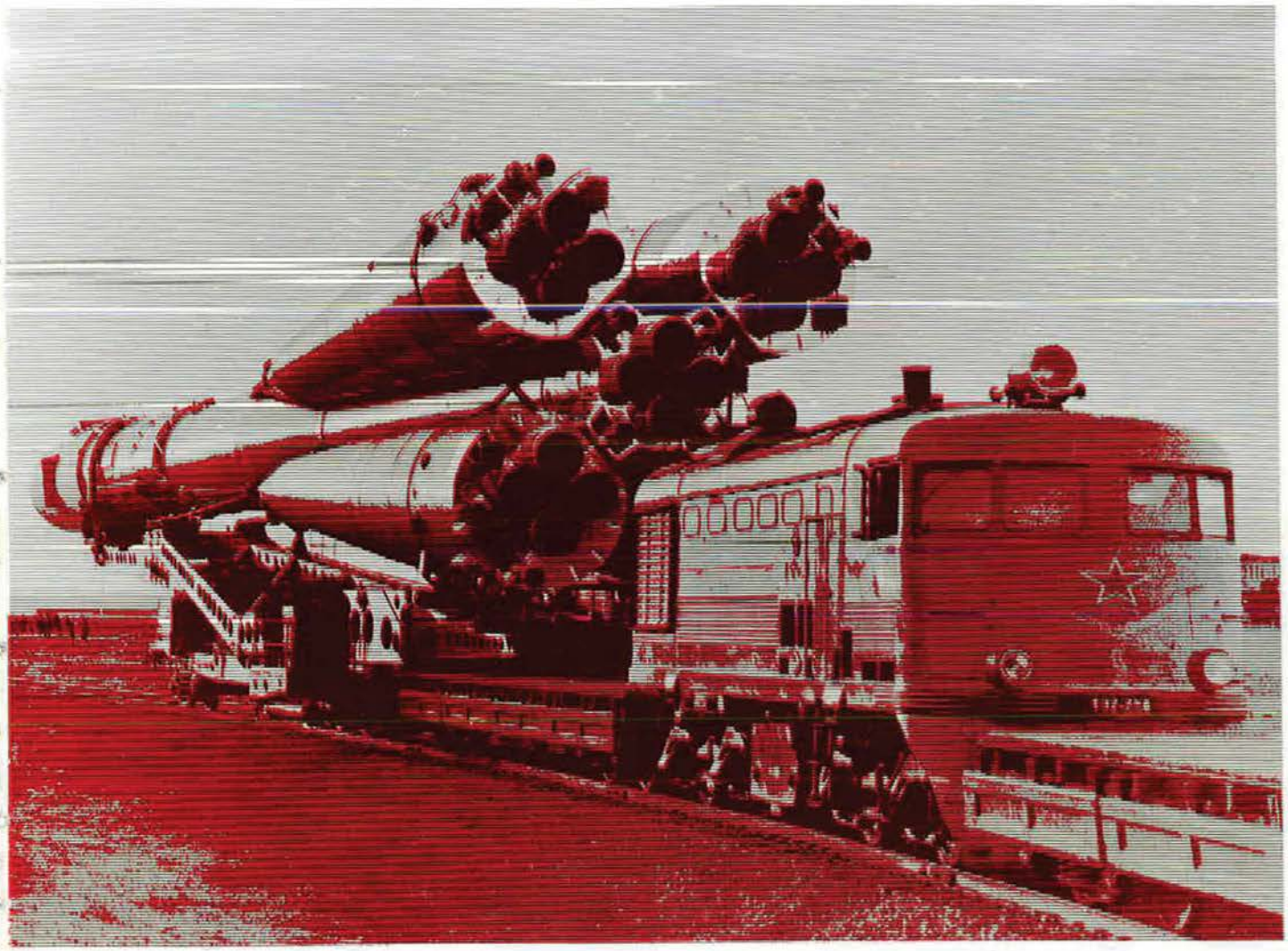
AUGUST 1973/$1

AIR FORCE

PUBLISHED BY THE AIR FORCE ASSOCIATION

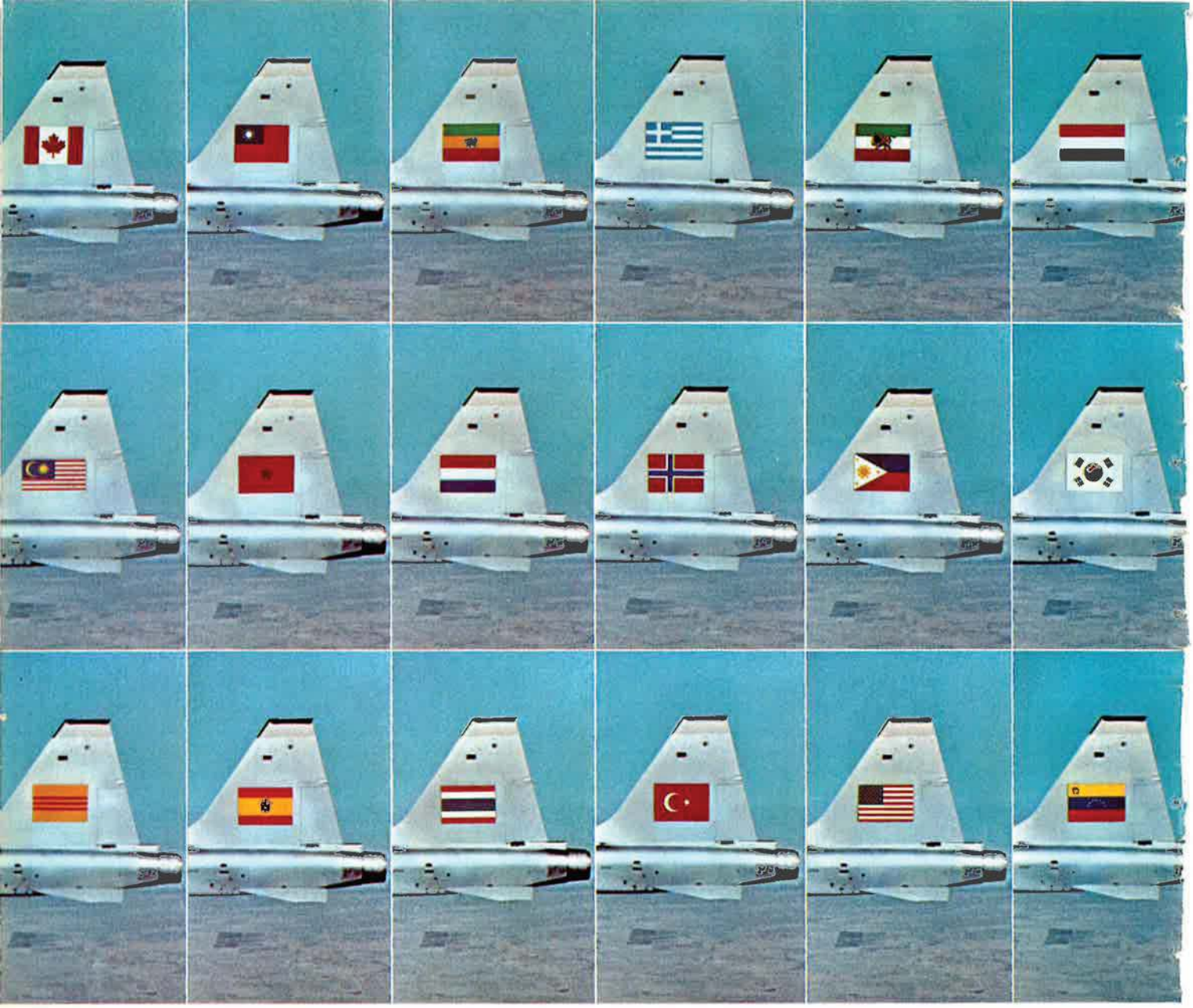
MAGAZINE



A Look Behind the Soviet Technological Curtain...

Soyuz spacecraft and launcher on a special rail transport.

USAF'S NEW LEADERS:
Air Force Secretary
John L. McLucas
and
Chief of Staff
Gen. George S. Brown



They tell our tale.

The tails of eighteen F-5 Freedom Fighters. Each representing the air force of a free world nation.

The story is 1,128 F-5 Fighters built so far since 1964. Proven in combat. Praised by pilots. By ground crews. And by the people who budget defense spending.

Because we designed the F-5 lean...precisely for their needs. By applying technology as a creative tool, we simplified. Improved performance. Made the F-5 make economic sense.

The F-5 Freedom Fighter proves our concept works. So do the 450 commitments we already have for the newly-minted F-5E Tiger II International Fighter (right).

And so do the new contenders we're bringing up now: The U.S. Air Force's YF-17. The multi-nation P530 Cobra.

Now, more than ever, the toughest family of light fighters in the world.

Flags shown identify F-5 users and do not necessarily represent actual tail markings of these nations. The countries are, from top left: Canada, Republic of China, Ethiopia, Greece, Iran, Libya, Malaysia, Morocco, Netherlands, Norway, Philippines, South Korea, South Vietnam, Spain, Thailand, Turkey, U.S.A., Venezuela.

NORTHROP

When record altitudes and 24 hours are just one flight,

E-Systems is there.

The E-Systems L450F has set 16 world flight records for piloted turboprop aircraft. It also flies as a remotely piloted vehicle (RPV) and it set flight endurance records for RPVs during Air Force tests. It can be equipped to act as a low-cost communications relaying satellite, to gather earth resources data, photo-mapping the earth, or serving wide-area sentry duty.

The L450F is only one segment of E-Systems' work in the intelligence and reconnaissance field. We also produce systems involving the most advanced multisensor equipment for data collection, analysis, dissemination, and recording; in airborne, shipboard, ground portable, or fixed ground station configurations.

Exciting as it is, this remarkable airplane is only one example of E-Systems multi-faceted capabilities in:

- Intelligence and Reconnaissance
- Command and Control
- Electronic Warfare
- Communications
- Guidance and Navigation
- Aircraft Overhaul and Modification
- Commercial and Industrial systems

Find out how we can help solve your problems. Write for our Corporate Capabilities brochure: P.O. Box 6030, Dallas, Texas 75222.

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We solve problems...systematically.

Melpar · Garland · Memcor · Greenville · Montek · Donaldson · Eagle Transport Co. · ESY Export Co. · TAI, Inc.

Within this simple shape 32 nations found the world's most versatile airlifter.

It carries cattle in Colombia. Bulldozers in Brazil. People in Peru. In other versions it's America's leading tactical transport: troop carrier, tanker, mapper, rescue plane, and an aircraft of many other missions.

Its labors are varied and immense, as befits a plane built in 45 models and named Hercules.

Some use it to hunt icebergs. Or seed clouds. Other models carry the commerce of industry, even pipe 60 feet long. Abroad Hercules serves as a country builder, hauling 45,000 pound loads to remote areas closed to other aircraft, landing on very short rough runways in only 2100 feet. Then trucks and tractors rumble down its low ramp ready to use. Generators and portable hospitals slide out of its huge rear door. In jungle, desert and mountain areas, Hercules helps countries carve out farmlands and build new cities.

Even the Antarctic is home to Hercules. There it changes wheels for skis at the flick of a switch. About the only thing this master of many missions hasn't done is land on water. But it could. The 46th model could be an amphibian.

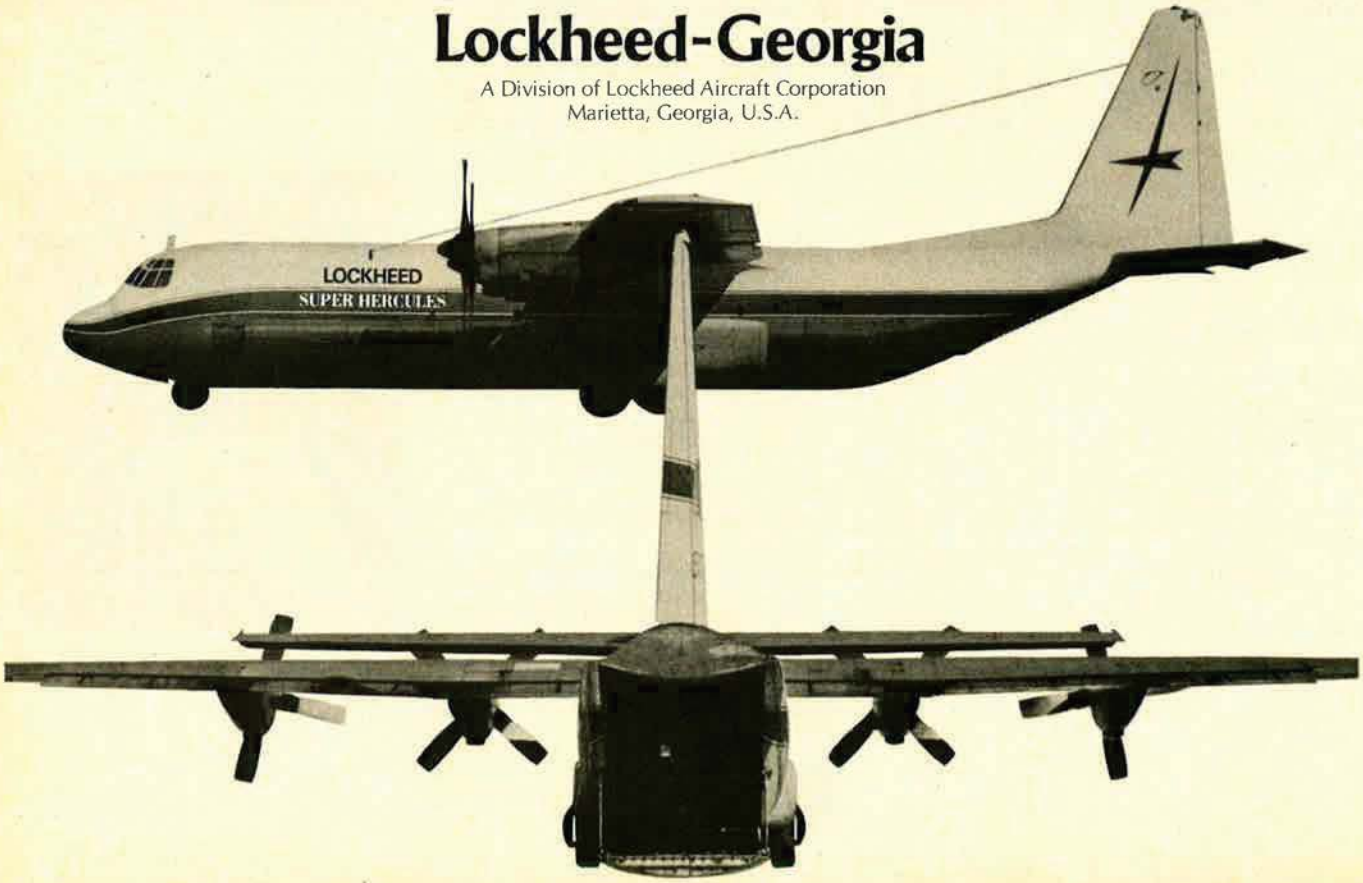
Because it fills so many needs, other countries have bought more than $1 billion of these workhorses.

Thus far 1200 have been built and new versions of this amazing airlifter continue to roll off Lockheed assembly lines in Georgia.

Hercules, a great American success story from the airlift capital of the world.

Lockheed-Georgia

A Division of Lockheed Aircraft Corporation
Marietta, Georgia, U.S.A.



AIR FORCE MAGAZINE
PUBLISHED BY THE AIR FORCE ASSOCIATION

VOLUME 56, NUMBER 8

AUGUST 1973

THIS MONTH'S COVER . . .

The Soviet Union's Soyuz booster is shown on its transporter. This launcher can also be used for military payloads. A special report on Soviet aerospace programs begins on p. 24.

THIS MONTH

THE DEPARTMENTS

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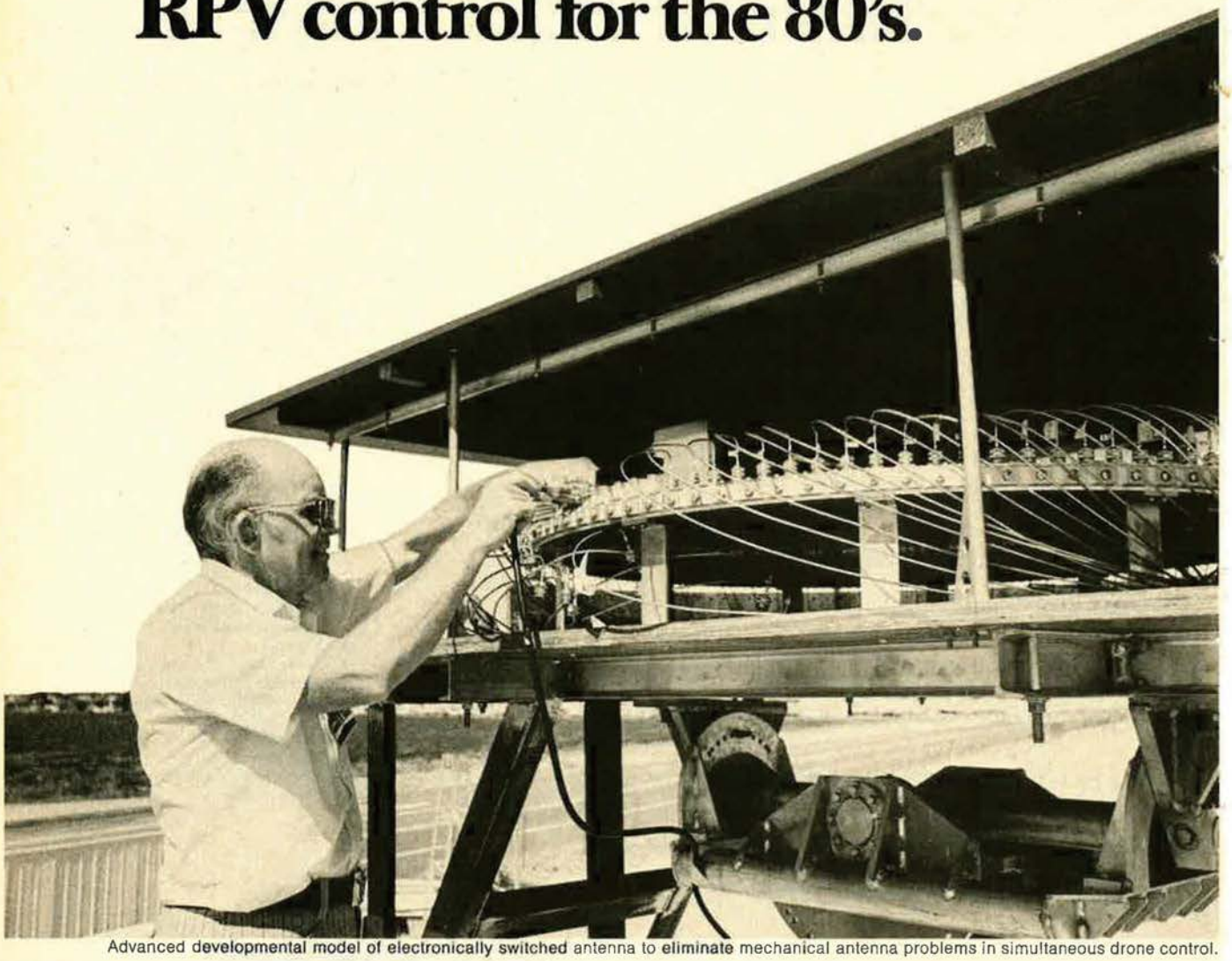
CHALLENGE:

Convince you of the truth. Motorola RPV control for the 80's.



Advanced developmental model of electronically switched antenna to eliminate mechanical antenna problems in simultaneous drone control.

We have a solution to the problem of sending a Remotely Piloted Vehicle into an environment too hostile for man. No boast. We've developed the technology that defines the state of the art, built over 80% of the hardware, and delivered a warehouse full of equipment. For a start:

Only one system has actually simultaneously controlled multiple drone missions successfully.

Ours. At Pt. Mugu, AN/USW-3–the only up-to-date integrated system and the only one with proportional control designed in from the beginning–has controlled multiple drone flights, plus exercised tracking and control at over 250 miles.

Unlike some "full control" systems that will have to leave a bird untracked, uncontrolled and unknown for five seconds or more due to their limited data processing rate, our system checks each drone in a four vehicle formation 15 times a second. At Mach 1, that means our maximum distance between check-ups is 61 feet. Theirs is 4500 feet. It isn't important...unless you're involved in recon, ECM, defense suppression, drone recovery, or flying from a range in the U.S.

This multi drone control station is already in military use.

The "secret" behind this is the highest data rate in the business, operating at 90 frames a second, pumping 17 words per frame, with a false command probability of 10^{-11}. Your slide rule will verify that 10^{-11} works out to no more than one false command per year

is furthest ahead with

if you stay in operation 24 hours a day, 365 days a year. Of course, with a mechanically scanning antenna system, our theoretical data rate wouldn't be worth anything in the tactical world. Therefore...

We're getting rid of mechanical antennas.

It isn't a paperwork dream. Right now we're building our second electronically switched antenna. The first one worked fine, and proved our theories were right. Now we're building one to meet drone control requirements. First tests have been completed.

As usual, it's something new from conservative old Motorola. We just "happen" to have years of experience where other people are just getting their feet wet, so we end up looking conservative. Our aim is to keep looking conservative with equipment that works every time you press the button. Like our multiple drone control software that actually worked like it was supposed to, controlling tracking systems, deciding who gets commands when, which console gets which display, organizing displays and computing X-Y plots for multiple drones.

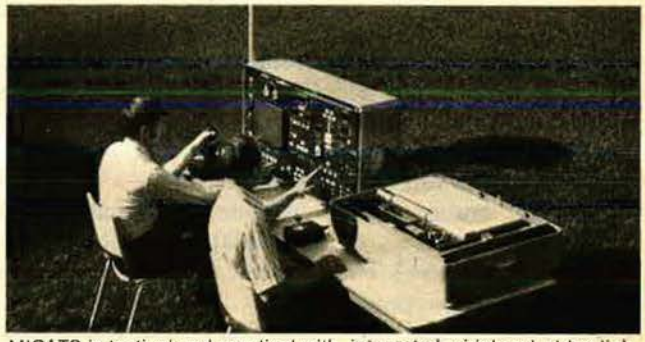
If that isn't enough, take a look at what we did in our spare time:

The first tactical mini-drone control for the 80's.

We're turning technology into hardware. Now. Thus far we've built a low-cost system complete with video link that has been integrated into a mini-RPV that will fly at 60 knots over a 15-mile range. And it fits into three footlocker sized boxes that weigh no more than 140 pounds apiece. Now we're improving the tracking and making it automatic plus sending the boxes to Weight Watchers. It'll end up four boxes, each under 125 pounds, that can be set up in 20 minutes. It's the first mini-RPV control system that's integrated, up to date, and practical. And it's all three. It's the first RPV control system actually designed for tactical use, to provide field level intelligence or artillery spotting through a forward observer with keener eyes and fleeter feet than any man.

And we did it on our own.

We had the control technology. DoD has already aid for it and we're in business to make a living, not a killing. So we didn't try for a contract that would make them pay for it twice. The wideband video link technology came from the space program where we've had years of experience. We built our first drone control system with anti-jamming devices back in the early 60's for



MICATS is tactical and practical with integrated wideband video link.

over-the-horizon use, and we're now investigating anti-jam for MICATS.

Some of our engineers just built the MICATS... with Independent Development Program funds. It's an offshoot of our continuing program that's stepping back from day-to-day headaches to investigate the future of RPVs in the 80's, the 90's and as far as we can dream.

Motorola combat surveillance drone test in the late 50's.

Challenge us.

Do us a favor. If, after reading about all this good stuff, you don't honestly believe we're further ahead with RPV control than anyone else, or if you feel we've overstated our case, call (602) 949-3181 or drop a line to Charles D. Deyerle at Motorola Government Electronics Division, 8201 E. McDowell Rd., Scottsdale, AZ 85257. We promise not to send you a canned answer or a big pitch. Tell us why or what you don't believe and you'll get the numbers, dates, references, or whatever else is needed to win you over.

Because unless you're convinced, our job of providing tactical RPV control can't be done.

MOTOROLA

. . . new thinking in electronics

An Editorial

Sunshine and Overcoats

By John F. Loosbrock
EDITOR, AIR FORCE MAGAZINE

IN A not-so-very-difficult context, some twenty years ago, a wise and experienced Secretary of Defense named Robert Lovett said about détente:

"You don't take off your overcoat in Washington every time the sun shines in Moscow."

A sage observation in its time, but what happens when the sun seems to be shining in Washington, as well as in Moscow? The overcoat market turns bearish —that's what happens.

In point of fact, the metaphorical sun, which seems to many to be shedding the warming rays of détente on both great capitals, is not really a sun at all. It is more like a giant spotlight, which illuminates without warming and lights only those parts of the scenery that the audience is supposed to see.

On today's stage, the spotlight is on negotiation, trade agreements, relaxation of tensions, and an end to the cold war. The problems, that is to say the threats—be they military, technological, ideological, or economic—have been relegated to the shadows. It may not even be too farfetched or facetious to surmise that Mr. Brezhnev has taken a leaf from the book of the losers in World War II, who have emerged in the long run as economic victors. By crying "King's X" in the cold war, he may be thinking, the Soviet Union may reap some of the loser's benefits, which the United States historically has generously bestowed on erstwhile opponents.

The grain deal is only for openers. We are talking about a continuous arrangement for agricultural cooperation; we are talking about increasing trade and technical cooperation subsidized by easy credit; we are talking about mutual, but now not necessarily balanced, force reductions in Europe; we are talking a lot of *quids* with damned few *quos* and, in the process, are repolarizing the world.

Our NATO allies must be confused, if not disheartened, as they face the prospect of being neutralized willy-nilly. In the long run, the Soviet Union then could concentrate its military efforts against the threat from Red China while engaging, at its own pace and convenience, in political and economic competition with the West. In this context, Mr. Brezhnev's visit would seem to have been a profitable one. What we got out of it was a week's vacation from Watergate.

It is clearly not the easiest of times to be in the overcoat business in the United States.

Hence it is that we can welcome without envy the new leadership that has taken the reins in our field of paramount interest—the United States Air Force. It is unusual, perhaps unprecedented, to be greeting, at the same time, in effect, both a new Secretary and a new Chief of Staff. But new may be largely a euphemism.

John McLucas has been both Under Secretary and Acting Secretary, and his involvement in defense matters covers a span of thirty years, including active military duty as well as service in industry and government. He brings a wealth of management, technological, and scientific experience to a job which, among the three services, places the highest premium on such experience.

Likewise, George Brown carries impressive credentials into the top blue-suit slot in the Air Force—a balanced blend of operations, staff, management, and command seasoning, including a heavy dose of service in key Pentagon staff posts. His last three assignments, in order, were as Assistant to the Chairman of the Joint Chiefs; Commander, Seventh Air Force in Southeast Asia; and Commander, Air Force Systems Command. It would be hard to devise a better prep course for the Chief's job.

Together the new team inherits some formidable assets—a truly professional force of high-quality people and a vast reservoir of know-how—both technical and operational. And they inherit some formidable problems relating to these assets—the getting, training, and retaining of good people, the developing and procuring of desperately needed new hardware, and the maintenance of high operational efficiency in a peacetime environment—and all these from financial resources that are taking up an ever-shrinking fraction of both the federal revenues and the Gross National Product.

Which brings us, if you will, back to the subject of sunshine and overcoats.

For underlying the more or less parochial problems outlined above is the deeper, more pervasive, less solvable problem of national attitudes, will, and political climate. The Air Force, after all, is a tool of national policy, and a tool must have a purpose and a use or it becomes, not a working instrument, but a museum piece. And the usefulness and the purpose of the Air Force, as well as its claims on public resources, come back inevitably to the size, the nature, and the immediacy of the threat that it must counter. There is no evidence that the threat is declining. There is plenty of evidence that it is growing. But the spotlight is on détente. The threat is in the shadows.

But it is there. This magazine has expended a great deal of time, effort, and money in documenting the threat. We will continue to do so. For it is here, we firmly believe, that Secretary McLucas and General Brown will find their biggest challenge. ■

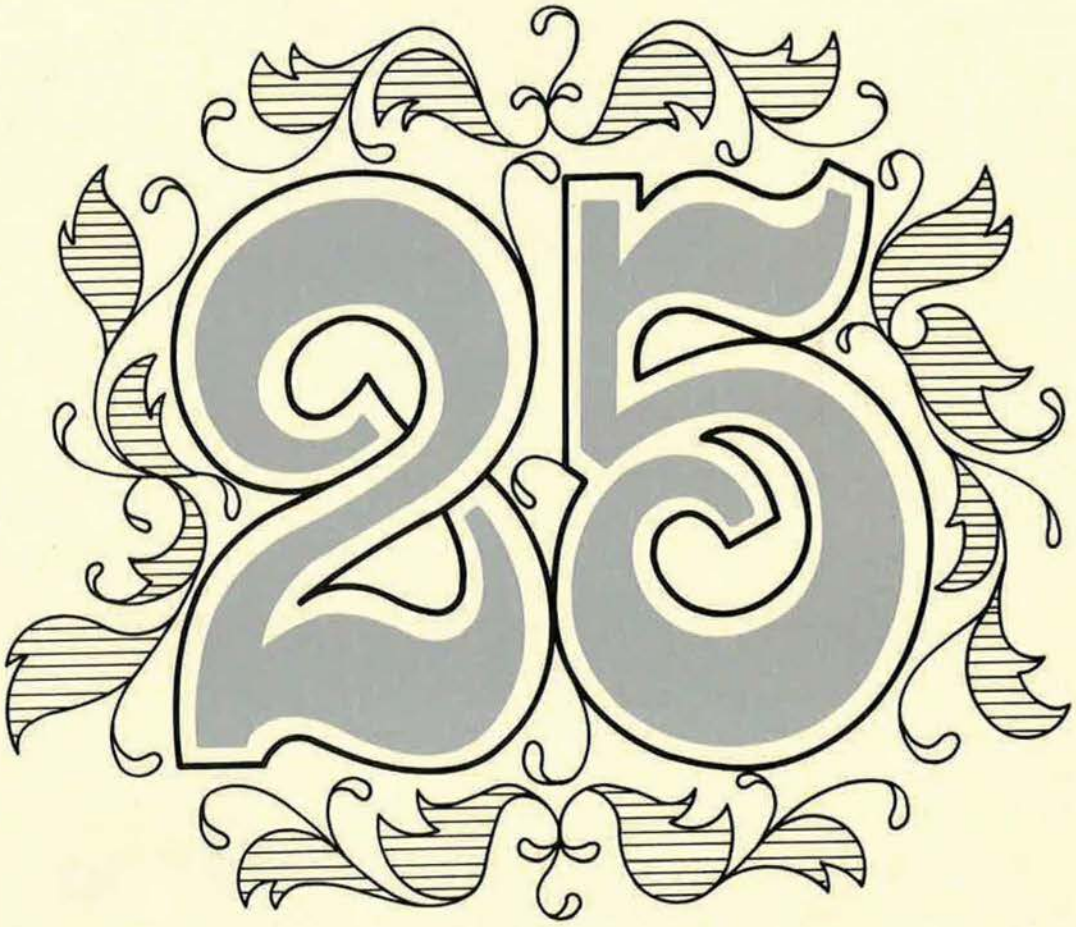
First we put our Projected Map System aboard the A-7

We knew our Projected Map System was good. After all, it was among the very first major avionics sub-systems to become fully qualified for the A-7D/E. But now, with hundreds of thousands of flight hours behind it, we find the PMS is being called the most effective interface between pilot and navigation system ever devised. Just ask the men who fly the A-7 about our PMS. They wouldn't leave the deck without it.

With its outstanding performance aboard the A-7D/E our Projected Map System becomes the obvious answer to low level, night, VFR and IFR radar navigation problems. We also have under development advanced integrated navigation systems that promise to be even more effective in reducing pilot workload and improving mission flexibility. If you would like to have more information about our navigation systems capability, write Avionics Marketing, Computing Devices of Canada Limited, P.O.Box 8508, Ottawa, Canada K1G 3M9.

Then the A-7 put us on the map!

Computing Devices of Canada Limited
a subsidiary of
CONTROL DATA CORPORATION



America's biggest solid rocket celebrates its Silver Anniversary flight.

Recently at the Western Test Range, a booster stage providing 24 million pounds of thrust lifted a Titan III launch vehicle toward space for the 25th consecutive time. Without a single failure.

And since each of the 25 stages utilized two giant rockets, 50 motors have now flown successfully. That makes it a Golden Anniversary, too.

These huge solid rockets were designed, developed and produced by United Technology Center. They're the only solid rockets of over a million pounds' thrust that have ever been flown. And the only solid booster rockets that have been qualified for manned flight.

UTC provided the rockets, the electrical and ordnance systems, thrust vector control, and the attach structure. In short, the complete stage.

These rocket stages have been in production at UTC since 1965. The UTC plant is the only operational facility in America producing large solid rockets of over a million pounds' thrust.

This on-going record of achievement can provide assurance of the future success of our space program.

United Technology Center

DIVISION OF UNITED AIRCRAFT CORPORATION

SUNNYVALE, CALIFORNIA 94088

Airmail

Change in Career Pattern

Gentlemen: While the current controversy pictures the DoD retirement plan as revolutionary, I feel that it is only an interim measure—too little, too late [re Ed Gates's "Revamping Retirement Pay," May issue]. As I see it, our entire career pattern needs revamping.

One of the points of the DoD plan is that "normal" retirement is in the early sixties. Yet, we in the military plan our lives around retirement in between the early forties and fifties, which is far too early for a permanent retirement. Retired roles (and hence costs) can only grow with retired life expectancy exceeding career life. A retirement after twenty leaves about thirty years of life on the retired roles and at least twenty fully productive years that the military could use.

To accept this proposal, we must first agree that our leaders no longer have to fight physically as they did in past centuries, but are employed as managers and directors (*e.g.*, AANCP, AWACS, RPVs). However, even more so than our civilian leaders, we must insist on being fit, lean, sober, and moral—and removing those who aren't. To those who feel that a man of fifty-five is over the hill, I point to our civilian airline pilots, who fly to age sixty, and to most of our corporate leaders, who hardly retire at forty-two.

My proposal is that the career be lengthened to a thirty/forty-year span (optional to those already on board). This would allow retirement approximately concurrent with Social Security, reduce the time on the retired roles to twenty/ten years, keep our experience in and, therefore, get a greater return on our training investment.

Naturally, changes to this fundamental would have associated problems, not the least of which are promotions and progression. Promotion phase points would have to be increased by a factor of fifty percent; however, with the added incentive of increasingly responsible jobs for the junior grades, the promise of a lifetime career, additional fogies, and the admittedly tradition-rending idea of adding additional grades (*e.g.*, dividing captaincy into upper and lower: double gold and silver bars?), I feel that morale could be maintained.

To make the system work (the present one for that matter), the promotion system would have to move away from promotions by seniority to promotions by merit. An easy way to obtain this would be to drop the selection rate at the phase points and use the additional slots to select more fast burners further below the zone (*e.g.*, dropping the major selection rate from ninety to fifty percent and using the extra forty percent in BTZ [below the zone] picks three to five years deep). This civilianization would improve top management, boost morale, induce a better grade of volunteers, and improve the military in the public's eye. There would also have to be a very strong power to eliminate deadwood, but not to be confused with "up and out." I see no crime in doing your present job well, but not being suitable for the next higher platform: The Peter Principle is alive and killing us.

These suggestions, if implemented over a suitable time frame, could do much to improve the military and reduce the staggering retirement costs while giving the individual a challenging, lifelong career.

Capt. Arthur L. Harrell
San Diego, Calif.

Now About That T-33/F-94

Gentlemen: I looked with surprise at the picture of the T-33 shown in your "Gallery of USAF Weapons" in the May 1973 issue, as I'm sure most pilots who have flown T-33s did. The airplane shown is no ordinary T-33, but is a research test-bed used by the Air Force Flight Dynamics Laboratory at Wright-Patterson AFB, Ohio.

