the old GI Bill. This, officials said, will "provide a strong incentive in the 1980s for members to leave active duty to use their benefits." Also damaging the future retention picture are the attacks by the President's pay commission and others on the twenty-year retirement system.

Officials explained that they are asking Congress for extra tuition assistance money to offset the GI Bill cuts. In another retention-improvement move, the Air Force is reinstating the delayed reenlistment program. This will increase the opportunity for first termers to reenter the service within three months of separation.

Not long ago Air Force had more pilots than it needed. But throngs of veteran commercial airline pilots —the "World War II group"—are approaching the lines' mandatory exit point. The Air Force estimates that ex-military pilots will comprise about eighty percent of all new hires.

USAF estimates airline requirements at 3,500 new pilots for calendar 1978 and more than 22,000 during the next ten years. Recent losses to the airlines already have damaged the service's six to eleven years' experience level. A recent internal Air Force survey found that most of its young pilots would take an offer from the airlines. Many of them seem mesmerized by the lofty airline pilot salary scales.

The Air Force cautions, however, that while senior airline captains are paid handsomely, newcomers face low starting pay and long years in the copilot's seat. Seniority is everything; for those without much of it, furloughs sans pay are not uncommon. Not infrequent crew strikes also halt paydays.

The Air Force is developing counseling and motivation programs it hopes will enhance its pilots' regard for military flying.

Brown Promises Pay Equity

Defense Secretary Harold Brown has promised that any changes coming out of the recommendations of the President's Commission on Military Compensation will be "fair and equitable."

He told a military audience recently at Ramstein AB, Germany: "The President and I will not exploit your patriotism or your dedication" and "your legitimate expectations will be honored and protected."

Official Air Force reaction to the Brown address was favorable. "His comments on the President's Military Compensation Commission are the first reassuring words we've seen from the OSD level," an advisor to the Air Force Secretary told AIR FORCE Magazine.

What comes out of the extended evaluations of the Commission's recommendations, going on for months among Defense and Service staffs, may be an entirely different matter. Differences over many of the recommendations are broad and deep, particularly on retirement changes. The Air Force, for example, firmly opposes ending the twenty-year retirement system, as the Commission recommends.

Some officials doubt that any kind of general agreement can be worked out. They also cite tough legal problems that complicate formulation of a new pay package. One official declared: "This pay report is too sweeping and controversial; it's not a winner, regardless of what comes out of it."

All-Vol a Success?

The All-Volunteer Force, replacing the draft in 1972, has been a success—in troop quality, discipline, personnel turnover, and costs. So declares the Department of Defense.

The AVF is a flop. It's producing inferior manpower and heavy turnover, and force readiness is threatened. So say congressional critics of the AVF, who have told the Pentagon to prepare a study of alternatives.

Sen. Sam Nunn (D-Ga.), one of Capitol Hill's leading critics of the AVF, wants the report by December. In late June he and his Senate Armed Services manpower subcommittee held another in a series of

hearings probing the AVF. One of the main witnesses was Rep. Robin L. Beard (R-Tenn.), an AVF opponent who recently explored manning in the US Army and found fault with training, discipline, and turnover. He called on Congress to consider a return to the draft or establish a national service system for all youths seventeen to twenty-six.

Defense's John P. White, the Assistant Secretary for Manpower, Reserve Affairs and Logistics, said he opposes national service. Under the AVF, he stated, the services have maintained congressionally authorized active-duty strengths, improved troop quality as measured by test scores and high school diplomas, and moved ahead on other manpower fronts. He acknowledged that Reserve manning is in poor shape. But he declared that "a strong case can be made that our active forces are stronger and better manned than at any time in our history."

Ease Allotment Curbs

The USAF Retiree Council wants the Air Force to relax its tough curbs on retired members' pay allotments. At its recent sixth annual meeting at Randolph AFB, Tex., the Council noted that, while retirees contribute to the AF Assistance Fund, they have trouble getting AF Aid help because regulations prohibit them from repaying loans by allotment. The Council also asked the service to eliminate other retiree allotment restrictions.

Among other recommendations, the Council again called for (1) recomputation of retired pay; (2) toll-free phone service for retirees to the Air Force Finance Center; and (3) a variety of steps to improve medical care.

The Council's new chairman is retired Maj. Gen. Rene G. Dupont.

AFA Believes . . .

Medical Care: More—Not Less—Needed

Ask any blue-suiter, active or retired, what single element of military benefits is most significant and the answer will probably be health care. Which, of course, includes the CHAMPUS program.

And, right now, the military health care system itself could use a little nourishing chicken soup. Antonia Handler Chayes, Assistant Secretary of the Air Force for Manpower, Reserve Affairs, and Installations, has put it this way:

> Within DoD and within the Air Force, our main priority in the people area is health care. One of the proudest traditions of the Air Force is . . . "we take care of our own" . . . and we're having serious problems with it. Although military medical facilities are among the finest in the world, we can't provide our people the attention they deserve unless we have enough physicians—and we don't. Nor is the CHAMPUS program taking up the slack. . . .

The outgoing Air Force Surgeon General, Lt. Gen. George E. Schafer, speaking primarily of retiree care capability, put it even more bluntly. He said, "...we want you to know the truth about your medical service at this time. Our capability is down, but we're going to get better. Please bear with us."

All of which, we're sure, comes as no surprise to you. An Air Force survey of its members on the adequacy of the CHAMPUS program found that the health-care needs of a majority of the respondents are not being met by CHAMPUS. This reinforces a recent informal sampling taken by a four-star commander with bases throughout the country. People are concerned about their medical benefits—especially CHAMPUS—and they are also concerned that these benefits are being eroded.

AFA believes, as enunciated in our current Policy on Defense Manpower Issues, that "military people, active and retired, deserve a health care system that will fully support their needs and the needs of their dependents." Therefore, we are watching with interest and concern the current evaluation of the total national health care system. We will contest any proposals that would degrade the already-weakened military system. And such proposals are beginning to surface.

For example, an internal memorandum being circulated among the federal departments concerned with health care analyzes various ways of developing a national health insurance (NHI) program. Some points made in the fifty-page memo bear further watching. Now, any planning document worth its salt must raise issues that might not be expected to survive close scrutiny. These "straw men" are an important aid in ensuring that all facets of a problem are considered. Nonetheless, some of the points in this memo may give an indication of Administration thinking. For example:

- Apart from the problems of financing an NHI plan, some decision would have to be made concerning the future role of such federal direct delivery programs as VA and DoD facilities and such non-HEW health insurance programs as CHAMPUS.
- One alternative could include abolishing all public insurance programs, such as Medicare and CHAMPUS and enrolling all eligible beneficiaries in an NHI plan.
- Assuming the Federal Employees Health Benefit Programs (FEHBP) and CHAMPUS were not incorporated into an NHI plan, there might be "adverse public reaction" to the federal government's maintaining a separate system for its own employees, while setting up another for the rest of the population. This is particularly so since "FEHBP and CHAMPUS offer very comprehensive benefit packages *which may not be equaled by the NHI package.*" [Emphasis added.]
- Inequities could be avoided by enrolling everyone in the NHI plan and providing supplemental packages to maintain existing benefits. Or, coverage of *"military, federal employee, and CHAMPUS personnel could be adjusted to correspond to the NHI benefit package."* [Emphasis added.]

We hope that neither Congress nor the Administration will attempt to eliminate or reduce the effectiveness of one program —military medicine and its CHAMPUS supplement—that generally has worked well, in order to institute a new and less comprehensive National Health Insurance program. Unfortunately, seeking the lowest common denominator is not unknown in government operations.

Sen. Gary Hart (D-Colo.) told the delegates at the 1978 Colorado AFA State Convention that "the crisis in the military health care system must be expeditiously addressed by Congress. Members of our services deserve the best medical care the nation can provide." He added that while he has co-sponsored legislation to broaden the ranges of services provided and has supported returning CHAMPUS reimbursement rates to the ninetieth percentile (an AFA policy) "more needs to be done." He stressed that "our defense can be no stronger than the people who give their lives to it."

AFA agrees and urges that any attempts to solve the nation's larger health care problems not be predicated on weakening a system that has been doing a good job, but for which "more needs to be done."

—JAMES A. McDONNELL, JR.

The Bulletin Board

AFA to Honor VA Employees

The Air Force Association has established a new national award to honor the outstanding employee or unit of the Veterans Administration. It marks the first time a private organization has elected to cite the VA annually. The first presentation will take place in September at the Association's national convention in Washington, D. C.

Drug Abuse Big AF Program

Detection and rehabilitation of drug users has become a sizable business within the Air Force since it began urinalysis testing seven years ago. The anti-drug program now has its own career field of more than 400 specially trained officers, airmen, and civilians. They and part-time workers serve in drug-abuse offices at 140 major USAF bases and at small, remote sites.

There is a three-tiered operating structure, topped by the Hq. USAF Drug Control Office. It receives a constant flow of data on drug use from bases and commands, all of which have their own drug control committees composed of commanders, surgeons, security police, JAGs, personnel officers, chaplains, etc.

Also in the battle against pot and harder stuff, bases employ drug/alcohol lectures, gate and barracks checks, sniffer dogs, and vehicle and aircraft searches.

Meanwhile, the House Narcotics Abuse and Control Committee has blistered the services, the Army particularly, for doing little to curb drug use among US troops in Germany, Committee Chairman Lester L. Wolff (D-N. Y.) has gone to the President about it, with Mr. Carter promising action. Other Administration officials want the services to resume random urine testing. And proposals to decriminalize marijuana use nationally also are pending.

The Air Force, of course, wants no part of mandatory testing or marijuana decriminalization. And despite the Committee's free-swinging charges against the military generally, numerous quarters consider the Air Force's anti-drug abuse program both vigorous and effective.

The Air Force's top personnel official, Lt. Gen. B. L. Davis, spelled it out for the Narcotics Committee in June. He denounced the random urine tests, which Congress halted in October 1976, as "expensive, insensitive, and ineffective." He said Air Force supports the current "commander-directed" urinalysis method, which allows officials to zero in on "known or suspected" drug users. "Sweep testing of entire units" is also used, particularly in heavy use areas like Germany.

This system, according to General Davis, has yielded a confirmed positive rate of under one percent. For all of 1978, General Davis expects 71,000 tests will be administered, and about 616 will show up positive. This would represent an increase over 1977, when 341 of

Ed Gates . . . Speaking of People

Roughshod Over Entrenched Policies

Another military pay study group has just issued its report, one that runs roughshod over a host of long entrenched policies and procedures. Still, it deserves attention by the Pentagon and Congress. Unlike the other compensation probes, this one deals exclusively with the Reserve components, and it focuses squarely on the alarming shortages of enlisted Reservists and Guardsmen.

It argues for cutting compensation of senior enlisted personnel and most officers, where it declares the need does not exist, and for increasing it substantially for junior enlisteds, where the need is great.

To bring this about, the study's final report, sent to the President June 30, advances a completely new pay-bonus system. Many of the planks would be flexible, payable only when and where there are people shortages in unit skills and types of duty.