The airplane has been modified, as can be seen in the picture. The tip tanks contain clamshell drag-producing devices that can be operated in flight, and the elongated F-94 nose contains an analog computer and data recording equipment. Special sensors and electro-hydraulic control surface actuators complete a variable control system.

The airplane is used to simulate the flight characteristics of other aircraft. Controls in the front cockpit cause the airplane to respond to the motion of the simulated airplane. Their inputs are electrically connected to the control surfaces through the computer. A safety pilot flies in the rear seat where he can take over control of the normal T-33 by disengaging the computer system. He can also change the simulated characteristics in flight by changing gain settings on the potentiometers located there.

This T-33 has been used for over fifteen years in research programs to help define flying qualities and design criteria for modern fighter airplanes and has been used to simulate specific airplanes and flight vehicles.

It was used, for example, to evaluate characteristics of the F-15, X-15, and the M-2 lifting reentry vehicle during their development. It was also used in evaluating A-9 and A-10 characteristics in air-to-ground weapon delivery prior to the A-X fly-off. The T-33 you pictured is a very versatile test-bed that has served the Air Force for these many years and will continue to do so in the future.

James R. Pruner, Group Leader
Airborne Simulation & Research Group
Flight Research and Test Branch
AF Flight Dynamics Laboratory
Wright-Patterson AFB, Ohio

Laos MIAs

Gentlemen: Reference the "MIA/POW Action Report" in the May issue. My husband is MIA in Laos, and I take exception to the whitewash article regarding accounting for men who are listed missing in action. Perhaps you were not given all the true and alarming facts.

First, the operation of the Four-Party Joint Military Team pertains only to North and South Vietnam. Never mind the agreements signed in Paris set forth terms for a united effort to locate and search all crash

Airmail

and grave sites throughout Indochina. From all appearances, our servicemen missing in Laos and Cambodia will remain deserted.

According to the Defense Department, the subject of accounting for MIAs in Laos is fully considered in the negotiations that are under way between the Pathet Lao and the Royal Laotian government. I find "considered" to be a very weak position, if it is one at all. Of course, the State Department still takes the position that they hold North Vietnam responsible for men lost in Laos. We were told for years the Pathet Lao would follow North Vietnam in treatment of prisoners, in release, etc.

Next, our country will provide the enemy with all necessary information known to us to assist them in difficult cases. In turn, we will secure appropriate documentation, whenever available, and arrange for return of remains, etc., if available. We have been well informed that in determining status of MIAs, this action is not contingent on reaching a crash site or recovery of remains. Give me the case files and I can write up a report of death. I believe this is a move so our government can say they accounted for all MIAs. If this is in line with our country's belief of liberty and justice for all, and every man is of value, I wish someone would explain the true meaning so I can tell our children.

The name of the current game in the Defense Department is "Determined and Presumptive Death," with little, if any, regard for the fact that some MIAs may be alive. For seven years our family has heard beautiful rhetoric, seen no action for prisoners in Laos, and experienced firsthand dishonesty of so-called experts. In almost every briefing, if we had done the opposite of what we were advised, perhaps the prisoners in Laos would have had a chance.

Mrs. Russell D. Martin
Kirksville, Mo.

Misplaced Air Stations

Gentlemen: I'm sure you've received several notices of the errors on page 170 of the May issue. I refer to the "Guide to Air Force Stations" — Calumet, Port Austin, and Sault St. Marie Air Force Stations are in *Michigan*, not in Minnesota.

A great issue, this annual Almanac, and I greatly enjoy each one.

Lt. Col. C. L. Chilton, Chaplain, USAF (Ret.)
Phoenix, Ariz.

Brass Pounders

Gentlemen: The Society of Wireless Pioneers (dedicated to the men who "went down to sea in ships" as wireless telegraphers and all those who have earned their living "pounding brass" as wireless or radio ops since the days of Marconi) is attempting to locate men and women who have been, or are, C/W radio operators.

There must be thousands who were in the AAF or USAF, graduating from such schools as Sioux Falls, Scott, Truax, Chicago, and Keesler.

The Society would greatly appreciate hearing from them.

John N. Elwood
Vice President
Society of Wireless Pioneers
P. O. Box 530, Dept. A
Santa Rosa, Calif. 95402

Lost Patches

Gentlemen: For some time I have been collecting patches representative of units in which I have served since 1942. However, in the many moves that have ensued, I have lost or misplaced several of the more important ones.

I wonder if some readers might be able to help me obtain a World War II Eighth and Ninth Air Force and a Military Air Transport Service patch. I have nothing to trade but will be willing to pay a reasonable price for them.

Col. William H. Rice, Jr.
PSC Box 326
435th MASWg (MAC)
APO New York 09057

JTB-29

Gentlemen: I would very much appreciate hearing from anyone who was associated in any way with the series of tests with the X-17 missiles that were air-launched from a JTB-29 (YB-29J), Serial No. 44-86402, in 1959, at Holloman AFB, N. M.

My major interest is in the aircraft rather than in the missile. As such, I am particularly interested in corresponding with former crew members who flew this plane during its entire life span. Any mission descriptions, comments, or photographs would be most helpful to a historical project for an aviation museum. All loaned materials will be carefully handled and returned in good condition.

Finally, congratulations on your May issue—it is the finest you have ever produced.

Robert White
P. O. Box 144
Bellevue, Neb. 68005

The *Lady Be Good*

Gentlemen: I would appreciate hearing from anyone with information concerning the *Lady Be Good*, the B-24 found in the Libyan Desert in 1963. I have some information and would like to share this with other interested parties.

This is really a fascinating story.

Charles R. McCreight
725 Lewis Rd.
Sumter, S. C. 29150

UNIT REUNIONS

Victorville Flying School

A reunion is being planned for late in 1973 for all World War II and Korean War vets who were stationed at Victorville Flying School. Please write to

MSgt. Bill Young, USAF (Ret.)
34237½ Avenue F
Yucaipa, Calif. 92399
Phone: (714) 352-2905

3d Tac Fighter Wing

The 1973 reunion of the 3d Tactical Fighter Wing will be held September 14–16 in Kansas City, Mo. Richards-Gebaur AFB transient aircraft facilities will be available. Contact

Lt. Col. Jack Doub
181st Tac Fighter Group (ANG)
Hulman Field
Terre Haute, Ind. 47803

36th Fighter Group

The WW II 36th Fighter Group, 9th Air Force, Europe, will hold its first organized reunion in Columbus, Ohio, October 12–14. Contact

Bill Shisler
1870 Tamarack Circle, N.
Columbus, Ohio 43229
Phones: (614) 469-4201 (day)
885-7079 (evening)
or
Bill Holyfield
Rte. 4, Box 475
Mobile, Ala. 36609
Phones: (205) 473-0311 (day)
661-2997 (evening)

SCIENCE/SCOPE

A contract for seven Audio Distribution Systems for the U.S. Air Force's AWACS (Airborne Warning and Control System) was recently awarded by Boeing to Hughes, who also furnished options for up to 100 production systems. Using advanced electronic devices, including MOS/LSI technology, ADS is extremely lightweight, requires low power, permits modular growth, minimizes aircraft interconnection wiring, and effectively eliminates crosstalk between channels.

Six out of seven Roland missiles were successful during recent tests conducted by the U.S. Army. Vehicle-mounted Roland, which defends against low-flying aircraft, is being evaluated along with two other European missiles, Crotale and Rapier. During the tests, more than 600 passes were flown by airborne targets ranging from hedge-hopping helicopters to supersonic F-111 fighter bombers. Roland was developed by Aerospatiale of France and Messerschmitt-Boelkow-Blohm of Germany. Hughes and Boeing Company have the U.S. production rights.

A new management tool for improving performance and lowering total life cycle costs of complex hardware systems, developed by Hughes, is called CREDIT (for Cost Reduction Early Decision Information Techniques). Using advanced statistical techniques and mathematical models to link initial basic causes to probable future failures, it enables management to achieve a specified reliability at lowest possible cost. CREDIT makes it possible to evaluate tradeoffs among specific modifications in design and manufacturing that will return predictable major reductions in field maintenance and total life cycle costs.

A Phoenix missile, launched at a record range of 110 nautical miles by a U.S. Navy F-14A Tomcat fighter, recently scored a hit against a supersonic target drone with its radar cross section augmented to make it appear as large as an enemy bomber, during tests at Pacific Missile Range, Pt. Mugu, Calif. The high point of the missile's trajectory was over 100,000 feet. No other known air-to-air missile has ever flown so far and so high and intercepted its target. The F-14A's AWG-9 weapon control system began tracking the target, which had an on-off blinking noise jammer, at extremely long range. Hughes builds both the Phoenix missile and the AWG-9 system.

A 50-percent reduction in the size of airborne computers has been realized by using the full wafer T^2L bipolar high-speed LSI circuits now being manufactured by Hughes. Two of the 1½-inch-diameter wafers form 80 percent of the arithmetic and control function of a high speed digital computer. The new multilayer pad relocation technique adds four insulation and metallization layers on top of the basic silicon wafer and makes functional interconnections by means of a logic routing mask and a computer-generated pad relocation mask which locates the desired cells. The results are reduced manufacturing cost, higher yields, and greater reliability.

TV-guided Maverick missiles launched from an RPV (Remotely Piloted Vehicle) scored direct hits on ground targets while controlled by pilots on the ground during recent tests. The air-to-ground missiles, built by Hughes, were launched from the U.S. Air Force's new BGM-34B jet drone. Under actual combat conditions, RPVs would be launched by a "mother" aircraft and recovered in flight by helicopters.

Creating a new world with electronics

HUGHES

HUGHES AIRCRAFT COMPANY

Airpower in the News

By Claude Witze
SENIOR EDITOR, AIR FORCE MAGAZINE

The August 15 Bombing Halt

Washington, D. C., July 5

In this week's issue of *Newsweek,* readers find eleven pages devoted to the Watergate scandal. There are three pages of news about how détente is sweeping Europe. The Nixon Administration defeat on the issue of bombing in Cambodia rates only a page. The editors cannot be faulted. Their evaluation is that of the country.

The *Congressional Record* of the last week in June, the days flanking President Nixon's June 27 veto of the ban on air war, tells the story of the great test. The White House was challenged and lost. Senate Majority Leader Mike Mansfield cried out after the veto that the Senate would add the prohibition to other bills "again and again and again until the will of the people prevails." The outcome, giving the White House until August 15 to ground its airpower, was called a compromise, but it was not.

The truth is that on June 27 our government was deadlocked. The first realist to surface, that same day, was Melvin R. Laird, former congressman, former Secretary of Defense, and now domestic adviser to the President. Mr. Laird said he thought the President would veto any bill that contained an immediate ban on bombing. But, knowing Congress better than his predecessors of Watergate fame, he hinted that a ban taking effect later in the summer might be acceptable.

At the moment, President Nixon's power to garner votes on Capitol Hill was low. In the floor debate, there were sound arguments offered for not forbidding the President to carry on the air war if he considered it necessary. Despite the history of how airpower, defanged for many years of the Vietnam War, finally forced Hanoi to talk peace, the arguments could not prevail.

One congressman, Rep. Robert L. F. Sikes of Florida, warned on the floor that the Nixon-Brezhnev agreements, announced days earlier, really skirted the Indochina question.

"We find nothing which says Brezhnev will use his power to bring hostilities to an end in Indochina," Mr. Sikes said. "The fact that there is no such written understanding should make it clear that the search for peace is to be on Soviet terms and by what means they choose to pursue."

Certainly there was no effort by the US to persuade the Russians to cut their aid to North Vietnam or remove the SAM missiles they have shipped to Indochina, along with personnel. And there is no Parliament in the Kremlin that can shut off funding. Mr. Sikes made this clear:

"Mr. Brezhnev may not have sufficient influence with North Vietnam to induce that country to forego the use of force in its goal to overrun all of Indochina. But his country is the principal supplier to North Vietnam, and as the principal supplier, he assuredly can influence the nation's policies."

So far, he said later, Russia has accepted the fact that we will not abandon Indochina. He warned Congress that it can "totally undermine what has been accomplished through military might and through diplomacy in ten grueling years by voting today to stop the residual American military action which is taking place there."

But the move to snatch defeat from the jaws of victory rolled on. The case was put by many members of Congress. One was Rep. Joseph P. Addabbo of New York, who said frankly he wanted to tie the hands of the President.

"Is there one person in this chamber who would not do it differently if we now had the Gulf of Tonkin resolution before us again?" he asked. "At times, the Congress must assert its rights. This is such a time. More than any body of government, we in this House represent the will of the people, and that will has been clearly expressed: no more war.

"We have given our word to the people there will be no more war in Cambodia by American fighting men. The world has looked upon that House action and will be watching what we do here today. We must remove the funds so necessary to further bombing."

It is not necessary to review the gyrations of the legislative mill in late June that led to the ban. On the last day of the month, the eve of the new fiscal year, it was essential to provide supplemental financing, because no money yet has been appropriated for Fiscal 1974.

The bombing ban was attached as an amendment. It passed the Senate by a voice vote and was approved in the House, 266 to seventy-five.

It is not easy to tell why an individual congressman voted the way he did. The appropriations portion of the bill was essential legislation, and it is not easy to vote against it, despite the fact that Mr. Nixon him-

Here is the text of the amendment cutting off all funds for US combat activities in Indochina as of August 15, as finally approved by Congress:

Notwithstanding any other provision of law, on or after Aug. 15, 1973, no funds herein or heretofore appropriated may be obligated or expended to finance directly combat activities by United States military forces in or over or from off the shore of North Vietnam, South Vietnam, Laos or Cambodia.

—Sanders in The Milwaukee Journal, with permission

"It looks like our pet hawk has flown the coop."

self had vetoed the measure once because of the bombing ban. There were a few liberals, such as Bella Abzug of New York, who voted nay because the cutoff was not ordered at once, instead of August 15. The members of the House Armed Services Committee showed support for the legislation. Twenty-four of them voted for it, and only six voted nay. Thirteen were listed as not voting.

The outcome was hailed in the expected places. The Washington *Post* said, "Congress won an immense victory," which was true, and accused the President of overstating his case when he warned that the ban would harm our credibility.

"The overstatement reflected more an obsession with Presidential power than a considered judgment of the real diplomatic stakes, and Congress rightly would not swallow it," the *Post* opined.

The New York *Times* said the ban "reverses a long-time trend toward unilateral Presidential initiatives in defiance of constitutional procedures, not only in Indochina but around the globe." The newspaper regretted "that the antiwar forces were compelled to compromise their efforts to achieve an immediate end to the bombing of Cambodia."

Time will tell, but it is hard to believe the end product will be any good. If the North Vietnamese now open a massive military effort to conquer its neighbors, certainly the frail peace agreement will be shattered. If this happens, it will be because the US President lacks the only real deterrent he can use in a suddenly developed volatile situation. Congress, of course, can change its mind, as it did in reverse about the Tonkin Gulf resolution, but it is not likely they will do it for this President.

The most optimistic possibility is that there will be no massive Communist effort in South Vietnam, and that the army and air force we readied there can hold the country. Few really believe this will happen. As for Cambodia, there is no optimism. Sam Adams, identified as a recent CIA analyst of Cambodian and Vietnamese Communists, has written in the New York *Times* that Phnom Penh will fall quickly, now that the bombing is ending. He says the Communists are far more powerful in Cambodia than the US realizes, or will admit, and blames this on mistakes made by our own intelligence experts.

What has happened in regard to the military situation in Indochina well may have its diplomatic counterparts looming in Europe. At Helsinki, the Conference on Security and Cooperation in Europe got under way this week. It started with a proposal for a new charter for relations among the states, designed by Andrei A. Gromyko, the Soviet Foreign Minister. His nation's announced purpose, from many years back, is to weaken NATO and stimulate US withdrawal. In pressing for détente, the goal now appears to be a legitimization of Russia's conquests in Eastern Europe. When this is over, the Czechoslovakians and Hungarians presumably will sleep better. To that end, Mr. Gromyko's plea is that the cold war is over and it is time for all to agree to "refrain from rendering political, military, economic, or any other aid and assistance to any state or states committing acts endangering international peace and security." Throwing rocks at Russian tanks certainly falls in that category, as it did in 1956.

The Helsinki meeting is more or less ethereal at this moment, but it bears close watching. At Geneva, there is another parley under way that may be more menacing. It is the new round of SALT talks. Last year, you should remember, there were a couple of one-sided accords worked out that curbed defenses against ballistic missiles and paved the way to ensure Soviet parity, if not superiority, in strategic strength. We did, largely through the efforts of Sen. Henry M. Jackson, say we were going to insist on equality.

Now there are rumblings that the qualitative advantage we thought we could maintain may be bartered away. Public discussion has been held to a minimum. This reporter's efforts to ask questions in the Pentagon were turned away—at the end of June—with the statement that the Defense Department has been forbidden to discuss prospects.

Rep. Floyd D. Spence of South Carolina, a member of the House Armed Services Committee, has raised the subject on the floor in a speech that was ignored by the press gallery. The date was June 7.

Mr. Spence says the rumblings that have reached his ears say the US is advancing proposals at SALT

"which would have the effect of disastrously limiting the US multiple warhead missile programs—including the Minuteman III missile, the Air Force land-based ICBM, the Navy's submarine-based Poseidon, and the yet-to-be deployed Trident submarine-launched ballistic missile. Efforts appear under way to reach an accord on the limitation of at least some portion of our multiple independently targeted reentry vehicles —MIRVs—the very heart of our technological superiority over our Soviet adversaries—in conjunction with the [then forthcoming] Brezhnev visit."

The congressman repeated rumors, now current in Washington, that the Pentagon is studying means by which contracts can be canceled. "It is time," he declared, "for the Congress to get some straight answers about what is going on in Geneva." He quoted Adm. Thomas Moorer, Chairman of the Joint Chiefs, as testifying that last year's SALT agreements were viable only if we moved ahead with the MIRV and other improvement programs.

Mr. Spence posed a half-dozen questions, constituting a challenge for any genuine investigative reporter who seriously believes the public has a right to know, particularly when survival is involved. Essentially, these are the questions:

1. To what extent is the US proposing limitations on MIRV deployment?
2. Are our proposals consistent with last year's Jackson amendment?
3. What effect would our proposals have on the strategic balance of power?
4. How would the resulting change in our nuclear forces affect our ability to meet our NATO obligations?
5. To what extent will we receive concessions from the Russians, or to what extent are our proposals unilateral?
6. What effect would the proposals have on our ability to meet the Soviet threat anticipated in the late 1970s and 1980s?

The congressman says he has asked Senator Jackson to conduct an investigation. Senator Jackson's staff, like the Pentagon officialdom, maintains silence. The challenge from Mr. Spence is clear:

"I would urge the committee [meaning the Senate Armed Services Committee's Strategic Arms Limitation Talks subcommittee, of which Senator Jackson is Chairman] to call those responsible within the National Security and Arms Control bureaucracy to account for the nature of the accords they seek. It is high time we make certain that the secrecy which justifiably surrounds international diplomacy does not become a means of concealing a negotiating position that would not stand the light of day within the Congress. I feel this is both reasonable and prudent inasmuch as the Congress will be called upon to support any such accords."

It is good that someone in Congress is asking questions.

Before the Cambodian bomb-ban vote, someone should have asked what options will be left to the President with the ban in effect, as it now is. And someone should have asked whether there had been a change of intentions by the North Vietnamese. And someone should have asked who was going to be hurt by a ban on the bombing. Could it be the Cambodians?

It may be demonstrated, a decade from now, that the biggest damage done by the Watergate shenanigans was in the arena of national security, as the predicted constitutional stalemate became a reality because of a situation that never should have existed. It is a melancholy outlook: the idea that clowns in rubber gloves, caught cold in petty thievery, could have impact on free-world security. ■

The Wayward Press

If there is any television show that the industry surely has lived to regret, it must be the 1971 CBS extravaganza, "The Selling of the Pentagon." To bring this up again in this space is not to beat a dead horse. The animal continues to limp along, in poor health despite the kudos injected into it by the media's own veterinarians.

In early June, a freshman congressman from Michigan, Rep. Robert J. Huber, inserted some figures in the *Congressional Record* that refuted part of the basic case CBS was trying to make a couple of years ago. The broadcast, you may recall, took its title from the public-relations effort of the Pentagon. Mr. Huber now has compared that effort with the one made by the Department of Health, Education and Welfare.

"I do not know whether HEW tried harder," Congressman Huber said, "but they are now No. 1 in public-relations budget and personnel. If we take the Fiscal Year 1972, we find that HEW spent $36.2 million on public relations, while the Pentagon spent $25.6 million. . . .

"This is all to say nothing of the fact that the HEW budget now exceeds that of the Pentagon. HEW is expected to spend $93.8 billion in Fiscal Year 1974, while the Department of Defense is expected to spend $78.2 billion. So HEW is No. 1 in budget fat also."

"The Selling of HEW" has not, at least so far, appeared on the listing of TV programs.

Aerospace World

News, Views & Comments

By William P. Schlitz

ASSISTANT MANAGING EDITOR, AIR FORCE MAGAZINE

WASHINGTON, D. C., JULY 6

The Air Force reports that, in June, the first F-111 crew in history flew its 100th combat mission in the aircraft.

While many individual F-111s have flown the magic 100, Capt. Christopher F. Russo, aircraft commander, and 1st Lt. Charles R. Foster, weapon systems operator, were the first team to get that many F-111 combat missions under their belts. *(For a report on the swing-wing aircraft's outstanding battle performance in Southeast Asia, see June '73 issue, p. 22.)*

The two flew the mission from Takhli RTAFB, Thailand, where their unit, the 474th Tactical Fighter Wing, is stationed.

While members of the 429th Tactical Fighter Squadron, Captain Russo and Lieutenant Foster flew the F-111 against targets in North Vietnam during the massive December 1972 Linebacker II bombing campaign *(see editorial in March '73 issue)* and later against targets in Laos. During this tour they chalked up a total of fifty-two missions. After a spell in the States, they returned to Takhli in March of this year and scored the additional forty-eight missions.

"The only difference in flying 100 missions now compared to several years ago," Captain Russo said, "is that now you don't get sent home after you complete them."

In a related matter, Congress is reappraising whether or not more F-111s of either the bomber or fighter versions will be built following the end of the current production run, scheduled for December 1974.

By that time, the Air Force will have in its inventory a total of 543 F-111s and FB-111s. Originally, DoD planned to buy for the Air Force and Navy more than 1,700 of the aircraft, built by General Dynamics Corp., Fort Worth, Tex., but steep cost increases and cancellation of Navy participation precluded that objective.

☆

This year marks the twenty-fifth anniversary of one of the most mind-boggling logistic feats of all time: the Berlin Airlift.

In June 1948, Soviet authorities suspended all ground transport into the American, British, and French sections of the divided city, well within the boundaries of Russian-occupied German territory. Their aim was to starve or otherwise force the Allies to abandon the city.

The Allies responded with a massive airlift, the backbone of which was a fleet of USAF C-54 transports assembled in Europe from air bases all over the world.

All essential supplies were then airlifted into the blockaded city, using Tempelhof Air Base in the US Zone, RAF Station Gatow in the British sector, and Tegel in the French Zone.

The peak of activity during the fifteen months of the airlift, one of the cold war's most dramatic events, came on April 16, 1949, when 1,398 British and American transports unloaded a total of 12,941 tons of food and other necessities. Called the "Easter Parade," this gargantuan undertaking worked out to an

1st Lt. Charles R. Foster, left, weapon systems operator, and Capt. Christopher F. Russo, aircraft commander, pose with the F-111 that took them on their 100th combat mission, the first two aircrewmen to reach that tally in the swingwing fighter-bomber (for further details, see item above).

Capt. Clifford N. Montgomery, right, is congratulated by the 3d TFS Commander, Lt. Col. Ralph S. Penny, on being first to complete 100 missions in the A-7D. The men are with the 388th TFW, Korat RTAFB, Thailand. For pilot comment on the A-7D's combat effectiveness, see p. 30.

Aerospace World

On final, back in 1948, a C-54 brings supplies to blockaded West Berlin. The twenty-fifth anniversary of the Airlift is being celebrated this year.

average of one flight per minute over twenty-four hours. Airspace was so tight that at times three aircraft were on final approach at once.

On May 12, 1949, the Soviets conceded defeat by lifting the blockade, but the flights of "Operation Vittles" continued to stockpile supplies until September 30, 1949.

During the Vittles effort, 276,926 flights logged ten million miles and delivered 2,323,067 tons of goods.

In July 1951, the Berliners dedicated a memorial to the thirty-nine British, thirty-one Americans, and five Germans killed during the airlift. This year, USAFE will join in spirit in a worldwide commemoration with the hundreds of airlift veterans who flew in unbelievable weather and other hazards to keep West Berlin fed and free.

☆

With Air Force operations so heavily dependent on satellites, radar, rapid communications, and other accouterments of the space age, solar disturbances have become of increasing concern.

These occasional flare-ups on the sun have a severe impact on ionospheric and atmospheric conditions, leading to disrupted radio communications and the like.

To be able to better contend with such events, the Air Force plans to establish a Solar Observing Optical Network (SOON) to augment its other operations that keep tabs on the sun.

With SOON, USAF Air Weather Service space watchers hope to accurately pinpoint the location and magnitude of solar activity via a global system of optical telescopes.

With the US Navy providing an assist of scientific and technical know-how, the Air Force hopes to have the SOON system operational within four years.

First on-site testing is scheduled for Palehua, Hawaii, followed by telescope installations at Ramey AFB, Puerto Rico; Athens, Greece; Carnarvon, Australia; Boulder, Colo.; and an as yet undecided location in the Far East.

A computerized data-processing and communications system would feed near-real-time data to the Air Force Aerospace Environmental Support Center, NORAD's Cheyenne Mountain, and other governmental agencies. Communications links would include the Astrogeophysical Teletype Network, the Automated Weather Network, and direct teletype and telephone solar-alert circuits.

☆

The effort to curtail aircraft hijackers in the US is working. While airliners of several other nations have become victims in past months, not one skyjacking attempt has taken place in the US since the stringent federal regulations were ordered early this year.

This is the upshot of recent remarks by Lt. Gen. Benjamin O. Davis, Jr., USAF (Ret.), Assistant Secretary of Transportation for Environment, Safety, and Consumer Affairs.

General Davis credits the 100 percent screening of boarding passengers, and their carry-on luggage, for the program's success, and notes other helpful developments: "There is the encouraging factor of détente with Cuba, both nations agreeing to extradite hijackers. Algeria, too, has made signs to our State Department that it might like a similar arrangement." But, the General said, "what is badly needed is world accord on skyjacking and terrorism . . . this form of political expression represents a threat to all stable society."

This statement could not have been more to the point in view of the savage assassination in July of Col. Yosef Alon, Israeli air and naval attaché to Washington. Investigative authorities presumed that Colonel Alon's murder was politically motivated.

Working against such crimes, General Davis said, is a top-level group of US officials that meet each week at the State Department in Washington. The single subject on its agenda: Terrorism and methods to stop it.

"The world's civil aviation system has become to the terrorist a conveyance, a target, and a means of extortion. The age of the international terrorist is also a jet age," said General Davis, a member of the Working Group of the Cabinet Committee to Combat Terrorism, established last September.

Despite the death of Colonel Alon and the succession of tragic events that have resulted from terrorist tactics in recent times, General Davis is optimistic:

"Some of the Arab nations have reacted with revulsion to the murderous activities of Black September [a terrorist group] over the past year; recent fighting in Lebanon between the army and Palestine Liberation groups indicates that the Beirut government is leaning toward King Hussein's solution for extremists—drive them out. And there is still hope for concerted world action against the terrorists, if not through the United Nations, then some other multilateral agreement."

☆

The Navy has had both a setback and a success in recent testing of

B-1 SCHEDULE SLIPS

Air Force Secretary John L. McLucas informed the US Congress on July 12 of a slippage in the schedule of the B-1 program, because it is taking more time than anticipated to build the first test airplane, especially installation of subsystems. Because of the delay and its effect on the flight-test program, the production decision date was rescheduled from July 1975 to May 1976. The B-1 development costs are now expected to be about $2.79 billion—$80 million higher than previously forecast. Both the delay and increased cost will be seized upon by opponents of the B-1. —E. U.

two of its major weapon systems.

Navy said that the recent crash of a Grumman F-14 into the Pacific near its Point Mugu test facility occurred when the aircraft was struck by a malfunctioning Sparrow air-to-air missile test-fired from the aircraft.

Flying the F-14 were two civilian employees of Grumman, who ejected unharmed and were later rescued by helicopter.

The aircraft was the third Tomcat lost since its flight-test program began in late 1970. A hydraulic failure brought about the first crash; cause of the second crash, in which test pilot William H. Miller was killed, has not been determined.

On a more encouraging note, a world record for distance was established with the recent F-14 launch of a Phoenix air-to-air missile. The missile, built and being tested by Hughes Aircraft Co., "hit" a target drone 126 miles from launch at Point Mugu. High point of the Phoenix's trajectory was 100,000 feet, also a record, the company said, before it closed with the drone and passed it within a lethal distance of the missile's warhead.

The target, a BQM-34E Firebee drone augmented with jamming instrumentation, was flying at Mach 1.55.

Fleet introduction of Phoenix is expected later this year.

☆

For its part, USAF has had smooth progress in the development of its new T-43A airborne navigator trainer *(for a full report, see p. 56).*

Flight tests of the first T-43A began April 10 and ended on June 5, three weeks ahead of schedule.

The program included testing of all flight systems and both air and ground evaluation of the plane's training equipment, officials pointed out.

The T-43A is a modified version of the Boeing 737-200 jetliner, and is due to replace USAF's fleet of aging, prop-driven T-29s. Nineteen of the new navigator trainers are on order, and are expected to be operational well into the 1980s, officials said.

Other major steps toward the procurement of Air Force-required hardware are also in the news:

• General Electric Co., Burlington, Vt., has received a go-ahead for full-scale development of the GAU-8 30-mm gun, intended for the upcoming A-10 close-support aircraft. Some forty-eight gun systems are to be produced, phased with the delivery of operational A-10s. Under the contract, Aerojet Ordnance and Manufacturing Co., Chino, Calif, will undertake subcontract development and limited production of ammunition for the weapon. (To assure lower costs through competition, a second source for ammunition development will be solicited, the Air Force said.)

• A Pratt & Whitney Aircraft Division engine has been decided on by USAF for NASA use aboard the Space Shuttle orbiter, currently under development. The air-breathing engines are off-the-shelf items to be used for horizontal flight testing of the Shuttle and for ferry flight once the craft is operational, officials said. The engine, designated

Key Air Force Posts Filled

McLucas

The White House has nominated John L. McLucas to be Secretary of the US Air Force. Named USAF Chief of Staff is Gen. George S. Brown, to replace retiring Gen. John D. Ryan. For editorial comment on USAF's new leadership, see p. 6. Biographical profiles on both men will appear in the September issue of AIR FORCE.

Brown

Sgt. Leon E. Basler, right, of St. Genevieve, Mo., presents his painting, "Formation Home." Accepting on behalf of the Air Academy art collection is Col. Mark E. Wilt, Academy Chief of Staff. The T-38s depicted are USAF's "most beautiful aircraft," says the Sergeant.

TSgt. Frederick Reynolds, left, and A1C Thomas Moxley, 58th Organizational Maintenance Squadron, Luke AFB, Ariz., check maintenance list on a special F-4 Phantom. The plane is the first received from McDonnell Douglas and is the longest flying F-4, with some 4,000 hours.

Aerospace World

the TF33-P-7, powers the C-141 transport, and modified versions are in use by commercial airlines.

The engine procurement is the fourth major systems selection for the Shuttle. Rockwell International's Space Division, Downey, Calif., will produce the orbiter vehicle and integrate all elements of the Shuttle system, while Rockwell's Rocketdyne Division, Canoga Park, Calif., is to supply the orbiter's main engines. Selection of the company to build the Shuttle's external tank is expected in August.

• Lockheed Propulsion Co. is working on a new and more versatile form of solid-rocket propulsion for use by air-launched missiles. Most present solid rocket motors contain only a single propellant grain charge that, once ignited, burns until consumed. Lockheed will build and test motors that have up to four types of propellant grains and igniters, capable of various firing combinations.

New USAF-developed video mapper will help air traffic controllers keep planes on the straight and narrow.

• USAF has awarded a $16.5 million contract to Cessna Aircraft Co., Wichita, Kan., for the production of sixty-five A-37B aircraft, an attack version of the T-37 jet trainer.

Cessna has already built 416 A-37Bs, which were widely used in Vietnam in a counterinsurgency and close-support role.

☆

The Air Force has developed a new electronic video mapper to help air traffic controllers "see" where an aircraft is in relation to mountains, buildings, and other potential hazards within areas varying from ten to 200 miles from an airport runway.

The video mapper consists of an extremely high-quality terrain and obstacle map etched on fine-grain film and reproduced electronically. This is superimposed on the normal image projected by a traffic controller's radarscope. In this manner, an operator can note at a glance all aircraft in his area and their position in relation to existing obstacles.

Designed by the Air Force Systems Command's Electronic Sys-

Senior Staff Changes

B/G Timothy I. Ahern, from Dep. Cmdr., 22d NORAD/CONAD Region, North Bay, Ontario, Canada, to DCS/Plans, Hq. ADC, Ent AFB, Colo. . . . **M/G Charles I. Bennett, Jr.,** from V/C, 8th AF, SAC, Andersen AB, Guam, to Dep. Dir., Plans, DCS/P&O, Hq. USAF, replacing M/G Richard G. Cross, Jr. . . . **M/G Maurice F. Casey,** from Dir., Transportation, DCS/S&L, Hq. USAF, to Dep. Dir., J-4 (Strategic Mobility), Jt. Staff, OJCS . . . **M/G Richard G. Cross, Jr.,** from Dep. Dir., Plans, DCS/P&O, to Dir., Operational Requirements & Dev. Plans, DCS/R&D, Hq. USAF . . . **M/G Woodard E. Davis, Jr.,** from Cmdr., 19th AF, TAC, Seymour-Johnson AFB, N. C., to Cmdr., USAF Tac Air Warfare Ctr., TAC, Eglin AFB, Fla., replacing retiring M/G Richard C. Catledge.

M/G (L/G selectee) William J. Evans, from Asst. DCS/R&D, to DCS/R&D, Hq. USAF . . . **B/G John P. Flynn,** USAF Medical Ctr., Keesler AFB, Miss., to Vice Cmdt., Air War College, AU, Maxwell AFB, Ala. . . . **B/G (M/G selectee) Raymond B. Furlong,** diverted from V/C, 9th AF, TAC, Shaw AFB, S. C., to Dep. Asst. Sec. of Def. (Legislative Affairs), Washington, D. C. . . . **Col. (B/G selectee) Andrew P. Iosue,** from Cmdr., 374th TAW, PACAF, Ching Chuan Kang AB, Taiwan, to Dep. Dir., Personnel Programs, DCS/P, Hq. USAF, replacing B/G Leland C. Shepard, Jr. . . . **B/G Kermit C. Kaericher,** from Cmdr., 341st Strat. Missile Wg., SAC, Malmstrom AFB, Mont., to Cmdr., 44th Strat. Missile Wg., SAC, Ellsworth AFB, S. C.

B/G Louis W. LaSalle, from DCS/P, Hq. ADC, Ent AFB, Colo., to Defense Language Institute, Monterey, Calif. . . . **Col. (B/G selectee) James E. McInerney, Jr.,** from Cmdr., 26th Tac Recon. Wg., USAFE, Zweibrucken AB, Germany, to Chief, AF Section, Joint US/Military Mission for Aid to Turkey, Ankara, Turkey, replacing B/G Grant R. Smith . . . **B/G (M/G selectee) Travis R. McNeil,** from Cmdr., 314th Air Div., PACAF, Osan AB, Korea, to Asst. DCS/P for Military Personnel, and Cmdr., AFMPC, Randolph AFB, Tex., replacing M/G Kenneth L. Tallman . . . **B/G Warner E. Newby,** from System Program Director, C-5A, ASD, AFSC, Wright-Patterson AFB, Ohio, to DCS/Logistics, Hq. MAC, Scott AFB, Ill., replacing B/G Paul F. Patch.