The "age sixty," or so-called Title III, retirement feature of the past and present would be slashed or scrapped entirely in favor of a bonus arrangement. The report does not recommend lowering Reserve retirement below age sixty. "The Reserve compensation system should place greater emphasis on current rather than deferred compensation," the new study declares, because "the need for a retirement system is much less apparent than for the active forces, particularly because many Reservists will be members of retirement systems through their primary employment." Cash to supplement their regular job pay is what young Reservists and potential recruits want, the probe holds.

However, Reservists already drawing Reserve retirement, or awaiting age sixty in order to draw it, would be "grandfathered in" and not be subject to the proposed system. Grandfathering is also envisioned for many current participants, though no specific cutoff point was suggested.

The new package is the product of the Reserve Compensation System Study (RCSS), a labor that has taken a couple dozen experts from the several military services twenty-two months to complete. Heading the Presidential-directed investigation was Vice Adm. Richard G. Altmann, USNR (Ret.).

The RCSS probe, a spokesman noted, marks the first time that Reserve–Guard compensation has been studied in depth as a single entity. What the probers say they found was in no sense a Reserve compensation "system," but rather a hodgepodge of "compensation elements that grew through time because of rigid links with the active force system." It was never designed to "respond to the unique features and problems in Reserve manning," the report declares.

At the outset, the probers were told to develop a cost-effective, highly flexible system. The RCSS report notes that while manpower shortages are most severe among the ground components, all the Reserve forces are short of first-term enlistees. But they are "over" in the seven-to-twelve years of service (YOS) category. Most components also are overstrength in the twenty-plus YOS group. And, of course, there are disturbing shortages in many skills in different YOS categories.

The RCSS report also charges that (1) access to the Reserve retired rolls is left largely up to the individual, not the needs of the services; (2) the Reserves "are an aging force" and the use of Reserve–Guard technicians is compounding the problem; and (3) the present Reserve pay system is highly inefficient. Annual pay hikes (linked with active-duty pay scales) are always of the across-the-board percentage type

58,281 tested proved to be users.

Marijuana usage, almost as widespread in the services as in civilian life, is not urine detectable, so exact figures cannot be pinned down. The typical user was described as "twenty-one, white, an E-3, high school graduate who smokes pot either as an experiment or as a casual user." The few addicts or dealers discovered are promptly discharged. General Davis reported that a recent survey shows that twenty-seven percent of the Air Force's E-1s through E-5s use pot, compared with thirty-eight percent Defense-wide.

Other drug users are identified through investigations and apprehension, routine medical care, and self turn-ins. The latter step improves a user's chances of securing an honorable discharge.

Air Force policy is to enter every substantiated drug abuser into a rehabilitation course, but there is a major exception: first-time marijuana users, other than crew members, may be exempt if the commander okays it.

General Davis said the rehabilitation effort is a money saver, that two of every three members treated return to full duty status. He reported that since the Southwest Asia draw-down, hard drug use generally has declined while marijuana use has remained stable. But there are trouble spots, like Germany and, to a lesser degree, Britain, where use of the hard stuff is rising.

56,000 in Nuclear Jobs

Air Force has disclosed that 56,000 in the service are on the Personnel Reliability Program (PRP) list, which means they're certified to handle nuclear weapons-related duties. People are carefully checked out before getting PRP approval and are continually evaluated by monitors in personnel offices, hospitals, and units. Any indication of drug use or other reliability problems means prompt removal from the list, according to Lt. Gen. B. L. Davis, the Hq. USAF Deputy Chief of Staff for Personnel. He said some in the Air Force were "permanently decertified" last year from the PRP for drug abuse, compared to a larger number removed in 1976. The decertifications were spread around over twenty career fields.

AFA Cites Finance NCO

AFA recently named CMSgt. Elmer Barnes the first recipient of the Maj. Gen. John R. Gilchrist award, as the USAF's most outstanding accounting and finance NCO of the year. Barnes is chief of pay and travel at Lowry AFB, Colo., where he has invoked numerous finance innovations. AFA created the Gilchrist award, named for the first commander of the Air Force Accounting and Finance Center, late last year.

It complements the Association's Maj. Gen. Paul W. Scheidecker Award, the latest edition of which went to Maj. C. L. (Chuck) Martin, Jr., director of finance at the Air Force Academy. The Scheidecker Award, named for the 1960–64 Center commander, honors the most outstanding finance officer in the Air Force. Both Barnes and Martin received their awards at the Colorado State AFA Convention in Pueblo in mid-May.

that increase the pay disparity between enlisted and officer compensation. This is a perverse operation, the study charges.

So what's to be done? The RCSS advanced two alternative schemes, both providing "equal compensation levels." Instead of the long-standing "drill pay," there would be "training pay" consisting of one-thirtieth of monthly cash Regular Military Compensation (RMC) for each eight hours of training. This represents a sharp cut from present drill pay rates.

However, the RCSS also would crank in a "retainer pay" for Reserve Forces members meeting participation standards. Enlisteds in Pay Category A (forty-eight annual drills), for example, would initially draw $400 a year in retainer pay; officers would get $800. There would be no variations by pay grades within these categories. But retainer pay would be highly flexible; the Pentagon could increase it periodically depending upon individual, unit, or geographical manpower supply and demand situations. Raises in nearly all cases would go to younger members, to improve recruiting and retention; long-termers would take cuts.

Under the training-retainer pay plan, the RCSS envisions the pay of enlisteds in the first six years of service rising twenty-six percent. But as service lengthens, the percentage boost would drop, to the point where an E-9 with more than twenty-six YOS would take a fifteen percent pay cut. Training-retainer pay of O-1s should jump about thirteen percent, but the typical O-5 would suffer a thirteen percent pay decrease. An O-6 would take a seventeen percent pay slash, the report estimates.

Such proposals, obviously, are not going to sit well with the Reserve Forces community.

Also under both RCSS Alternative plans are three "selective differential pays," which the Secretary of Defense could distribute just about any way he chooses. One is a "selected enlisted option," under which an enlistee could take a cash bonus or educational assistance worth $1,200–$2,000. The second is a "selective affiliation bonus" for certain prior-service enlistees, paying $25 per month for up to eighteen months. The third is a "selective reenlistment bonus" worth up to $1,200.

These bonuses would be used "only in components, skills, and units where they are needed to overcome manning difficulties." As the report underscores, they would provide a "second major element of flexibility" (in addition to training-retainer pay) in the drive to procure sufficient manpower.

It's in the "deferred compensation" areas that the two RCSS Alternative plans differ. Plan 1 would scale down the present retirement annuities substantially by cutting drill points in half, eliminating gratuitous and correspondence course points, and involving other innovations. The changes would reduce Title III benefits twenty to thirty-five percent, the report says.

Alternative Plan 1 also includes a lump-sum option; thus, instead of a scaled-down age sixty annuity and loss of military privileges, Reservists with twenty or more years of satisfactory service could take a lump-sum payment built up over the years.

The RCSS Alternative 2 Plan includes the training-retainer pays and the three selected differential pays described above. It contains no retirement plan whatsoever, and no retiree privileges at sixty; they're dropped completely. But there is what RCSS calls a "Reserve Career Bonus," paid at departure from service in the tenth through the twentieth years of participation. The bonus would range from about $6,600 for enlisteds to more than $11,600 for officers. Here again, however, the bonus would be "flexible." The Pentagon periodically could raise or lower its value, depending on the manpower supply situation.

Both Alternative Plans 1 and 2, the RCSS report says, "are far more efficient than existing Reserve compensation." But it favors Alternative 2, mainly because that plan would eliminate what the Reserve probers consider a needless and expensive retirement system.

The reaction of the Reserve community, the Administration, and Congress to the RCSS report should be lively, perhaps explosive. We'll report further developments. ■

The Bulletin Board

It's USAF or Nothing

Eighty percent of today's young airmen would not have joined another US service if Air Force's doors had been closed to them. They would have chosen college or vocational training instead.

That's the Air Force reply to suggestions that it steer some of its high-quality enlistee applicants to the other services, Army particularly. The Air Force response, based "on available feedback data from our current enlistees," indicates such an effort would be pointless.

That's not the way the House Armed Services Committee sees things. In its report on the FY '79 military authorization bill, the committee held that the big thing in recruiting is to get a prospect "to exhibit interest in joining the military. Once that mental step is taken, a strong likelihood exists that he can be recruited by one of the services."

At another point the committee noted that only sixty percent of the Army enlistees now are high school graduates and that the male manpower pool is shrinking. It said the Air Force should "experiment" with taking on more women, the idea being that the Army could then get a crack at more quality male youths.

The Air Force isn't going for that either. It told AIR FORCE Magazine it is sticking to its earlier long-range female buildup schedule that will boost distaff population from the current 45,000 to more than 81,000 by the end of FY '83 *(see "Widening Horizons for Air Force Women," January '78 AIR FORCE).*

Spotlight on Vet Bills

At mid-year, the House was scheduled to take up—and almost certainly approve—legislation raising aging veterans' pensions and tying them to cost-of-living increases *(see pp. 60–64 for further details).* Also due for early House approval were two disability compensation sweeteners. One would elevate the rates across the board, and also hike dependency-indemnity compensation (DIC) payments. The other would give veterans with service-connected disability ratings as low as forty percent extra compensation for dependents. Currently it takes a fifty percent or higher disability rating to receive the extra pay.

Other recently introduced bills of interest include:

- **H.R. 12955** (Hammerschmidt) would allow the surviving spouse of a deceased veteran to be buried in a national cemetery with the veteran even if the surviving spouse had remarried.
- **H.R. 13033** (Burton and Whitehurst) would qualify unremarried former spouses of active-duty and retired members for military medical and dental care, providing the couple had been married twenty years.
- **H.R. 13020** (Schroeder) would give the former spouse of a military member, if the couple had been married ten years or more, a portion of his retired pay and a portion of the survivor benefits annuity.
- **H.R. 12878** (Panatta) would merge the services' separate medical systems, bring more private physicians into military hospitals, and make other innovations in military medical care.

Airman Commissioning

Selection of the 200 members the USAF will enroll in the Airman Education Commissioning Program (AECP) in FY '79 is nearing. All will enter technical or engineering disciplines. Thirty will study computer technology and twenty will become meteorology officers. Selectees will receive up to three years of college, followed by Officer Training School (OTS) and award of commissions. Airmen already holding nontechnical degrees are also eligible for AECP, though they may prefer going directly to OTS. A whopping 3,250 OTS slots are opening in FY '79, a figure that includes 500 for women with nontechnical degrees.

Retiree Jobs, Pay Mirrored

Last year, the Defense Department asked 13,000 retirees of the military services twelve pages of questions about their incomes, second careers, and related topics. The Department subsequently received 6,403 replies, which, it says, reflects the situation for the 1,200,000 people on the retired rolls. The survey findings, released in May, show that:

- Of retired officers, fifty-six percent work full time, seven percent part time, and the rest are fully retired. Most took a salary cut, from fifteen to thirty-two percent, on their first post-retirement job, compared to their civilian counterparts. Of all the full-time working officers, average earnings (for 1976) were $19,370, or $36,565 counting retired pay.
- Of enlisted retirees, seventy percent work full time, five percent part time, and the rest were fully retired or otherwise not working. Their first job earnings were twenty to thirty-two percent less than their civilian counterparts. Of those working full time, 1976 average earnings were $13,356, or $19,963 counting retired pay.
- The typical retiree found a job "immediately" after retirement.
- Uncle Sam hires retirees at considerably lower salaries than they earned on active duty just prior to retirement. For example, the average retired officer is an O-5, supposedly the equivalent of a GS-14 civilian employee. Yet the average retired officer entering Civil Service starts as a GS-10.