B/G Russell G. Ogan, from Dir., POW/MIA Affairs, OSD, Washington, D. C., to US DCS/Live Oak, Casteau, Belgium . . . **B/G George A. Pappas, Jr.,** from Dep. Dir., J-6, Jt. Staff, OJCS, to Dir., Ops & Engineering, ODASD (Ops & Engineering, OASD (Telecommunications), Washington, D. C. . . . **B/G Paul F. Patch,** from DCS/Logistics, Hq. MAC, Scott AFB, Ill., to Dir., Transportation, DCS/S&L, Hq. USAF, replacing M/G Maurice F. Casey . . . **M/G John W. Roberts,** from Dir., Personnel Plans, to Asst. DCS/P, Hq. USAF.

M/G Ray A. Robinson, Jr., from DCS/Ops, Hq. ADC, Ent AFB, Colo., to Cmdr., 21st NORAD/CONAD Region, with add'l duty as Cmdr., 21st Air Div., Hancock Field, N. Y. . . . **B/G Leland C. Shepard, Jr.,** from Dep. Dir., Personnel Programs, DCS/P, Hq. USAF, to C/S, JUSMAG, Seoul, Korea . . . **B/G Grant R. Smith,** from Chief, AF Section, Joint US/Military Mission for Aid to Turkey, Ankara, Turkey, to Dep. Cmdr., 22d NORAD/CONAD Region, North Bay, Ontario, Canada, replacing B/G Timothy I. Ahern . . . **M/G Kenneth L. Tallman,** from Asst. DCS/P for Military Personnel, and Cmdr., AFMPC, Randolph AFB, Tex., to Dir., Personnel Plans, DCS/P, Hq. USAF, replacing M/G John W. Roberts . . . **Col. (B/G selectee) Garry A. Willard, Jr.,** from V/C, 314th Air Div., PACAF, Osan AB, Korea, to V/C, WRAMA, AFLC, Robins AFB, Ga.

PROMOTIONS: To be **Lieutenant General:** William J. **Evans;** Daniel **James,** Jr. To be **Major General (ANG):** Edward R. **Fry.**

RETIREMENTS: L/G Royal B. **Allison;** M/G Joseph H. **Belser;** M/G Richard C. **Catledge;** L/G Otto J. **Glasser;** L/G Eugene B. **LeBailly;** M/G Larry A. **Smith.**

—Compiled by Catherine L. Bratz

NORAD Commander Gen. Seth J. McKee, right, discusses space defense with Gen. Earle E. Partridge, USAF (Ret.), left, and Lt. Gen. James H. Doolittle, USAF (Ret.), during a recent tour of the underground Combat Operations Center south of Colorado Springs, Colo. General Partridge was NORAD's first chief (1957–59).

tems Division, some 130 of the devices are being built for the Air Force by General Time of Rolling Meadows, Ill. FAA will receive an additional thirty.

☆

The Army announced that Bell Helicopter Co., Fort Worth, Tex., and Hughes Helicopters & Hughes Aircraft Co., Culver City, Calif., have nosed out competitors to build the Army's new Advanced Attack Helicopter.

Development and test program for the new helicopter will take about five and a half years. The two firms will initially compete in a flyoff involving two flying prototypes each. Some three years will be needed to complete the competitive flyoff phase.

Winner of the flyoff competition will then install and test the required subsystems for night vision, fire control, navigation, and communications. After further testing, a production decision will be made, officials said.

☆

This summer, the headquarters of CONAD, the Continental Air Defense Command part of NORAD (the North American Air Defense Command), and the headquarters of USAF Aerospace Defense Command (ADC) will merge.

The consolidation is taking place as an austerity measure, USAF said.

The net result is a reduction in force of about 930 military and civilian positions, including about 765 from the CONAD/ADC staffs, Air Force officials said.

The merger involves only the US element of NORAD and does not alter the basic US/Canadian NORAD structure, mission, or relationships. No Canadian force reductions will take place.

ADC is to retain its identity as an Air Force command, and the Commander in Chief of NORAD/CONAD will serve also as ADC Commander. Deputy CINCNORAD is to continue as a Canadian three-star general officer.

The CONAD Deputy will be a US Army three star who will also head up the Army Air Defense Command (ARADCOM). Vice Commander of ADC will be an Air Force three star.

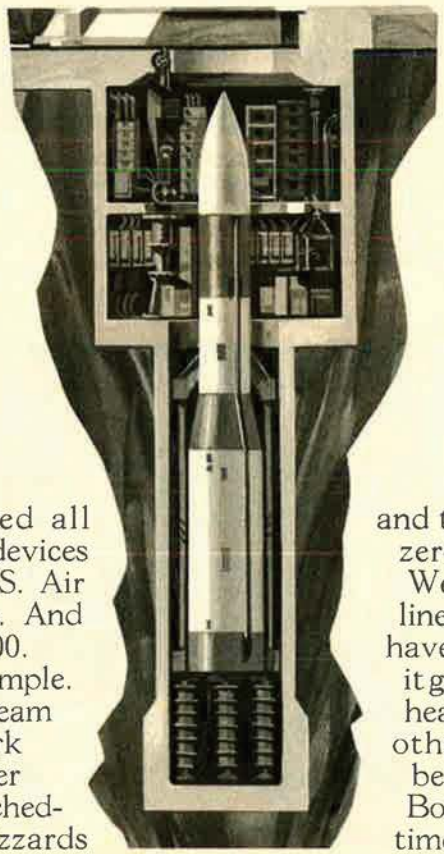
All attempts will be made to place career Civil Service employees with other government agencies. ■

Index to Advertisers

"Time is the most valuable thing a man can spend."

Theophrastus.

Minuteman. On time, every time, for 11 straight years.



Last year, Boeing delivered all Minuteman missiles, training devices and other equipment to the U.S. Air Force on or ahead of schedule. And underran the program $4,515,000.

That's not just one isolated example. In 1971, the Boeing-Air Force team finished its Minuteman III work in North Dakota $7,000,000 under target and 45 days ahead of schedule. This, despite periods of blizzards and temperatures of 45 degrees below zero.

We've been meeting Minuteman deadlines like this for over a decade. Changes have been made to the missile, giving it greater range, improved accuracy and heavier payloads. From time to time, other changes in Minuteman might be necessary. If so, you can count on Boeing being on time, every time.

BOEING

MIA/POW Action Report

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

Medical SITREP

It seemed too good to be true—the apparent good health of most of the returning POWs when they deplaned on arrival home last winter.

Even the professionals were misled, at first. "When they came off the planes they looked so well we were deceived," Dr. Richard S. Wilbur, the Pentagon's top health officer, told a recent news briefing.

The nation had more or less psyched itself up to expect a collection of emaciated wrecks, tottering down the aircraft ramps. Instead—except for a few stretcher-borne, some on crutches, and a number limping—the majority of the returnees bounded out of the aircraft as if on springs, flashing American-type grins, heads held high.

It seemed too good to be true, and it was.

In the interval since, Department of Defense medical officials have cautioned that many returned POWs are afflicted with ailments that might take years of treatment. With certain physical disabilities, a program of surgical correction might be called for. In the less-understood area of emotional trauma, adjustment to a new life by some POWs might prove difficult. The military medical teams based their diagnoses on the superthorough examinations given each ex-POW on his return.

For the public at large, all this has been brought sharply into focus by the death in June of two of the returned POWs. Following what his family described as a severely depressed state, Air Force Capt. Edward A. Brudno fell victim to an overdose of barbiturates. "All the normal problems of repatriation and rehabilitation to him were crises, and he magnified the problems in his own mind. Perhaps his death was the only way he could find peace," a brother later commented.

It is useless to speculate to what extent the charge of misconduct lodged against Marine Corps Sgt. Abel Larry Kavanaugh contributed to his suicide. Despite extensive medical profiles, it is simply impossible to gauge with accuracy the state of any POW's emotions, especially when complicating factors exist, medical experts insist.

While other POWs seem to be adjusting to a new life in society and their careers, Pentagon officials found themselves lacking general terms with which to describe the emotional and physical health of the POWs as a group.

"You must bear in mind that we are dealing with 566 individuals here," said a DoD spokesman. "They range in age anywhere from their early twenties to their fifties. And they have been prisoners—under varying degrees of duress—from a few days to perhaps *seven years*.

"In view of this, we are tailoring medical treatment to the individual; whatever is needed is available, and the 'door is always open' and will remain so."

With the bulk of the ex-POWs being USAF aircrew, it is no small wonder that the doctors have found one class of injury general among

AFA's Harry S. Truman Chapter recently sponsored an Armed Forces Day Dinner Dance at Richards-Gebaur AFB, Mo. Attending, from left, Col. H. E. Lovelace, Base Commander; Capt. R. L. Mastin, local former POW; Chapter President C. H. Church, Jr.; Brig. Gen. D. W. Winn, former POW; Maj. Gen. P. R. Stoney, AFCS Commander; Capt. L. W. Stutz and Majs. H. E. Johnson and E. L. Hubbard, ex-POWs.

Capt. Michael Monaghan, second from left, receives a Certificate of Appreciation for his POW work from Alaska AFA President V. R. Davis, left. Looking on are former POW John Nasmyth and Joni Morgan.

—Anchorage Daily Times

VIVA's "wanted" poster dramatically points up the fact that the fate of many Americans missing in Southeast Asia remains unknown.

many returnees—major bone fractures (from the physical punishment associated with bailing out of high-speed aircraft, exacerbated by subsequent poor medical treatment by their captors). Such injuries have been diagnosed in about thirty-one percent of the returnees, with about sixteen percent of the group suffering from spinal impairments.

But literally the worst plague besetting the repatriates is an affliction of intestinal parasites—some fifty-three percent have them. Other diseases stem from dietary deficiencies while in the camps.

Of major concern are the POWs suffering from a virulent malaria that is resistant to medication. New drugs developed in Southeast Asia hold promise of helping to combat this problem.

Military psychiatrists consider about two percent of the returnees either mildly or moderately depressive, a low figure considering what many of the men have been through.

In general, however, "a large number of the returnees are in pretty good shape—overall a healthy bunch of people," a Pentagon spokesman said. "Several are in even better health than when they were captured."

Now that the excitement of homecoming and the subsequent active pace for many of the ex-POWs has abated somewhat, "the objective is to absorb them once again into the mainstream and to allow them some privacy and time for self-reflection," an Air Force official said.

On Behalf of MIA/POWs

At press time, the League of Families was in the final stages of preparing for its national convention to be held in Washington, D. C., July 27–29.

With concern running high among MIA families about changes in status for their men, and the progress of the MIA identification program in SEA, the theme of the three-day annual meeting will be "The Right to Know," League officials said.

Encouraged by an expected large turnout of MIA/POW family members, the League plans to bear down hard on what it considers key issues.

With that aim, the League has scheduled special sessions revolving around the problem of accounting for the missing.

Seminars will detail the assistance available to families following a change in the status of their men and the rehabilitation program for repatriated POWs, their families, and those of the missing. Individual family counseling will be available, including the services of child psychologists and other medical specialists.

As in the past, the League has set aside an additional day, July 26, so that family members wishing to do so can call on their representatives on Capitol Hill.

Invitations to participate in the League convention have been extended to Army Brig. Gen. Robert Kingston, head of the US Joint Casualty Resolution Center headquartered in Thailand, and Army Lt. Gen. Leo Benade, Deputy Assistant Secretary of Defense for Military Personnel Policy. The latter is expected to conduct sessions covering benefits and assistance to families.

Another special guest will be Robert Earl of the American Red Cross, whose cooperation over the years has been of great help, League officials said.

League National Coordinator Helene Knapp has extended a welcome to all former POWs who attend the convention; several have been scheduled as guest speakers. ■

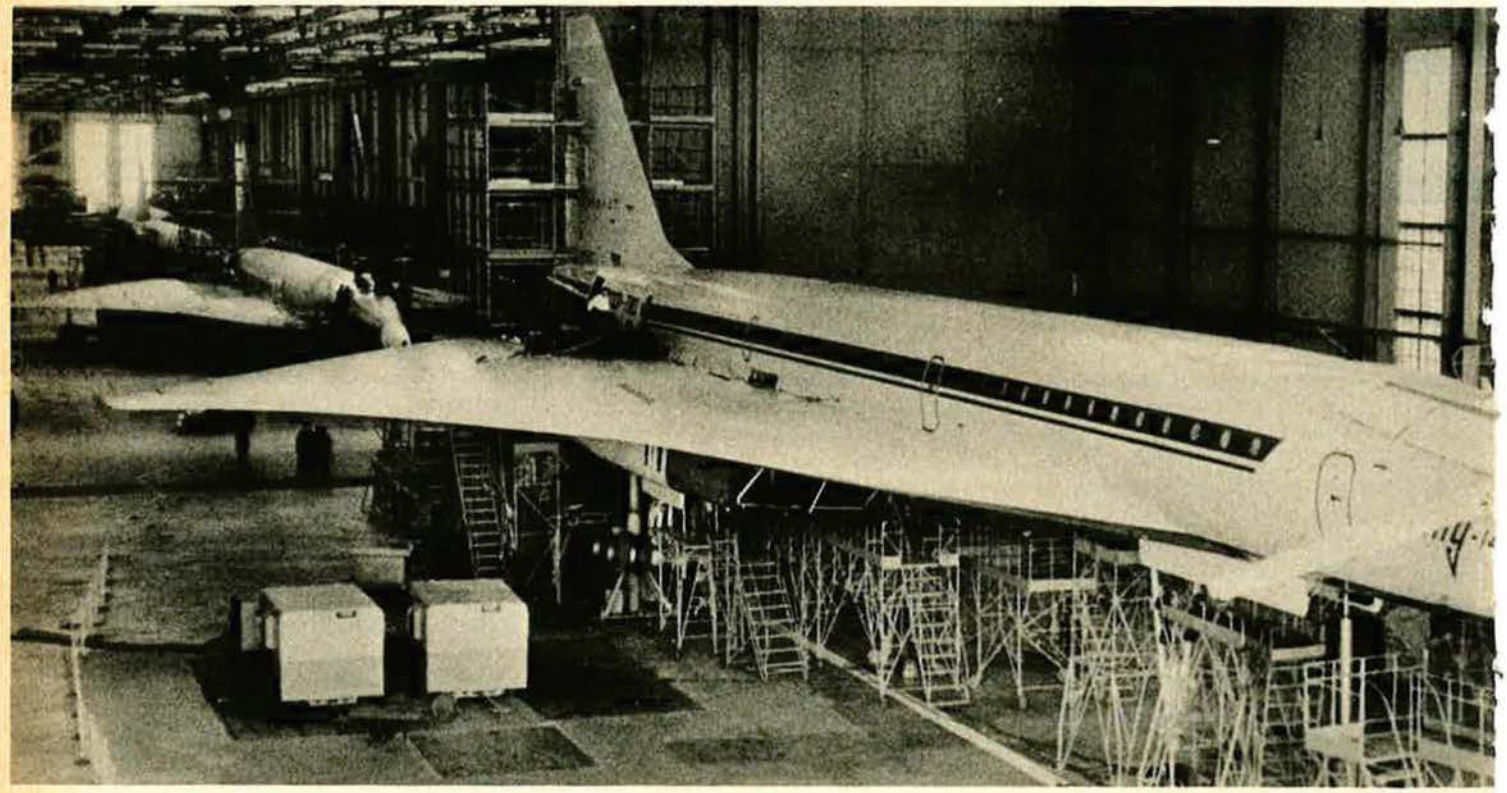
AIR FORCE
AUGUST 1973 MAGAZINE

While the Soviet Union continues its usual reticence regarding weapon system development and associated technologies, the current spirit of détente has led to a degree of openness in areas of basic and commercial technology that would have been considered unthinkable a year ago. In this article, AIR FORCE Magazine reports on a unique ten-day tour of Soviet aerospace facilities . . .

THE USSR LIFTS THE TECHNOLOGICAL CURTAIN

By Edgar Ulsamer
SENIOR EDITOR, AIR FORCE MAGAZINE

—Novosti Press Agency



Existence of a full-fledged series production facility for the TU-144 SST at Voronezh came as a surprise to the US journalists. Four aircraft are in final assembly at this time.

★ Soviet designers are experimenting with hypersonic vehicles powered by scramjet propulsion systems and capable of operating in the Mach 5 to Mach 7 speed regime.

★ At present, the Soviet Union is not developing an equivalent of the US Space Shuttle, but may do so later when it deploys space stations that accommodate from six to eighteen crew members. The Soviets don't plan on any manned moon landings, but admit that they may change their minds toward the end of the century.

★ The Soviet Union has placed a highly advanced, enlarged, 150-passenger SST in full series production and is already developing a larger, longer-range, second-generation supersonic transport. In the process, Soviet metallurgists have developed extensive and highly competent titanium-processing capabilities and have brought down the cost of this militarily important metal by some 300 percent during the past five years.

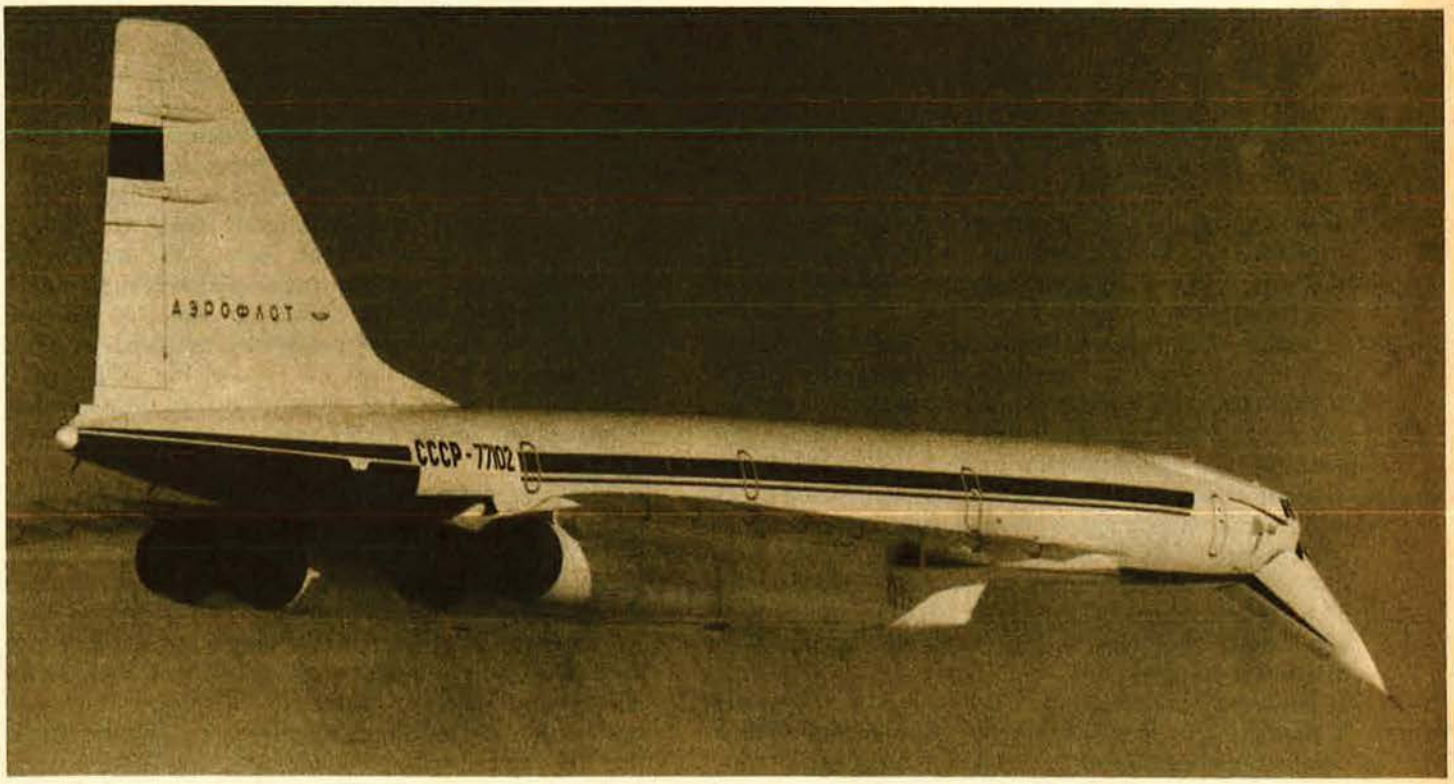
★ The Koliesov Engine Design Bureau, whose existence had not been previously known in the West, is developing an alternative engine to the Kuznetsov NK-144, the 44,000-pound-thrust powerplant that is used on current models of the TU-144 and, according to Western intelligence experts, on the new "Backfire" strategic bomber. The Koliesov engine is a variable-geometry, variable-bypass-ratio engine that functions as a straight turbojet at supersonic flight and as a turbofan in the subsonic regime. No such advanced design exists in the West.

These are some of the findings by this reporter during a ten-day tour of Soviet aerospace facilities, arranged by the USSR's Novosti Press Agency and the Soviet Ministry of Aircraft Industry. This visit, by six US aerospace writers, came hard on the heels of the tragic crash of the TU-144 at the close of the Paris Air Show and on the eve of Soviet Party Leader Leonid I. Brezhnev's US visit. The extensive briefings, plant visits, and interviews—although confined to non-military matters—were marked in general by unexpected candor, openness, and abundant bonhomie.

The better part of a day was spent with the Minister of Aviation Industry, P. V. Dementjev, Deputy Minister M. S. Mikhailov, and top-ranking officials of major aircraft and engine design bureaus. One day was given over to an unprecedented tour of the A. S. Yakovlev Design Bureau, originator of the various military and commercial YAK aircraft, and another to visiting the TU-144 production facility at Voronezh, some 350 miles southeast of Moscow, heretofore off limits to Americans.

On the final day of the trip, the US visitors were given a grand tour of "Star City," the Soviet Union's counterpart of NASA's Lyndon B. Johnson Space Center at Houston, Tex. All questions were answered, although some more candidly than others. This reporter's question to Soviet Air Force Maj. Gen. Vladimir Shatalov,

—Novosti Press Agency



Soviet TU-144, shown in flight with its movable nose in down position, can transport 150 passengers over a distance of more than 4,000 statute miles and will cost less than the British-French Concorde.

SOVIET AEROSPACE ACTIVITIES

the Cosmonaut Corps' Director of Flight Training, about recently observed spacecraft breakups and other anomalies in the Soviet space program drew the brusque assertion that the USSR's space effort "always meets the objectives of the Academy of Science [which acts in the role of NASA]" and that the insinuations about recent difficulties he understood the Western press had made "were not justified by the facts."

By contrast, General Shatalov, himself a veteran of orbital space flights aboard Soyuz-4, -8, and -10, was forthright in discussing the disaster that befell Soyuz-11 in 1971 and caused the death of three cosmonauts. Failure of an automatic latch, rather than human error, caused the hatch of the spacecraft to open during reentry and resulted in the instant death of Cosmonauts Georgi Dobrovolski, Vladislav Volkov, and Viktor Patsayev. General Shatalov told AIR FORCE Magazine that this fault was pinpointed immediately and has since been corrected by redesign.

A Bid for the US Market

The obvious question that suggests itself as a result of the surprisingly free access to the inner sanctums of Soviet aerospace granted the US aerospace writers is "Why?" The answer has to be conjectural. There was, however, considerable evidence, in explicit as well as implicit form, that the Soviets look forward eagerly to intensified cooperation with the United States in space and a new era of mutually profitable joint marketing and production ventures.

Minister Dementjev hinted broadly that current negotiations with Rockwell International include the option of producing the YAK-40 short- to medium-range trijet under license in the United States. Terming the aircraft a jet-age successor to the DC-3, the Soviet aviation executive said it seemed destined "to fill a gap in the performance spectrum that your designers have left unfilled." The YAK-40 is designed to operate from short, semiprepared landing strips and is priced in the $1.5 million range. Of the 400 YAK-40s built to date, about thirty have been bought by foreign, mainly West European, countries.

There were also hints that the Soviets are interested in promoting foreign marketing or coproduction of their current supersonic transports, as well as of their future second-generation SSTs. The long-term US market potential of the TU-144 would appear to be promising in the absence of a US SST program. Because its capacity exceeds that of the British-French Concorde by a significant margin and in view of its more advanced technology (about one-fifth of the TU-144's airframe is titanium, while the Concorde is an all-aluminum airplane), and lower price, the Soviet SST might well find favor with US carriers. US market acceptance has eluded the Concorde so far, presumably because of its high price and limited capacity.

There was evidence that the Soviets plan to explore the US market for two brand-new aircraft designs whose existence had not been known previously. One of them is the YAK-42, a medium-range trijet that can transport between 100 and 120 passengers over a distance of about 1,200 miles. With a reduced payload the aircraft's range is about 1,800 miles.

The other new design is a 350-passenger wide-bodied superjet, the IL-86, powered by four wing-mounted, advanced technology, high-bypass-ratio engines of about 26,500 pounds of thrust each. Designed for relatively high subsonic cruise in the Mach .84 to .85 range, the aircraft is somewhat smaller than the Boeing 747. Its range is comparable to that of the first L-1011s and DC-10s, or in the 1,500- to 2,500-mile bracket. The US market potential of both the IL-86 and the YAK-42 probably is below that of the YAK-40 and the TU-144, neither of which has a US counterpart.

The SST Age Has Arrived—In the USSR

On Monday, June 11, a warm and sunny day in Moscow, some 2,000 Soviet military and civilian aviation leaders, along with relatives and friends, gathered at Novodivichi Cemetery to pay their last respects to the six crew members who had perished eight days earlier aboard the TU-144 SST during the closing moments of the 1973 Paris Air Show. As the volley of a Red Army honor guard tore the hushed silence of the mourners, the six caskets were lowered into a common grave, located about halfway between the final resting place of Russia's revered aircraft designer, Andrei Tupolev, the originator of the Soviet SST, and that of the USSR's most forgotten man, Nikita Khrushchev.

In his eulogy, Minister Dementjev repeated what he had told the visiting US aerospace journalists earlier: "The accident which took the lives of the skilled crew casts no shadow on the aircraft and its future. What happened pushes us all the more to expedite the work ahead."

Most observers of the TU-144's crash in Paris—this reporter included—felt that the accident was the result of exceeding the aircraft's design limits in a dangerous game of aerial "chicken" played by the Concorde and the Russian SST. Some observers felt, however, that the breaking off of the wing in the plunge that followed the aircraft's stall denoted structural problems. Soviet officials and designers withheld all opinion about the probable cause, pending completion of their investigation. Minister Dementjev made clear that if the investigation indicates design flaws, changes will be made promptly, but that the program will not be disrupted.

The high, uninterrupted rate of production activity at the TU-144 production facility at Voronezh observed by AIR FORCE Magazine bears out Mr. Dementjev's claim. Four aircraft were nearing completion, with eleven others further down the production pipeline. According to plant director Boris M. Danilov, there are thirty aircraft currently in series production. (Lt. Gen. Alexei Ivanovich Semenkov, Deputy Minister of Civil Aviation and Deputy Director of Aeroflot, the USSR's state-owned airline, expects to operate about seventy-five TU-144s within three years from the day the aircraft first enters its inventory in 1975.)

The production aircraft that is coming off the Voronezh line is a far cry from the prototypes shown in Paris in 1971. The new aircraft is about twenty feet longer, for a total length of 210 feet, and its passenger capacity has been increased from 120 to 150. The aircraft's fuselage has been widened. Like the B-1 supersonic bomber, the redesigned TU-144 uses retractable canards, but their purpose is not to improve high subsonic ride quality and serves only to enhance the aircraft's takeoff and landing characteristics, according to its designers (*see also "Jane's All the World's Aircraft Supplement" item on the TU-144, p. 41 of this issue*).

The four engines of the TU-144 are now said to produce about 44,000 pounds of thrust each, compared to about 38,000 pounds for the previous design. The engine nacelles have been placed further apart, and the aircraft's deltawings have been extensively redesigned to provide camber, twist, and sculpturing.

Mr. Danilov said the new design's maximum cruise speed is Mach 2.35, but that the airframe is capable of sustained cruise at Mach 2.6. (This comes very close to the Mach 2.7 cruise speed of the now-defunct US SST, which American carriers deemed optimal in terms of productivity and profitability.) The range of the aircraft, according to Soviet officials, is "6,500 km [about 4,050 miles] with full payload." This would be adequate for New York to London and New York to Paris routes. General Semenkov emphasized, however, that there was a pressing need for the new speedy aircraft in Aeroflot's domestic system and that intercontinental operations would not be undertaken until domestic and, later, intra-European demands were met.

General Semenkov's conservative forecasts about Aeroflot's supersonic route planning were in contrast with the more ambitious statements by Minister Dementjev about the TU-144's export potential, which he underscored by stressing that "our price will be lower than that of the Concorde because we simply can't lag behind [the British and the French]."

Minister Dementjev, General Semenkov and other Soviet aviation experts said there would be "no difficulties in operating the aircraft supersonically over Soviet territory." Tests so far have shown that sonic boom overpressures remain within tolerable levels and that Western reaction to that phenomenon was "extreme and emotional." All officials pointed out, however, that Aeroflot will abide by prohibitions against supersonic overflight of foreign countries with which the Soviet

—Novosti Press Agency

The Soyuz-10 orbital spacecraft is shown mounted on the standard, heavy-duty rocket launcher used by the USSR in slightly varying configuration for different payloads.

SOVIET AEROSPACE ACTIVITIES

Union has bilateral accords. The TU-144, like the Concorde, loses some range if it is forced to operate subsonically, according to General Semenkov.

The Voronezh Production Line

By far the most surprising discovery of the US aerospace writers was the fact that the Soviet SST is in full-scale production, that the production facilities are extremely modern and highly automated, and that a major expansion program, which will double the capacity of the plant, is currently in progress.

Although the sprawling plant was built in 1933 and was damaged by the German invasion during World War II, it has been thoroughly modernized. Its only product is the SST, except for a somewhat incongruous secondary product—metal chicken coops. The plant's chief engineer, A. K. Potavov, told AIR FORCE Magazine that, at the moment, the production rate is one aircraft every six weeks but, with the completion of the expansion program, that rate will accelerate to about one every three weeks.

Two facets of the TU-144 production program stand out: the extensive use of numerically controlled machine tools and profile milling machines which in turn are programmed by computer complexes, and the sophistication of the titanium fabrication, involving chemical milling as well as forging. Although the US aerospace writers were not shown the computer installation, Mr. Potavov said that it is of the so-called Minsk type, that it consists of three units, and that the computer is capable of "30,000 operations per second." All machine tool equipment, the computer complex, and all other automation equipment, he said, are Soviet products. (This also applied to the computers, digital and analog tape systems, and other electronic equipment observed by this reporter at the Yakovlev Design Bureau.)

One of the most noteworthy features of the Voronezh facility, and one that the Ministry of Aviation Industry is obviously proud of, is its titanium-processing capability. Titanium, named after the Greek mythical giants, was first used by aircraft designers in the Air Force's F-86 during the late 1940s. It has a significantly better strength-to-weight ratio than aluminum and is far more resistant to high temperatures and corrosion. In its natural state, titanium is found only in combination with other elements; purification involves a complex heat-and-chemical treatment process. It is more difficult to fabricate than aluminum and, of course, is far more costly.

Titanium is normally used only as an alloy, usually with a small percentage of vanadium and aluminum. Soviet Ministry of Aviation Industry officials declined to discuss the specific makeup of the titanium alloy used for the TU-144, but indicated that it includes vanadium. Mr. Potavov said the titanium ingots used at his plant came "from somewhere in the Urals."

One of the principal requirements of titanium fabrication is vacuum-annealing, meaning that the cooling-off process, following heat-treatment, has to take place in high vacuum. Soviet officials claimed that their annealing involves 10^{-5} vacuums. US materials experts rate this "as an adequate but not unusually high figure." The basic purity of the titanium "sponge," the raw metal prior to the alloying process, was given by Soviet spokesmen as "0.02." This is a higher purity than attained in the US. As a USAF materials expert explained, "We, of course, know how to get purities of this and even higher levels, but we don't consider them cost-effective."

During the tour of the TU-144 production facility, the US aerospace writers were shown a stainless-steel furnace currently under construction, which Soviet officials claimed can handle titanium parts some fifteen feet by thirty-six feet in size. This would seem to make it one of the largest in the world. The quality and size of the Voronezh facilities for titanium handling leave no doubt that the Soviet aviation industry is rapidly catching up with corresponding US capabilities.

According to Mr. Danilov, eighteen percent of the TU-144's airframe is made of titanium alloy; this is roughly the same percentage as that of USAF's next strategic bomber, the B-1. The reason for this high percentage is, however, not dictated by kinetic heating of the airframe, but "solely and exclusively to have an airplane of great strength and durability." There is no titanium in the areas that experience the highest temperatures during cruise, such as the wing leading edge, he explained. The metal is used instead in such places as the wing torque boxes, the engine nacelles (eighty percent titanium), the rudder, wing-panels, ailerons, and similar components where high strength-to-weight ratios are of critical importance. The service life of the airframe, according to Mr. Danilov, is "30,000 flight hours." Boeing, prior to the cancellation of the US SST program, had claimed a 50,000-hour service life for its design, an all-titanium aircraft.

Soviet officials claimed that the TU-144 design uses an advanced, high-performance aluminum alloy, which they declined to discuss, as well as some special chrome nickel steel alloys that are in the aircraft's eight-wheel landing gear. No advanced composites are now used on the TU-144, but Minister Dementjev told AIR FORCE Magazine that after seeing at the Paris Air Show how effectively US designers used boron-based materials on the US Navy's F-14 "we might consider their application" on the Soviet SST.

Separation of R&D from Manufacturing

The Soviet SST program originated as a requirement of the Ministry of Civil Aviation in 1962 and became an active program in 1964, according to Minister Dementjev. All told, ten prototypes were built and test flown, including a twenty percent scale model weighing about 35,000 pounds based on a modified MIG-21 fighter aircraft. It was not made clear how many Soviet design bureaus were initially involved. Soviet officials rejected, seemingly on doctrinal grounds, the suggestion by the US visitors that there might have been a competitive selection before the Tupolev Design Bureau was picked. The visitors were told in no uncertain terms that there was no competition within the Soviet system, but that from collective efforts "we chose the best product." The distinction appears to be more semantic than substantive.

According to General Designer A. S. Yakovlev, head of the design bureau bearing his name, who discussed the Soviet arrangement in detail with AIR FORCE Magazine, "The Ministry will approve a given design and select a production facility only after the customer, be that the Air Force or Aeroflot, has certified that his requirements have been met." Although hesitant to compare the merits of the Soviet approach with the normal policy in the US of the design competition winner also building the aircraft, Ministry officials stressed that, on the basis of long experience, they were "enthusiastic about separating design from production."

There is no lack of consideration of production problems on the part of the designers. If a given design feature turns out to be difficult to handle at the production facility, it can always be corrected by the design bureau representatives at the site, AIR FORCE Magazine was told. Liaison with the production facility is maintained by the designers "throughout all production activities and for the duration of the program."