Short Bursts

Defense Secretary Harold Brown in an address to a New York City businessmen's group: **"Business leaders** come to government at no small sacrifice to themselves. One such Defense official recently . . . was asked . . . how much it costs to eat in the Pentagon Executive Dining Room. He answered, 'About $400,000 a year.' "

The Air Force is about to link selection of NCOs to attend the **Senior NCO Academy** with **E-8 and E-9 promotion lists.** A similar tie-in of officer school picks with hike lists has been SOP for some time.

The Air Force has laid on an **early-out program,** effective this month, for 1,500–2,000 first-term airmen in eighty noncritical skills. Eligible volunteers chosen for early exit will depart up to thirteen months before their enlistments end. The action is being taken so Air Force can attain its mandated end-FY '78 strength goal of 470,903 airmen. There is no officer early-out program in operation.

The recent test at USAF bases in Europe in which male and female airmen could **visit each other in their dormitory rooms** *(see February '78 "Bulletin Board")* was

"highly successful" and has become a permanent fixture, USAFE reports.

Airmen hear this: **Commissions in USAF's Biomedical Sciences Corps** are available for qualified members who possess master's degrees in social work. The Military Personnel Center, Randolph AFB, Tex., has details.

The service hopes to do a better job selling separatees on serving with the **Air Force Reserve or Air National Guard.** Base Career Advisors, who do most of the counseling, are slated to get new handbooks containing answers to questions separatees might have. Later this year, a joint USAFR/ANG film in the PALACE FLICK series, to help advisors in selling AFR–ANG, also will be in the field. ■

Senior Staff Changes

PROMOTIONS: To Major General: Walter H. **Baxter** III. To AFRES Major General: Thomas A. **Diab;** Edward **Dillon;** Rex A. **Hadley;** John E. **Lacy;** Robert M. **Martin,** Jr.; David L. **Stanford;** Thoralf T. **Thielen.** To Brigadier General: William R. **Brooksher;** Robert C. **Karns;** Keith D. **McCartney.** To AFRES Brigadier General: William A. **Anders;** S. T. **Ayers;** Robert V. **Clements;** James J. **Feeney;** Donald M. **Jenkins;** Charles E. **Jones** III; Paul W. **Kadlec;** Donald A. **McGann;** Donald T. **Schweitzer;** James W. **Taylor;** Richard A. **Wegner.**

RETIREMENTS: M/G Benjamin R. **Baker;** B/G Jay R. **Brill;** Gen. George S. **Brown;** M/G Richard B. **Collins;** B/G Robert A. **Foster;** L/G LeRoy J. **Manor;** M/G Robert C. **Thompson;** B/G Fred A. **Treyz;** M/G William B. **Yancey,** Jr.

CHANGES: M/G Anderson W. Atkinson, from Dep. Dir. for Ops. (Current Ops.), J-3, JCS, Washington, D. C., to Dep. Dir., Defense Attaché Sys., DIA, Washington, D. C. . . . **B/G Jerome R. Barnes, Jr.,** from DCS/Pers., Hq. SAC, Offutt AFB, Neb., to Cmdr., 7th AD, SAC, Ramstein AB, Germany . . . **B/G (M/G selectee) Rufus L. Billups,** from Cmdr., Def. Gen. Sup. Cen., DLA, Richmond, Va., to Dir., Log. Plans & Pgms., DCS/S&L, Hq. USAF, Washington, D. C., replacing M/G William R. Nelson . . . **L/G Marion L. Boswell,** from Cmdr., Alaskan Air Command, and Cmdr., Alaskan NORAD Region, Elmendorf AFB, Alaska, to C/S, Hq. Pacific Command, Honolulu, Hawaii, replacing retiring L/G LeRoy J. Manor . . . **L/G Arnold W. Braswell,** from Dir. for Plans & Policy, J-5, JCS, Washington, D. C., to Cmdr., 9th AF, Shaw AFB, S. C., replacing L/G James V. Hartinger . . . **B/G Louis C. Buckman,** from Dep. Dir. for Combat Readiness, DCS/P&O, Hq. USAF, Washington, D. C., to Cmdr., 42d AD, SAC, Blytheville AFB, Ark., replacing B/G James R. McCarthy . . . **M/G Edgar A. Chavarrie,** from Dep. Asst. to the Secy. for Legislative Affairs, OASD(LA), Washington, D. C., to Dir., J-5, US EUCOM, Vaihingen, Germany, replacing retiring M/G Richard B. Collins . . . **B/G Theodore P. Crichton,** from Cmdr., 435th TAW, MAC, Rhein-Main AB, Germany, to Dep. for Surveillance & Nav. Systems, ESD, AFSC, Hanscom AFB, Mass., replacing retiring B/G Robert A. Foster . . . **B/G William D. Curry, Jr.,** from Cmdr., Hq. Tac. Tng., TAC, Davis-Monthan AFB, Ariz., to Cmdr., Def. Gen. Sup. Cen., DLA, Richmond, Va., replacing B/G Rufus L. Billups.

B/G Thomas G. Darling, from Dir. of Tng., Hq. SAC, Offutt AFB, Neb., to DCS/Pers., Hq. SAC, Offutt AFB, Neb., replacing B/G Jerome R. Barnes, Jr. . . . **M/G Garth B. Dettinger,** from Dir. of Med. Plans & Resources, OTSG, Washington, D. C., to Dep. Surg. Gen., OTSG, Washington, D. C. . . . **M/G (L/G selectee) Hans H. Driessnack,** from Dir. of Budget, Office of The Comptroller, Hq. USAF, Washington, D. C., to Comptroller of the Air Force, Hq. USAF, Washington, D. C., replacing retiring L/G Charles E. Buckingham . . . **M/G William D. Gilbert,** from Dep. Dir., Engrg. & Svcs., DCS/P&R, Hq. USAF, Washington, D. C., to Dir., Engrg. & Svcs., DCS/S&L, Hq. USAF, Washington, D. C. . . . **B/G Allison G. Glover,** from DCS/Engrg. & Svcs., Hq. AFSC, Andrews AFB, Md., to DCS/Engrg. & Svcs., Hq. SAC, Offutt AFB, Neb., replacing B/G Clifton D. Wright, Jr. . . . **L/G Edgar S. Harris, Jr.,** from Vice CINC, Hq. SAC, Offutt AFB, Neb., to Cmdr., 8th AF, SAC, Barksdale AFB, La., replacing L/G Richard L. Lawson . . . **L/G James V, Hartinger,** from Cmdr., 9th AF, Shaw AFB, S. C., to Cmdr., 12th AF, Bergstrom AFB, Tex.

B/G Robert C. Karns, from Cmdr., 26th TRW, USAFE, Zweibrücken AB, Germany, to V/C, USAFTAWC, TAC, Eglin AFB, Fla., replacing B/G Robert E. Kelley . . . **B/G Robert E. Kelley,** from V/C, USAFTAWC, Eglin AFB, Fla., to Cmdr., Hq. Tac. Tng., TAC, Davis-Monthan AFB, Ariz., replacing B/G William D. Curry, Jr. . . . **M/G Charles F. G. Kuyk, Jr.,** from Dir., Opnl. Rgmts., DCS/R&D, Hq. USAF, Washington, D. C., to Cmdr., 22d AF, MAC, Travis AFB, Calif. . . . **L/G Richard L. Lawson,** from Cmdr., 8th AF, Barksdale AFB, La., to Dir. of Plans & Policy, J-5, JCS, Washington, D. C., replacing L/G Arnold K. Braswell.

B/G James R. McCarthy, from Cmdr., 42d AD, SAC, Blytheville AFB, Ark., to Dep. for Acq. Pgms., AFALD, AFLC, Wright-Patterson AFB, Ohio . . . **B/G Robert G. McIver,** from Cmdr., USAF School of Aerospace Medicine, AFSC, Brooks AFB, Tex., to Cmdr., AMD, AFSC, Brooks AFB, Tex., replacing B/G Howard R. Unger . . . **M/G William R. Nelson,** from Dir., Log. Plans & Pgms., DCS/S&L, Hq. USAF, Washington, D. C., to V/C, 16th AF, USAFE, Torrejon AB, Spain, replacing retiring M/G William B. Yancey, Jr. . . . **Col. (B/G selectee) Richard W. Phillips, Jr.,** from Chief, Aero Sys. Div., Dir. Development, DCS/R&D, Hq. USAF, Washington, D. C., to Dep. Dir., Dev. & Acq., DCS/R&D, Hq. USAF, Washington, D. C. . . . **Col. (B/G selectee) Winston D. Powers,** from Dep. Dir., Telecomm. & Command & Contr. Resources, ACS/CCR, Hq. USAF, Washington, D. C., to Dir., of Telecomm. & Command & Control Resources, ACS/CCR, Hq. USAF, Washington, D. C.

M/G Robert Scurlock, from Dep. for F-15, ASD, AFSC, Wright-Patterson AFB, Ohio, to Dir. of Budget, Office of The Comptroller, Hq. USAF, Washington, D. C., replacing M/G (L/G selectee) Hans H. Driessnack . . . **B/G Click D. Smith, Jr.,** from Cmdr., 435th TAW, MAC, Rhein-Main AB, Germany, to Cmdr., 322d AD, MAC, Ramstein AB, Germany . . . **B/G Herbert V. Swindell,** from Comd. Surg., Hq. MAC, Scott AFB, Ill., to Dir. of Med. Plans & Resources, OTSG, Washington, D. C., replacing M/G Garth B. Dettinger . . . **Col. (B/G selectee) Harold W. Todd,** from Chief, Readiness NATO Staff Gp., AF/CVA, Washington, D. C., to Exec. Asst. to Chmn., JCS, Washington, D. C. . . . **B/G Howard R. Unger,** from Cmdr., AMD, AFSC, Brooks AFB, Tex., to Comd. Surg., Hq. MAC, Scott AFB, Ill., replacing B/G Herbert V. Swindell . . . **B/G Clifton D. Wright, Jr.,** from DCS/Engrg. & Svcs., Hq. SAC, Offutt AFB, Neb., to Cmdr., AF Civil Engrg. Cen., Tyndall AFB, Fla.

SENIOR ENLISTED ADVISOR CHANGES: CMSgt. Donald E. Lindemann, from Air Force Accounting and Finance Center, Denver, Colo., to Senior Enlisted Advisor, AFAFC, Denver, Colo., replacing retiring CMSgt. Melvin D. Bauer . . . **CMSgt. Ralph V. McKeown,** from Air Force Test and Evaluation Center, Kirtland AFB, N. M., to Senior Enlisted Advisor, AFTEC, Kirtland AFB, N. M., replacing retiring CMSgt. Martin J. Kuettel . . . **CMSgt. Wesley H. Skinner,** from Senior Enlisted Advisor, 8th AF, SAC, Barksdale AFB, La., to Senior Enlisted Advisor, NORAD/ADCOM, Peterson AFB, Colo., replacing CMSgt. James T. Forman, reassigned as first sergeant/Air Force Element Taft Iran/Doshan. ■

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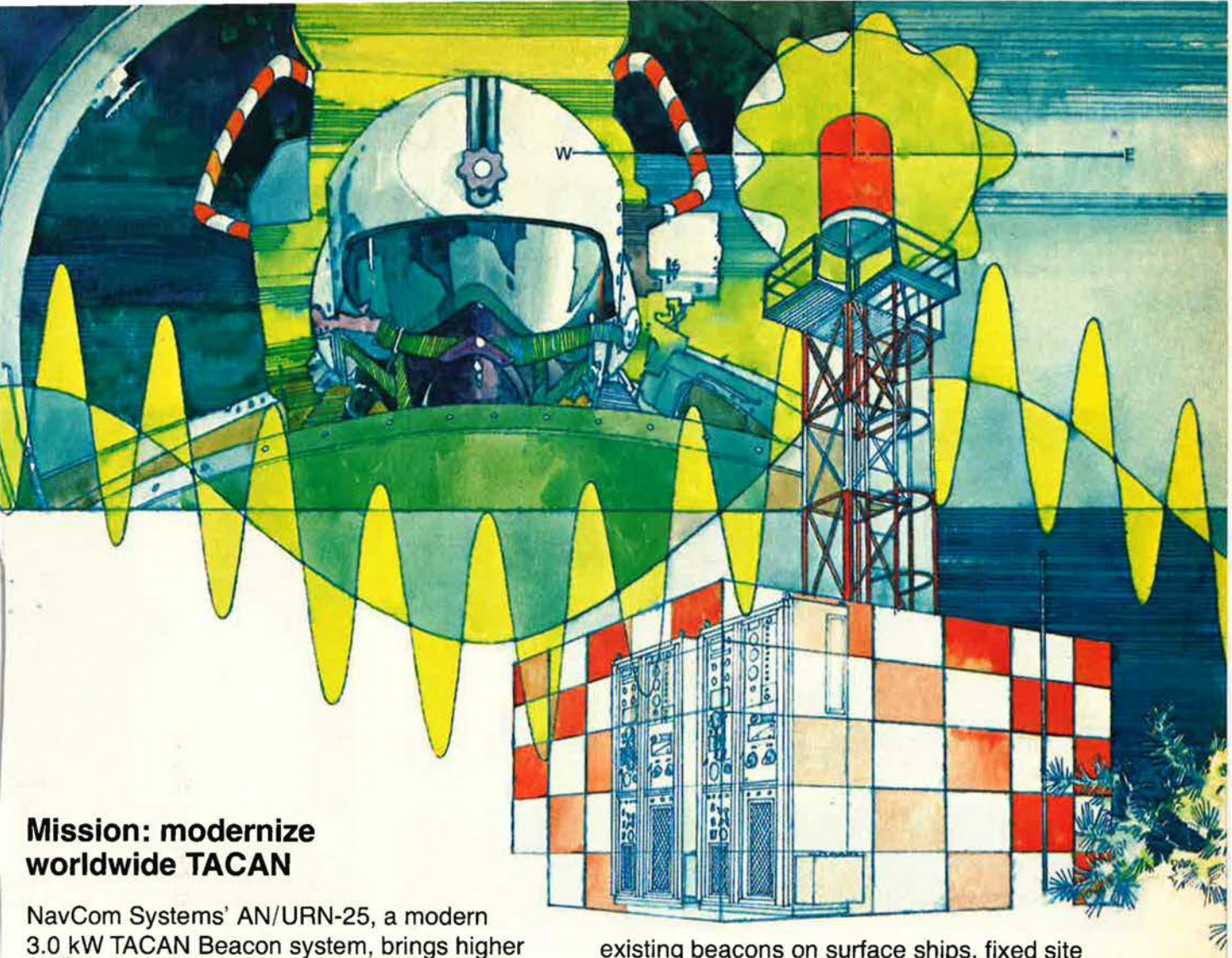

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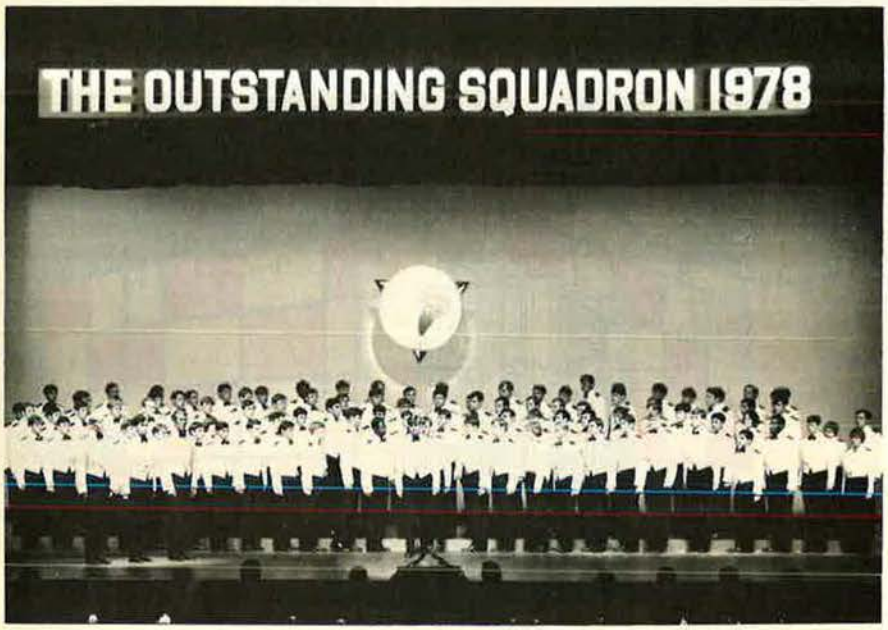
19th Annual Outstanding Squadron Dinner... A Photo Feature

BY DON STEELE, AFA AFFAIRS EDITOR



The cadets of 1978's Outstanding Squadron, the 18th Squadron, assembled on the stage of The Broadmoor's International Center to be introduced to some 600 guests who gathered in Colorado Springs to salute them for achieving overall excellence across the spectrum of academics, physical education, and military training.

Col. Robert D. Beckel, the Academy's first cadet wing commander, Class of 1959, now Commander of the 100th Air Refueling Wing (SAC) at Beale AFB, Calif., made brief inspirational remarks.

During the formal program, AFA National President Gerald V. Hasler presented AFA Life Memberships to the Squadron's three commanders, from left, Cadet Lt. Cols. Douglas N. Barlow, Fall Term Commander; George Kailiwai, III, Winter Term Commander; and Jeffrey D. Brake, Spring Term Commander. Mr. Hasler also presented AFA's Outstanding Squadron Trophy to the three commanders representing all the members of the 18th Squadron. Cadet Lieutenant Colonel Barlow responded for the Squadron.

Shown with AFA's Outstanding Squadron Trophy are, from left, Lt. Gen. Kenneth L. Tallman, Academy Superintendent; Bob Mathias, master of ceremonies; Cadet Lt. Cols. Douglas N. Barlow, Jeffrey D. Brake, and George Kailiwai, III; Gen. Lew Allen, Jr., USAF Vice Chief of Staff (now USAF Chief of Staff), the featured speaker; and Henry A. Kortemeyer, President of AFA's Colorado Springs Chapter, cosponsor of the dinner. Mr. Mathias, the only athlete in history to twice win the Olympic Decathlon Gold Medal, has been a Marine Corps captain, a movie and TV actor, and a four-term United States Representative. He now is Director of the US Olympic Training Center in Colorado Springs.

Guests from Colorado Springs included, from left, Mrs. John J. Clune; Gordon Culver, Senior Vice President, First National Bank; John Sawyer, a Colorado Springs businessman; Margarite Gigiello, Assistant to the Director of the US Olympic Training Center; and Col. John J. Clune, the Academy's Director of Athletics.

AFA leaders attending included, from left, National Director James Grazioso, Utah AFA Past President James Taylor, AFA National Secretary Jack C. Price, Utah AFA President-elect Lee Mohler, and New Jersey AFA Secretary Lloyd Nelson.

Guests from the Academy faculty included, from left, Lt. Col. and Mrs. Eugene H. Galluscio, Capt. Dale O. Condit, and Lt. Col. Ben A. Loving.

Enlisted personnel from the Academy included, from left, Mrs. McBrearty; CMSgt. J. M. McBrearty, Cadet Wing Sergeant Major; Mrs. Mason; and SMSgt. Gerald A. Mason, Group Sergeant Major.

During the evening, AFA National President Gerald V. Hasler, left, and Board Chairman George M. Douglas, right, visited with Gen. Lew Allen, Jr., center, the featured speaker.

Head-table guest Gen. James E. Hill, left, Commander in Chief, North American Air Defense Command, with AIR FORCE Magazine Senior Editor Edgar Ulsamer.

Airman's Bookshelf

New Translation of Clausewitz

On War, by Carl Von Clausewitz, edited and translated by Michael Howard and Peter Paret, with introductory essays by Peter Paret, Michael Howard, and Bernard Brodie, and a commentary by Bernard Brodie. Princeton University Press, Princeton, N. J., 1977. 711 pages. $18.50.

Carl Von Clausewitz's *On War* is indispensable for those who have a strong interest in war: professional soldiers, statesmen, diplomats, politicians. An unabridged translation of this classic has long been out of print in America, and its publication is welcome. Far from being out of date, readers of *On War* cannot fail to be impressed by the insights in the book that are relevant to the last decades of the twentieth century. Bernard Brodie, one of America's foremost strategists, believes that Clausewitz is as pertinent to our times as most of the literature written on nuclear war, and he finds Clausewitz better to read than anything else written on conflict in this century.

This reviewer agrees with that judgment, and so, apparently, does the faculty of the Air War College, because next year's class will study this edition of *On War.*

While the class of '79 will receive many benefits from reading Clausewitz's work—such as a thorough grounding in the relationship between war and politics, the connection between morale and victory, the attributes of military genius, and the effects of friction on the military machine—the highest dividends will probably come from Clausewitz's treatment of the principles of war. Study of these fundamentals has been neglected in official military doctrine in this generation, and examining Clausewitz might correct this shortcoming. The latest edition of the US Army's published doctrine—FM 100–5—eliminates completely a discussion on the principles of war. Material on them has only recently returned to Air Force published doctrine—AFM 1–1—and the treatment by the Air Force is thin.

In the recent past there has been a proclivity either to ignore the principles or to reduce them to eight or nine adages that would fit on a small laminated card. Clausewitz knew better and wrote chapters where others wrote aphorisms. Readers will find chapters spread throughout the book devoted to such concepts as superiority of numbers, surprise, economy of force, concentration, and perseverance. Students of military history can recount victories nearly without number, from Jericho to Normandy, in which the principles were correctly applied, or defeats in which they were not considered or were misapplied. Professional soldiers who steep themselves in the writings of Clausewitz will be getting back to basics.

Lack of space prevents a full analysis of Clausewitz's writing on the fundamentals of war, but his perceptions outlined here should whet the reader's appetite for more. He wrote: "In tactics as in strategy, superiority of numbers is the most common element in victory. . . . It thus follows that as many troops as possible should be brought into the engagement at the decisive point. . . . To achieve strength at the decisive point depends upon the strength of the army and on the skill with which it is employed. The first rule, therefore, should be: Put the largest possible army into the field."