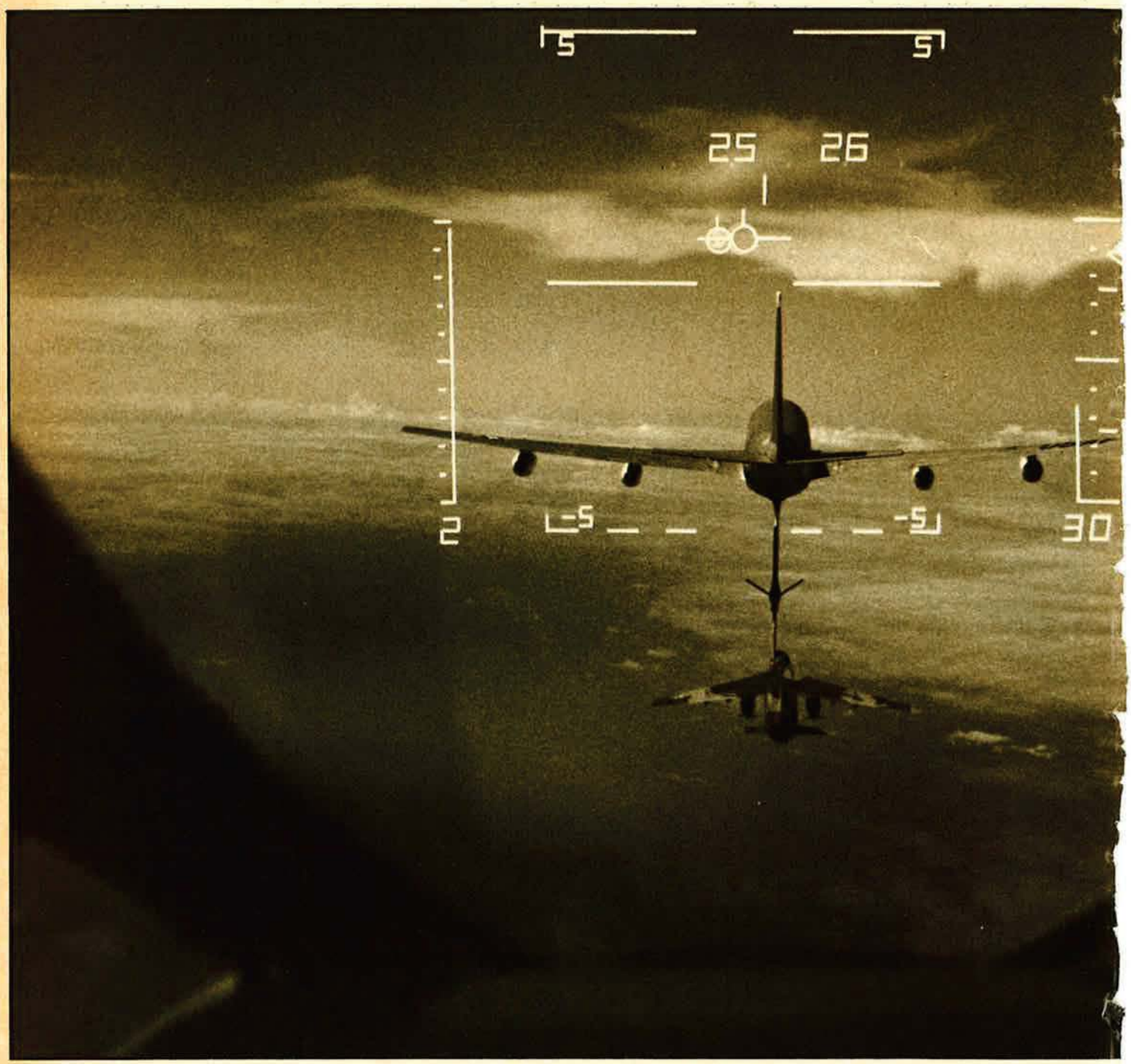
US journalists are shown in front of a TU-144 at the Voronezh facility. The author, fifth from right, is standing next to the director of the plant, fourth from right, Boris M. Danilov.

Once the Tupolev design had received the cachet of the Ministry of Aviation Industry, especially that of Deputy Minister Mikhailov who is in overall charge of the program, the Ministry selected the Voronezh plant to build the aircraft. This is in keeping with Soviet policy of separating design from production. Such an arrangement does not rule out design changes and other modification, even though the aircraft is in production; the design bureau maintains a high-level liaison staff at the production facility.

Changes, AIR FORCE Magazine was told, can be initiated by any of the concerned agencies of the Soviet government, but usually come from the "customer." For the TU-144 program, the customer is the Ministry of Civil Aviation, and its operating arm, Aeroflot. In the case of military aircraft, the customer, of course, is the Soviet Air Force. The Soviet officials explained that the customers participate in the flight test and flight evaluation of all prototypes.

Two principal questions associated with the Soviet SST program were left shrouded by Soviet spokesmen, possibly because the government has not yet made final decisions. One involves details about the second-generation SST, currently under development. Minister Dementjev and General Semenkov would say only that the aircraft will be "more economical," presumably meaning greater payload, and have longer range. The same applied to the aircraft's alternate engine, which one official described as providing a fall-back position in the interest of safety and reliability, while others hinted that it was meant to power the second-generation TU-144. ■

(This report on Soviet aerospace activities will be continued in the September issue of AIR FORCE *Magazine.)*



A pilot's view through the A-7D's Head-Up Display as he waits his turn on a tanker, somewhere over the Pacific.

THE A-7D IN COMBAT

In the closing weeks of the Vietnam War, USAF sent the 354th TFW and its A-7Ds to Southeast Asia. During those ten weeks, the Little Hummer flew some 4,000 sorties—interdiction, close support, SAR, escort, Linebacker II. The wing lost only two aircraft in combat ops. Its accuracy with iron bombs set a new standard for tac fighters . . .

HOW THE A-7D REWROTE THE BOOK IN SEA

By John L. Frisbee
EXECUTIVE EDITOR, AIR FORCE MAGAZINE

"WHEN OUR flight of three A-7s got to the target area in Laos, three F-4s were working it with laser-guided bombs. They were going after a bridge and had damaged it extensively before their fuel ran low and they had to leave.

"Then the FAC put us on the bridge. One of our pilots was a first lieutenant on his second mission in SEA—the second time he had ever dropped bombs in combat. We destroyed that bridge with three bombs.

"Next, the FAC gave us a bypass bridge about 100 meters down the river. We dropped it with two bombs and went over to a ferry crossing on another river. With three bombs, we destroyed the ferry cable, the dock, and the ferry.

" 'Okay,' the FAC said, 'I've got

THE A-7D IN COMBAT

only one more bridge.' We went down to that bridge and destroyed it with three bombs. Fantastic!"

The A-7D mission that Capt. Buddy Sizemore—a pilot of the 354th Tac Fighter Wing out of Myrtle Beach AFB, S. C.—described may not have been exactly typical, but it wasn't all that untypical of the wing's experience in Southeast Asia, either. And Captain Sizemore's "Fantastic!" is the judgment of a pilot who had been there before. Earlier in the war, he flew a tour in F-4s, based at Phu Cat.

High Accuracy, Low Losses

If you didn't know that USAF had an A-7D wing in SEA during the closing months of the Vietnam War, you're forgiven. Despite the remarkable record of the 354th TFW and its A-7D "Little Hummer," they got scant notice in the press. But they were there, all right.

The wing, then commanded by Col. Thomas M. Knoles, arrived at Korat Royal Thai AFB in mid-October 1972. Its seventy-two birds flew some 4,000 sorties between October 16 and the end of December, when the Linebacker II bombing campaign ended US participation in the Vietnam War. A squadron of the 354th is still there, along with one squadron from the 355th TFW, Davis-Monthan AFB, Ariz., both under Col. William D. Curry, now the 354th Wing Commander.

Although neither Guinness nor anybody else keeps record books on tactical fighter wing achievements, the 354th TFW must have set a lot of new marks. Its deployment from Myrtle Beach to Korat set the tone for the entire operation. Col. John Rhemann—then Wing Deputy for Operations and now Wing Commander Rear, back from SEA and running the show at Myrtle Beach—said, "This was one of the few times in Air Force history that a wing of fighter aircraft departed the US and arrived at its overseas destination with all aircraft on schedule."

During its ten weeks of combat in 1972, the wing—operating at a 0.87 frag rate for its seventy-two aircraft, which comes out to sixty-two sorties a day—dropped nearly 25,000 bombs, most of them Mark 82 500-pounders. According to FACs and other interested observers of bombing accuracy, they probably had an average miss distance of about ten meters.

Capt. Harry G. Rodman is a FAC who worked the 354th A-7s, mostly against interdiction targets. He's now stationed at Hurlburt Field, Fla., with the 549th Tactical Air Support Training Squadron. Captain Rodman says that the A-7D "was tremendously accurate. You could depend on the weapon system to put an iron bomb exactly where you wanted it—an unguided system that could be used with confidence against point targets. When all its systems were operating, it was nearly as accurate as guided bombs."

Against all kinds of targets—trucks, storage sites, ammunition caches—the wing averaged close to twenty-five percent secondary explosions, significantly higher by estimates of experienced pilots than normally scored by other tactical fighters.

The A-7D proved to be reliable and easy to maintain. It had a ground abort rate of 0.3 percent and an air abort rate of 0.5 percent. Tactical Air Command's "acceptable" rate is 5.0 percent.

Perhaps most remarkable of all was the A-7D's combat loss rate. The 354th was fragged against all kinds of targets in South Vietnam, Laos, and Cambodia, with emphasis on generally well-defended interdiction targets. During Linebacker II, they supplied the bulk of the daytime strike force, hitting undisclosed targets—some of them near downtown Hanoi—requiring extreme accuracy. The wing lost only two aircraft in its combat operations. One of the pilots was captured and subsequently returned when the POWs were released by North Vietnam. The other, regrettably, was killed.

The A-7D's Smarts

What accounts for the 354th TFW's unprecedented accuracy in delivering unguided bombs and for its combat loss rate, which must be the lowest in the history of tactical fighter operations? Ask any A-7D pilot, and he'll tell you it was the airplane—not the pilots.

Even though fighter pilots are not noted for their modesty, we'll discount that statement. With two or three exceptions, all of the 354th pilots who flew in SEA were old hands. Most of them had at least one previous SEA tour in F-100s, F-105s, or F-4s. The same goes for the rated members of the wing staff and the squadron commanders who led missions. And they all had a good bit of A-7 time in the States. You don't write off that kind of experience as a neutral factor.

Nevertheless, a large share of the credit must go to the bird itself. Its electronic systems were described in some detail by Capt. Tom Ryan, a 354th pilot, in an article, "A-7D—That Super-Accurate SLUF," published in our March 1972 issue. The systems include forward-looking radar, Doppler, an Inertial Measurement System, and a radar altimeter. The information supplied by these systems is digested by a tactical computer and displayed on a Projected Map Display System (a map in the cockpit on which the aircraft's precise position is continuously indicated) and on a Head-Up Display (HUD) projected on the windscreen, which gives the pilot all information he needs to control the aircraft and deliver bombs or 20-mm shells on target. The systems can be used for accurate straight-and-level bombing from medium altitude, radar offset bombing, com-

puted gunfire, and for dive-bombing—the most accurate bomb delivery mode.

One of the beautiful things about the Little Hummer's systems is the flexibility they give a pilot in his dive-bombing run. After the navigation systems have led him to the target area, all he has to do is identify the target, then, looking through the Head-Up Display on his windscreen, put the HUD's aiming symbol on the target and press a "designator" button on the stick. The computer almost instantaneously figures out the point in space where bombs must be released to hit the target. The pilot can take evasive action all the way down the chute until the aiming symbol meets the target. At that point, he levels his wings for "about three seconds," pickles the bomb, and pulls off the target. Bull's-eye or a near miss! No more worries about parameters of airspeed, dive angle, release altitude, which have always demanded so much of a pilot's attention, kept his head in the cockpit, and made him a predictable target for enemy gunners.

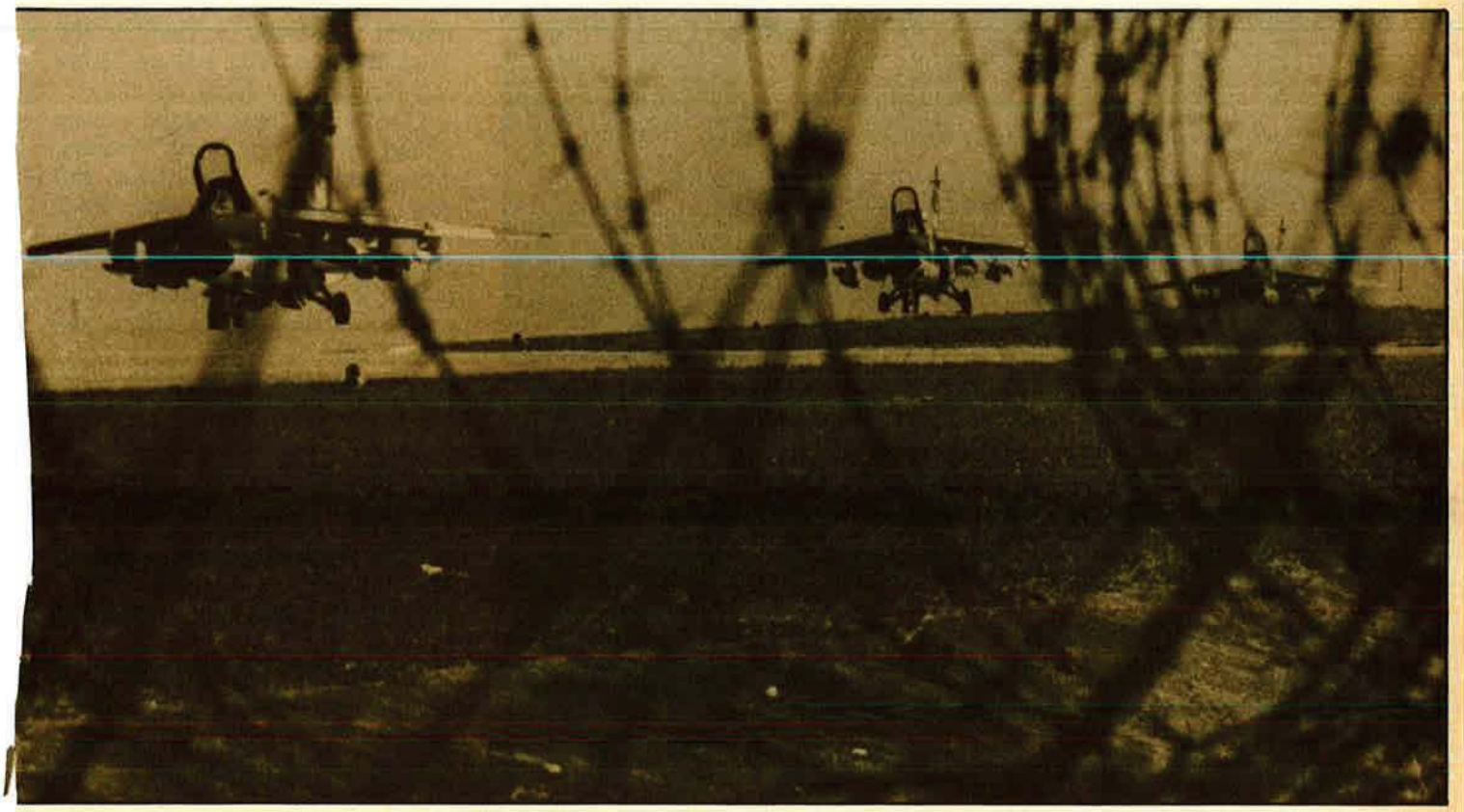
Stay High, Stay Safe

Except in cases where they had to go low in order to identify a target, the 354th pilots released from altitudes between 5,000 and 7,000 feet—well above the effective range of small-arms fire and most enemy AAA. So the A-7D's electronic systems in the hands of competent pilots came up with unequalled accuracy and survivability.

Here's how Lt. Col. Charlie Copin, Commander of the wing's 356th Squadron, put it: "My job as a squadron commander was to make sure that targets were hit and that the airplanes came back so they could be used again the next day. It was damned nice to be able to put a 3,000-foot-above-the-ground minimum altitude restriction on my pilots, knowing that they could hit the target without getting down in the weeds. It was the *airplane*, not the pilots, that allowed us to do that."

The A-7's accuracy did create an educating job for the pilots. "We had to get the FACs to not talk in general terms," Captain Sizemore said. "They would say, 'Okay, fifty meters west of my smoke.' You'd drop a bomb and the FAC would say, 'Now ten meters east.' We had to tell them, 'Hey, wait a minute. I see a tree on a rocky point. Where do you want it in relation to that?' We had to educate them to use specific points."

Should the A-7 be modified to carry laser or electro-optical guided bombs? Capt. Don Cornell doesn't think so. "To be realistic, LGBs are more accurate than the A-7's iron bombs. The difference in ac-



From Korat RTAFB, A-7s could reach Hanoi without tankers.

THE A-7D IN COMBAT

During Linebacker II, ammo handlers worked round the clock.

curacy isn't great, and it's not going to cost you as much to destroy a given target with the A-7 as with guided bombs."

Another virtue of the A-7D's systems was pointed out by Capt. Dave Sawyer. "The tac computer allows you to come in on a target from any direction, dive angle, and airspeed. With several A-7s working a target, each with different parameters, you really can keep the defenders busy. And you don't have to waste any time finding the target. All pilots know where it is from their systems. You can hit it and get out fast."

When operating on long missions, as they did in SEA, and for deployment, the A-7D's navigation system is a real boon. Captain Cornell said that occasionally, during the deployment to Korat, the KC-135s that refueled them over the Pacific would update their navigation systems from his. "I was less than a mile off course between Hawaii and Wake Island. This was entirely on the Inertial Measuring System, and without the Doppler, since we were over water."

Little Bird—Long Legs

Another plus for the A-7D—and for Seventh Air Force planners—was the length of the airplane's legs. Colonel Rhemann has a bunch of charts in his briefing room at Myrtle Beach AFB, centered on Korat RTAFB. They show the areas in which combat-loaded A-7Ds could operate without refueling from tankers—essentially all of Southeast Asia.

A typical configuration was for a mission with a 350-nautical-mile radius. That radius takes in all of western South Vietnam, North Vietnam to within about ninety miles of Hanoi, Cambodia, and Laos except for the extreme northern tip. Carrying two 300-gallon wing tanks, eight Mark 82 bombs, and 1,000 rounds of 20-mm ammunition, the bird had thirty minutes in the target area and 2,300 pounds of fuel reserve on return to Korat. By cutting the fuel reserve to 1,500 pounds, combat radius was increased to 480 nautical miles—well beyond Hanoi and Haiphong, without refueling.

Often a pilot was fragged against a target in southern South Vietnam, diverted to one in north Laos, and was still able to give the FAC twenty to thirty minutes in the target area without refueling. Some Linebacker II missions were flown without tanker support; on others, external tanks were left off in order to increase the A-7's bomb load, and tankers were used.

The A-7D's range came in handy in two other missions assigned to the 354th: search and rescue (more about that later), and night escort for the AC-130 Spectre gunships. Maj. Jack Terry believes that the A-7 was the best aircraft in SEA for gunship escort "because we could stay with them so long—about an hour and a half. When escorting the Spectres, we did flak suppression on the big guns," which was never a real fun job.

Did the wing do much night work? "No," said Lt. Col. Dave Eknes, the 355th Squadron Commander. "The A-7 is well adapted to night operations because of the precision of its systems, but we were limited by the number of aircraft we had over there. They wanted us in the daytime."

Search and Rescue

When the 354th went to SEA, they expected to be flying interdiction and close support. It turned out to be more interdiction than close support, largely because of the nature of the conflict at that time. Very few US ground forces were involved, and, during late 1972,

there were fewer troops in contact, so the number of true "close-support" sorties was considerably less than in previous years. Then they flew some bombing missions that could be classified as strategic during Linebacker II.

The big surprise, however, was being given the Sandy role in search and rescue (SAR) operations—locating and protecting downed airmen, covering the rescue helicopters, and coordinating action in the pickup area. That happened three weeks after their arrival at Korat, because the A-1s that had done the Sandy job throughout the Vietnam War were being turned over to the South Vietnamese Air Force.

"There was considerable skepticism about the A-7's suitability for the Sandy mission," Colonel Rhemann recalled. "We went into an extensive training program to develop new tactics. By comparison to the A-1, the A-7 is a relatively fast, high-performance aircraft. Tactics had to be changed significantly. We had a couple of pilots who had flown A-1 Sandys in SEA, and that helped.

"A week after taking over the Sandy job, our pilots participated in the pickup of two F-105 pilots near Thanh Hoa in some very marginal weather. It was a difficult mission, and, after that, there was little doubt that the A-7 was not just an adequate replacement for the A-1. It was far superior in that role."

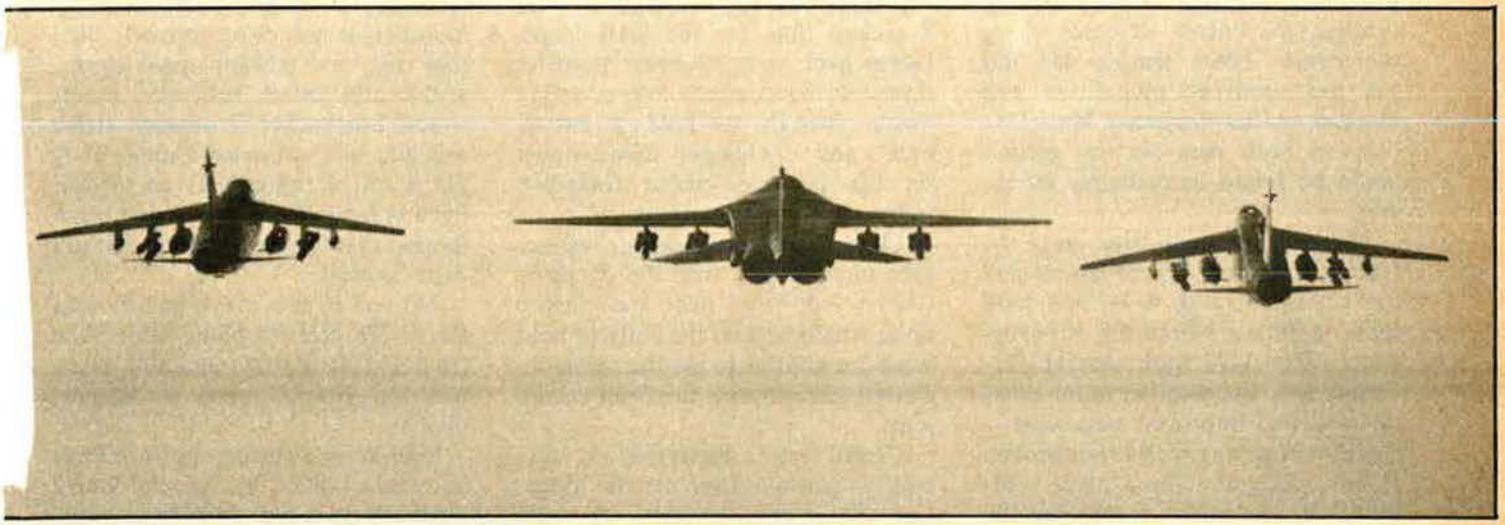
Before the air war ended eight weeks later, 354th Sandy pilots had taken part in the rescue of twenty-two downed flyers. The "difficult mission" Colonel Rhemann spoke about was certainly among the classics of the SAR business. Here is how it went:

An F-105 Wild Weasel had been hit by a SAM in the vicinity of Thanh Hoa, on the coast, some ninety miles south of Hanoi. The Weasel crew bailed out at about 11:00 p.m., landing at the base of the first ridge line west of the city. The following day, three of the 354th Sandys went up in very bad weather and got the survivors located, part way up the ridge line, but separated from each other.

A SAR force of about seventy-five aircraft was put together late that day and during the night by the Joint Rescue Coordination Center at Tan Son Nhut Air Base, near Saigon. It included F-105 Wild Weasels to suppress the SAMs around Thanh Hoa, F-4 Wolf FACs and F-4 MIG CAP aircraft, tankers, an HC-130 Kingbird (the mission coordinator), H-53 Jolly Green rescue helicopters, A-7Ds with smoke for screening purposes, and three 354th TFW Sandys. Pickup was set for first light the following day, with takeoff for the Sandys at 0430.

Maj. Colin A. "Arnie" Clarke, who was operations officer of the 354th TFW's SAR organization, led the Sandys. He has been awarded the Air Force Cross for his part in the show.

The Sandys rendezvoused with the Jolly Greens above a solid overcast along the Laos-North Vietnam border. While the Jollys held in orbit, Major Clarke and his wingmen worked east from the Plaine des Jarres in Laos, looking for a break in the overcast through which a chopper could let down. Approach from the Gulf of Tonkin seemed out of the question. The Thanh Hoa area was heavily defended by anti-aircraft guns and SAMs, while just north of the town was a MIG field.



Rare straight-and-level bombing mission on the wings of an F-111A.

Into the Valley

Major Clarke told his wingmen to hold while he let down several times into narrow valleys, trusting to the accuracy of his Projected Map Display and radar altimeter. Each time he broke out under very low ceilings, the valley proved too narrow to turn in, and ahead the

THE A-7D IN COMBAT

In SEA, the 354th's birds flew sixty hours of combat a month.

clouds closed down over rises in the ground.

Giving up on the valleys, Clarke climbed up on top, flew east, and let down over the Gulf to see if there was any way to work a Jolly through the enemy defenses along the coast. There wasn't. He did get the survivors pinpointed and marked on his Projected Map Display so both men on the ground could be found immediately on return.

Clarke now went back over the Gulf, picked up his wingmen and the smoke-carrying A-7s, and took them in to see where the survivors were. The A-7s took several .51-caliber hits. But weather in the pickup area had improved somewhat—2,500-foot ceiling with lower broken clouds, rain, and three miles' visibility. It was still too low for the supporting F-4s to use their delay-fuzed CBU antipersonnel bomblets against enemy gun positions. To the west, the only approach route for the choppers, it was still down in the valleys.

Everything pointed to an aborted mission. But Major Clarke "knew that the weather wouldn't be any better for days. The survivors couldn't last that long." Having been shot down himself on an earlier tour as an F-100 Misty FAC, he knew that it was now or never.

Going back west again, Major Clarke let down on instruments in a valley wide enough to turn in. While he orbited just above the ground, one of the Jollys did a DF letdown on him, but ran low on fuel, climbed back through the clouds, and headed for home.

The mission now was six hours old.

Two more Jollys came up from Nakhon Phanom and held while Clarke went out to a tanker for a rest and fuel. At that point, he set a pickup time for the SAR force. Going back west, he once more let down on instruments into a valley "wide enough to hold a two-G turn" and a chopper DFed down on his position—about forty-five miles west of the survivors.

Flying ahead and doing 360-degree turns to stay with the chopper, Clarke led it to near the pickup area, where he told the Jolly to hold while he went in to get the survivors alerted and suppress fire from enemy guns.

Clarke now discovered a .51-caliber gun position on the ridge, just above one survivor, who was hiding in tall brush. "A guy could have thrown a hand grenade from the gun pits onto the survivor." He and his wingmen, Captains Sawyer and Cornell, kept fire on the guns while the A-7 smoke birds laid down a screen.

By this time, there was a lot of lead flying around and a lot of chatter on the radio. The Jolly Green pilot decided to come in, unaware of the gun position close to one survivor. Miraculously, he made both pickups, then headed west, directly past the .51-gun pits.

Clarke made "a very low pass" on the guns to protect the Jolly and took a hit "by something that felt like a 57-mm." He lost all his systems and pulled up into the clouds "with what I hoped was wings level. About that time a SAM radar picked me up, and things didn't look too good." The SAM apparently didn't fire.

Clarke broke out on top, joined up with a couple of A-7s, and made an IFR landing at Da Nang, flying the wing of one A-7. Mission time: about nine hours.

The "57-mm hit" turned out to have been a .51-cal tracer that exploded one of his empty wing tanks, blowing in the side of the fuselage and bowing the underside of the wing.

That was one to remember.

Many Pluses—A Few Minuses

The 354th Tactical Fighter Wing was the first to try out the A-7D in combat. They went to Korat to fly interdiction and close support. That they did, and gunship night escort, search and rescue, helicopter escort—and Linebacker II daytime strike missions in and around Hanoi. They did a lot of things that no tactical fighters have done before, and some things that other fighters haven't done as well.

No one in the 354th bad-mouths the A-7D. Not the pilots, who came from F-100, F-105, and F-4 units. Not the ground crews or support people.

Like every airplane, the A-7D has its faults—like its ground-loving tendency on a hot, 105-degree runway with a full load—but they're few compared to its virtues. And, so far as runway length is concerned, Charlie Copin pointed out that "where you don't have to fly as far to target as we did in SEA, you can leave off the wing tanks, carry the same bomb load, and reduce take-off roll by 3,000 feet."

If they could redesign the A-7D, how would they change it? More power? Of course. Every pilot wants that in any airplane. A bigger gun? Maybe, but if you can hit a tank with bombs on the first pass, do you really need a bigger gun?

Anything else?

After a long pause, Capt. Don Cornell replied, "I guess about the only thing I'd do would be to make it a little prettier."

And that just about sums up the 354th Tactical Fighter Wing's feeling of affection for its Little Hummer. ■

Interview With USAF's Surgeon General

Policy-makers and planners are hard at work on the problem of finding enough health-care people to meet projected shortages now that the draft—either directly or indirectly DoD's primary source of physicians—has ended. In an exclusive interview with AIR FORCE Magazine, Lt. Gen. (Dr.) Robert A. Patterson tells what is being done and what lies ahead in the challenging task of . . .

HOLDING THE LINE ON USAF HEALTH CARE

"WE'RE JUST BEGINNING TO SEE A SHORTAGE OF DOCTORS IN THE AIR FORCE." —GENERAL PATTERSON

By Maj. Robert W. Hunter, USAF
CONTRIBUTING EDITOR, AIR FORCE MAGAZINE

THE medical benefits that go with military service are generally considered to be the most important of all "fringe" benefits. Yet, there are indications that, unless some way is found to replace the draft as a source of medical personnel, that benefit may be undermined.

According to DoD sources, when the all-volunteer force was first envisioned, health-care personnel were not included. Their exclusion was soon dropped as politically infeasible discrimination. Nonetheless, the problem was of such concern that, as late as this past spring, the question was reexamined. The goal of an all-volunteer health force was again affirmed.

To gain some perspective on what's ahead in the Air Force health-care situation, AIR FORCE Magazine interviewed Lt. Gen. (Dr.) Robert A. Patterson, Surgeon General of the Air Force.

Shortages Forecast

"We're just beginning to see a shortage of doctors in the Air Force because the draft has just ended. We, of course, have depended on the draft to keep us up to strength. It would appear that, unless we can get some substitute for the draft, in the form of supplemental pay, for example, *serious* shortages will exist," the General said. "Right now, we're looking at a shortage of 439 doctors by the end of FY '74. This will mean some reduction in services, which will hit the retiree and his dependents first."

The Air Force's Medical Work Load
(Calendar Year 1972)

Inpatient Admissions	318,890
Number of Births	39,340
Outpatient Visits	16,506,198
Immunizations	4,923,292
Prescriptions Filled	19,564,952
Flight Physical Exams	168,776
Other Complete Physical Exams	484,439

Air Force Medical Service Strength
(Assigned as of Dec. 31, 1972)

Medical Corps	3,792
Dental Corps	1,668
Veterinary Corps	358
Medical Service Corps	1,523
Nurse Corps	3,866
Biomedical Sciences Corps	1,144
Enlisted	
Medical	23,012
Dental	3,370
Civilians (authorized)	9,125
Hospitals	
CONUS	75
Overseas (incl. Alaska and Hawaii)	35
Clinics	
CONUS	21
Overseas	21

The situation is compounded by the fact that projected shortages are not a question of numbers alone. "Medicine has become more and more specialized over the years, and it's a question of getting the right specialties within the overall number of physicians needed," the Surgeon General explained.

General Patterson pointed out that the Air Force has had a shortage of General Medical Officers (GMOs) for some time. In fact, there are only enough GMOs to staff about fifty percent of the authorized positions. Now specialties—obstetrics-gynecology (OB-GYN), pediatrics, and psychiatry in particular—are forecast to become critical. (Last year USAF closed twelve OB-GYN services. Ten more ceased operation on June 30 of this year. The bases affected in the June 30 closings were: Chanute, Columbus, Forbes, Griffiss, Grissom, Myrtle Beach, Patrick, Plattsburgh, Reese, and Webb Air Force Bases.)

"The primary inducement for doctors to join the Air Force has been a draft deferment until they got their specialty training. That system was the Berry Plan. With the end of the draft, there's less incentive to sign up, and in the Air Force we've had insufficient 'Berry-Planners' to fill our needs," according to the General.

In General Patterson's view, "Unless we are able to continue a well-balanced, professionally acceptable medical service, we will be in a crisis. If elements [specialties] of that service are peeled off and all we do is care for a group of healthy males between twenty and fifty years of age, we will have an impossible task in obtaining physicians and other health-care personnel."

The Surgeon General amplified a problem, which is not peculiar to the services: "In 1970, a very small percentage of doctors went into general practice nationally. Yet, there is a tremendous need, in and out of the service, for people to do 'primary care.' It is these general practitioners who sort out illness and direct patients to the right specialist, when they cannot care for a medical need." General Medical Officers, he believes, can probably care for eighty to eighty-five percent of all illnesses. "At present, if a patient comes in with a pain, it's hard, without a General Medical Officer, to decide whether he should see a cardiologist or a surgeon, for example," General Patterson added. One consequence of this shortage is that members of a hospital's specialty staff are often called on to practice general medicine.

The larger society also has another problem not yet significant in the Air Force—inadequate geographical distribution of physicians. While the Air Force can control distribution by its assignment policies, the General said that USAF wants more stability in assignments, and so this potential problem cannot be ignored. In closing OB-GYN services, for example, medical planners had to search for areas in which that kind of civilian care was available.

What Is Being Done

A number of actions are being taken to deal with shortages that may be created by a zero draft. First among these is the physicians' bonus, part of the Uniformed Services Special Pay Act of 1973 sent to Congress on April 2, 1973. Last year, a similar bill sailed through the House with some modification, but the Senate did not take up a similar measure be-

fore adjournment of the 92d Congress. In last year's bill, DoD proposed a bonus for doctors of up to $17,000 a year. The House cut that to $12,000. This year, DoD has asked for a bonus of $15,000.

The bonus would be flexible, giving broad power to the Service Secretaries as to whom it would be paid. Present planning calls for the money to be used for physicians, dentists, veterinarians, optometrists, and clinical psychologists.

As General Patterson pointed out, "We know that there is a significant disparity in pay between military and civilian physicians. We're hopeful a bonus will meet our needs and overcome a zero draft."

Another proposed change to the health-force pay structure would delete "specialty pay" for veterinarians and optometrists who enter the services after enactment of legislation. According to DoD sources, these specialties are comparable in salary, especially in the field grades, to civilian practice.

Other actions are being taken, but, as Dr. Patterson noted, their impact is still several years down the road. For example, 5,000 annual scholarships—most for doctors and dentists—are now available under the Health Professions Scholarship Program. In addition, DoD's medical school—the Uniformed Services University of the Health Sciences—is due to graduate its first 100 students in 1982. The University's Board of Regents has been appointed, a site-selection committee chosen, and a dean is soon to be selected.

The Air Force is also working to upgrade its clinics, by providing more examining rooms and more working space for doctors. A growing use of physicians' assistants and nurse clinicians—such as the Pediatric Nurse Practitioner and OB-GYN nurses—should also help. OB-GYN nurses would perform, among other duties, routine cancer screening procedures, freeing the physician for more complex procedures. Malcolm Grow USAF Medical Center, Andrews AFB, Md., has begun a Nurse-Midwifery Residency Training Program. This new program is nine months long and is based on guidelines established by the American College of Nurse-Midwives in coordination with the American College of Obstetrics and Gynecology.

Still another new program is being tested at Homestead AFB, Fla. It is a family-doctor system in which the physician would assume full and continuing responsibility for comprehensive medical care to all members of a family. This would include the consultation of specialists when appropriate. Doctors for this program are now being trained at Andrews AFB, Md., at Wright-Patterson AFB, Ohio, and at Scott AFB, Ill.

Maj. Robert W. Hunter interviewed General Patterson prior to completion of his tour with AIR FORCE Magazine under the Air Force Education With Industry (EWI) program. A Distinguished AFROTC Graduate of Holy Cross College and of the Air Command and Staff College, and a top graduate of DoD's Information School, Major Hunter also holds a master's degree in sociology from the University of Denver. He is now serving as Deputy Assistant for Policy and Programs in the Internal Information Division at Air Force Headquarters.

USAF Recruiting Service is also at work. Its personnel are trying out a team concept of recruiting that is expected to attract 2,500 health professionals in FY '74. A twenty-eight-man Medical Personnel Recruiting Division at Randolph AFB, Tex., will work with twenty-one field teams located near 200 medical and dental schools in the US. The division will process applications from any area. The field teams will each have two or three Medical Service Corps officers and seasoned recruiters.

Dependent Care and CHAMPUS

With about forty percent of the Air Force patient load consisting of dependents (about ten percent are retired; fifty percent active duty), the question arises whether dependent medical care will be cut back if shortages are not met. "The shortage we are looking at now does not call for a cessation of active-duty dependent care. It just says we can't do all we've done in the past," the Surgeon General explained. The closing of OB-GYN services is just one example. By law, medical care is to

be given to active-duty personnel, then to dependents, and finally to retirees on a space-available basis.

Dependent care was made a legal right in 1956 with passage of the CHAMPUS (Civilian Health and Medical Program of the Uniformed Services) law. In 1966, the entitlement was modified to require that a dependent living with a sponsor within thirty miles of a military medical facility obtain certification that military medical care is not available. One might expect that, if the Air Force's in-house capability decreases, CHAMPUS will play a bigger role. "However," General Patterson said, "the Air Force has facilities where civilian care is *not* available. Our pattern of care will have to be laid against what is available in civilian communities and in accordance with statutory priorities."

As evidence that CHAMPUS is generally well understood and the mechanisms for receiving CHAMPUS care functioning, the Surgeon General pointed out that, in 1968, the Air Force spent $41.9 million on CHAMPUS care. That figure rose to $96 million in 1971 and is projected to be about $130 million for 1972 and $164 million for 1973. It takes about two years to get all the bills in and paid. The Department of Defense is the executive agent for CHAMPUS.

Significant in these rising costs has been the broadened scope of benefits. For example, many handicapped, semichronic, and psychiatric cases are now covered, as well as some developmental child defects. "There is also an increased sophistication in medical care in this country generally," Dr. Patterson said. "There is a greater demand for medical care by everybody."

GENERAL PATTERSON: "THE AIR FORCE HAS FACILITIES WHERE CIVILIAN CARE IS NOT AVAILABLE."

A Healthy Force and Career Doctors

How healthy is the Air Force? "Outstandingly healthy," the General said. Good health of the force is a function of four factors, he believes. First, entry standards keep out the physically unfit. Second, the force is young. Thus, one might expect less serious or chronic illnesses. Third, the Air Force has a comprehensive preventive-medicine program. There are good public-health procedures on bases, and the base is a controlled environment in which procedures are well established for checking industrial hazards and the like. Finally, since Air Force health care is not an economic burden to the individual, early care in any disease process is the rule, rather than the exception.

What kind of doctor makes the Air Force a career? According to General Patterson, "One who has had some exposure to military life either before entering or during some phase of training; exposure that has led him to develop an affinity for the military life-style." The General believes that most career doctors feel they are contributing to society in a professionally rewarding job. As for noncareer doctors, "By and large, the physicians we've had on active duty for a two-year period have been outstanding doctors who have done a fine job and made a contribution to their country," General Patterson observed.

Vietnam Lessons

AIR FORCE Magazine asked what lessons had been learned in Vietnam. "It is clear," the Doctor said, "that the ability to move patients directly from the point of injury to a nearby medical facility by helicopter is of tremendous importance in reducing mortality and morbidity. We have developed an optimum schedule for moving patients from the site of injury to a surgical unit, then on to an area of stabilization, and finally to a facility for long-term care."

Lessons in vascular surgery were relearned—*e.g.,* the high-energy cavitational effects produced by high-velocity missiles upon tissue, the importance of early repair of vascular injuries, and the meticulous handling of tissue. The above factors plus the utilization of vein autografts and the availability of vascular prostheses greatly reduced the morbidity and mortality of patients with vascular injuries, when compared with similar statistics of earlier wars.

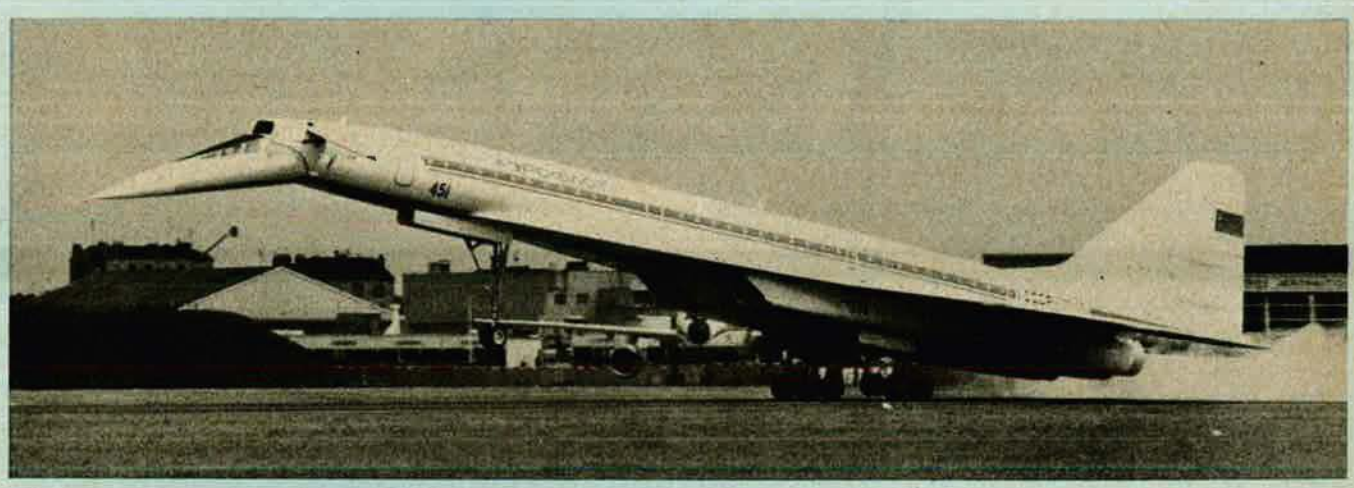
The treatment of acute renal insufficiency was greatly enhanced in Vietnam by the availability and utilization of hemodialysis (artificial kidney). This is the first conflict in which such sophisticated medical equipment has been readily available to the injured soldier. The use of whole blood, either fresh or frozen, made immediately available, also was of major importance in saving lives.

"We relearned a lot of lessons, of course; the treatment of malaria, for example. And we have made great progress in our knowledge of how to treat massive injuries and burns."

So, despite shortages verging on crisis proportion, there is room for some optimism. The Air Force is doing all it can to make an all-volunteer health-care force work. There are some unknowns. One cannot, for example, judge the efficacy of the physicians' bonus until it has been in effect for a reasonable time. Meanwhile, the Air Force is streamlining and modernizing its health services, making them more relevant to new demands in medicine, and more accessible to the patient. ■

JANE'S

ALL THE WORLD'S AIRCRAFT SUPPLEMENT



Production version of the Tupolev Tu-144 supersonic transport (Air Portraits)

TUPOLEV
TUPOLEV DESIGN BUREAU; USSR

TUPOLEV Tu-144
NATO Code Name: "Charger"

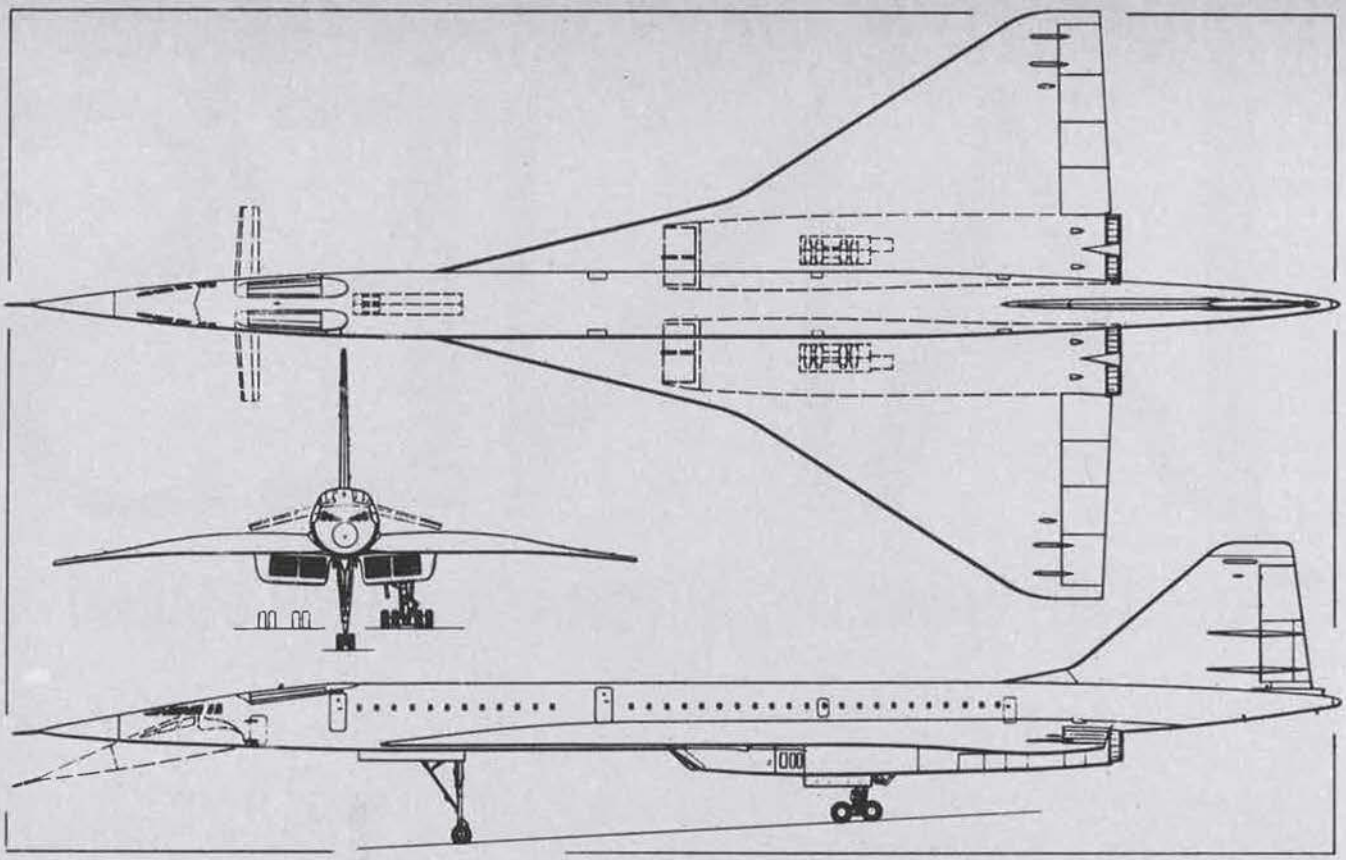
Since this supersonic transport aircraft was first shown in model form at the 1965 Paris *Salon de l'Aéronautique*, it has undergone considerable development. Its general configuration has become increasingly similar to that of the Anglo-French Concorde, with a fully-cambered delta wing and large underwing ducts for the four engines. However, it has larger overall dimensions than the Concorde and is intended to carry a slightly larger number of passengers initially, at higher cruising speeds. It also embodies in its production form retractable "moustache" foreplanes to enhance its take-off and landing characteristics.

Three airframes were laid down initially, plus a structure test version. In addition, an otherwise-standard MiG-21 was fitted with a scaled-down replica of the Tu-144's ogival wing, in place of its normal delta wing and horizontal tail surfaces. This aircraft made several dozen research flights, as a result of which modifications were made to the design of the full-size wing.

The first of two prototypes of the Tu-144 (CCCP-68001) was assembled and ground-tested at the Zhukovsky Plant, near Moscow, and flew for the first time on 31 December 1968, this being the first flight by a supersonic airliner anywhere in the world. Its landing gear remained extended throughout the 38-minute flight, as it did during the 50-minute second test flight on 8 January 1969. The crew comprised Eduard Elyan, pilot; Mikhail Kozlov, co-pilot; and two engineers. The pilots occupied upward-ejection seats, side by side on the flight deck. Two further escape hatches in the top of the fuselage further aft indicated the positions of the crew ejection seats.

On 5 June 1969, the Tu-144 exceeded Mach 1 for the first time, at a height of 36,000 ft (11,000 m), half-an-hour after take-off. Only a slight tremble was said to be discernible as it passed through the transonic region. On 26 May 1970 this prototype became the first commercial transport to exceed Mach 2, by flying at 1,160 knots (1,335 mph; 2,150 km/h) at a height of 53,475 ft (16,300 m) for several minutes. The pilot was again Eduard Elyan. Highest speed reported to date is Mach 2.4, probably with the aircraft in its production form. Normal in-service cruising speed is expected to be Mach 2.2 to 2.3.

At the first public showing of the Tu-144, at Sheremetyevo Airport, Moscow, on 21 May 1970, the Soviet Deputy Minister for the Aviation Industry, Alexander Kobzarev, said that series production had already started, at Voronezh. By May 1972 the prototype had logged a total of about 200 flying hours in nearly 150 flights, of which more than 100 hours were at supersonic speed. The second and third aircraft had each completed only a few flights at that time, and the Tu-144 will not enter scheduled passenger service before 1975, by which time it is expected that total flying time on the type will exceed 3,000 hours.



Tupolev Tu-144 supersonic airliner (four Kuznetsov NK-144 turbofan engines) (Pilot Press)

There are no pre-production Tu-144s, and the aircraft (CCCP-77102) exhibited at the 1973 Paris *Salon de l'Aéronautique* was No. 2 of the initial series production models, representing almost a total redesign by comparison with the prototypes, described and illustrated in the 1972–73 *Jane's*. Unless changes are necessary as a result of the enquiry into the loss of CCCP-77102 during its flight demonstration at Paris, no further major modifications are planned for the aircraft that will be operated eventually by Aeroflot.

Construction of the Tu-144 is mainly of VAD-23 light alloy, with extensive use of integrally-stiffened panels, produced by both chemical milling and machining from solid metal. Stainless steel and titanium are used for the leading-edges, elevons, rudder, and undersurface of the rear fuselage, and the aircraft is stated to embody 10,000 parts made of plastics.

The wings have a "double-delta" planform, with a sweepback in the order of 76° on the inboard portions and 57° on the main panels. The prototype had marked conical camber on the highly-swept inboard leading-edges, but flat trailing-edges. The production aircraft has wings increased in span by nearly 4 ft (1.15 m) and cambered over the full area, with a downward-curving trailing-edge like that of the Concorde. The structure is multi-spar, with large honeycomb panels. The powered control surfaces consist of four separate elevons on each wing and a two-section rudder, each operated by two separate actuators.

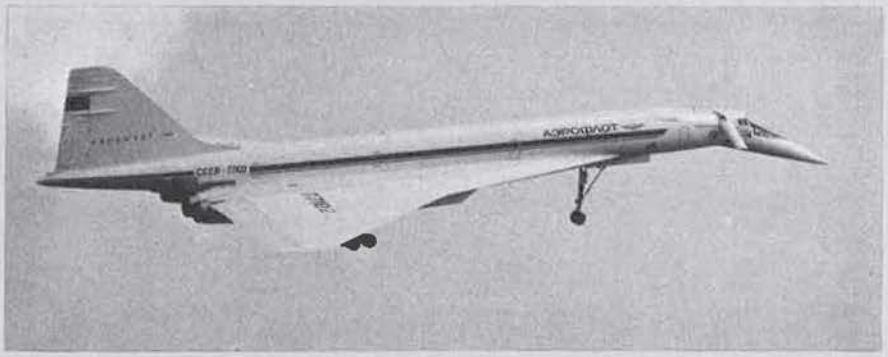
The fuselage (nearly 19 ft; 5.7 m longer on production aircraft) blends with the low-set wings, giving a flat undersurface that contributes to fuselage lift and directional stability. The number of cabin windows is increased from 25 each side on the prototype to 34 on production aircraft. There are doors forward of the passenger cabins and in the centre on the port side; the number of emergency exits has been increased from four to six.

The "moustache" foreplanes are pivoted from points near the top of the fuselage, immediately aft of the flight deck. Each has a double-slotted trailing-edge flap and a fixed leading-edge double-slat. The foreplanes retract rearward, protruding only a little externally but restricting to a narrow passage the space between flight deck and cabin. When extended they have anhedral but no sweep.

Following relocation of the engines *(see below)*, all three units of the landing gear have been redesigned. The twin-wheel steerable nose unit now retracts forward into the fuselage. Each main eight-wheel bogie (two rows of four, compared with three rows of four on prototype) now retracts forward and up into one of the engine ducts, between the divided air-intake trunks. This requires the bogie first to pivot sideways through 90° about the base of the leg, before retraction. Nosewheel tyres are size 950 x 300. The main wheels are fitted with size 950 x 400 tyres and quadruple steel disc brakes. All wheel-bays are thermally insulated, and the nosewheel tyres are blown with cooling air after retraction, throughout cruising flight.

The first flight of the Tu-144 prototype was also the first time that the Kuznetsov NK-144 turbofan engine had been tested in the air. At that time the engine max ratings were 28,660 lb (13,000 kg) st without reheat and 38,580 lb (17,500 kg) with full reheat; and the four turbofans were mounted side by side in the rear of a single large underbelly duct with bifurcated twin intake trunks. On production aircraft the rating with full reheat has been increased to 44,090 lb (20,000 kg) st, and the engines are paired in two separate ducts, further outboard. As before, each intake trunk contains a central vertical wall, giving an individual flow of air to each engine. The intakes have fully-

Retractable foreplanes enhance the take-off and landing performance of the production Tu-144 (Air Portraits)



automatic movable ramps, with manual reversion, and with airflow dump doors midway from the inlet to the engines. Reheat is normally maintained at 30% to 40% of its maximum additional thrust throughout cruising flight. No thrust reversers are installed, but a twin brake-parachute is fitted solely for use on short runways.

Total fuel capacity has been increased from 154,325 lb (70,000 kg) on the prototype to about 176,370 lb (80,000 kg) on production aircraft, with a transfer tank in the fuselage tailcone to counterbalance CG movement in flight.

In service, a flight crew of three will normally be carried, consisting of two pilots and a flight engineer. The pilots have fully-adjustable, armchair-type seats. During cruising flight, their windscreen is faired in by a retractable visor that has bird-proof side windows and a "solid" top. The entire nose can be drooped for improved visibility during take-off and landing.

The basic interior layout is for a total of 140 passengers in three cabins. The front cabin contains 11 seats for first class passengers, basically three-abreast, with tables between the front two rows. It is divided by a movable partition from the forward tourist class cabin, which contains six rows of five-abreast seats, with the three-seat units on the starboard side of the centre aisle. The rear tourist class cabin contains 15 rows of five-abreast seating at the front and six rows of four-abreast seating at the rear. Seat pitch is normally 41.3 in (105 cm) for first class and 34.25 in (87 cm) for tourist class; but alternative layouts are available, and the production Tu-144 shown at Paris in 1973 contained fewer than 100 seats.

Forward of the passenger accommodation there are toilet (port) and cloakroom compartments (starboard), with a bench seat for two cabin staff by the forward door. A second cloakroom, toilet, and buffet kitchen are located between the two tourist class cabins, with two further toilets at the rear. Aft of these, in line with the engines, is a large compartment for containerised baggage and freight, which are loaded and unloaded semi-automatically through a large door on the starboard side of the hold, at the rear. There are no underfloor holds.

Little information is yet available on aircraft systems. The prototype had three independent hydraulic systems and two separate systems for pressurisation and air-conditioning. Preparation for flight, ground air-conditioning, and engine starting can be performed independently of airport services. Advanced automatic flight control and navigation systems are standard, with the intention of progressing eventually to full automatic landing under all weather conditions. Six landing and taxi lights are mounted on the nosewheel leg.

DIMENSIONS, EXTERNAL:

Wing span	94 ft 6 in (28.80 m)
Length overall	215 ft 6½ in (65.70 m)
Height, wheels up	42 ft 2 in (12.85 m)
Wheel track	19 ft 10¼ in (6.05 m)
Wheelbase	64 ft 3½ in (19.60 m)

DIMENSION, INTERNAL:

Cabin: Headroom	6 ft 4 in (1.93 m)

WEIGHT:

Max T-O weight	396,830 lb (180,000 kg)

PERFORMANCE (nominal):

Max cruising speed	Mach 2.35 (1,350 knots; 1,550 mph; 2,500 km/h)
Normal cruising speed	Mach 2.2 (1,240 knots; 1,430 mph; 2,300 km/h)
Cruising height	52,500–59,000 ft (16,000–18,000 m)
T-O speed	188 knots (217 mph; 350 km/h)
Landing speed	130 knots (150 mph; 240 km/h)
T-O run	6,240 ft (1,900 m)
Landing run	3,610 ft (1,100 m)
Max range with 140 passengers, at an average speed of Mach 1.9 (1,080 knots; 1,243 mph; 2,000 km/h)	3,500 nm (4,030 miles; 6,500 km)

The Tu-144's "moustache" foreplanes are pivoted from points near the top of the fuselage, immediately aft of the flight deck, and are retractable (Air Portraits)

KAMAN

KAMAN AEROSPACE CORPORATION; Head Office: Old Windsor Road, Bloomfield, Connecticut 06002, USA

KAMAN SEASPRITE

US Navy designations: UH-2 (formerly HU2K-1), HH-2, and SH-2

The prototype Seasprite flew for the first time on 2 July 1959, and the following versions have since been produced for the US Navy:

UH-2A. Initial production version. Entered US Navy service on 18 December 1962, when deliveries began to Helicopter Utility Squadron 2. First shipboard service as HU-2 Detachment 62 on USS *Independence* on 4 June 1963. Total of 88 built.

UH-2B. Development of UH-2A, for operation under VFR conditions. Differed only in the non-installation of certain electronic navigation equipment, although provision for fitting this equipment was retained. Entered shipboard service with Detachment 46 of HU-4, on USS *Albany*, on 8 August 1963. Total of 102 built. All single-engined A and B models have been converted to twin-engine configuration, the last being delivered from the Pensacola, Florida, SAR detachment in early 1972.

UH-2C. Seasprites were converted to twin-engined configuration, with this designation, under a US Navy contract. Each has two 1,250 shp General Electric T58-GE-8B turboshaft engines in place of the former single T58. Deliveries began in August 1967, and about 100 had been delivered by the end of 1970, including HH-2Cs and HH-2Ds *(see below)*.

NUH-2C. Designation of a single UH-2C modified to have launch racks for Sparrow III and Sidewinder missiles, and fire directional control equipment. Tests were carried out at the US Navy's Pacific Missile Range at Point Mugu, California, by the Naval Air Test Center and the Raytheon Company, of Bedford, Massachusetts, to evaluate the helicopter as a missile launch platform with a view to enhancing its combat capability for the LAMPS ASMD mission.

HH-2C. Armed and armoured version of the standard UH-2C for search and rescue missions. It differed from the UH-2C by having a chin-mounted Minigun turret, waist-mounted machine-guns, extensive armour around the cockpit and other vital areas, a four-blade tail rotor, dual wheels on the main landing gear, and a transmission uprating and gross weight increase to 12,500 lb (5,670 kg). Six of these aircraft were delivered to the US Navy for combat search and rescue operations from DLGs in Southeast Asia. Helicopter Combat Support Squadron 7 (HC-7), NAS Imperial Beach, California, and Subic Point, Republic of the Philippines, which had operated HH-2Cs (and earlier armed UH-2A/Bs) from frigates in the Gulf of Tonkin, retired these machines at the beginning of 1972. All have been converted to SH-2s.

HH-2D. Announced late in 1969, this version was identical to the HH-2C, except that the armament and armour were deleted. A total of 67 HH-2Ds were retrofitted from earlier single-engine models, and deliveries to the US Navy, at NAS Lakehurst, New Jersey, began in February 1970.

Two HH-2Ds were modified in 1971 at the US Navy's Air Development Center,

Kaman NUH-2C Seasprite, a one-off modification of the UH-2C to carry Sparrow III or Sidewinder missiles, seen here with a Sparrow

Kaman HH-2D modified for test-flying Cubic Corporation's retractable radar antenna in an inflatable radome

Warminster, Pennsylvania, for preliminary testing in the ASMD (anti-ship missile defence) portion of the LAMPS mission. These aircraft, each fitted with a Texas Instruments APS-115 experimental undernose radar (instead of the Canadian Marconi LN 66HP fitted to the first 20 LAMPS SH-2Ds), were tested on board the USS *Fox* on the US west coast under the Navy's DV-98 programme. Also under this programme, two more HH-2Ds were modified for ASW tests on board the USS *Wainwright* and USS *Belknap* on the East coast. The systems tested were embodied subsequently into Kaman's LAMPS SH-2Ds.

An HH-2D was also used to test a large-aperture retractable radar antenna in an inflatable radome configuration designed and developed by Cubic Corporation of San Diego, California. Suitable for use with the Canadian Marconi LN 66HP radar system, it is inflated by engine bleed air and, when extended, has a diameter of 6 ft 8 in (2.03 m) and depth of 4 ft 4 in (1.32 m).

SH-2D. LAMPS (Light Airborne Multi-Purpose System) version of the HH-2D, for ASW and anti-ship missile defence. The US Navy announced in October 1970 the award of a $2 million contract to Kaman Aerospace for the modification of 10 HH-2Ds, and 10 more were ordered in July 1971. The first SH-2D made its first flight at Bloomfield, Connecticut, on 16 March 1971, and by March 1972 Kaman had completed the modification of the first 20 aircraft. This involved the installation of Canadian Marconi LN 66 high-power surface search radar in a glassfibre honeycomb dome under the chin; ASQ-81 MAD deployed by winch from a pylon on the starboard side of the fuselage; 15 active or passive sonobuoys launched by a small explosive charge from a removable rack on the port side; ALR-54 electronic support measures; eight Mk 25 marine flares/smoke markers; data link; tactical navigation system, and associated command/control units, recorders, displays, and antennae. Auxiliary fuel tank mounts on each side of the fuselage have been hardened for the added purpose of launching Mk 44 or Mk 46 ASW homing torpedoes.

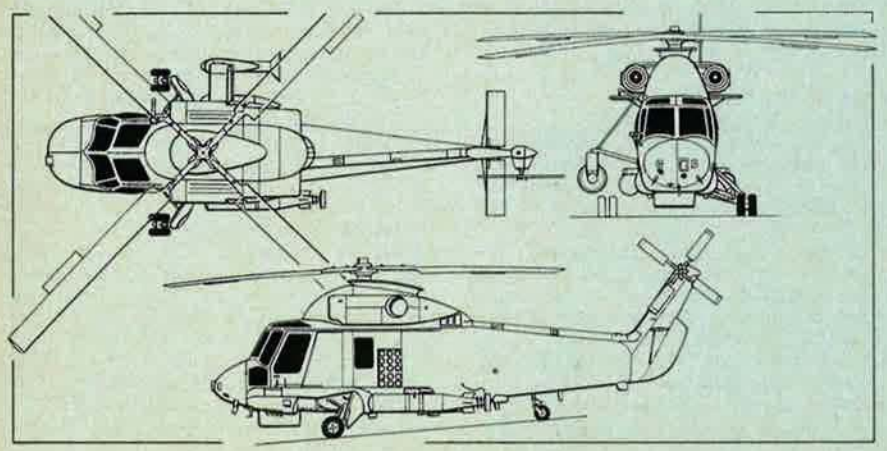
Kaman SH-2F, latest version of the Seasprite in LAMPS configuration

As the LAMPS helicopters became operational, the Navy reorganised two squadrons to provide detachments to fleet units and to train additional personnel to operate and maintain them. Helicopter Combat Support Squadron 4 (HC-4) at Naval Air Station Lakehurst, New Jersey, was renamed Helicopter Antisubmarine Squadron Light 30 (HSL-30), and HC-5 at NAS Imperial Beach, California, became HSL-31. Formation of additional HSL squadrons on the east and west coasts is scheduled for 1973.

Operational deployment of SH-2Ds began on 7 December 1971, with assignment of the first unit from HSL-30 to the guided missile frigate USS *Belknap* (DLG-26), the detachment reporting on board in Crete. The second detachment, from HSL-31, was assigned to the guided missile frigate USS *Sterett* (DLG-31) and deployed to the Pacific in January 1972. The USS *Joseph Hewes* (DE-1078) was the first Atlantic Fleet ocean escort of the DE-1052 "Knox" class to become operational with a LAMPS detachment, and the USS *Harold E. Holt* (DE-1074) was the first of this class in the Pacific. First DE-1040 "Garcia" class escorts operational with LAMPS will be the USS *Brumby* (DE-1044) in the Atlantic and the USS *Bradley* (DE-1041) in the Pacific. By the end of 1972, 12 LAMPS detachments had been deployed (not simultaneously) in the Mediterranean and the Pacific.

YSH-2E. While delivery of the first 20 SH-2Ds was being completed, Kaman also delivered in March 1972 two HH-2Ds modified with a new type of radar and other improved LAMPS sensors. These aircraft were designated YSH-2E and were assigned to HC-5 (now HSL-31) at Imperial Beach NAS for testing on board the USS *Fox* (DLG-33) in the Pacific. With their specialised equipment, these aircraft were to have been forerunners of a growth version of LAMPS, designated Mk II, with successive LAMPS H-2s similarly configured. On the basis of data provided by operations from the *Fox*, the Navy cancelled the Mk II configuration, and utilised the information in drawing up specifications for a Mk III LAMPS, inviting helicopter companies to

Kaman SH-2F Seasprite Light Airborne Multi-Purpose System (LAMPS) helicopter (Pilot Press)



submit updated proposals for a new-generation LAMPS aircraft. The two YSH-2Es were returned to Naval Air Development Center, Warminster, Pennsylvania, in November 1972 for further testing, and may be recycled eventually into the LAMPS modification programme.

SH-2F. In February 1973, Kaman announced the receipt of additional Navy contracts for the third increment of 25 LAMPS helicopters and long lead time funding for a fourth increment of 30 more, bringing to 75 the number committed to LAMPS. It is expected that the final 30 H-2s available in fleet inventory will be authorised for conversion in FY 1975. Aircraft in the third, fourth, and subsequent increments, like those already delivered, will be standardised in the SH-2F configuration. Deliveries of the 25 SH-2Fs in the third increment were scheduled for the period March–November 1973.

The SH-2F is fitted with Kaman's "101" rotor, developed through funding by both the company and the US Navy and qualified for installation on the entire H-2 inventory. This rotor provides substantially improved performance in all flight regimes, while practically eliminating rotor vibrations at all speeds and weights, thus improving system reliability and maintainability. The new simplified rotor control system utilises titanium hub and retention assemblies, reduces the number of control elements by two-thirds, and offers a 3,000-hour life from blade tip to blade tip.

Other features of the SH-2F include increased-strength landing gear; a shortened wheelbase by relocation of the tailwheel; twin 1,350 shp General Electric T58-GE-8F turboshaft engines; an improved LN 66HP radar, improved tactical navigation and communications systems, and other modifications. In January–February 1973 Kaman was testing the prototype for flight qualification to a maximum gross weight of 13,300 lb (6,033 kg), which is 800 lb (363 kg) more than the SH-2D. This may be utilised as increased payload, or in the form of additional fuel in larger auxiliary tanks to provide extended range and endurance.

The following details apply to the SH-2D and SH-2F versions of the Seasprite:

TYPE: Naval anti-submarine warfare and anti-missile defence helicopter, with secondary capability for search and rescue, observation, and utility missions.

ROTOR SYSTEM: Four-blade main and tail rotors. Blades of aluminium and glass-fibre construction, with servo-flap controls. Blades folded manually. Main rotor rpm 287. Performance figures below are for aircraft with the Kaman "101" rotor modification.

FUSELAGE: All-metal semi-monocoque structure, with flotation hull housing main fuel tanks. Nose fairing split on centre-line, to fold rearward on each side to reduce stowage space required. Fixed horizontal stabiliser on tail rotor pylon.

LANDING GEAR: Tailwheel type, with forward-retracting dual main wheels and non-retractable tailwheel. Liquid spring shock-absorbers.

POWER PLANT: Two 1,350 shp General Electric T58-GE-8F turboshaft engines, mounted on each side of rotor pylon structure. Normal fuel capacity of 396 US gallons (1,499 litres), including external auxiliary tanks with a capacity of 120 US gallons (454.6 litres).

ACCOMMODATION: Crew of three, consisting of pilot, co-pilot, and sensor operator. One passenger or litter patient with LAMPS equipment installed; four passengers or two litters with sonobuoy launcher removed. Provision for transportation of internal or external cargo.

DIMENSIONS, EXTERNAL:

Diameter of main rotor	44 ft 0 in (13.41 m)
Main rotor blade chord	21.6 in (55 cm)
Diameter of tail rotor	8 ft 2 in (2.49 m)
Tail rotor blade chord	9.3 in (23.6 cm)
Length overall (blades turning)	52 ft 7 in (16.03 m)
Length overall, nose and blades folded	38 ft 4 in (11.68 m)
Height overall (blades turning)	15 ft 6 in (4.72 m)
Height to top of rotor head	13 ft 5 in (4.09 m)
Stabiliser span	9 ft 9 in (2.97 m)
Wheel track (outer wheels)	10 ft 10 in (3.30 m)
Wheelbase:	
SH-2D	22 ft 7 in (6.88 m)
SH-2F	16 ft 9 in (5.11 m)

WEIGHTS:

Weight empty:	
SH-2D	6,953 lb (3,153 kg)
SH-2F	7,040 lb (3,193 kg)
Normal T-O weight:	
SH-2D	12,500 lb (5,670 kg)
Overload T-O weight:	
SH-2D, SH-2F*	12,800 lb (5,805 kg)

PERFORMANCE (at normal AUW, except where indicated):

Max level speed at S/L:	
SH-2D, SH-2F	143 knots (165 mph; 265 km/h)
Normal cruising speed	
SH-2D, SH-2F	130 knots (150 mph; 241 km/h)
Max rate of climb at S/L:	
SH-2D	2,440 ft (744 m)/min
Service ceiling:	
SH-2D	22,500 ft (6,858 m)
Hovering ceiling in ground effect:	
SH-2D	18,600 ft (5,670 m)
Hovering ceiling out of ground effect:	
SH-2D	15,400 ft (4,695 m)
Normal range with max fuel:	
SH-2D, SH-2F	367 nm (422 miles; 679 km)

*The SH-2F had not, at the time of writing, been certificated for operation at its design max T-O weight of 13,300 lb (6,033 kg).

DASSAULT/BREGUET

AVIONS MARCEL DASSAULT/BREGUET AVIATION; Head Office: 46 avenue Kléber, 75116-Paris, France

In November 1972, the French government cancelled further development work on the Dassault Super Etendard, which was under design evaluation as a replacement for the Etendards currently equipping French naval strike squadrons on the carriers *Clémenceau* and *Foch*. This decision was reversed after the Aéronavale selected the Super Etendard in preference to the Jaguar M or Skyhawk in January 1973; and on 23 March it was announced that the SNECMA Atar 8K-50 turbojet had been chosen to power the new strike fighter, rather than the Pratt & Whitney J52. Up to 100 Super Etendards are expected to be ordered, for service from 1977.

DASSAULT SUPER ETENDARD

The Super Etendard is being developed from the Dassault Etendard IV-M carrier-based strike fighter, which has served with operational squadrons of the French Navy since 1962. It will be a transonic single-seat aircraft, for low- and medium-altitude operations from ships of the *Clémenceau* and *Foch* class.

The general appearance of the Super Etendard is shown in the accompanying photograph of a model. Its structure will be about 90% similar to that of the Etendard, but it will be powered by a SNECMA Atar 8K-50 non-afterburning turbojet engine rated at 11,025 lb (5,000 kg) st. This offers a 7.5% reduction in specific fuel consumption at Mach 0.6 by comparison with the Atar 8C fitted in the earlier aircraft.

Very comprehensive high-lift devices will be installed. Armament will include two 30 mm guns, with provision for a wide variety of external air-to-surface and air-to-air weapons. Equipment will include a simple and accurate nav/attack integrated electronic system, utilising a multi-mode radar known as Agave *(Appareil de Guet pour Avion de Veille Embarqué)*, which is being developed jointly by Thomson-CSF and Electronique Marcel Dassault. Inherent long range will be increased by flight refuelling capability and, like the Etendard, the new fighter will be able to operate as a tanker for other aircraft.