Related to superiority of numbers is the principle of surprise. "Surprise . . . is more or less basic to all operations, for without it superiority at the decisive point is hardly conceivable. Surprise, therefore, becomes the means to gain superiority, but because of its psychological effect it should be considered an independent element. Whenever it is achieved on a grand scale, it confuses the enemy and lowers his morale; many examples great and small, show how this in turn multiplies the results. . . . We suggest that surprise lies at the root of all operations without exception. . . . The two factors that produce surprise are secrecy and speed."

Also related to superiority of numbers is the principle of economy of force. Suroly this is the most misunderstood of all the principles of war. Too frequently modern writers have taken this principle to mean conserving forces and not using more to carry the objective than the minimum necessary. That is the opposite of Clausewitz's meaning and a violation of the principles of superiority of numbers and concentration: ". . . always make sure that all forces are involved . . . always . . . ensure that no part of the whole force is idle. If a segment of one's force is located where it is not sufficiently busy, or if troops are on the march—that is, idle—while the enemy is fighting, then these forces are being managed uneconomically. In this sense they are being wasted, which is even worse than using them inappropriately. When the time for action comes, the first requirement should be that all parts must act: Even the least appropriate task will occupy some of the enemy's forces and reduce his overall strength, while completely inactive troops are neutralized for the time being."

Related to economy of force is the principle of concentration. Clausewitz placed heavy emphasis here: "The best strategy is always be very strong: first in general and then at the decisive point. . . . There is no higher and simpler law of strategy than that of keeping one's forces concentrated. No force should ever be detached from the main body unless the need is definite and urgent. . . . All forces intended and available for a strategic purpose should be applied simultaneously: Their employment will be the more effective the more everything can be concentrated in a single action at a single moment."

Once all these principles are ap-

plied, Clausewitz admonishes the commander to persevere. He knew of the countless physical and mental pressures on the commander that weaken resolve: "Perseverance in the chosen course is the essential counterweight" to fear and exhaustion. "Moreover, there is hardly a worthwhile enterprise in war whose execution does not call for infinite effort, trouble, and privation, and as a man under pressure tends to give in to physical and intellectual weakness, only great strength of will can lead to the objective. It is steadfastness that will earn the admiration of the world and of posterity."

As long as war pits human against human, these principles will be worthy of study. Failure to consider them courts disaster. There is much more to *On War* than has been sketched here, but professional soldiers and airmen—like those in the upcoming class of '79—will benefit most from reading and then discussing Clausewitz's ideas on how to fight. The addition of Clausewitz to the Air War College curriculum is the latest step in reintroducing war to the war college: a worthy enterprise. Statesmen, diplomats, and politicians will gain from Clausewitz's clear writing on the connection between war and politics (professional soldiers will gain from that, too), making this latest translation of *On War* a most necessary addition to the professional libraries of everybody interested in war.

—Reviewed by Lt. Col. Alan Gropman, USAF.

Strategy in Vietnam

Summons of the Trumpet: U.S.-Vietnam in Perspective, by Dave Richard Palmer. Presidio Press, San Rafael, Calif., 1978. 277 pages, with bibliography, index. $12.95.

One of the great problems faced by veterans of Vietnam is the particularity, insularity, or parochialism of their knowledge of the war. The one-year tour, even when repeated, made narrow experts of us all, and legion are those who can relate the detailed history of the 8th Tactical Fighter Wing from June 1965 to May 1966 (or the advisory business in I Corps during 1967, the siege at Khe Sanh, Lam Son 719 from the left seat of an O-2, etc.).

For those who recognize this shortcoming in themselves, the search for the big picture has often been frustrated by the many books that weigh in with similar shortcomings. *The Making of a Quagmire, The Best and the Brightest, The Pentagon Papers, Fire in the Lake, Papers on the War, A Soldier Reports, The War Managers*—in almost every case these admittedly important works face their topic from a singular perspective, often one quite foreign to the experience of most readers. What has been missing, until now, has been a well-written, straightforward military history of American involvement from its beginnings in 1954 through its demise in 1973. To the very considerable extent that it succeeds in being such a history, Dave Palmer's *Summons of the Trumpet* answers a crying need.

Palmer views the war in three distinct phases: the advisory decade, 1954–64, ending with the introduction of US combat troops in 1965; then the period when perplexed military leaders sought solutions to the strategic paradox they found themselves in, from mid-1965 through the thunderclap of Tet 1968; and finally the prolonged search for a way out, culminating with Linebacker II in December 1972. Most of the book (four of its five parts, twenty-three of its thirty chapters) is devoted to the first two phases, culminating in Tet and its aftermath. Some might question his devoting only forty-seven pages to the period from 1969 to 1973, but not if they come to agree with the author that the years (and opportunities) from 1962 through 1968 reveal the essence of our national failure.

Let me be clear that this is not campaign or battle history; the focus is one level higher, at the level of the attempts made to translate national policy into military strategy and operations. "Nevertheless, strategy viewed in isolation from its tactical realities loses meaning, so selected campaigns or battles [Ap Bac, Ia Drang, Khe Sanh, etc.] are woven into the narrative. . . . Nor is strategy a one-sided matter; the plans and actions of North Vietnam and the Viet Cong receive full treatment." This approach yields important dividends, chief among which is the reader's ability to reconstruct the sequence of decisions that in the end determined the course of military action on both sides. No book yet available does this better than Palmer's.

The author, an Army colonel now with the 1st Brigade, 2d Armored Division, is a trained historian with four books to his credit along with wide-ranging experience in Vietnam. Save for one egregious error on page 132 (where, at the end of a second excellent chapter on Rolling Thunder, he makes a totally unnecessary *and* invalid comment about bombing during World War II), his accuracy and objectivity inspire confidence throughout. "In the final analysis," he writes, "[this] is a soldier's view of Vietnam." It's more that that—it's the best military history of the war yet to appear.

—Reviewed by Lt. Col. David MacIsaac, USAF, Woodrow Wilson International Center for Scholars, Smithsonian Institution, Washington, D. C.

New Books in Brief

Design for Flying, by David B. Thurston. With more than thirty-five years' experience as an aircraft designer, the author, who heads his own aircraft design firm, has written a no-nonsense guide to show how and why an airplane behaves as it does. Pilots and owners can learn how to equip or modify a plane for instrument flying. Photos, index. McGraw-Hill Book Co., New York, N. Y., 1978. 272 pages. $14.95.

Diversity and Development in Southeast Asia: The Coming Decade, by Guy J. Pauker, Frank H. Golay, and Cynthia H. Enloe. Sixth in the Council on Foreign Relations' 1980s series, this volume analyzes political, economic, and social factors likely to affect Southeast Asian nations in the next decade. Authoritarian government will reign in an atmosphere of unemployment, ethnic conflict, and student unrest on the one hand, and the need for economic growth and equitable distribution of goods on the other. The book examines the critical issues and the changing role of the major powers. Index. McGraw Hill, New York, N. Y., 1977. 191 pages. $5.95.

The Great War, 1914–1918: A Pictorial History, by John Terraine. Some 300 carefully selected photos convey a deep sense of the horror, the heroism, and the grandeur of events from Sarajevo to the Arm-

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Airman's Bookshelf

istice. Index. Doubleday & Co., Inc., Garden City, N. Y., 1978. 400 pages. $10.

Jeppesen Sanderson Aviation Yearbook 1978, edited by Ed Mack Miller. Significant aerospace events that occurred in 1977 are detailed in this annual reference, edited by the late Ed Mack Miller who died soon after this was published. It contains articles reprinted from several aviation publications, including AIR FORCE Magazine, on general, commercial, military, and sport aviation activities. Color photos, index. Jeppesen Sanderson, Inc., Denver, Colo., 1978. 442 pages. $14.95.

Jet Roulette, by Fred McClement. The author reveals ample evidence that commercial aviation may be less safe than statistics seem to indicate. Vivid descriptions of major crashes pinpoint risks that went unheeded, official safety recommendations that were ignored, and regulations that were casually violated. Doubleday & Co., Inc., Garden City, N. Y., 1978. 189 pages. $7.95.

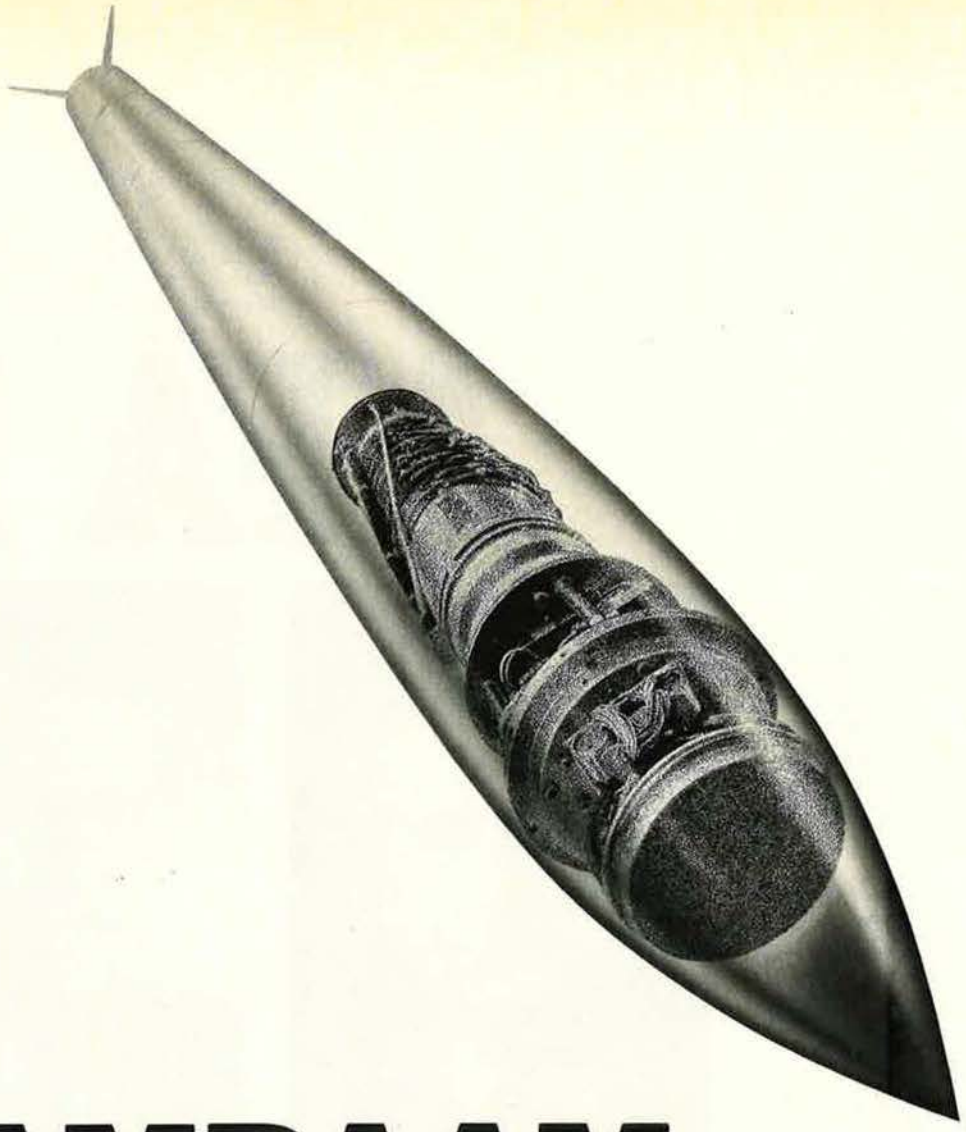
The Officer's Handbook: A Soviet View, edited by General-Major S. N. Kozlov. Thirteenth in the Soviet Military Thought Series translated and published under USAF auspices, this volume is intended to assist Soviet officers in broadening their outlook and in resolving problems related to the training and education of subordinates. It also covers Soviet military psychology, key terms in Soviet military thought, Soviet concepts of cadre organization, centralization, and unity of command, data on the legal status of Soviet active-duty and reserve officers, and much more. Superintendent of Documents, US Government Printing Office, Washington, D. C. 20402, 1971. 358 pages. $4.

A Revolution Is Not a Dinner Party: A Feast of Images of the Maoist Transformation of China, by Richard H. Solomon, with collaboration of Talbott W. Huey. Here is a visually appealing and immensely readable book that explores American myths about China and gives them real meaning through a Chinese rather than American perspective. In the words of the authors: "In an understanding of our own cultural biases lie points of contrast which will help us appreciate Chinese views of themselves, of their history and revolution, and of America." Linecuts, photos, notes, and selected chronology. Anchor Press, Doubleday & Co., Inc., New York, N. Y., 1978. 199 pages. $6.95.

Shield of David: An Illustrated History of the Israeli Air Force, by Murray Rubenstein and Richard Goldman. From the creation of an underground Air Service in 1947, when Israel was still a part of British-mandated Palestine, through four major wars, numerous crises and skirmishes, including Entebbe to the present day, this book tells how the Israelis went from a make-do air operation to one of the most experienced and formidable air forces in the world. Photos, appendices (including aircraft specifications, armament, camouflage, a flight log of a Canadian ace who volunteered in Israel's War of Independence, and a historical chronology). Prentice-Hall, Inc., Englewood Cliffs, N. J., 1978. 223 pages. $12.50.

Shelters in Soviet War Survival Strategy, by Leon Gouré. In the 1960s, Soviet war-survival strategy centered on evacuation and dispersal of urban residents. Today emphasis has shifted to shelters, the author, a noted Sovietologist, says. Sufficient shelter space exists to accommodate from fifty-three to sixty-four percent of the urban population or seventy percent of the elements Soviet authorities deem necessary to preserve Soviet power during a war and in postwar recovery. Concludes the author: "Given the large amount of resources required for its implementation, the Soviet shelter program and especially the decision to provide the entire urban population with ready shelter space, are a measure of the seriousness with which the Soviet leadership regards civil defense." Center for Advanced International Studies, University of Miami, 1730 Rhode Island Ave., N. W., Washington, D. C. 20036, 1978. 74 pages. $6.95.

—Reviewed by Robin Whittle



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The incumbents—Gerald V. Hasler, Presi
George M. Douglas, Board Chairman; Jack C.
Secretary; and Jack B. Gross, Treasurer—
been nominated by acclamation to serve another

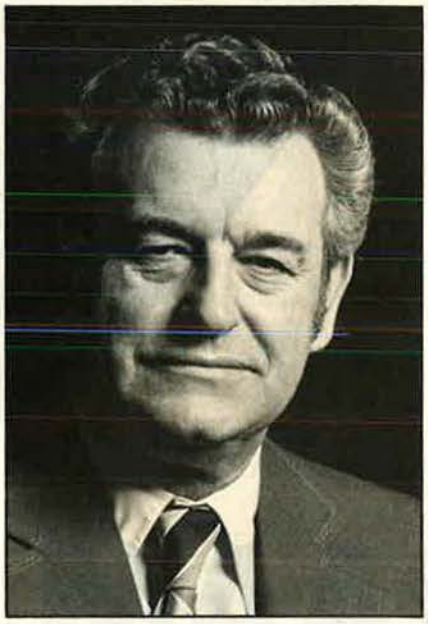
AFA No

1978

At its annual meeting in Colorado Springs, Colo., on May 27, AFA's Nominating Committee, comprised of the National Officers and Directors, and the President of each AFA State Organization or his or her designee, chose a slate of four National Officers and eighteen Directors to be presented to the Delegates at the National Convention in Washington, D. C., on September 18, 1978.

The four incumbent National officers—Gerald V. Hasler, President; George M. Douglas, Board Chairman; Jack C. Price, Secretary; and Jack B. Gross, Treasurer—were nominated by acclamation for another term in their respective offices.

Mr. Hasler, of Endicott, N. Y., is the President and Chief Executive Officer of an architectural design and remodeling corporation. During World War II, he was a B-25 instructor pilot. Immediately following the war, he was with the United Nations Relief and Rehabilitation Administration as its Director for the French Zone of Occupation and Director of Supply and Transport for Austria with headquarters in Austria. An AFA member since 1963, Mr. Hasler now serves as Chairman of the Executive, Nominating, Awards, and Convention Site Committees; as a member of the Resolutions Committee; as an ex officio member of all Committees and Councils; and as a member of the Aerospace Education Foundation's Board of Trustees. He has served as Board Chairman, an elected National Director, Chairman of the Constitution Committee, National Convention Parliamentarian, an ex officio (nonvoting) member of the Finance Committee, Treasurer of the Aerospace Education Foundation, and a State and Chapter President.



Gerald V. Hasler

George M. Douglas

Mr. Douglas, of Denver, Colo., is Assistant Vice President/Marketing of Mountain Bell. During World War II, he served with the Army in the Pacific Theater. Currently, he is an Air Force Reserve major general with an assignment as the Mobilization Assistant to the Deputy Chief of Staff/Personnel at USAF Headquarters. Mr. Douglas now serves as a member of the Executive, Awards, Convention Site, and Resolutions Committees; as an ex officio (nonvoting) member of the Finance Committee; and as a member of the Board of Trustees of the Aerospace

and the Nominating Committee's slate of
ates to be members of AFA's Board of Directors
presented next month to delegates attending
Force Association's 1978 National Convention.

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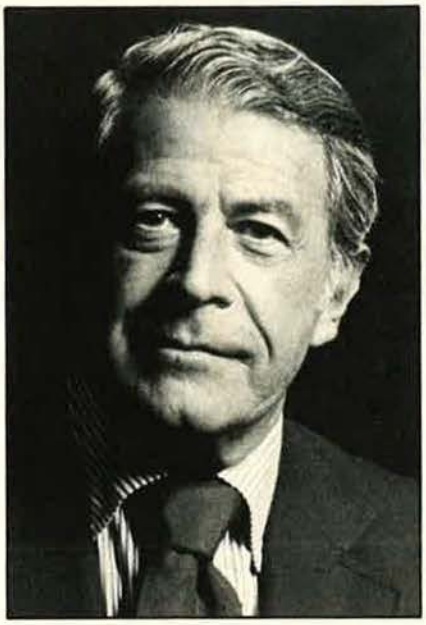
Jack C. Price



Jack B. Gross

Education Foundation. Mr. Douglas is a former National President, elected National Director, and State and Chapter President. He is a Life Member of AFA.

Mr. Price, of Clearfield, Utah, a former Air Force NCO, now is an Air Force civilian executive at the Ogden Air Logistics Center at Hill AFB. A member of AFA since 1964, Mr. Price has served as Chapter and State President, Vice President for AFA's Rocky Mountain Region, an elected National Director, and Chairman of the Organizational Advisory Council. Currently, he is Chairman of the Resolutions Committee and a member of the Executive Committee. He is a Life Member.

Mr. Gross, a prominent Hershey, Pa., civic leader and businessman, now is serving an unprecedented seventeenth term as National Treasurer. Mr. Gross also serves as Chairman of AFA's Finance Committee; as a member of its Executive, Resolutions, and Convention Site Committees; and as a member of the Aerospace Education Foundation's Board of Trustees. He has served as Chairman of the Board of Directors, an elected National Director, and as a State and Chapter President. He is a retired Air Force colonel, and a Life Member of AFA.

The following are permanent members of the AFA Board of Directors under the provisions of Article IX of AFA's National Constitution:

John R. Alison, Joseph E. Assaf, William R. Berkeley, John G. Brosky, Edward P. Curtis, James H. Doolittle, George M. Douglas, Joe Foss, Jack B. Gross, George D. Hardy, Martin H. Harris, Gerald V. Hasler, John P. Henebry, Joseph L. Hodges, Robert S. Johnson, Arthur F. Kelly, Thomas G. Lanphier, Jr., Jess Larson, Curtis E. LeMay, Carl J. Long, Nathan H. Mazer, John P. McConnell, J. B. Montgomery, Edward T. Nedder, Martin M. Ostrow, Julian B. Rosenthal, John D. Ryan, Peter J. Schenk, Joe L. Shosid, C. R. Smith, William W. Spruance, Thos. F. Stack, Arthur C. Storz, Harold C. Stuart, James M. Trail, Nathan F. Twining, A. A. West, and Jack Withers.

The eighteen men whose pictures appear on the following page are nominees for the eighteen elective Directorships for the coming year. (Names marked with an asterisk are incumbent National Directors.)

—By Don Steele, AFA Affairs Editor

1979


Blankenship


Callahan


Carr


Chandler


Emrich


Grazioso


Haire


Harris


Haug


Keith


Kregel


McBride


Nettleton


Rapp


Stearn


Taylor


West


Wilkins

Nominees for AFA's Board of Directors

David L. Blankenship, Tulsa, Okla.—industry executive. Former Chapter President; National Council member. Current State President.

Daniel F. Callahan, Nashville, Tenn.—management engineering consultant. Former State President; National Council Chairman; National Committee member; National Director. Current Aerospace Education Foundation Board of Trustees member; Chapter President. Life Member.

***Robert L. Carr,** Pittsburgh, Pa.—real estate broker. Former Chapter, State President; National Committee member; Vice President (Northeast Region).

William P. Chandler, Tucson, Ariz.—insurance broker. Former Chapter, State President; National Council member. Current Vice President (Far West Region).

***Richard C. Emrich,** McLean, Va.—financial manager, FAA. Former Chapter, State President; Vice President (Central East Region). Life Member.

***James P. Grazioso,** West New York, N. J.—roofing and sheet metal contractor. Former Chapter, State President; Vice President (Northeast Region); National Council member.

***John H. Haire,** Huntsville, Ala.—engineer. Former Chapter, State President; National Council member, Vice President (South Central Region); National Committee Member. Life Member.

***Alexander E. Harris,** Little Rock, Ark.—property management executive. Former Chapter, State President; Vice President (South Central Region); National Committee Member. Life Member.

***Roy A. Haug,** Colorado Springs, Colo.—telephone company executive. Former Chapter, State President; Vice President (Rocky Mountain Region); National Council Chairman; National Committee member. Current Aerospace Education Foundation Board of Trustees member. Life Member.

***Sam E. Keith, Jr.,** Fort Worth, Tex.—traffic and maintenance engineering manager. Former Chapter, State President; National Council member; Vice President (Southwest Region). Current National Committee member; Aerospace Education Foundation Board of Trustees member. AFA "Man of the Year" 1967. Life Member.