No other details are yet available.

MARTIN MARIETTA

MARTIN MARIETTA CORPORATION; Aerospace Headquarters: International Club Building, 1800 K Street NW, Washington, DC 20006, USA

MARTIN MARIETTA X-24B

Martin Marietta has been engaged in lifting-body research and development since

Model of the Dassault Super Etendard carrier-based fighter ordered for the French Navy

Martin Marietta X-24B lifting-body research aircraft

1959, this work leading to the X-24A, which was described in the 1972–73 *Jane's*. NASA announced on 29 July 1971 that the X-24A was to be stripped down to its basic structure and rebuilt as the X-24B with completely new external lines. This work started in January 1972 and was completed in October of the same year. First flight of the X-24B was scheduled to take place in June 1973. The unique "double-delta" form of this wingless research aircraft, which is designed to be air-launched from beneath the wing of a B-52 "mother-plane", is shown in the accompanying illustration.

TYPE: Lifting-body research aircraft.

FUSELAGE: Light alloy structure, primarily of 2024 aluminium. Triangular cross-section, with flat bottom and rounded top. The whole of the fuselage is pressurised.

TAIL UNIT AND CONTROL SURFACES: Light alloy triple-finned tail unit. Fixed centre fin. Each outer fin carries a pair of split rudders. The upper rudders control the vehicle in yaw. The lower rudders are not controlled by the pilot but act as trim surfaces, positioning themselves automatically in proportion to the aircraft's speed. Upper and lower flaps at extreme tail, between fins, serve as elevators and for pitch trim. Ailerons, outboard of the fins, function for both roll and pitch control. All control surfaces are fully powered by irreversible dual hydraulic systems, and have thick trailing-edges. A redundant three-axis stability augmentation system is fitted.

LANDING GEAR: Manually-retracted tricycle type, pneumatically extended. Nose unit, with twin wheels, retracts forward. Main units, each with a single wheel, retract aft. All units have oleo-pneumatic shock-absorbers. Hydraulic disc brakes.

POWER PLANT: One 8,000 lb (3,625 kg) st Thiokol XLR-11 four-chamber regeneratively-cooled turbo-rocket engine. Cylindrical propellant tanks to contain the liquid oxygen and ethyl-alcohol-water mixture are housed longitudinally, side by side in the centre fuselage. Total propellant capacity 4,500 lb (2,041 kg). Two 400 lb (181 kg) st Bell LLRV optional landing rockets.

ACCOMMODATION: Pilot only on zero-zero ejection seat beneath jettisonable transparent bubble canopy, which is hinged at rear and opens upward and aft. Conventional control stick and rudder/brake pedals.

SYSTEMS: Air-conditioning and pressurisation system, with max differential of 3.5 lb/sq in (0.25 kg/cm²). Duplicated hydraulic system, pressure 3,000 lb/sq in (210 kg/cm²), for operation of flying control surfaces and brakes. Pneumatic system, pressure 3,000 lb/sq in (210 kg/cm²), for landing gear extension. All electrical power provided from storage battery. Oxygen system standard.

ELECTRONICS: Com transceiver.

DIMENSIONS, EXTERNAL:

Width overall	19 ft 2 in (5.84 m)
Length overall	37 ft 6 in (11.43 m)
Height overall	10 ft 4 in (3.15 m)

AREA:

Double-delta planform 330 sq ft (30.66 m²)

WEIGHTS:

Weight empty equipped, without propellants	7,800 lb (3,538 kg)
Max launching weight	13,000 lb (5,896 kg)

PERFORMANCE (estimated):

Max level speed at 60,000 ft (18,300 m)	868 knots (1,000 mph; 1,609 km/h)
Service ceiling	90,000 ft (27,430 m)

PATCHEN

MARVIN PATCHEN INC; Address: Aero Magazine, PO Box 1184, Ramona, California 92065, USA

PATCHEN EXPLORER/OBSERVER

In conjunction with *Aero* magazine, the former Thurston Aircraft Corporation designed and began constructing a prototype of a landplane version of the TSC-1A1 Teal under the designation TSC-2 Explorer. Following acquisition of all rights in the Teal by Schweizer Aircraft Corporation, Marvin Patchen Inc, which financed the original development, retained rights to the TSC-2 Explorer, and has proposed two versions, one for civilian use and the other, named the Observer, for law enforcement.

Construction of the prototype Explorer has been completed by Aerofab Corporation of Sanford, Maine, on a contract basis, and its initial flight test programme was completed successfully by November 1972. In early February 1973 a market survey was being carried out to determine the special requirements of pipeline patrol operators, aerial photographers, and law enforcement agencies; simultaneously, work towards certification was being continued.

No decision had been reached by February 1973 regarding the manufacturer of any future production aircraft.

TYPE: Four-seat cabin monoplane.

WINGS: Cantilever shoulder-wing monoplane. Wing section NACA 4415. Dihedral 1°. Incidence 4°. All-metal "D-spar" structure. No flaps.

FUSELAGE: All-metal semi-monocoque structure, with glassfibre nose section and cabin top skins. Transparent bubble nose to provide helicopter-like visibility.

TAIL UNIT: Cantilever all-metal structure, with T-tail. Trim tabs on elevator and rudder.

LANDING GEAR: Non-retractable tricycle type. Cantilever spring steel main-gear struts. Nose unit has oleo-pneumatic shock-absorber. Main wheels and tyres size 6.00–6; nosewheel and tyre size 5.00–5. Single-disc brakes.

POWER PLANT: One 200 hp Lycoming IO-360-A1A four-cylinder horizontally-opposed air-cooled engine, pylon mounted above the wing centre-section, and driving a Hartzell two-blade metal constant-speed propeller. One 22.5 US gallon (85 litre) fuel tank in each wing leading-edge; total fuel capacity 45 US gallons (170 litres). One optional all-metal fuel tank in fuselage, capacity 25 US gallons (94.6 litres). Total optional fuel capacity 70 US gallons (264.6 litres).

ACCOMMODATION: Pilot and three passengers, seated in pairs, in enclosed cabin. Door on each side of fuselage, sliding fore and aft for cabin access and side photography. Cabin is heated and ventilated.

ELECTRONICS AND EQUIPMENT: Panel designed to use Narco Spectrum radio. Optional equipment includes searchlight, stabilised optics slaved to searchlight, siren, PA system, camera mountings, STOL kit, and "quiet" kit.

DIMENSIONS, EXTERNAL:

Wing span	32 ft 0 in (9.75 m)
Wing chord (constant)	5 ft 0 in (1.52 m)
Length overall	23 ft 4 in (7.11 m)
Height overall	9 ft 8 in (2.95 m)
Tailplane span	10 ft 0 in (3.05 m)
Wheel track	7 ft 9 in (2.36 m)
Wheelbase	9 ft 4 in (2.84 m)
Propeller diameter	6 ft 2 in (1.88 m)

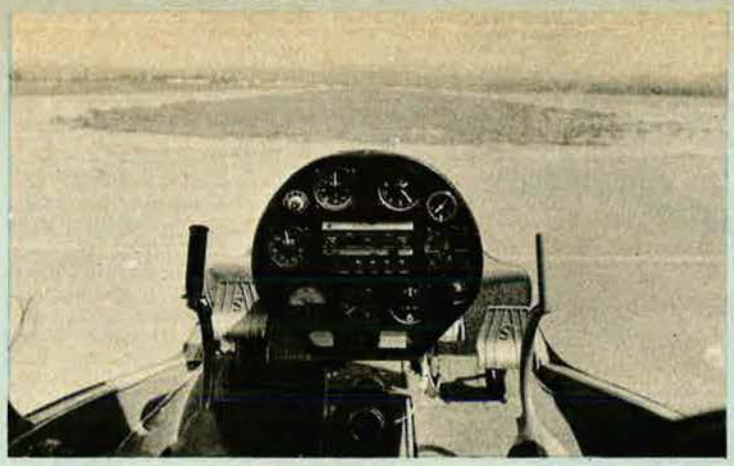
AREAS:

Wings, gross	157 sq ft (14.59 m²)
Ailerons (total)	12.8 sq ft (1.19 m²)
Fin	10.7 sq ft (0.99 m²)
Dorsal fin	2.4 sq ft (0.22 m²)
Tailplane	19.1 sq ft (1.77 m²)
Elevator, incl tab	15.7 sq ft (1.46 m²)

WEIGHTS AND LOADINGS:

Weight empty	1,370 lb (621 kg)

Patchen Explorer four-seat light aircraft (200 hp Lycoming IO-360-A1A engine)



This photograph from the cabin emphasises the helicopter-like forward field of view offered by the Explorer

Canadair CL-84-1 demonstrating VTOL operation from a platform on the USS Guam

Max T-O and landing weight
2,200 lb (998 kg)
Max wing loading
14.0 lb/sq ft (68.3 kg/m²)
Max power loading
11.0 lb/hp (4.99 kg/hp)
PERFORMANCE (estimated, at max T-O weight):
Max cruising speed 109–113 knots (125–130 mph; 201–209 km/h)
Stalling speed, power off* 46 knots (53 mph; 85.5 km/h)
Max rate of climb at S/L
1,300 ft (396 m)/min
T-O to 50 ft (15 m) under 850 ft (259 m)
Landing from 50 ft (15 m)
under 850 ft (259 m)
Range with max fuel at 75% power
770 nm (887 miles; 1,427 km)

*Prototype will not stall power on, with wings level, at any angle of attack.

CANADAIR

CANADAIR LIMITED; Head Office and Works: Cartierville Airport, St Laurent, Montreal 381, Quebec, Canada

CANADAIR CL-84

The CL-84 is a twin-engined tilt-wing V/STOL aircraft, the original private-venture prototype of which was described in the 1967–68 *Jane's*. It was followed by three examples of the CL-84-1, ordered for evaluation by the Canadian Armed Forces (CAF designation CX-84). The first of these made its initial flight on 19 February 1970, and is described fully in the current edition.

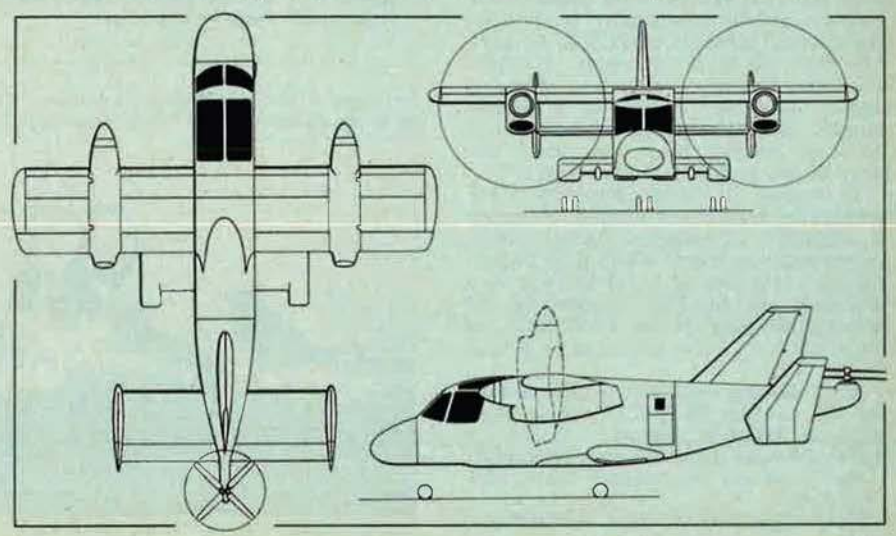
CAF evaluation of the CL-84-1 has been completed successfully, the programme including gun-firing trials in the hover mode; conventional and slow-speed tilt-wing flight while using a fixed Minigun; demonstrations operating from the Pentagon helicopter pad; and a series of take-offs and landings on board the USS *Guam* some 17 nm (20 miles; 32 km) off the coast of Norfolk, Virginia. The second aircraft was delivered to the US Naval Air Test Center at Patuxent River, Maryland, at the beginning of December 1972 for a tripartite V/STOL instrument flight test programme scheduled to last for 12 months. The aircraft has been prepared specifically for instrument flight evaluation by crews from the UK, US, and Canada. The programme is concerned with terminal area guidance and control of V/STOL aircraft, and will investigate head-up and head-down display requirements, and transition and steep-angle approach flight profile parameter limits. In addition, the terminal area handling characteristics of the CL-84 will be investigated, together with its operating and design parameters as they might apply to shipboard operations.

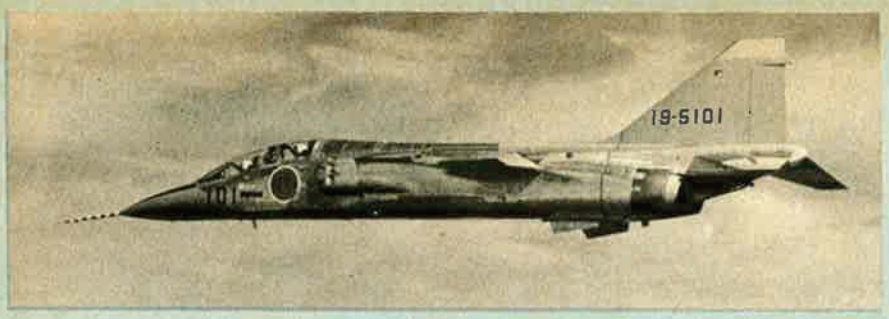
CANADAIR SCS CL-84

In terms of a potential production model of the CL-84, emphasis has now shifted from the uprated CL-84-1 approach (as exemplified by the CL-84-1D, described in the 1972–73 *Jane's*) in favour of an advanced CL-84 using two T64 turboprop engines. This version, known as the SCS CL-84 (Sea Control Ship CL-84), has been designed to meet ship-based ASW and radar surveillance requirements, operating from a short deck where the mission profiles require operations in the STOL or VTOL modes. One of the CL-84-1 prototypes was scheduled to return to the USS *Guam* in the late Summer of 1973 for further testing in this connection. Canadair has proposed the SCS version to the US Navy; if adopted, production would be shared with General Dynamics (Convair) under the designation Model 84. Emphasis has been placed on the substantial short take-off overload capability. The overall configuration, as shown in the accompanying three-view drawing, is basically that of a scaled-up CL-84-1 with provision for wing and propeller folding to facilitate shipboard stowage.

DIMENSIONS, EXTERNAL:
Wing span 42 ft 0 in (12.80 m)
Width, wings folded 27 ft 0 in (8.23 m)
Max length 50 ft 8 in (15.44 m)
Length of fuselage 47 ft 8 in (14.53 m)
Height overall, wing at 0° 18 ft 8 in (5.69 m)
Main propeller diameter 16 ft 6 in (5.03 m)
Tail propeller diameter 7 ft 9 in (2.36 m)
WEIGHTS (estimated):
Operating weight empty
16,500 lb (7,483 kg)
Max weight for vertical T-O at S/L:
ISA 29,000 lb (13,154 kg)
32°C 26,500 lb (12,019 kg)
Max weight for short T-O, 250 ft (76 m) deck roll, zero wind, ISA; or 20 knot (23 mph; 37 km/h) wind, 32°C
36,000 lb (16,329 kg)
PERFORMANCE (estimated):
Max level speed
375 knots (432 mph; 695 km/h)
Best-range speed
265 knots (305 mph; 491 km/h)
Best-endurance speed
220 knots (253 mph; 408 km/h)
Max rate of climb at S/L
6,500 ft (1,980 m)/min
Service ceiling 30,000 ft (9,145 m)
Range at 10,000 ft (3,050 m) with 7,000 lb (3,175 kg) payload, short T-O as above 1,400 nm (1,612 miles; 2,595 km)
Endurance at 10,000 ft (3,050 m) with 7,000 lb (3,175 kg) payload, short T-O as above 6 hr
Ferry range
2,650 nm (3,050 miles; 4,910 km)

Canadair SCS CL-84, configured for service on board Sea Control Ships (Pilot Press)





First prototype of the Mitsubishi T-2 supersonic trainer (two Rolls-Royce/Turboméca Adour turbofan engines)

MITSUBISHI

MITSUBISHI JUKOGYO KABUSHIKI KAISHA (Mitsubishi Heavy Industries Ltd); Address: 5-1 Marunouchi 2-chome, Chiyoda-ku, CPO Box 10, Tokyo, Japan

MITSUBISHI T-2 and FS-T2-KAI

The T-2, the first supersonic aircraft to be developed by the Japanese aircraft industry, is a twin-engined two-seat jet trainer designed to meet the requirements of the JASDF.

Mitsubishi was selected as prime contractor for the development programme in September 1967. Preliminary and detailed design, under the leadership of Dr Kenji Ikeda, were followed by the completion of a full-size mock-up in January 1969, after which a development contract for prototype construction was awarded. The first XT-2 prototype (19-5101) flew for the first time on 20 July 1971, and flew supersonically for the first time in level flight (Mach 1.03) during its 30th flight, on 19 November 1971. The first flight of the second prototype (19-5102) followed on 2 December 1971. These two aircraft were delivered to the TRDI in December 1971 and March 1972 respectively for further flight testing. A static test airframe was delivered in March 1971.

Meanwhile, in 1970 two additional development aircraft were ordered, for operational flight testing. These had joined the evaluation programme by August 1972, and by mid-January 1973 the four prototypes had completed 504 hours' flying. The flight test programme is scheduled to continue until the end of March 1974. A fatigue test airframe is to be delivered in late 1974.

An initial production order for 20 T-2s was placed in March 1973; the first of these is scheduled to fly in early 1975, and JASDF pilots will begin training on the aircraft later that year. The 4th national DBP (defence buildup programme) provides for the eventual purchase of 59 T-2s by 1977. Mitsubishi, as prime contractor, is responsible for fuselage construction, final assembly, and flight testing of production aircraft. Major programme subcontractors are Fuji (wings), Nippi (tail unit), and Shin Meiwa (pylons and drop-tanks).

To replace its North American F-86F Sabres, the JASDF has decided to develop a single-seat close-support fighter version, provisionally designated **FS-T2-KAI.** Following the conversion of a T-2 to serve as a prototype, the 4th DBP provides for the eventual purchase of 68 FS-T2-KAIs, of which the first 22 are expected to be ordered in FY 1974.

The following description applies to both the T-2 and the FS-T2-KAI, except where a specific version is indicated:

TYPE: Two-seat supersonic jet trainer (T-2) and single-seat close-support fighter (FS-T2-KAI).

WINGS: Cantilever all-metal shoulder-wing monoplane. Thickness/chord ratio 4.8%. Anhedral 9° from roots. Sweepback approx 42° on outer leading-edges, increasing sharply towards roots. Multi-spar torsion-box machined from tapered thick panel. Aluminium honeycomb leading-edge flaps, the outer portions of which have extended chord to give "dog-tooth" effect. Electrically-actuated all-metal single-slotted flaps, with aluminium honeycomb trailing-edges, over 70% of trailing-edge. No conventional ailerons. Lateral control by hydraulically-actuated all-metal two-section spoilers ahead of flaps.

FUSELAGE: Conventional all-metal semi-monocoque structure.

TAIL UNIT: Cantilever all-metal structure. One-piece all-moving swept tailplane, with 15° anhedral. Inner leading-edges of titanium, outer leading-edges of aluminium. Trailing-edges of aluminium honeycomb construction.

LANDING GEAR: Hydraulically-retractable type, with pneumatic backup for emergency extension. Main units retract forward into fuselage, nose unit rearward. Single wheel on each unit. Oleo-pneumatic shock-absorbers. Hydraulic brakes and anti-skid units. Brake parachute in fuselage tailcone.

POWER PLANT: Two Rolls-Royce/Turboméca Adour turbofan engines, each rated at 7,140 lb (3,238 kg) st with afterburning, mounted side by side in centre of fuselage. (Engines will be licence-built eventually by Ishikawajima-Harima, under designation TF40-IHI-801A.) Fixed-geometry air intake, with auxiliary "blow-in" intake doors, on each side of fuselage aft of rear cockpit. Fuel in seven fuselage tanks, with total capacity of 841 Imp gallons (1,010 US gallons; 3,823 litres). Provision for carrying up to three 183.2 Imp gallon (220 US gallon; 833 litre) drop-tanks under wings and fuselage.

ACCOMMODATION (T-2): Crew of two in tandem on Weber ES-7J zero-zero ejection seats in pressurised and air-conditioned cockpits, separated by windscreen. Individual manually-operated rearward-hinged jettisonable canopies. Liquid oxygen equipment.

SYSTEMS: Cockpit air-conditioning system. Two independent hydraulic systems, each 3,000 lb/sq in (210 kg/cm²), for landing gear, spoilers, brakes, and anti-skid units. Pneumatic bottle for landing gear emergency extension. Primary electrical power from two 12/15kVA AC generators.

ELECTRONICS AND EQUIPMENT (T-2): Mitsubishi Electric J/ARC-51 UHF, Nippon Electric J/ARN-53 TACAN, and Toyo Communication J/APX-101 SIF/IFF. Mitsubishi Electric J/AWG-11 fire control system in nose. General Electric SR-3 attitude/heading reference system.

ELECTRONICS AND EQUIPMENT (FS-T2-KAI): To include air-to-air and air-to-surface radar, inertial navigation system, radio altimeter, data computer, optical ranging system, and radar warning system.

ARMAMENT (T-2): One Vulcan multi-barrel 20 mm cannon in lower fuselage, aft of cockpit on port side. Attachment point on under-fuselage centre-line and two under each wing for drop-tanks or other stores. Wingtip attachments for air-to-air missiles.

ARMAMENT (FS-T2-KAI): Single multi-barrel 20 mm cannon, as in T-2. Eight to twelve 500 lb bombs, two or four infrared air-to-air missiles, two air-to-surface missiles, or rockets, on external attachments.

DIMENSIONS, EXTERNAL:

Wing span	25 ft 10 in (7.87 m)
Length overall	58 ft 7 in (17.86 m)
Height overall	14 ft 7 in (4.445 m)

AREA:

Wings, gross	228.0 sq ft (21.18 m²)

WEIGHTS:

Weight empty (T-2)	13,668 lb (6,200 kg)
Max T-O weight:	
T-2, clean	21,274 lb (9,650 kg)
FS-T2-KAI with eight 500 lb bombs	approx 30,865 lb (14,000 kg)

PERFORMANCE (T-2 at max T-O weight, clean):

Max level speed at 36,000 ft (11,000 m)	Mach 1.6
Service ceiling	50,025 ft (15,250 m)
Required field length	5,000 ft (1,525 m)
Max ferry range with external tanks	1,550 nm (1,785 miles; 2,870 km)

PERFORMANCE (FS-T2-KAI, approximate):

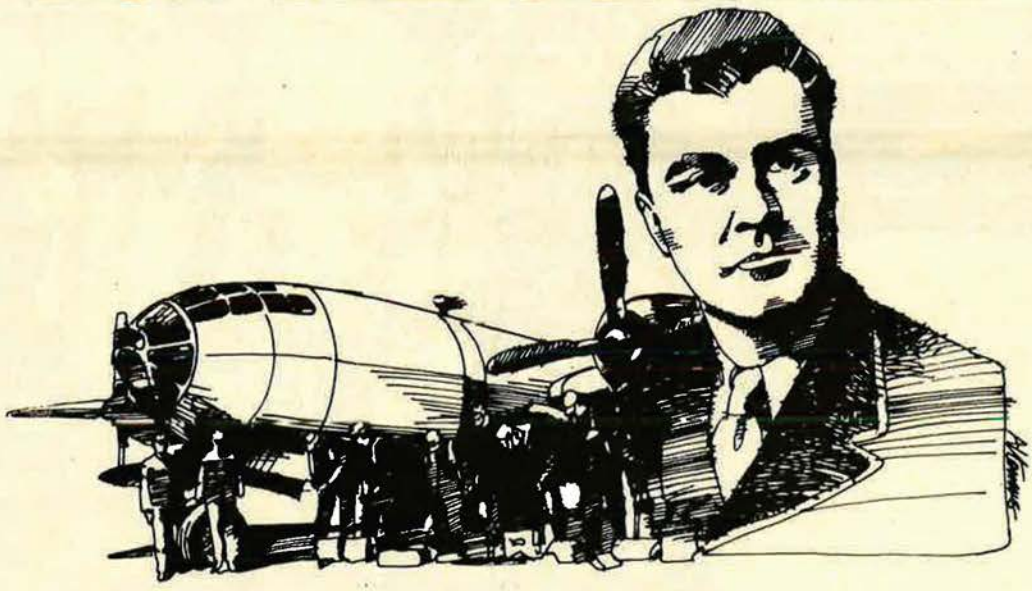
Max level speed at 36,000 ft (11,000 m)	Mach 1.6
Time to 36,000 ft (11,000 m)	2 min
T-O run	4,000 ft (1,220 m)
Combat radius (hi-lo-hi) with eight 500 lb bombs	300 nm (345 miles; 555 km)

Prototype of the Mitsubishi T-2 supersonic trainer, from which is to be developed the FS-T2-KAI close-support fighter (Gordon S. Williams)

TWENTY-EIGHT YEARS AGO

On August 6, 1945, a B-29, the *Enola Gay*, dropped history's first atomic bomb, on the Japanese city of Hiroshima, opening an era in which nearly every aspect of man's existence has been altered by the nuclear presence. The *Enola Gay* was piloted by then-Col. Paul W. Tibbets. Two years earlier, while a lieutenant colonel, he had been assigned sole responsibility for organizing and training the AAF's super-secret 509th Composite Group to deliver an atomic weapon whose physical power and political impact were but vaguely understood. Here, General Tibbets, writing for the first time about his experiences, describes what probably was the most important and unorthodox task ever assigned an officer of his rank . . .

Training the 509th for Hiroshima



By Brig. Gen. Paul W. Tibbets, USAF (Ret.)

ILLUSTRATIONS BY ROBERT ALTEMUS

DURING the years since August 6, 1945, I have been asked countless times, "How were you selected to drop the first A-bomb?" I have no answer as far as any directive is concerned. As a matter of fact, I probably selected myself because of circumstances prevailing during the time I was carrying out my instructions "to organize, equip, and train a self-sufficient organization capable of a split operation." This oral directive was given me by Maj. Gen. Uzal "P. D." Ent in his office at Second Air Force Headquarters, Colorado Springs, Colo., in September 1943.

Prior to this date, I had been at Alamogordo, N. M., working with Dr. E. J. Workman of the Physics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Department of the University of New Mexico. We were testing the ability of a B-29 to defend itself against fighter attack at high altitude. Upon my return from a flight one morning, a clerk told me to call General Ent immediately. I made the call, and the General told me to report to his office the next morning and to bring my B-4 bag, because, "You will not be returning to Alamogordo; you will probably be given an assignment that will eventually take you overseas."

When I arrived at General Ent's office, his aide went in to announce me. The aide came out accompanied by an Army lieutenant colonel who introduced himself as Jack Lansdale. He said he had some questions to ask and suggested we go into another room where we could have some privacy. He opened with a couple of questions that let me know he knew a lot about me.

While he was talking, my mind flashed back to a telephone call from my father, possibly a month before. "You haven't been in any kind of trouble, have you?" my father had asked. I replied in the negative and asked him why the question. It turned out that family friends in Miami had mentioned detailed inquiries being made about me by some "investigators." My session with Colonel Lansdale lasted no more than five minutes, and we returned to General Ent's office.

There were two men with General Ent—a Navy captain and a civilian. The three looked at Lansdale, apparently expecting a comment. As the door closed behind us, Lansdale said, "I'm satisfied." General Ent then introduced Capt. W. S. Parsons and Dr. Norman Ramsay and said they, as well as Colonel Lansdale, were from the Manhattan Engineering District.

As I listened in silence, the story began to unfold. The United States was working to produce an atomic bomb. These men were a part of the organization directly responsible for the bomb design, and I would be working with them, since I had been selected to head the Army Air Forces' contribution to that effort.

General Ent explained that my selection came after the field had been narrowed to three people: a brigadier general, a full colonel, and me, a lieutenant colonel. The names had been given to Gen. H. H. "Hap" Arnold, AAF's wartime leader, with comments and recommendations. General Arnold picked me and apparently never offered any explanation for his decision.

Dr. Ramsay, who had the ability to reduce complex scientific talk and theory into understandable terms, gave me a quick summary of what had led up to splitting the atom, the development of plants and facilities for processing uranium, and where the development of a bomb now stood. Captain Parsons was more directly involved in developing the bomb shape. He had been working with an Air Materiel Command-furnished B-29 crew. Parsons briefed me on their tests of some shapes for ballistic purposes as well as experimental fuzing development. Last, but not least, Jack Lansdale gave me a rundown on security. He was headman in this department. After quite a "learning session," Norman Ramsay, Capt. "Deke" Parsons, and Jack Lansdale departed, leaving me alone with General Ent.

Building the 509th

"You have to put together an outfit and deliver this weapon," he told me. "We don't know anything about it yet. We don't know what it can do. We don't know its size or what it will look like, but you've got to mate it to the airplane and determine the tactics, the training, and the ballistics—everything. These are all parts of your problem. This thing is going to be very big. I believe it has the potential and possibility of ending the war."

He went on, "It is so secret that nobody has any knowledge of it, even in Washington [meaning the Air Staff], except one man with whom you will deal when necessary. I am the only one here who has any knowledge of this and will be the only one to know. You can only inform those people who absolutely have to know. You can't tell your family, your friends, or anybody what you're doing, where you're going, or anything about it. You'll have to make up any kind of story you can to satisfy those with whom you work and associate. You will put nothing in writing—you will have to remember everything."

We discussed various aspects of the job and the fact that I would be on my own. It would be up to me to determine what was to be done, what was needed, and to do it with the least amount of fanfare. I would use normal channels for the ordinary things. If something was needed that was out of the ordinary, I was to use the code name SILVERPLATE and go to my contact in the Air Staff. General Arnold had passed this name to the Air Staff with instructions that any SILVERPLATE request or requisition was to be honored immediately without challenge or question. General Ent cautioned me to use the code name wisely as some day I could be called to account for my actions. I remembered his advice and followed it carefully.

General Ent had selected a B-29 squadron as my organization nucleus and wanted me to take a look at Fairmont, Neb.; Mountain Home, Idaho; and Wendover, Utah, as possible bases. They had runways that would support B-29 operations and were located so that security could be rather easily maintained. Wendover was my first stop, and after flying around the area for a while, looking at its remoteness and at the availability of bombing ranges, I felt that, if the base facilities were just half as good, this was the base I wanted—and that's the way it turned out. Hangars, base shops, and housing were good, and there were adequate barracks and troop facilities.

I went to take a look at the 393d Bomb Squadron, the unit picked by General Ent, at Fairmont Army Airfield, Neb. It was fully manned, equipped, and trained, and had a good record since its formation.

The crew of the Enola Gay, *the B-29 that carried history's first atomic bomb, included, from left, Maj. Thomas W. Ferebee, bombardier; Col. Paul W. Tibbets, pilot; Capt. Theodore J. Van Kirk, navigator; and Capt. Robert Lewis. They're shown here in Tinian, where the unit was based.*

This, of course, spoke well for the squadron commander, Lt. Col. Tom Classen, who General Ent thought would be of great help to me. He was right. Tom became my deputy and played a major role in the success of the original 509th Composite Group.

After visiting Wendover and the 393d, I went back to see General Ent to confirm that I wanted both. This put things in motion. The remains of a P-47 Combat Crew Training Squadron were ordered out of Wendover, and the 393d ordered in. As soon as some of the earlier arrivals got established, I offered them leave. This was in keeping with a plan I had devised with the security detachment commander assigned by Jack Lansdale.

Security

It had occurred to me that if we could convince the men we were serious about security before they had learned anything about the operation, we would be well ahead of the game. My plan was to deliberately "set them up" and make examples of some, so the others would learn what was in store for them if they talked out of turn. Before the men were allowed to leave the base, we had agents in Salt Lake City and Elko, Nev., at the airport, rail, and bus stations. These were the only routes in or out of Wendover. Consequently, it was easy for the agents to follow the men into a bar or waiting room, strike up a conversation, and get information out of them that we could use to make our point.

No sooner were these men home than they were summoned back to Wendover by telephone or telegram. Upon arrival, I would call them into my office. The conversation went like this:

"We warned all you men that this was the most serious security station in your Army experience. Why couldn't you keep your mouths shut?"

"Why, Colonel, I didn't say anything to anybody."

"Well, how come at such and such a place you drank a double bourbon and said this?" Their jaws would drop. They'd be thinking, "How in hell did you know this?" I would say, "We told you we would know when you broke security," and then I'd place them under arrest. Twenty-four hours or forty-eight hours later I'd call them in again and say, "Look, it'll cause me a lot of trouble if we go through a court-martial. Now, I'm willing to forget this one, but remember I've got one strike on you, and, if there's another, we'll double the charges!" It was a psychological move. The word on those first few arrests went around the barracks—and the bachelor officers quarters, too—like wildfire. And it worked. The Army Air Forces never was charged with a security violation during this period.

We also monitored all telephone conversations through the station's switchboards and telephone booths. I watched these reports, and, now and again singling out individuals, would drop a remark that would cause the listener to wonder.

It might be that some crew chief's wife would phone and tell him she was pregnant. A day or so later, I would congratulate the man on the impending event. You can imagine the look on the man's face. All this kept the outfit very security conscious.

The Manhattan Project security people ran a complete security check on every man in the 509th (officially activated on December 17, 1943) and on every man who came into it later. The checks were thorough, and it was amazing what turned up. We found a man who had been wanted for suspicion of murder for a long time. We found others who were in the Army under false names. We found a pilot who had a background of psychiatric problems, and a man who had been in mental institutions during his teens. In this and other cases, the security people simply provided me the information for decision.

Our murder suspect was a very good machinist, and we needed such skills. He stayed on the job. If we felt an individual was likely to be a security risk, I told the security group to get rid of him. The Man-

hattan security people had the place to put such men.

As it turned out, only five security risks had to be removed from Wendover. One was my first Group Operations Officer. This guy loved the sound of his own voice and wanted to appear important in front of subordinates and strangers—the worst possible combination. When the security men told me about several incidents, I told them to "ship him." TDY orders were cut for him to go to Air Materiel Command to check on something. He was driven to the Salt Lake City Airport to be picked up by a Gooney Bird courier en route east.

Once he was aboard, however, the aircraft did not go east. Instead, it flew to a remote destination where the Manhattan people had a nice comfortable camp in which this gentleman found other people of like inclination with whom he "talked" until the end of the war. The arrangements included mail delivery to and from the camp using APO stamps so that family and friends would not suspect that the man was anywhere but in a theater of war doing his best for God and country.

For several years after the war, I was interviewed at intervals by the OSI on security matters. Only one case concerned the Army Air Forces. That one case involved a photograph of a "bomb" in a storage area on Tinian. The photo showed a "Shape" and a guard leaning up against it, apparently asleep. This photo or a copy had figured prominently in one of the notorious "A-Bomb Spy" cases.

When the OSI investigator showed it to me in an accusing manner, I broke into laughter. It was a decoy we had set up to entice the curious, guarded by a soldier who had been told to "play it raunchy." Until I saw the photo in the hands of the OSI man, I didn't know how successful the scheme had been. To my knowledge, the AAF was the only part of the Manhattan Project that has never had a proven security violation.

Brig. Gen. Paul W. Tibbets, USAF (Ret.), graduated from flying school in 1938. In June 1942, he participated in the first B-17 raid on occupied Europe. Later that year, he flew Gen. Mark Clark to his rendezvous with the French in preparation for the North African invasion, then General Eisenhower and his staff to Gibraltar on the night of the invasion. General Tibbets led the first heavy bomb mission in support of the invasion. In 1943, he participated in developing and testing the B-29 prior to his assignment described in this article. After the war, he was a technical adviser at the Bikini bomb tests, B-47 project officer, and a SAC wing and division commander. He held several key planning and operations assignments on the Air Staff and Joint Staff and was Deputy Chief, US Military Supply Mission to India. Retired in 1966, he now is Vice President for Operations and Maintenance, Executive Jet Aviation, Inc., Columbus, Ohio.

Crew Training

By the time the 509th reached the Marianas, there was no doubt in my mind that I had some of the sharpest B-29 crews in the Twentieth Air Force. When we first started flying at Wendover, I had had some reservations. All of the crews had been through B-29 training and had met the required standards. But these were not good enough to do the job we had been given. They could get the airplane up and down, but they really did not know its capabilities and limitations. If they navigated within five miles of a target, they thought they were doing great. And if they dropped a bomb pattern within 500 feet of the aiming point, they counted it a bull's-eye. I knew they had to be retaught.

In an early meeting, General Ent had told me I would have first priority on personnel within the Second Air Force and, in all probability, throughout the AAF. I had taken advantage of this offer and had gathered about a dozen men whose talents I knew and respected. Among them were a couple of the best bombardiers and navigators in the business. The others were real pros as far as B-29s were concerned. They had been with me for about eighteen months on other B-29 projects. With this nucleus as instructors, I got the training program under way.

We began by thoroughly teaching crews the airplane's systems. Once that was done, they learned to get maximum performance from the airplane under any flight conditions. Emergency procedures became routine. These things were stressed until the crews had confidence in the aircraft and in their ability to handle it under any circumstances.

When I told the crews that I expected them to bomb from 30,000 feet with a circular error of 200 feet, if I had not been "the old man," they would have called the flight surgeon in to see if I was not in need of psychiatric treatment. They didn't believe it could be done.

My bombardier, Tom Ferebee, was on hand to show it could be, and to teach them how. As to navigation, I said all navigators would be expected to navigate over land or water with no more than a half-mile error. That was received in the same way until Ted "Dutch" Van Kirk proved to the squadron navigators that it was not too much to expect. Up to this point, the crews had been trained to only a minimum because the theory was that "Lead Crews" would take them to the bomb-release point and then back home again.

I am not criticizing or belittling the crews or the system. I am only trying to show that we could do better if it was required and expected. I wanted every crew in the 509th to be a Lead Crew—not only that, but to be a top Lead Crew.

While this individual training was going on, I was constantly flying with my own crew in support of the test and development program. Our "Shapes" had to be made to fly a predictable trajectory and the fuzing mechanism had to be perfected to detonate within a plus or minus fifty feet of the set altitude, a feat difficult to obtain in the early forties. Along with this went the problem of "marrying" the bomb and the aircraft. This posed problems because of the constant changes being made in the different experimental models.

New Tactics

While this testing was going on, I was formulating a tactical concept for weapon delivery. The nature of the explosion, the predicted shock wave, and the radioactive cloud ruled out a formation accompanying the bomb-carrying aircraft. Fighter escort from Okinawa was impractical, and using carrier-based fighters posed too big a risk to the carrier. Also, with that many more people involved, the planning and coordination would present a security risk that no one was willing to take.

I remembered my experience in New Mexico, where I was testing the B-29's vulnerability to fighter attack. One day, our assigned B-29 was out of commission. I had another B-29 that had been stripped of its fire-control system and was normally used for transition training. I decided to fly it to give the fighters a chance to practice and to check new gun cameras.

I quickly learned that the stripped airplane could operate about 4,000 feet higher than one fully equipped, that it was faster and more maneuverable, and that I could turn inside the P-47 that was flying against us. Also, once the P-47 made an attack and turned to come back again, he could not catch us. As I remembered, the performance of the Japanese Zero was similar to the P-47. Consequently, I began to believe that my best defense against possible fighter attack would be a stripped airplane.

Based on that experience, I had ordered the 509th's modified B-29s from the Martin plant at Omaha to be delivered completely stripped of guns, turrets, and armor plate, except for the tail.

Needless to say, I was challenged on this one. Gen. Leslie R. Groves, who was head of the Manhattan Project, went to General Arnold. General Arnold called Gen. Bob Williams, who had replaced General Ent after his B-25 accident. General Williams, with whom I had as good a working relationship as I had had with General Ent, called me in. When I gave him my reasons, he agreed. I felt this was a vote of high confidence because General Williams was a confirmed fighter pilot. After that, I heard no more about it until I went to Guam to brief General LeMay and Admiral Nimitz on the bomb and to tell them that a bomb-carrying outfit was coming into the theater. When I mentioned the "stripped" airplanes to General LeMay, he asked, "Who authorized that?" I admitted responsibility.

During the testing, formulation of tactics, and acceptance checking of the modified airplane, I did all of the things demanded of the crews. It became a challenge for them to beat me. This friendly competition created an *esprit de corps* like I had never seen before, and it prevailed until the unit returned to the States at the end of the war.

By practicing initially with 500-pound iron bombs, the crews perfected their techniques. Later they used practice "Shapes." Their ability to navigate was improved and refined by sending them TDY to Cuba, to Batista Field outside of Havana. This gave them the whole Caribbean area in which to navigate over water, the idea being to simulate conditions in the Pacific. Both time and testing were moving along to the point where I was becoming concerned.

New Base—Tinian

By March 1945, we had a pretty reliable and predictable weapon as far as ballistics and fuzing were concerned. The gun-type ("Thin Man") bomb was a certainty; the implosion ("Fat Man") was a good bet. Yet, the scientists wanted more tests; they were after a one-in-100,000 probability of failure. Tests to establish these odds could have taken another year. At this point, reliable opinion was that the odds of a failure were one in 10,000. These odds were acceptable to me. Timewise, the Air Staff was pressing for a ready date so that the overseas movement could begin. Finally, it got to the point that I bowed my neck and took one hell of a calculated risk entirely on my own initiative. I sent the code to Washington that would put the wheels in motion.

In February, there had been a meeting in General Arnold's office to select targets in Japan and a probable time for bombing. Irvin P. Krick, an AAF meteorologist, had worked up a long-range forecast and said that between the fifth and tenth of August we should have the weather we wanted. Either before or after this period, the odds were against it. Attending this meeting were General Groves, a select few

of the Manhattan people, and me. At that time, Groves had said they would be ready. In all of my planning after this meeting, I had used the first of August as the time I had to be in place and ready.

My decision to move the 509th put the scientists in a position of having no aircraft for continued testing. General Groves took me to task when he found out about it. He summoned me to his office in Washington and kept me standing at attention for twenty minutes while he chewed on me. He let me know he could have me "drawn and quartered" for such action bordering on gross insubordination and had me believing he might until I saw a twinkle in his eye, followed by a trace of a smile. Then he confided that he agreed with the action, but not with my taking it without consulting him. In the future, I was to consult him before doing anything as drastic.

Once on Tinian, the 509th settled into the general routine of the other outfits, except that we did not fly missions like the others. We got things they did not get.

Curious Command Channels

The posture of the 509th in the theater was a different one, to say the least. The official history of the Army Air Forces in World War II says of the 509th Composite Group in 1945: "Command channels [relating to its operations] were highly irregular . . . and due to the fact that the atomic bomb program circumvented established command channels for the most part, because of essential secrecy, little is known of its sources for authority which must have originated at a level of approximately the Big Three." We were in a theater of war commanded by a competent, on-the-scene commander who had only administrative authority over the 509th. With the move to the Pacific, General Groves was not giving up his control over the atom bomb.

General Groves had selected a former associate from the Corps of Engineers and placed him on Tinian as his "eyes and ears." He was Brig. Gen. Thomas F. Farrell. Together with a couple of the Los Alamos scientists, they were dubbed the "Tinian Joint Chiefs." Our release to fly was to come from this group. The "GO-NO GO" signal was to pass from President Truman to Groves in Washington. Groves would then telex the decision to Farrell via a designated circuit into the 313th Wing Communication Center. This machine was isolated from the others by heavy drapes.

By August 3, we were watching the weather and comparing it to the Krick forecast. The actual and forecast weather were almost identical, so we got busy. The 509th operations and intelligence personnel made out the mission plans with the "Tinian Joint Chiefs" observing. These plans were taken by courier to Twentieth Air Force Operations on Guam, where Col. William H. "Butch" Blanchard (the only officer cleared other than Spaatz and LeMay) translated them into a strike order to be transmitted to the 509th when (and if) told to do so by Farrell.

During late July and the first part of August, the Twentieth Air Force was conducting mining operations in Japanese coastal waters. The wing assigned to this operation was on Tinian. Their aircraft were grossing around 158,000 pounds at takeoff, which was above the usual max gross for other operations.

As we were in the final stages of preparation for our mission, one of the mining aircraft lost an engine and crashed on takeoff. This worried Farrell and company as I was estimating my takeoff gross at 163,000. They figured that if we crashed, the bomb could explode and wipe out a large part of the island. Consequently, there were some busy sessions working out a method of inserting the fissionable material and arming the bomb after takeoff. This was worked out and practiced before we were dispatched.

GO!

August fifth arrived, and the weather was almost exactly what had been forecast. Truman was at Potsdam, and, in anticipation of a "GO" signal from him, we were loading and following the planned sequence of events as though we had actually received our strike order. In the early evening, Farrell got his message from Groves, and we knew it was "GO" for real.

There has been much written about the actual mission to Hiroshima. From my point of view, in retrospect, there was no drama until we saw the cloud rising above Hiroshima after detonation. Until that moment, it was the smoothest, most precise mission I have ever seen. Everything went exactly as planned. Our order said we were to strike at 09:15 Japanese time, and the detonation is officially recorded at 09:15:15. Flying back to Tinian, I felt a sense of satisfaction from a job well done.

Over the past twenty-eight years, I have been asked by news media people, statesmen, and historians how I felt about the mission and would I do it again?

I have but one answer. It was all impersonal. I did not allow my feelings to be injected into the matter. I had a job to do and did it to the best of my ability.

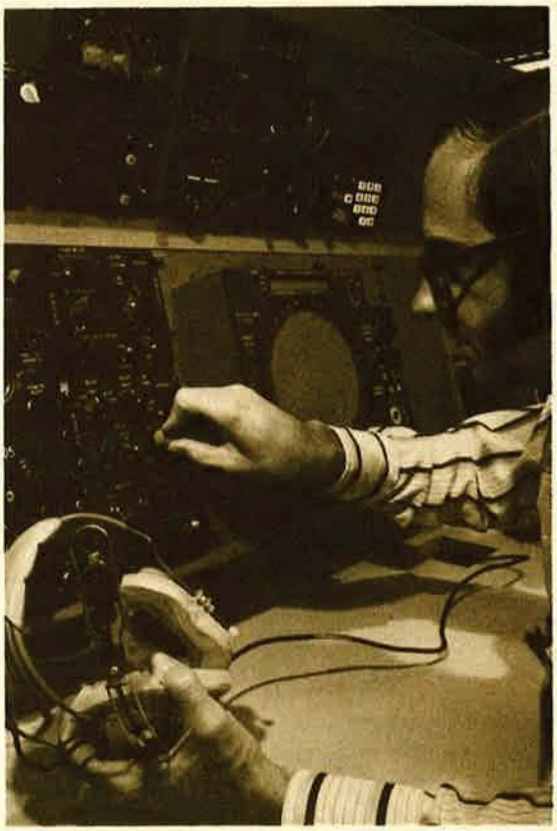
Would I do it again? Give me conditions and circumstances similar to those that prevailed in 1945, and I would not hesitate. I feel that, at that point in time, it was the only thing to do. I am convinced that the use of the two weapons prevented an invasion that would have taken more Japanese lives than did the bombs, not to mention the American lives or the added billions of dollars that would have been expended. ■

THE T-43A

The Air Force's training of its navigators and bombardiers, impeded heretofore by World War II vintage equipment, is being brought abreast of the state of modern aeronautical and electronics technology with the introduction this year of a sophisticated new ground trainer and a modern airborne trainer capable of simulating the flight conditions aboard the Air Force's newest operational aircraft . . .

UNTS— THE LAST WORD IN NAVIGATOR TRAINING

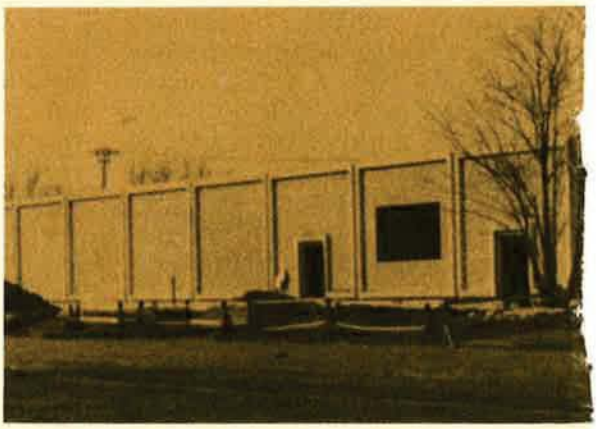
By Edgar Ulsamer
SENIOR EDITOR, AIR FORCE MAGAZINE



The ground-based portion of the Air Force's new Undergraduate Navigator Training System (UNTS) can simulate altitudes up to 70,000 feet. Honeywell's Marine Systems Division is the manufacturer.

USAF's navigator and bombardier training is getting a long-overdue face-lift this year with the introduction of UNTS, a modern Undergraduate Navigator Training System consisting of a large, jet-powered trainer and a technically advanced ground simulator. The system is expected to increase proficiency while cutting the cost and duration of the training program.

The trainer is the T-43A, a derivative of Boeing's 737-200 commercial twinjet. It was



The ground-based UNTS training facility, currently under construction, is located at Mather AFB, Calif. As many as fifty-two students can be trained at the same time.

rolled out and completed its first flight this spring. The ground-based half of the system is Honeywell's T-45 electronic simulator, which will be "rolled out" this summer. UNTS will be operated by the Air Training Command at Mather AFB, Calif.

The Air Force's outgoing Assistant Secretary for Research and Development, Grant L. Hansen, disclosed at the T-43A's roll-out that, once the entire UNTS system of nineteen airborne trainers and fifty-two ground simulators is in operation, "our navigator students will receive better training in much less time at a saving of about $27 million each year over our present methods."

On the same occasion, ATC Commander Lt. Gen. William V. McBride pointed out that the new system is vital to "our drive and efforts toward a leaner, more economical, and higher-quality force, resulting in a better return on the taxpayer's investment." He added that currently used equipment and facilities are incapable of simulating the performance levels of most aircraft in USAF's operational inventory. The new system, by contrast, will train students on equipment and under conditions "similar to what they will use in their operational environment; that is, the speeds, altitudes, and ranges encountered operationally in such systems as the F-4, F-111, B-52, and C-5—and we will be in good shape to accommodate training for even newer systems," as they come into the inventory.

Due to the sophistication of the ground equipment, the Air Force can reduce the number of flying hours required to train a navigator by nearly twenty-five percent, *without* a drop in the quality of the training process.

The New Airborne Trainer

The T-43A is a medium-range jetliner, powered by two underwing-mounted JT8D-9 P&W turbofan engines that produce 14,500 pounds of thrust each. (The same engine powers the Air Force's C-9A medical evacuation aircraft derived from the McDonnell Douglas DC-9 commercial twinjet. Maintenance of both aircraft will be eased by use of a common engine.) Total cost of the nineteen aircraft currently on order is about $82 million.

Each T-43A sortie will provide up to six hours of training time. The aircraft can be operated at high speed and low altitudes and can duplicate a wide range of mission profiles that are flown by USAF combat and transport aircraft.

The interior of the aircraft is laid out as a flying classroom. Three instructors will train twelve student navigators as well as assist in the proficiency training of an additional four rated navigators. Each instructor and student will have his own station displaying information from the various navigation systems aboard.

While the aircraft is in flight, students will learn and practice all major navigational techniques currently used by USAF, including

A Honeywell Series 700 computer controls the entire topographic map of the United States through a 7,000,000,000-bit memory at the UNTS training facility at Mather AFB.

The Air Force's new T-43A navigator trainer, a derivative of the Boeing 737-200 commercial jetliner, is the airborne half of the new Undergraduate Navigator Training System. The system is expected to provide better training in much less time, at a saving of about $27 million each year over presently used methods. The Air Force is buying nineteen T-43A aircraft from Boeing.

inertial, celestial, radar, radio aid, dead reckoning, and grid. Each student console displays information from the aircraft's LORAN (long-range navigation), Doppler and search radars, TACAN (Tactical Air Navigation System), VOR (very high frequency omnirange), inertial navigation, radar altimeter, and a range of communication subsystems.

The qualities of the T-43A's airframe, as well as the avionics of the new trainer, are well suited for low-level penetration missions. This is important because navigators in B-1 crews will have to be especially proficient in low-level flight. The B-1 strategic bomber is designed to defeat enemy defenses by low-level, high-speed penetration.

The T-43A is being developed for the Air Training Command by the Directorate of T-43/Cargo Systems of the Air Force Systems Command's Aeronautical Systems Division. So far, the program is on schedule and also has the rare distinction of being some $17 million below original cost forecasts. Including the 385 items of government-furnished equipment (GFE) aboard each aircraft, the unit cost of the T-43A is about $6.25 million. Total program costs, including some $30 million of GFE, are just under $125 million.

Litton Industries' LTN-51 inertial navigation system is a key element of the new T-43A navigator trainer. More than 550 of these systems are currently in use worldwide.

This interior view of the T-43A "Flying Classroom" shows the facilities on which twelve navigator students as well as four graduate students will train in all forms of navigation.

The T-45 Ground Simulator

Later this year, Honeywell's Marine Systems Division will turn over to the Air Force a 30,000-square-foot facility at Mather AFB, Calif., that will be the latest word in ground-based navigator training. The $18 million T-45 electronic simulator facility duplicates actual flight conditions to an unprecedented degree and will shorten the undergraduate navigator program by five weeks and that for navigator/bombardiers by thirteen weeks.

In addition to a mission control center and classrooms, the UNTS facility consists of fifty-two student stations that simulate the appearance, operation, and responses of the navigator stations aboard the T-43A. Typical three- to five-hour missions in the simulator can include basic dead reckoning, celestial and inertial navigation, radar, LORAN, and TACAN. It can simulate extreme high altitudes, supersonic speeds, and unusual flight conditions that can't be duplicated by the T-43A.

The simulator uses a high-capacity, high-speed computer that can store seven billion bits of digital information about the topography, hydrography, and population centers of the United States. This information, in turn, makes it possible to simulate radar displays covering the entire land mass of the United States. The system uses elevation and radar reflectance data on cities, mountains, and other terrain features to produce high-resolution, moving simulation of what a navigator would see on his radar displays at altitudes up to 70,000 feet and speeds as high as Mach 2.

Other simulation data that can be varied by the instructor include wind force and direction, barometric pressure, temperature, and magnetic variations. For celestial navigation, it can simulate forty-one navigational stars, including the sun, and five planets. The instructor will be able to monitor student response to various tasks on special pictorial displays and through printed information.

Each station can be operated independently so that students can be taught individually. The instructors will be able to simulate breakdown of various equipments in order to confront students with realistic navigational problems and to force the trainee to use alternate tactics and displays. The system also enables the instructor to "freeze" the work of any student at a given moment without interrupting the others. Once the student understands a particularly tough problem, the instructor restarts the training program.

Several foreign nations, including West Germany and Canada, have expressed an interest in acquiring some or all elements of UNTS.

Air Training Command spokesmen told AIR FORCE Magazine that the UNTS system will become operational in March of next year when the first class enters training, with graduation scheduled for October. The training involves two phases. The navigator students start out with instruction in the basics of dead reckoning, map reading, and celestial navigation. During this phase, which lasts for sixty days, students will receive forty hours in the T-29, which still is well suited for fundamental navigation training. Twenty out of the seventy-seven T-29s currently in USAF's inventory will be retained for this purpose.

In the advanced training phase of eighty days, students will learn to operate the advanced and integrated navigation systems of the T-43A. During that period, they will participate in about twenty simulator training missions totaling approximately eighty-one hours. Finally, they will fly twenty-one missions totaling 105 hours in the T-43A. Total flying time will be reduced forty-one hours from the present schedule. This reduction is made possible by the greater capabilities of the new ground simulator.

Likening the importance of UNTS to the quantum jump from prop-driven aircraft to jet trainers in pilot training more than a decade ago, General McBride predicted that it will turn out to be one more good reason why "the Air Force navigator takes a back seat to no one." The fact that General McBride is himself a navigator as well as a command pilot does not diminish the credibility of this statement. ■

"VORS ARE NOT VUN DIS VAY"

Operation Torch was our first major invasion of World War II, imposing upon the AAF logistics organization at Wright-Patterson Field a major test of its efficiency. Some weeks before the North African landing, scheduled for November 1942, a group of logisticians journeyed to Dayton, Ohio, to brief Lt. Gen. William S. Knudsen, the automobile-production genius. Gen. H. H. "Hap" Arnold had brought Knudsen on duty at high rank to ensure that his wisdom would be imposed on a military supply operation that, since 1918, had run at a business-as-usual pace.

One of the Torch briefers was a Maj. Robert S. McNamara, a model of efficiency, who ticked off the projected invasion statistics: so many rounds of ammunition; so many trucks; so many gallons of aviation gasoline; so many rations, etc. It appeared to one of the briefees, now a retired major general, that the calculation was too closely figured down to the last nut, the last bolt.

"What about attrition of these supplies due to enemy action?" this officer asked skeptically.

"Well," said Major McNamara brightly, "with air cover and the Navy, we shouldn't lose any."

General Knudsen stirred in his chair. According to the officer, who "can still see him to this day," he bristled and, in his thick Danish accent, said, with a note of finality: "Mr. McNa-mahra, vors are not vun dis vay."

—CONTRIBUTED BY DR. MURRAY GREEN

(AIR FORCE *Magazine will pay $10 for each anecdote accepted for publication.*)

AS A PERCENTAGE OF THE TOTAL DEFENSE BUDGET, MILITARY RETIREMENT PAY NOW CONSTITUTES A SIZABLE CHUNK. ALARMED BY THIS INCREASE IN FIXED EXPENDITURES, THE CONGRESS HAS LEANED HEAVILY ON THE PENTAGON FOR REVISION OF ITS BASIC PENSION PACKAGE. THE RESULTING PLAN FOR MODIFICATION —WHICH MAY OR MAY NOT WIN APPROVAL—HAS DRAWN BOTH BOOS AND BOUQUETS . . .

OVERHAULING RETIREMENT PAY:

Prospects and Probabilities

By Ed Gates

CONTRIBUTING EDITOR, AIR FORCE MAGAZINE

SERVICE members' reactions to the Defense Department's plan to overhaul the nondisability retirement system have ranged from a chorus of boos to reluctant agreement that something must be done about the long-term costs of military retirement. There have been far more boos than wilted bouquets. Angry letters have poured into service journals, Congress, and the Pentagon.

Few if any grand schemes to revamp key sections of military personnel legislation have ever received such a rough reception from the troops at large. Some insist it is misleading, breaks faith, and reneges on promises.

It all adds up to a large-size flap within the military establishment, one in which most career members have considerable at stake. Congress will be the ultimate decision-maker; the lawmakers must eventually rule on DoD's controversial recommendations. They could, of course, modify them significantly.

At this writing, it appears that the legislators are more inclined to go along with the Defense-sponsored package, or with a slightly modified version, than with the troops' call for rejection.

Once again, the basic issue is money. Military personnel outlays—including retirement expenditures—have been rising steadily. The most recent automatic retired pay boost, under the Consumer Price Index (CPI) formula, took place July 1 when the 977,922 retired US service members received an extra 6.1 percent. This pushed the annual retired-pay price tag to nearly $5 billion, and all future projections—under the current retirement system—are up.

The lawmakers and DoD seem determined to apply the brakes. The Pentagon's new package of proposals would represent one step toward shaving future costs.

DoD's new plan is officially called "The Proposed New Military Nondisability Retirement System." It was developed in the offices of Roger T. Kelley, the former Assistant Defense Secretary for Manpower, and Lt. Gen. Leo E. Benade, the Deputy Assistant Secretary of Defense for Military Personnel Policy.

Following extensive massaging in the Pentagon and elsewhere in the Administration, the plan was sent to Capitol Hill last spring. The Armed Services Committees exercise jurisdiction.

But the big drive to convince the troops began last fall. After retaining a civilian advertising agency to develop a presentation, DoD told the services to saturate the active-duty community with the specifics of the complicated package. It ordered all members to attend briefings and films, complete individual

work sheets, and otherwise endure a steady tattoo of information. Most service critics say the official presentations were slanted, that they covered up or ignored the undesirable features of the plan.

For example, the twenty-two-page pamphlet about the new system, a copy of which was given each member, declares that it is "the intent of the Department of Defense to encourage more service members to strive for a thirty-year career." The widespread fear, of course, is that once DoD gets the new "vesting" authority to compensate people for departing early, force-outs before twenty years of service will rise. It is also doubted that the provisions aimed at keeping some in for a thirty-year career are adequate—a point we will return to later.

Another unfortunate result of the sustained internal publicity is the incorrect notion many service people came away with—that the proposals are just a whisker away from going into effect. How soon that may occur is a question; not this year, almost certainly. Full congressional approval is required first.

The Pressure Points

Why have DoD's proposals drawn such fire from the membership? And will the chorus of dissent persuade Congress to scuttle the package or modify it significantly?

First, the mountain of opposition is really no surprise. DoD, in effect, is telling the service community, "Look, the present retirement system is extremely generous, but there are inequities. And it's getting frightfully expensive. Congress is pushing us hard for really rough changes—like making people contribute to a retirement fund, and serve longer than twenty years to receive retired pay. We're holding off on that kind of thing, but we are standing firm behind the mild changes in this new package."

The most criticized section of the new proposal would eliminate the long-time computation formula that provides fifty to seventy-five percent of basic pay and replace it with a thirty-five to seventy-eight percent spread. The plan to integrate members' Social Security income with retired pay at age sixty-five is almost as thoroughly despised. The aforementioned vesting proposal, because of fears for how it may be employed, figures to draw more opposition in the near future.

Members with under twenty years' service on implementation of the new package would be affected adversely by the thirty-five to seventy-eight percent computation formula, unless they went on to serve out thirty full years. But since most members don't intend to serve that long, or are not permitted to do so, this proposal gets the back of their hand.

Here's why. Consider a member with sixteen years' service on the plan's implementation date, who intends to retire after twenty-four years' service. When he retires with twenty-four years' service, he would receive fifty-seven percent of his base pay for six years—the so-called "Early Retirement Annuity"—until he reached his thirtieth service anniversary. At that point, he would start drawing sixty percent—the "Increased Annuity"—which is the same percentage persons currently retiring with twenty-four years of service receive.

The government would save money during the intervening six years.

For members with less service than in the above example, the reduction would be larger. Thus, a member with ten years' service on implementation, who retires at twenty years' total, would initially receive a 42.5 percent retirement. Then, on the thirtieth anniversary of his service date—a full decade after his retirement—his retired pay would increase to fifty percent.

The reduced percentage formula continues to decline for persons with less service on implementation of the new package—down to thirty-five percent.

As for the proposed three percent increase (from seventy-five to seventy-eight percent of base pay for those retiring at thirty years), DoD made a big point of it in the information campaign. The figure would be attained by increasing the 2.5 percent annual multiplier factor to three percent from the twenty-fifth year on.

The seventy-eight percent feature would mean (under present pay scales) only $26.88 a month more for a thirty-year E-7, or a $61.87 monthly raise for a thirty-year O-6. Except for the very highest ranks, retired pay is not enough to live on unless supplemented by a civilian job. (Currently, average monthly pay for retired officers is $647; for enlisted retirees, $318.) The small monthly retired-pay increases resulting from the seventy-eight percent factor probably would have little effect on retention, especially since civilian employment is harder to find after age fifty.

Service members overwhelmingly reject DoD's plan to reduce a member's retirement annuity at age sixty-five by half the benefit attributable to the government's contribution to the member's Social Security fund while he was on active duty. This is the so-called "fifty percent offset." DoD insists that, under the present system, Uncle Sam is paying twice for the member's retirement—once through the regular military retirement system and a second time through Social Security; hence, the reduction is justified. Whether Congress will agree remains to be seen, though there will be considerable pressure on the lawmakers to accept

The author, Edmond "Ed" Gates, became a Contributing Editor of AIR FORCE *Magazine with the April 1973 issue. Previously, he was editor of* Air Force Times, *with which he had been associated since 1950. Mr. Gates is a recognized authority on military and Air Force personnel matters.*

this provision, because it would yield substantial savings.

Nevertheless, the integration of Social Security and military retirement pay results in a loss of benefits that military people have been promised and have counted on for the past sixteen years. Although many civilian retirement plans follow this pattern, military people consider it a breach of faith on the part of the government.

Retired Pay—Present and Proposed System

Comparison for Persons with Twenty or More Years at Implementation

Rank	Yrs. Svc.	Present Monthly Pay	Proposed Monthly Pay	Monthly Increase
E-7	22	$438	$438	$ 0
E-8	26	647	657	10
E-9	30	836	869	33
O-4	20	704	704	0
O-5	28	1,094	1,111	17
O-6	30	1,547	1,609	62
O-7	30 (or more)	1,761	1,831	70
O-8	30 (or more)	2,025	2,106	81
O-10	30 (or more)	2,259	2,340	90

Members with long service—mainly officers—retiring after implementation of the Defense Department plan to overhaul the nondisability retirement system would enjoy an immediate pay raise. It's because the plan would boost the 2.5 percent annual multiplier to three percent from the twenty-fifth through the thirtieth year of service. This feature helps explain why the new plan, though eventually aimed at saving the government money, would actually cost more during the first year of operation.

The Vesting Issue

The third major change proposed in DoD's package would establish the vesting program. Since the declared purpose is to recognize a member's service short of retirement and pay him for it, one might assume the idea would draw many cheers. It hasn't.

Currently, only RIFed officers enjoy separation payments, under a hodgepodge of arrangements. DoD would erase all of these and establish the following new plan for both officers and enlisteds:

- **Voluntary Separatees.** Those leaving after ten but less than twenty years of service would receive, starting at age sixty, a monthly pension based on 2.5 percent of the member's final year's pay times years served. Thus, twelve years' service would translate into a thirty percent retirement at age sixty. CPI raises between separation and age sixty would be included.

An important point here, of course, is that very few service members separate voluntarily after ten years in uniform; by then, they're going for twenty or more. And deferring the mini-retirement to age sixty curbs the cost.

- **Involuntary Separatees.** Here, a person would qualify for benefits after only five years' service. And the payoff is much more generous for the involuntary separatee, even though in most cases he would be leaving under a cloud.

The individual could choose between (1) a monthly age-sixty retirement like the voluntary separatee would receive, plus an immediate lump-sum readjustment payment; or (2) an immediate lump-sum payment equal to twice the readjustment pay. It's a "double dip."

The readjustment payment would equal five percent of a person's annual basic pay times years of service. At five years, for example, a member would receive twenty-five percent of a year's basic pay; at ten years, fifty percent; and at fourteen years, seventy percent. (*For more details, see the May '73 issue, p. 32.*)

There seems little doubt that, once the exit benefits are authorized, the services will be more inclined to use them than heretofore—in order to weed out poor performers. "Personnel managers would be more selective in whom they keep aboard," a spokesman in General Benade's office said.

"High One" and "Save Pay"

The Pentagon's new package contains a plan to compute future retirees' pensions on a member's average basic pay during his final twelve months of service. Most service members seem to acknowledge that this would provide a more equitable arrangement than the present situation under which some people can schedule their retirement date immediately following an active-duty pay raise, but others can't. Over a lifetime, the former outdraw the others by many thousands of dollars.

So DoD, in effect, is opting for a "high-one" formula for computing future pensions. The plan would still be more generous than many nonmilitary systems, where pensions are frequently based on workers' highest three or highest five years of earnings. Civil Service uses the "high three," and numerous lawmakers want to impose that system on the military. This could become a lively issue during congressional hearings.

The greater the number of years used to calculate an average earnings' base, of course, the better the odds for reducing the pension.

Even the "save-pay" proviso in DoD's package of proposals has salved few wounds on the part of the complaining troops, the flood of protests indicates. The save-pay section guarantees that a person will receive retirement pay

at least as high as the amount received by a service member who retired earlier with the same grade and years of service, adjusted upward to reflect any increases in the Consumer Price Index.

DoD's Defense

So much for individual reactions to the proposal. What about the military services? When DoD cranked up the proposed new nondisability retirement system, Air Force, along with the Army and Navy, endorsed the project. It was not exactly an all-embracing, enthusiastic type of endorsement, but USAF definitely went along. All the services are now firmly locked in behind the plan; any backtracking is out of the question.

General Benade and his aides certainly entertain no doubts about the controversial legislative package they have fathered. The General many times has insisted that continued personnel cost increases must be curbed. He suggests forthrightly that future pay raises will occur less frequently. And he has sponsored a recent legislative request to authorize the placement of part or all of future pay raises into allowances rather than basic pay. Insiders believe Congress will approve it.

Such action, of course, would trim both retired cost projections and increases in the individual's retired pay, which is computed on basic pay alone.

General Benade told AIR FORCE Magazine that pressure from Congress "to place military retirement on a contributory basis, and eliminate the twenty-year retirement privilege, is very strong."

The DoD executive made it clear he is completely satisfied with the package. He repeated what he's been saying all along, that service members who believe the proposals will reduce retirement benefits "are using assumptions that may not occur.

"They're assuming that, regardless of the rising cost of the military retirement system and active-duty pay, pay increases are going to come with the same frequency and size as they have before.

"I personally think this is an overly optimistic assessment," he said. Leroy Spence, a Benade assistant and a former top personnel planner with Hq. USAF, told AIR FORCE Magazine that the retirement change proposals are considerably less drastic than what some influential quarters have called for. Considering the heavy pressure for curbing costs, the package is entirely reasonable, he said.

Mr. Spence reminds us that powers in Congress like Sen. John Stennis (D-Miss.) and Rep. George Mahon (D-Tex.) are on record for tough actions to pare retired pay projections. Stennis heads the Senate Armed Services Committee, while Mahon chairs the House Appropriations Committee.

Estimates of what military retirement will cost in the years ahead vary widely, depending on what assumptions are used. The most frequently used government figure forecasts an annual increase from the present $4.75 billion to about $8 billion by Fiscal Year 1980, further increasing to nearly $22 billion a year by the turn of the century.

This assumes that the present retirement formula remains unchanged, and that a five-percent-per-year basic pay boost and a 1.5 percent CPI increase will be forthcoming. The latter, of course, appears far too modest.

DoD's long-range estimates of savings under the controversial new package also vary depending on different situations. With an annual five percent basic pay and a 1.5 percent CPI

One Reason Why Military Retirement Costs Are Rising

Contributing to the rising cost of military retirement is the increasing number of Reserve, or "Title III," retirees reaching their sixtieth birthdays.

DoD says there were 50,431 of them (44,684 officers and 5,747 enlisted people) on June 30—who received an estimated $166 million during Fiscal Year 1973. The estimate for the current fiscal year is 56,371, drawing $178 million. This compares with 48,495 Title III retirees drawing $146 million during Fiscal Year 1972. DoD recently presented these new figures to the congressional appropriations committees.

Recipients are primarily officers who have completed twenty or more "good years" in the Reserve Forces, or a combination of active-duty and Reserve years, and have reached age sixty. Their retired pay starts at that time, based on rank and points earned for participation.

Further increases in numbers of Title III retirees drawing pay are forecast throughout the next decade as more World War II veterans who have participated actively in the Reserve Forces reach their sixtieth birthdays.

"Title III" refers to the section of a 1948 law that authorized the age-sixty retirement program.

increase, the new program would provide a cumulative savings of $13–$14 billion by the year 2000, DoD says.

Officials advanced another point of probable significance: the new Defense Secretary, James R. Schlesinger, believes that the Pentagon's approach toward altering the present retirement system is too mild. Dr. Schlesinger, when he served on the President's Inter-Agency Committee in 1971, made known his desire for a somewhat tougher approach. It was the Inter-Agency Committee that hammered out various recommendations for altering the military retirement system, some of which appear in the package now before Congress.

The Atmosphere on the Hill

With DoD holding firm in support of the new package, despite heavy in-service flak, what is the atmosphere on Capitol Hill? Congress is often responsive to servicemen's demands. Will it be this time?

For clues, AIR FORCE Magazine talked with John Ford, a member of the staff of the House Armed Services subcommittee with jurisdiction over the Pentagon's new package and other retirement legislation. Rep. Samuel S. Stratton (D-N. Y.), closely identified with lawmakers favoring curbs in rising military personnel costs, heads the subcommittee.