***Vic R. Kregel,** Dallas, Tex.—industry executive. Former Chapter, State President; Vice President (Southwest Region); National Council member. Current National Committee member. AFA "Man of the Year" 1976. Life Member.

William V. McBride, San Antonio, Tex.—recently retired USAF general. Former USAF Vice Chief of Staff.

***J. Gilbert Nettleton, Jr.,** Washington, D. C.—industry executive. Former Squadron Commander; Chapter President; Chairman of National Air Force Salute; Chairman of the Board of Trustees, Aerospace Education Foundation. Current National Committee member; Aerospace Education Foundation Board of Trustees member. Life Member.

William C. Rapp, Buffalo, N.Y.—telephone company executive. Former Chapter, State President, National Council member. Current National Committee member; Vice President (Northeast Region).

***Edward A. Stearn,** San Bernardino, Calif.—industry executive. Former Chapter President, State officer; National Committee member; National Council member. Current National Advisor. AFA "Man of the Year" 1977.

***L. T. "Zack" Taylor,** Lompoc, Calif.—retired industry executive. Former Chapter and State President; National Council member.

***Herbert M. West, Jr.,** Tallahassee, Fla.—environmental consultant. Former Chapter, State President; Vice President (Southeast Region). Current National Council member; Aerospace Education Foundation Board of Trustees member.

***Sherman W. Wilkins,** Bellevue, Wash.—industry executive. Former Chapter President; Vice President (Northwest Region). Current National Committee member. Life Member.

Plan Now To Attend...

AFA's 1978 National Convention and Aerospace Development Briefings and Displays

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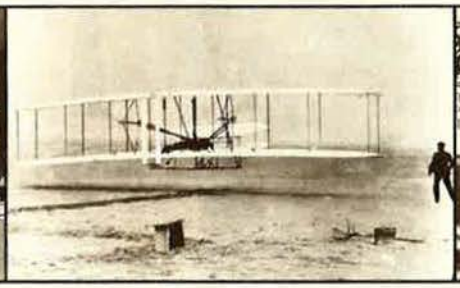

AFA's 1978 National Convention and Aerospace Development Briefings and Displays will be held at the Sheraton-Park Hotel, Washington, D.C., September 17-21. Hotel accommodations are available at the Sheraton-Park, and a limited number of rooms are available at the nearby Shoreham-Americana Hotel.

All reservation 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.

Arrivals after 6:00 p.m. require a one-night deposit or written guarantee for the night of arrival.

Convention activities will include AFA business sessions, luncheons honoring the Secretary of the Air Force and the Air Force Chief of Staff, JROTC Award Luncheon, the annual Salute to Congress, the AFA Delegates' Reception, and the Air Force Anniversary Reception and Dinner Dance. Program details will be presented in forthcoming issues of this magazine.

Advance Registration Form
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Note: Advance registration and/or ticket purchases must be accompanied by a check made payable to AFA. Mail to AFA, 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006.

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Current Registration Fee (After Sept. 8) $80.00

* Tickets to Salute to Congress available only to AFA Convention Delegates accompanied by their Congressman.

AFA News

By Don Steele, AFA AFFAIRS EDITOR

The Hon. Antonia H. Chayes, Assistant Secretary of the Air Force for Manpower, Reserve Affairs and Installations, was the featured speaker at the California State AFA's 31st Annual Convention, held recently in Sacramento. Shown with Ms. Chayes are, from left, Vince Lozito, President of the Sacramento Chapter, hosts to the convention; William Chandler, Vice President for AFA's Far West Region; and California AFA President Dwight Ewing. Delegates elected Ed Stearn, of San Bernardino, to succeed Mr. Ewing as State President for 1978–79. Maj. Gen. Frank J. Schober, Jr., Commanding General, California National Guard, was the dinner speaker, and Joe Higgins, the "Safety Sheriff" and a former AFA National Director, was the master of ceremonies.

—Photo by SMSgt. C. E. Lucas, USAF (Ret.)

The Indiana State AFA's 1978 Convention was held in Indianapolis. Shown during the installation of the newly elected officers are, from left, A. C. Field, Jr., Vice President for AFA's Great Lakes Region, the installing officer; Vice President Robert Wilkie; President Roy P. Whitton; and Treasurer John P. Kelly, Jr.

Principals in the South Carolina State AFA's 1978 Convention, held recently at the Myrtle Beach AFB Officers' Club, were, from left, State President Edith Calliham; retired Maj. Gen. C. T. Ireland, named the State AFA's "Man of the Year"; Lt. Gen. James V. Hartinger, Commander, 9th AF, Shaw AFB, and the luncheon speaker; and AFA President Gerald V. Hasler, the dinner speaker. Retired Maj. Gen. Robert Morrell was elected State President for 1978–79.

—USAF Photo by Sgt. J. P. Jones

The North Carolina State AFA held its 1978 Convention at Seymour Johnson AFB. Brig. Gen. Robert D. Russ, right, Asst. DCS/Ops. (Ops. & Trng.) at Hq. Tactical Air Command, Langley AFB, Va., was the banquet speaker and presented awards. Award recipients included, from left, Ray Kleber, Scott Berkeley Chapter membership chairman; Dale A. Wolfe, N. C. State University, ROTC Award; CMSgt. Fred A. Hallman, Jr., N. C. ANG, Senior NCO Award; Gerald B. Bowen, Central Cabarrus High School, Junior ROTC Award; Maj. Harold O. Seagraves, N. C. State University, ROTC Instructor Award; TSgt. Delano Clark, Pope AFB, Junior NCO Award; Lt. Aaron B. Rogers, Seymour Johnson AFB, Junior Officer Award; and SrA. William E. Ottani, Seymour Johnson AFB, Airman Award. Delegates to the convention reelected incumbent President William Bowden for another term.

chapter and state photo gallery

One of the highlights of the recent visit to Colorado Springs by members of AFA's Board and AFA State Presidents was a visit to the North American Air Defense Command's Combat Operations Center for briefings and a tour of the underground center in Cheyenne Mountain. Canadian Forces Lt. Gen. David R. Adamson, Deputy Commander in Chief of NORAD and an honorary member of AFA, is shown welcoming AFA President Gerald V. Hasler to the briefings.

—NORAD Photo

During briefings in the Space Defense Center, AFA leaders examined a piece of Cheyenne Mountain space debris. Shown are, from left, AFA National Director Judge John Brosky, his son David, AFA National Director James Grazioso, and Minnesota State AFA President David Little.

Brig. Gen. Norma E. Brown, DCS/Personnel, Air Force Logistics Command, Wright-Patterson AFB, Ohio, was the principal speaker at the Ohio State AFA's 1978 Convention hosted by the Mid-Ohio Chapter in Granville. General Brown, center, is shown visiting with Ohio AFA President-elect Robert J. Puglisi, left, and retiring State President Ed Nett, right, who was named Chairman of the State AFA's Board. Chuck Skidmore was named the State AFA's "Man of the Year," and George Chaconas received a special award for having recruited more than 150 new AFA members over the past three years.

During the past few months, AFA's AFROTC and AFJROTC Medals have been presented to the outstanding cadet in each of the AFROTC and AFJROTC units throughout the country. Representative of these presentations are the two shown here. In the photo at left, Pease, N. H., Chapter President Charles Sattan, left, presents AFA's AFROTC Medal to Cadet Gordon B. McKay, during the Annual University of New Hampshire ROTC Awards Ceremony. The photo at right shows Middle Tennessee Chapter President Daniel F. Callahan, Maj. Gen., USAF (Ret.), presenting an AFA AFJROTC Medal to Cadet Maj. Cathy Crowder of the Lawrence County High School AFJROTC Cadet Squadron.

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Sen. Thomas J. McIntyre of New Hampshire, Chairman of the Subcommittee on Research and Development, Senate Armed Services Committee, was the guest of honor and speaker at a recent luncheon sponsored by the Nation's Capital Chapter in the Dirksen Senate Office Building. In the photo, Senator McIntyre is at the lectern. Head-table guests are, from left, Chapter Councilman Robert W. Givens; Air Force Vice Chief of Staff (now Chief of Staff) Gen. Lew Allen, Jr.; Chapter President Ricardo A. Alvarado; Sen. Barry Goldwater of Arizona; the Hon. John J. Martin, Assistant Secretary of the Air Force (Research, Development and Logistics); and the Hon. Jack L. Stempler, Assistant to the Secretary of Defense (Legislative Affairs).

—USAF Photo by SSgt. Victor Vasquez

AFA's Scott Memorial Chapter, Ill., and the Belleville Exchange Club jointly purchased and installed a Freedom Shrine in the Scott AFB School North. The unique exhibit contains twenty-eight reproductions of historically famous American documents, spanning the 325 years from the Mayflower Compact to the World War II Instrument of Surrender in the Pacific. Participants in the dedication ceremonies included, from left, Msgr. James R. McCormick; Mascoutah Mayor Leroy Perrottet; Chaplain (Lt. Col.) Robert E. Merrell; Belleville Exchange Club President Lee Keck; Scott Memorial Chapter President Bob Eisenhardt; Col. Frank Carter, Asst. Deputy Chief of Maintenance, 375th Aeromedical Airlift Wing, one of the speakers; Mrs. Martha O'Malley, Regional Superintendent of Schools, another speaker; and Bert A. Olson, master of ceremonies.

More than 200 members and guests attended the Wichita Falls, Tex., Chapter's Annual Awards Banquet, at which Lt. Gen. George E. Schafer, USAF Surgeon General, was the guest speaker. The three award recipients shown with General Schafer, second from left, are, SMSgt. Bernard Gaydosh, left, "Airman of the Year"; C. D. Knight, second from right, "Man of the Year"; and Col. (Dr.) James Richardson, right, "Officer of the Year."

Gen. Russell E. Dougherty, USAF (Ret.), was the guest speaker at the University of Kentucky's AFROTC Spring 1978 Dining-In, cosponsored by the Arnold Air Society's General Albert M. Woody Squadron. General Dougherty also presented award certificates to the 1978 Distinguished AFROTC graduates. Shown during the presentation are, from left, General Dougherty; Cadet award recipients Don Kinman, Lucy Jo Shepherd, and Bill Huggins; and Col. Joseph M. Dougherty, Detachment Commander.

photo gallery

. Gen. Thomas P. Stafford, DCS/R&D, Hq. USAF, was the guest speaker at a dinner meeting of e Ak-Sar-Ben Chapter in the Offutt AFB, Neb., NCO Club. Shown with General Stafford, center, are hapter President Robert Runice, left, and Nebraska State AFA President Lyle Remde, right, who also rves as Vice President for AFA's Midwest Region. A special guest at the dinner was Lt. Gen. mmy Doolittle, USAF (Ret.), one of AFA's founders and its first National President.

Brig. Gen. H. J. Dalton, left, USAF Director of Information, recently presented Col. Jack Kruse, right, a plaque and citation designating him the most outstanding mobilization augmentee (Reservist) serving at USAF Headquarters. Colonel Kruse, a Past President of the New Jersey AFA Information Chapter, was elected Vice President of the New Jersey State AFA at its recent convention in Cape May.

COMING EVENTS

AFA's 32d Annual National Convention, Sheraton-Park Hotel, Washington, D. C., September 17–20 . . . **AFA's Aerospace Development Briefings and Displays,** Sheraton-Park Hotel, Washington, D. C., September 19–21 . . . **AFA National Symposium,** Los Angeles, Calif., October 26–27 . . . **Seventh Annual Air Force Ball,** Century Plaza Hotel, Los Angeles, Calif., October 27.

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Perspective
Comment & Opinion

By Lt. Col. Ross L. Meyer, USAF, NELLIS AFB, NEV.

Let's Get Serious About Night Operations

"The paramount deficiency of the USAF today—certainly as regards air-ground operation—is our inability to seek out and destroy the enemy at night." Whether or not you agree, at one time this statement was true, at least so said the Fifth Air Force Commander, Lt. Gen. Earle Partridge, at the height of the Korean War.

Surely in the past twenty-seven years we've learned our lessons and have solved—or at least diminished—most of the problems associated with stopping the enemy at night . . . or have we? Well, during the early part of the Southeast Asia conflict, one F-4C squadron commander noted, "New pilots continue to arrive with absolutely no night weapons delivery training." And, as recently as 1977, the USAF Tactical Fighter Symposium Final Report stated, "All [symposium] groups agreed we must train and develop tactics for the night environment, and that the current trends toward decreasing aircrew proficiency at night must be reversed."

Well, then, perhaps we haven't solved the problems that General Partridge spoke of in 1951. But then again, perhaps we don't have to worry about fighting at night. Maybe we've reached a point in the evolution of modern warfare where night combat operations simply aren't feasible. Some observers even predict that ground-to-air defenses have already precluded the use of tactical fighters at night—that the only way to avoid SAMs is to see them, at times an impossible task at night.

A close examination of the facts will reveal, however, that a nighttime capability by our tactical fighters *is* essential. There are self-defense programs under development that should provide a capability to operate at night with an acceptable degree of risk. There can be little doubt about the intentions—or capability—of our potential enemies to conduct night operations. The well-known Soviet military spokesman, Col. A. A. Sidorenko, wrote in his book *The Offensive,* ". . . the role and importance of combat operations at night will increase sharply in a future . . . war." And could anyone argue with the extent of night operations during the Southeast Asia conflict and later during the 1973 Yom Kippur War when the Syrians and Egyptians initially maintained an all-out, twenty-four-hour-a-day offensive? Many of their troops were equipped with hardware designed solely for nighttime operations.

Are we doing anything about our deficiency in night operations? In my opinion, the answer is, regrettably, not enough.

It seems clear that all tactical segments of the USAF (not just certain groups such as F-111s), as well as any other remaining combat and support units also considered "night deficient," must become fully prepared to fight twenty-four hours a day. If we are really serious about training the way we're going to fight, we *must* conduct a significant amount of our training at night. It must be realistic and, for tactical fighters that have an air-to-ground mission, it must include low-level navigation and tactical weapons delivery. Routine night flying just doesn't provide tactical fighter aircrews the necessary proficiency or experience for night combat operations.

To be sure, most of our air-to-ground committed tactical fighters do train at night. The new training/readiness concept in Tactical Air Command called Graduated Combat Capability (GCC) recognizes this need for specialized night proficiency and requires certain units to perform additional night training. However, these night "dedicated" units, along with the other air-to-ground wings that also must conduct some night training, just don't receive *enough,* and *realistic enough,* training. Their night weapons delivery is generally performed on controlled ranges using box patterns, relatively shallow dive angles, and higher than normal release altitudes. That sort of training simply doesn't provide the required proficiency.

Too many of our combat-ready tactical fighter pilots have never operated under flares or expended ordnance against realistic ground markers (logs, fires, ground fire, etc.) on a tactical range. In order to enhance safety—a consideration I fully recognize as important—previously mentioned restrictions are placed on these aircrews along with such other restrictions as no turns after weapon release until the nose of the aircraft is above the horizon—a most unlikely maneuver if, as can reasonably be expected, the enemy is shooting back.

OK, how do we increase our nighttime capability, without incurring added costs?

At least two reasonable methods have occurred to me. The first which has surfaced over the years whenever we were forced into a nighttime commitment, is to develop night-dedicated units. A generally accepted method is to have one squadron within a wing dedicated to night operations. This provides a group of professionals who are con

HOW TO SHARE YOUR PERSPECTIVE

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tinuously refining their night tactics and techniques, and a capability in each wing to quickly train other aircrews if the need arises.

Unfortunately, this approach would probably require a significant increase in resource expenditures, since a wing's support elements would have to start their day when the first day squadron came to work and not shut down until all the night flyers had landed. This makes for a very long day and could be reasonably supported only if there were a large increase in manpower authorizations.

The second method, and the one I favor, is to have night-dedicated units at the wing level (or to have all tactical fighter wings train this way). Generally speaking, although on duty twenty-four hours a day, a tactical fighter wing works about a fourteen-hour day, from around 0600 until 2000. The fighter squadrons generally rotate their flying schedules so that the very early and very late flying periods are distributed equitably. Most night requirements are normally accomplished when the aircrews are flying the very late schedule.

Night-dedicated tactical fighter wings—or if we want maximum flexibility, all tactical fighter wings—could start to work around 1000 and quit about midnight, these times adjusted to the seasons. This would provide many more training sorties—and realistic training events—at night, all without additional resources.

To be sure, there are real disadvantages to this approach. Most of us want to work during the day and tend to shy away from nighttime work—particularly when it involves flying close formation in weather, low-level navigation, or delivering ordnance under tactical constraints. Our wives want us home in the evening for supper, and we want to spend time with our children before they go to bed. And clamor is sure to arise from the local community when the noise associated with night training disturbs its evening's activities!

There doubtless are other options that can minimize or perhaps eliminate some of the problems I've mentioned and others I haven't. However, the important point to consider is our future capability to effectively blunt the enemy when the time comes. There is no doubt that sometime we will again be involved in a conflict in which tac air will be required to conduct combat operations. If we're not prepared to operate at night, our side is going to be at a severe disadvantage.

Tactical Air Command has pioneered some recent realistic training—the most notable being Red Flag—and has put some real meaning in the slogan, "Let's train the way we're going to fight." I suggest we take this realistic training one step further and get serious about improving our night capability. ■

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Bob Stevens'

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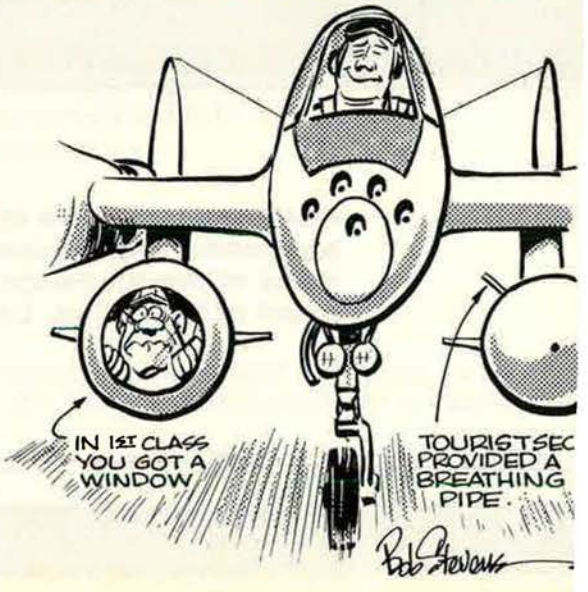

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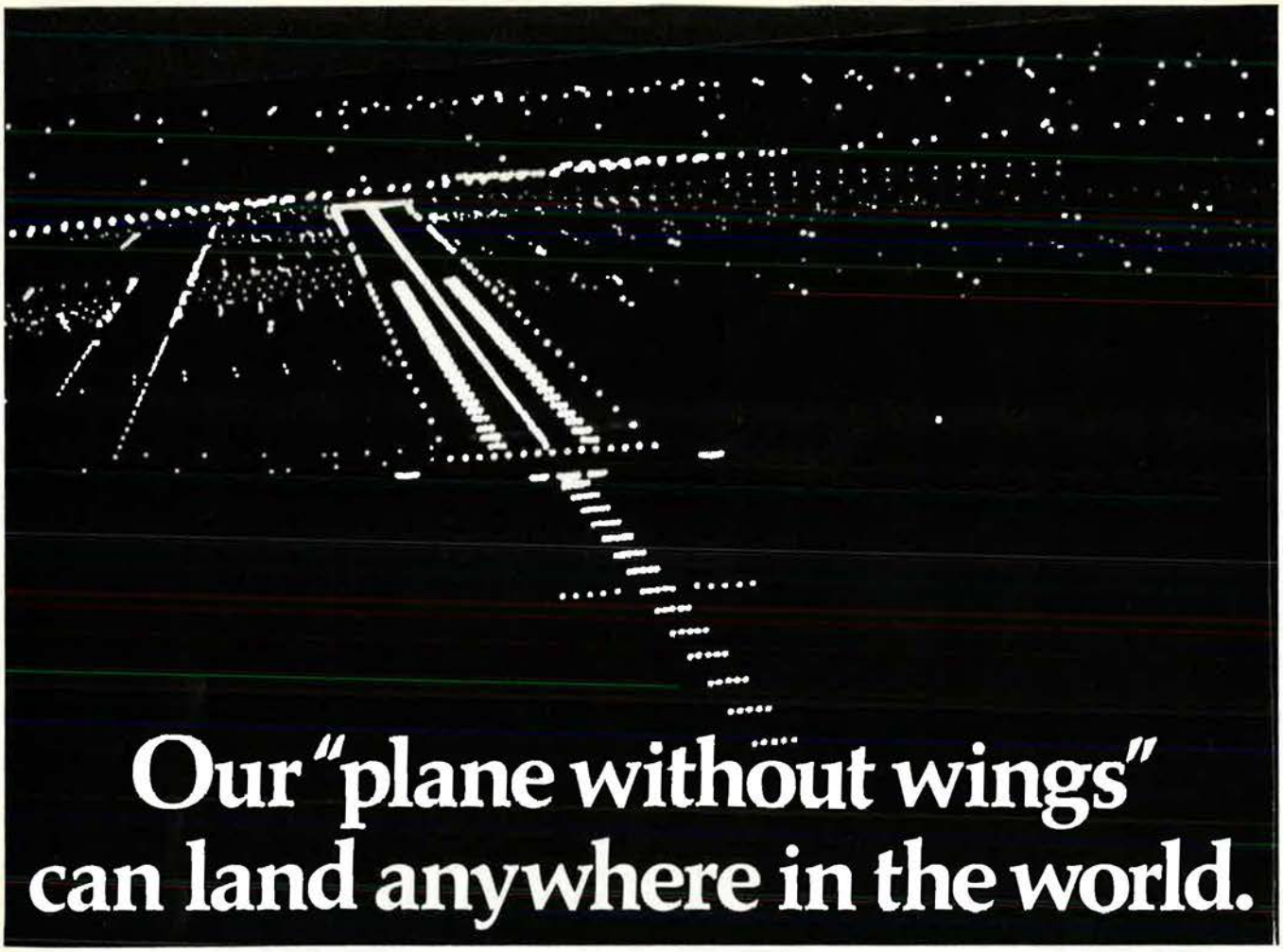

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