Mr. Ford, for many years the congressional correspondent for the Army Times Publishing Co. and its several newspapers, is generally regarded as Capitol Hill's leading authority on military retirement.

Like Pentagon officials, Mr. Ford noted that pressures to trim retirement costs by tampering with the system's present expensive features have increased tremendously in recent years. The troops' protests over the new package may induce the lawmakers to soften an item here or there, Ford believes. But he sees no general dissatisfaction with the proposals on the subcommittee's part.

The "double dip" for involuntarily separated members and the section to increase the maximum retirement from seventy-five to seventy-eight percent are among the proposals Congress is likely to question closely, the congressional aide indicated.

He pointed out that many congressmen—"far more than a decade ago"—are stirred up about the mounting military personnel budget, which now claims fifty-six percent of the total DoD budget. Retired military pay now accounts for thirty percent of the total US military personnel budget, and the figure is rising. Lawmakers want that trend halted, Mr. Ford said.

He forecast that it will probably be some time this fall—"after August"—before the Stratton subcommittee, and subsequently the full House Armed Services Committee, holds formal hearings on DoD's nondisability retirement package and related legislation. What happens after that is uncertain, though no Senate action is expected this year.

Meantime, DoD officials were advising the congressional appropriations committees, in testimony on the Fiscal Year 1974 military budget, that retired military pay now accounts for 6.06 percent of the entire DoD budget. They pointed out that a decade ago, retired pay accounted for only 2.4 percent of the total budget, and twenty years ago, in Fiscal Year 1954, it amounted to less than one percent.

The Pentagon, in short, is hauling out heavy artillery to back up its efforts to curb rising retirement outlays. On the other hand, it seems likely that service members' protests over tampering with the No. 1 benefit will intensify. ■

MUSIC IN THE AIR

It was at a base in the isolated Far North, and, except for an occasional USO drop-in, there was not a woman to be seen or heard. In this all-male environment, colorful descriptive language was an accepted part of communication.

One of the fighter pilots stationed at the base lined up for takeoff.

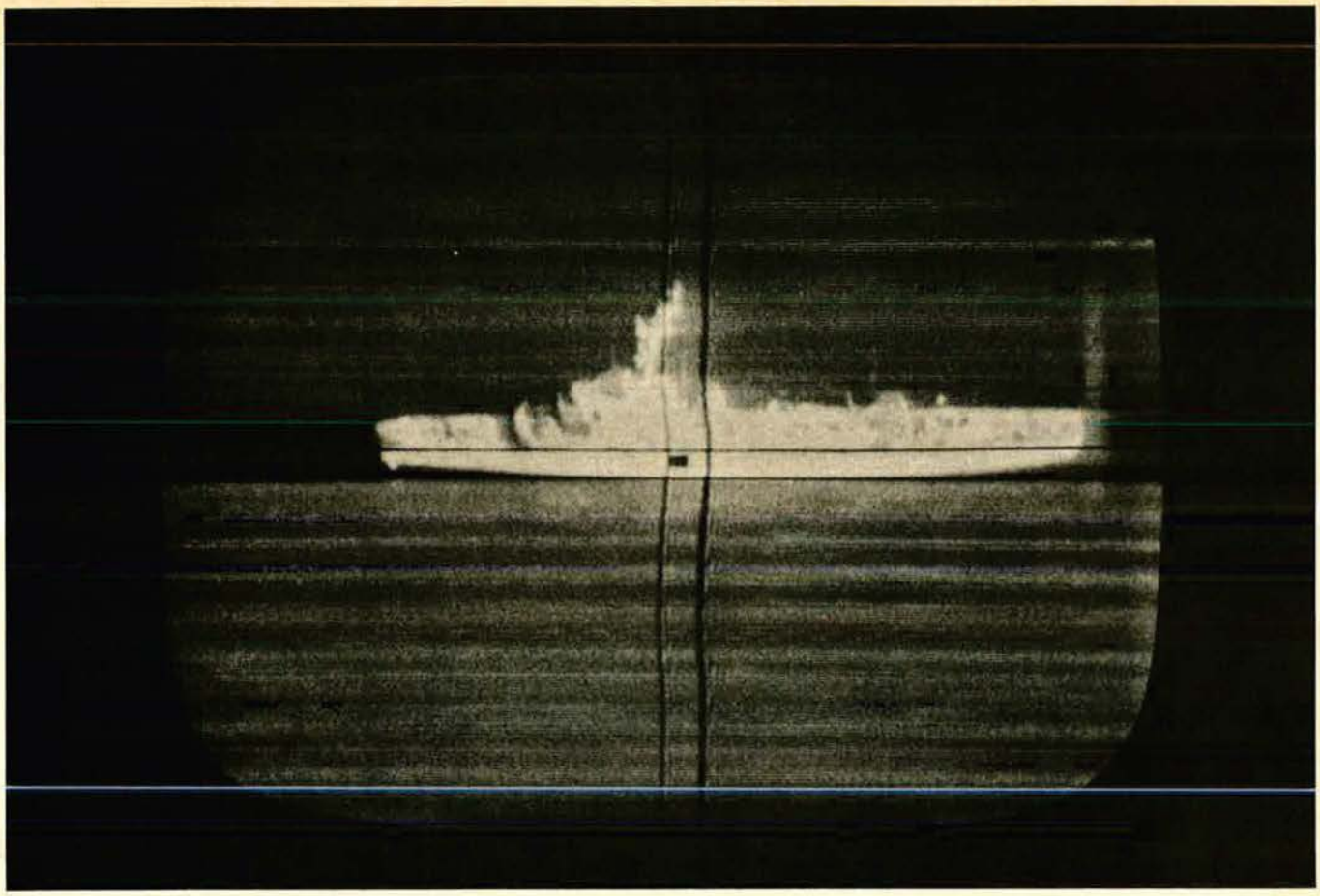
"084 ready for takeoff. Feet are on the rudders, hand is on the gas. Gimmie the word, and I'll kick her in the ass."

There was a pause, and a lovely feminine voice answered, "Why don't you just try a conventional takeoff?"

An immediate and enthusiastic search of the base failed to discover what would have been the ultimate step in a base-improvement program. It turned out that the voice was that of a flight nurse aboard a Gooney Bird operating in the area and on the tower frequency. No doubt she was put up to it by those Gooney drivers, who delighted in needling the fighter jocks.

—CONTRIBUTED BY GROVER TATE, USAFR (RET.)

(AIR FORCE *Magazine will pay $10 for each anecdote accepted for publication.*)



Now pilots can eye the target from a safe distance. And hit it.

Ready...fire...aim. That's the whole idea behind the Navy CONDOR stand-off tactical weapon system. It permits the missile to be readied and launched from stand-off ranges outside heavily defended land and sea targets.

When the missile reaches the target area, the missile operator acquires the target on a TV monitor via data-link from the missile nose TV camera and locks on the most vulnerable point of the target. From there on

terminal homing is automatic. And safe for the launching aircraft and crew.

CONDOR has successfully completed flight demonstrations with eight consecutive direct hits on land and sea targets.

The Missile Systems Division of Rockwell International is working with the Naval Weapons Center, China Lake, Calif., to accomplish fleet introduction of the CONDOR weapon system.

Responding to a need for new generations of weapons, the Missile Systems Division is engaged in the design, development and production of not only CONDOR, but other tactical missiles as well.

Missile Systems Division
Rockwell International

AFA Symposium—Part II of a Special Report

Two elements of the US ICBM force are paramount—the men and women who operate the missiles, and the command control mechanism that activates this force. SAC's missile people, what motivates them, and how their career field compares with others in the Air Force came in for close scrutiny at AFA's Symposium on "The ICBM Challenge," covered in part by a previous report that appeared in the July issue . . .

SAC's MISSILEERS LOOK TOWARD A BRIGHT FUTURE

By Edgar Ulsamer
SENIOR EDITOR, AIR FORCE MAGAZINE

"THERE will be an even greater need in the future for the proven emergency backup capability of an advanced airborne command post [the eventual successor of "Looking Glass"]. The future airborne system should be totally independent of all ground lines of communications. Sensor satellite data, force status, and intelligence information would be relayed through survivable communications satellites directly to airborne computers and display devices. Fast-reaction messages originated by the National Command Authority could be transmitted directly to the forces utilizing the satellite relay." That is how Maj. Gen. James R. Allen, SAC's Deputy Chief of Staff for Operations, described the future command control requirements of the Strategic Air Command at AFA's Symposium on "The ICBM Challenge" at Vandenberg AFB, Calif., May 1–3, 1973. (The first report on this event appeared in the July issue of AIR FORCE Magazine.)

In a comprehensive discussion of SAC's command control systems, General Allen stressed that recently instituted revisions now make it possible for the National Military Command Center to maintain direct contact with SAC's bomber and missile crews through the so-called primary alerting system. One of the key elements of SAC's survivable command control is the post-attack command control system, made up of nine Looking Glass aircraft as well as an airborne UHF (ultra-high frequency) radio link with the National Command Authority, General Allen explained.

Looking Glass aircraft have been airborne continuously since 1961, with one aircraft and its battle staff always in the air flying in a random fashion over a 79,000-square-mile territory. Looking Glass aircraft operate in rotation from Offutt AFB, Neb. The remaining eight aircraft are on ground alert at Grissom, Ellsworth, Minot, and Offutt AFBs, General Allen reported.

The basic command control requirement of the Strategic Air Command is to assure con-

tinuous direct contact with the combat crews for control and direction in order to "maintain the ability to carry out Presidential and Secretary of Defense directives promptly and accurately," General Allen told the AFA Symposium.

Human Side of the ICBM Challenge

"SAC's missile people are responsible for operating and maintaining sixty-five percent of the free world's deterrent force, so it is of utmost importance that we ensure that our personnel are capable of assuming this responsibility. Being capable involves being mentally and physically fit and technically qualified," according to Brig. Gen. Robert R. Scott, SAC's Deputy Chief of Staff for Personnel.

Because of the wide range of personnel programs tailored to the missile crews, ICBM duty has become "a hard-core career field—one which has solidified its own image and developed its own leaders and expertise. Whether he stays in missiles or not, a missileman's tour has given him the opportunity to build a strong performance record in a combat unit, gain valuable experience, earn a master's degree, attain his first level of professional military education, and gain much confidence and maturity that he may have lacked when he came on active duty as a second lieutenant. He has, if he has taken advantage of the opportunities, a five-year head start on his contemporaries."

During the Symposium's question and answer period, Lt. Gen. James M. Keck, Commander of SAC's Second Air Force, rejected the notion that nonrated missile people are handicapped in terms of promotion potential, compared to rated career officers. "Don't get trapped looking back. We have not had our missile force long enough to produce general officers out of this career field. But things change, and there can't be any doubt that [in the years ahead] nonrated people will be in high positions in the Air Force," General Keck pointed out.

"To strike back . . . at any instant . . . at any hour, we, the missile launch crews are ready . . . and primed, in the earth within our hardened blast-proof capsule. We are on strategic alert . . . twenty-four hours a day . . . in defense of America." That is how Capt. James R. Frantz, a missile combat crew commander, described the duty and attitude of SAC's professional missilemen for the AFA Symposium. His detailed report of the duties of the Minuteman crews was followed by a briefing on missile maintenance given by Maj. Tom Vitito, a representative of SAC's Missile Maintenance Directorate, who concluded his presentation with this statement:

"A sense of personal accomplishment in contributing to the national security is one reward that I and other officers have received for ensuring the maximum number of ICBMs on alert. I feel that the logistics and personnel management responsibilities in ICBM maintenance is as challenging, possibly more so, than that of any Air Force career field which I might have entered. [It] offers excellent career and promotion potential for the professional maintenance officer. It has allowed me to gain a wealth of both logistic management and personnel management experience, greatly increasing my potential for a senior logistics manager position in future missile and space systems."

Lt. Gen. James M. Keck, Commander of SAC's Second Air Force, answers a question posed by AFA's Executive Director James H. Straubel. Lt. Gen. William F. Pitts is seated.

Linebacker II Report

General Allen also briefed those attending the Symposium on Linebacker II, the climactic twelve-day bombing campaign against North Vietnam during December 1972, which helped end US involvement in that war. A total of 20,370 tons of bombs was dropped over North Vietnam during the campaign. About three-fourths of that total, or 15,000 tons, was delivered by SAC's B-52s on thirty-four target complexes, according to General Allen.

Although MIG fighters were actively deployed against the US force, they "did not materialize into a formidable threat. Tactical fighters flying along with the B-52 strike force

General Keck dispelled the myth of lagging promotion of SAC's missile people.

and suppression strikes against the MIG airfields helped to minimize this threat. Nevertheless, MIGs were encountered on several occasions. B-52 tail gunners were credited with downing two MIGs. Support forces, combined with countermeasures and other protective equipment, were employed by the B-52s to effectively counter the MIG threat," according to General Allen.

In discussing the loss of fifteen B-52s during Linebacker II, General Allen stated that, although this was a large number, "when compared with the number of aircraft that were flown over the target, this represented about

Lt. Gen. William F. Pitts, Commander of SAC's 15th Air Force, presented a detailed report on plans for missile force improvements.

SAC's DCS/Plans, Maj. Gen. Ray B. Sitton, reported that the Minuteman force, because of its high readiness, accounts for sixty-five percent of the Triad deterrent.

Brig. Gen. Robert R. Scott, SAC's DCS/Personnel, said missile duty has become a "hard-core career field" and offers a wide range of promotional opportunities.

AN AFROTC CADET'S VIEW OF THE AFA SYMPOSIUM

By Cadet Capt. Phillip Smithson

CENTRAL WASHINGTON STATE COLLEGE, ELLENSBURG, WASH.

As an Air Force ROTC cadet, I saw the AFA Symposium on missiles as an all-out push by the Air Force to promote its need for an improved missile system and the manpower to make it work.

The Symposium brought together business and social leaders from throughout the nation, generals from within the Strategic Air Command, and awestruck cadets who had never seen so many stars in one place in their lives.

The Triad concept of strategic deterrence was fully explained, along with the evolutionary introduction of missiles into the military hardware inventory. But, for an ROTC man, the biggest opportunity the affair provided was the chance to find out what the missile program could do for a future military career. In other words, the question in most cadet minds was: "Can I become a general through a career in missiles?"

The military and civilian delegates to the Symposium were more than willing to answer any questions the cadets put forth. It was obvious that the military leaders want missilemen to enter this growing career field. Cadets were given several opportunities to talk informally with generals in an atmosphere that bred frank comments and valuable advice.

In effect, these high priests of our nation's military strength loosened their ties and showed themselves to be humans who just happened to hold important positions. Personally, the experience taught me how to converse with a high-ranking officer. Although it may seem to be a minor point, to a cadet it can be either a rewarding experience or an embarrassing ordeal.

We cadets were immediately put at ease and encouraged to corner various important persons to ask what we felt to be important questions.

Most of the questions centered around the importance that the military high command places on experience as a combat crew member in a missile command. Most agreed that, for the nonrated officer, missiles are the best direction to go.

But whether or not a nonrated officer goes into missiles, one general officer offered some important tips for nonflyers.

Maj. Gen. Robert N. Ginsburgh, the Director of Information for the Air Force, a nonrated officer, said, "Don't carry a chip on your shoulder if you aren't a pilot, because there will always be a guy with wings to knock it off."

He added that the best course of action for a nonrated officer to take is to learn his job as well as possible. "When the former pilot gets the same job you have, you'd better be able to show that you know a lot more than he does about the work. If you don't, your superiors will figure that in a short time, he was able to learn almost as much as you, and he'll get the promotion."

But missiles were in the spotlight during the Symposium. Missilemen were called "young tigers" and commended for their ability to endure the rigorous testing that is constantly evaluating their capabilities.

Before I attended the Symposium, I felt that I had no future in the Air Force unless I could somehow gain a rated status.

Now I know that there is pride to be found on the ground. The Triad system of ICBMs, sea-launched missiles, and manned bomber forces can work only if all three play an equal part. Missiles are fulfilling their role and will continue to do so as long as technical improvements and manpower keep coming. Military leaders realize this, and while presently there are few high-ranking officers who have come solely from missile fields, as the program matures, their numbers will rise.

I want to be one of them.

a two percent loss rate, somewhat lower than we had anticipated.

"We did everything possible to protect our crew members, but in an operation of this magnitude against highly sophisticated defenses, it is nearly impossible not to have losses. The longer we flew on a sustained basis, the lower our loss rate became as the enemy defenses suffered heavy attrition. In fact, during the last two days of the operation, the B-52s over the North Vietnam heartland did not sustain a hit," General Allen reported.

In terms of crew members, he revealed, "four SAC men lost their lives when their battle-damaged aircraft crashed during a landing attempt. Thirty-three of our crew members were initially carried as captured and, of course, have subsequently been released. Twenty-six crew members bailed out of crippled B-52s and were successfully recovered, and twenty-nine of our crew members are being carried as missing in action."

During the twelve days of the air campaign against North Vietnam, SAC's bombers delivered more than 49,000 bombs and destroyed or damaged more than 1,600 military structures and 373 pieces of railroad equipment. In addition, about 3,000,000 gallons of petroleum were destroyed, and North Vietnam's rail net was interdicted in more than 500 places. As a result, General Allen disclosed, "the imports into the country from the Soviet Union and Communist China [were reduced] from an estimated 160,000 tons to 30,000 tons a month. B-52 strikes against North Vietnamese airfields interdicted runways and taxiways in at least ten separate locations."

Contributions of Reconnaissance Drones

SAC contributed to Operation Linebacker in other ways, too, especially through its KC-135 tankers and its photoreconnaissance drones. During the twelve-day campaign, "KC-135 crews flew more than 1,300 sorties refueling B-52s and Air Force tactical aircraft such as F-4s, A-7s, and F-105s. Without these air refuelings, the flexibility of applying tactical airpower for maximum effectiveness would have been greatly constrained."

General Allen disclosed that "SAC support also included drone photoreconnaissance of the target areas. It was the . . . monsoon season over the [upper] portions of North Vietnam, and there were only twelve hours of good weather during the twelve-day period. The drones, which were able to operate below the cloud cover, provided vital daily photographic coverage of Linebacker II targets."

The Joint Chiefs of Staff requested the Strategic Air Command to set up a special KC-135 airlift to assure the rapid delivery of all Linebacker II photoreconnaissance products to Washington, D. C. This delivery system "permitted top-level exploitation of this information within twenty-four hours after initial processing in Southeast Asia. The average delivery time was approximately twenty hours," according to General Allen.

The Symposium concluded with a question and answer session that involved General Pitts and General Keck. AFA's Executive Director James H. Straubel acted as moderator of the two-day program.

The social highlight of the Symposium was a reception and banquet that featured Rep. James Wright of Texas, Deputy Majority Whip of the United States House of Representatives, a charter AFAer, and the first "AFA Man of the Year" in Texas. Probing the problems of the "pampered society," Congressman Wright called for a change away from the present national trend toward self-indulgence and a return to self-control. Quoting Ralph Waldo Emerson, he said America today needs "someone to inspire us to do what we can."

AFA's Chairman of the Board, Joe L. Shosid, opened the program by outlining AFA's pioneering support of the nation's ICBM force, which dates back more than twenty years. AFA's support of the ICBM concept was not reached without some dissension in its own ranks, Mr. Shosid said, because some of the more conservative elements saw the missile as "just a damned cannon," which should be assigned to the US Army. Mr. Shosid recalled that AFA's first President, Lt. Gen. James H. Doolittle, ended the argument with the comment: "I bet you miss your boots and spurs!"

Emcee of the banquet program was Hollywood personality and long-time AFA leader Joe Higgins. ■

Maj. Gen. James R. Allen, SAC's DCS/ Operations, described the future advanced airborne command post as "totally independent of all ground lines of communication" and of crucial importance to command and control.

Rep. James Wright, Deputy Majority Whip of the House of Representatives, was the banquet speaker.

Minuteman III's advanced silo and launch control center, shown here in cutaway form, will be able to survive a near miss from a large-yield weapon, according to SAC briefers at the AFA Symposium.

AIR FORCE ASSOCIATION

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

The High-Option Plan ($100,000 Maximum)

20-24	$100,000	$12,500	15.00	$6,000	$2,000	$2.50
25-29	90,000	12,500	15.00	6,000	2,000	2.50
30-34	75,000	12,500	15.00	6,000	2,000	2.50
35-39	60,000	12,500	15.00	6,000	2,000	2.50
40-44	37,500	12,500	15.00	5,250	2,000	2.50
45-49	22,500	12,500	15.00	4,050	2,000	2.50
50-59	15,000	12,500	15.00	3,000	2,000	2.50
60-64	11,250	12,500	15.00	2,250	2,000	2.50
65-69	6,000	12,500	15.00	1,200	2,000	2.50
70-75	3,750	12,500	15.00	750	2,000	2.50

* In the event of an accidental death occurring within 13 weeks of the accident, the AFA plan pays a lump sum benefit of $12,500 *in addition to* the benefit, except as noted under AVIATION DEATH BENEFIT, above.

** Each child is covered in this amount between the ages of six months and 21 years. Children under six months are provided with $250 protection once they are 15 days old and discharged from the hospital.

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

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Wide eligibility! If you're on active duty with the U.S. Armed Forces [regardless of rank], a member of the Ready Reserve or National Guard [under age 60], a Service Academy or college or university ROTC Cadet, you're eligible to apply for this coverage [see exceptions].

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Administered by insurance professionals on your Association's staff, for excellent service and low operating cost.

EXCEPTIONS:

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

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

The insurance will be provided under the group insurance policy issued by United of Omaha to the First National Bank of Minneapolis as trustee of the Air Force Association Group Insurance Trust. However, because of certain limitations on group insurance coverage in those states, nonactive-duty members who reside in Ohio, Texas, Florida, and New Jersey are not eligible for AFA group life insurance coverage.

EFFECTIVE DATE OF YOUR COVERAGE

All certificates are dated and take effect on the last day of the month in which your application for coverage is approved. Coverage runs concurrently with AFA membership. AFA Military Group Life Insurance is written in conformity with the Insurance Regulations of the State of Minnesota.

Yes, now the Air Force Association offers members of the United States Air Force their choice of two great new life insurance plans, both designed to meet the special requirements of Air Force personnel.

Planned for You

Both plans have been specifically designed to fill your particular needs. This is full-time, worldwide protection. There are no war clauses—no hazardous-duty restrictions, or geographical limitations on AFA life insurance protection. At AFA, our policy is to provide the broadest possible protection to our members, including those in combat zones.

Low Group Rates

And, as a member of AFA, you are able to secure this outstanding protection at low group rates. What's more, there's no increase in premiums for flying personnel. In fact, in most cases, flying personnel are entitled to full death benefits. Only when death is caused by an aircraft accident in which the insured was serving as pilot or crew member does the special Aviation Death Benefit take effect.

Higher Benefits for Young Families

The higher benefits for younger members make both plans particularly outstanding buys for the young family. The young family breadwinner can make a substantial addition to his life insurance estate at a time when his family is growing up—when his financial obligation to his family is at its greatest!

CHOOSE EITHER OF THESE GREAT PLANS! MAIL THIS APPLICATION TO AFA TODAY!

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United of Omaha

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

Full name of member _____
Rank Last First Middle

Address _____
Number and Street City State ZIP Code

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

Please indicate category of eligibility and branch of service.

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

Name and relationship of primary beneficiary

Name and relationship of contingent beneficiary

This insurance is available only to AFA members

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

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

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

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

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

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

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

IF YOU ANSWERED "YES" TO ANY OF THE ABOVE QUESTIONS, EXPLAIN FULLY including date, name, degree of recovery and name and address of doctor. (Use additional sheet of paper if necessary.)

I apply to United Benefit Life Insurance Company for insurance under the group plan issued to the First National Bank of Minneapolis as Trustee of the Air Force Association Group Insurance Trust. Information in this application, a copy of which shall be attached to and made a part of my certificate when issued, is given to obtain the plan requested and is true and complete to the best of my knowledge and belief. I agree that no insurance will be effective until a certificate has been issued and the initial premium paid. I understand United reserves the right to request additional evidence of insurability in the form of a medical statement by any attending physician or an examination by a physician selected by United.

Date _____, 19 ____ _____
Member's Signature

8/73
Form 3676GL App

Application must be accompanied by check or money order. Send remittance to: Insurance Division, AFA, 1750 Pennsylvania Avenue, NW, Washington, D.C. 20006

The Bulletin Board

By Maj. Robert W. Hunter, USAF

CONTRIBUTING EDITOR, AIR FORCE MAGAZINE

AIR FORCE MANAGEMENT PROGRAMS

In this column, in the June 1973 issue, we reported on the Air Force program for managing its officer resource—TOPLINE. Now from USAF personnel sources comes word on two other programs: TOPCAP, USAF's plan to manage its airman resource, and the Rated Supplement by which rated members are given career broadening in nonrated jobs.

TOPCAP

TOPCAP, which stands for Total Objective Plan for Career Airmen Personnel, provides the Air Force a set of rules for managing the flow of airmen into, through, and out of each grade and the career force. The plan—used by the Air Force since July 1, 1971—has two major parts:

- A career-progression system oriented in terms of grades and promotions, and
- A force structuring system that specifies the number of people the Air Force needs by skill level within each career field subdivision.

The career-progression system provides each Air Force specialty equal opportunity for promotion. The system also establishes fixed minimum opportunities for promotion over fixed promotion zones. This involves several factors.

Under TOPCAP, in addition to minimum time-in-grade requirements, one must also have minimum time in service to be eligible for promotion. The earliest year of completed service in which an airman can be promoted to the next higher grade, assuming he is otherwise eligible, is referred to as the "low year of tenure."

Time in grade and time in service are computed up to the first day of the last month of the promotion cycle in which the airman is being considered. Minimum time-in-service requirements by grade are: for sergeant, one year; for staff sergeant, three years; for technical sergeant, five years; for master sergeant, eight years; for senior master sergeant, eleven years; for chief master sergeant, fourteen years.

The period between the low year of tenure and the year in which one is no longer considered for promotion to the next higher grade is called the "zone of eligibility." During the years of service when one is eligible and would be considered for promotion to the next higher grade, TOPCAP guarantees the following promotion opportunities: ninety percent from sergeant to staff sergeant; ninety percent from staff to technical sergeant; eighty-four percent from tech to master sergeant; seventy-five percent from master to senior master sergeant; sixty percent from senior to chief master sergeant.

This means that if an airman is promoted to staff sergeant before completing his fourth year of service, he would be considered for promotion to technical sergeant during the sixth year of service. Personnel would be considered for promotion each year until their nineteenth year of service, which, for staff sergeants, is the "high year of promotion eligibility."

By this time, ninety percent of the individuals in a year group who are still in the Air Force will have been promoted to tech sergeant or higher. Those who had not been selected by this time would not be allowed to reenlist, but would retire at twenty years.

This method of promotion consideration holds true for each grade and applies to all eligibles competing for that grade, regardless of AFSC. This promotion opportunity is measured against airmen in any year-of-service group, in contrast to the previous system where vacancies in a given grade paved the way for promotions. TOPCAP does not promote to fill vacancies. Promotions are made to ensure the guaranteed promotion opportunity for each grade.

In addition to the low year of tenure, TOPCAP also has a feature called the "high year of tenure." If an airman has not been promoted out of a given grade by this year, he will be denied reenlistment. For staff sergeants, it is the twentieth year of service; for tech sergeants, twenty-three years; for master sergeants, twenty-six years; and for senior master sergeants, twenty-eight years.

The high year of tenure feature is a major facet of TOPCAP and was included to prevent promotion stagnation by setting a maximum number of years that a person can stay in a given grade. Forced separation should occur only after ample opportunity for promotion has been made available.

Associated with the high year of tenure is the high year of promotion eligibility option. Under this option, one's promotion eligibility *ends* prior to his high year of tenure. (This feature of TOPCAP has been temporarily waived because, for now, it is not needed to sustain promotion flow in the current force.

(However, as the personnel inventory approaches the configuration of the objective force, or if strength reductions limit promotion flow, it may be necessary to implement the high year of promotion eligibility in order to sustain promotions.)

The second part of TOPCAP—the Force Structuring System—is designed to produce an ideal force structure where the exact number of career airmen needed to accomplish the mission of the Air Force is specified in terms of skill level and years of service, from the fifth to the thirtieth year of service. TOPCAP considers every man who has more than four years of active

military service as a career airman.

The ideal force was constructed using a computer model of the enlisted force. Such information as total size of the enlisted force, the number of seven- and nine-level NCOs authorized for that size enlisted force, the rate at which people in the various specialties leave the Air Force, and the rate at which the various specialties upgrade to the seven level were fed into the model. After some two and one half years of study and analysis, an ideal career force that would support the Air Force in time of peace, as well as in time of limited war, was established.

The idea of a career force objective is not new to the Air Force, but the method of determining and describing it is. Previously, the career force was simply stated as a percentage of the total force. Under that concept, the size of the career force would fluctuate each year as the budget changed, and, in turn, caused changes in the number of airmen the Air Force was authorized to have on board.

As a result, people programs such as promotion, pro pay, and retraining fluctuated widely from year to year, causing problems for the people involved. TOPCAP is designed to provide a new dimension of stability to the enlisted force with the concept of a career force that remains constant in size over a range of total enlisted strengths.

The current, approved career force consists of 213,084 airmen. It will remain at this figure until the total authorized airman strength goes above 577,000 or falls below 527,000. Should the total airman force go above or below these two figures, then a new career force size will be established.

This career force requires an input of 19,274 men and women each year into the fifth year of service. Each AFSC has its individual reenlistment objective. The career force consists of 67,912 career journeymen, the majority of whom have between four and eight years of service, and 145,172 superintendents/supervisors and technicians, most of whom have ten to twenty years of service.

Under TOPCAP, annual strength fluctuations will still occur, but the changes will be absorbed in the first-term force. This provides a stability in the career force that allows USAF to guarantee promotion opportunity in each grade.

Col. Harold D. Kletschka, center, a correspondence graduate, and Lt. Col. Ovid L. Bayless, seminar graduate, are presented a diploma by Maj. Gen. Lawrence S. Lightner, former Commandant of Air War College, Maxwell AFB, Ala. The two represent the 500 officers and civilians completing nonresident Air War College programs in 1973.

Another aspect of TOPCAP is the elimination of the traditional skill/grade relationship that has existed since the origin of the Airman Classification System. The objective career force is built solely on the basis of the skill level that a job requires, *not* the grade.

The career force of today is a long way from the ideal career force called for under TOPCAP. There are, at present, considerable overages in the sixteen- to thirty-year group. Changing this real structure to coincide with the ideal structure is the Air Force's task.

The Rated Supplement

USAF's Rated Supplement Program, which centralizes the concept of using rated officers in nonrated jobs, is only three years old.

It has three basic reasons for existence. First, the Rated Supplement officer is a wartime resource. The Air Force needs rated people, over and above the number filling normal peacetime authorizations, in order to meet increased requirements during the initial phase of a war. For example, it takes eighteen months or more to produce a qualified F-4 Phantom pilot. While a new pilot is being trained, qualified pilots can be returned from the Supplement to rated duty to fill the increased cockpit needs. The Supplement thus acts as a bank for a wartime resource.

Second, many of the Air Force's future commanders and managers will come from the young rated officers on board today, and USAF says they need an opportunity for career broadening and development. Continuing cuts in both budgets and numbers of people will increase the need for officers who have demonstrated ability to manage people and resources.

Third, the Supplement maintains a career potential for nonrated officers within the specialties to which rated officers often are assigned. Prior to US involvement in Southeast Asia, rated officers were usually moved into nonrated jobs at the local level to fill local requirements. Since there was no centralized control, the large number of rated officers assigned in nonrated areas—more than 17,000 in 1965—blocked the progression of nonrated officers in many of these fields.

The rated officers in the Supplement are now centrally managed, and the number assigned in each career field is controlled. This ensures that progression of nonrated officers is maintained.

A key feature of the Air Force Personnel Plan's volume on TOPLINE, the Rated Supplement Program provides for central management of the movement of pilots and navigators into, within, and out of each nonrated career field, according to established goals *(see "The Bulletin Board," June '73 issue).*

The goal for each field is based upon a certain percentage of nonrated field authorizations. The percentage of rated officers authorized in a nonrated field ranges from ten to fifty percent, with most fields in the ten percent category. For example, supply is a ten percent field, which means that up to ten percent of the authorizations within this specialty can be filled by rated officers.

There are several routes for moving a flyer into the Supplement. He

can request a duty specialty code change to a nonrated specialty through his CBPO. He can also apply for a technical training school with an end assignment to a nonrated field. Completing an Air Force Institute of Technology (AFIT) program can result in a directed duty assignment into a nonrated specialty.

All rated officers on the move are screened by the Military Personnel Center (MPC) and considered for entry into the Supplement. A local commander or major command may also nominate an officer for a specific nonrated position. Also, MPC may place a requirement or levy on a major command for rated officers to move into the Supplement.

Each of these routes requires approval by MPC to ensure that control is maintained over the number of rated officers assigned to each nonrated field. When a rated officer is assigned to a nonrated job, two data items are entered into his records at MPC: Supplement category and completion date.

If the flyer meets flying excusal criteria, he is coded "controlled rotation" and is excused from flying. If he is not eligible for excusal, he is coded as "surge" or "drawdown" and must continue to fly for proficiency to meet minimum requirements. In a contingency, the surge and drawdown officers would be the first to return to rated duty.

The Supplement completion date of an officer overseas or on a Stateside stabilized tour will coincide with the date he rotates from his overseas assignment or the date he completes his stabilized tour. The completion date of all other Supplement officers is normally three years from the month they are assigned to the Supplement.

Officers completing AFIT programs have a Supplement tour that coincides with any longer AFIT-directed duty assignment. Since reassignment may result in an officer being extended in the Supplement beyond his completion date, major commands must have MPC approval before reassigning an officer currently in their Supplement.

Every officer assigned to the Supplement is reviewed for return to rated duty. Those on overseas tours or stabilized tours must be reassigned by MPC at the end of their tours and receive a Supplement review at the beginning of the reassignment cycle nine months prior to their tour completion date.

The review for officers not on stabilized or overseas tours begins one year prior to their completion date. If selected for return to rated duty, the officer's major command is notified and instructed to advise the flyer to update his AF Form 90 to reflect the type of flying job he prefers. Nine months prior to his completion date, his records enter the normal assignment cycle, and his assignment is determined by the MPC rated management branch. During the first ten months of Fiscal Year 1973, 290 pilots and 155 navigators were assigned back to rated duties upon completion of a Supplement tour.

In some instances, usually for more senior officers, Air Force needs may require Supplement duty beyond the three-year point. Tours can be extended for from one to three years.

Flight Pay

The Department of Defense request to the Congress to extend, from May 31 of this year until December 31, the effective date for terminating flight pay for colonels and equivalent (O-6) and above in noncombat assignments was disapproved in late June.

The request, strongly supported by the Air Force Association, was made in order to prevent reducing the monthly pay of the officers affected before congressional study and hearings could be completed on newly proposed DoD-supported legislation relative to incentive pay *(see below).*

While the request for extension was initially passed by the Senate, it "died" on the floor of the House by a 238 to 175 vote, approving a move introduced by Rep. Otis G. Pike (D-N. Y.), to send it back to the Armed Services Committee with instruction to conferees not to accept the Senate-approved extension of the pre-May 31 status through the end of this year.

In conference, however, the Senate agreed to the House action.

The principal features of DoD's proposed legislation now before the Congress are:

- Payment of crew member flight pay on the basis of years of aviation service (rather than service by grade and longevity computed for pay purposes by Section 205, Title 37) until eighteen years of active officer service.
- For both commissioned and warrant officers, the highest rates of incentive pay to begin after six years of aviation service, rather than at about eighteen years of service for pay purposes, as is the case today. The six-year point of aviation service generally coincides with the expiration of the first obligated tour of duty, and the higher rates address the inadequate retention issue at that point.
- A gradual decline of pay rates from eighteen years of active officer service on the basis of years of active officer service, rather than remaining on the higher rates.
- Termination of all crew member flight pay after the completion of twenty-five years of active officer service, rather than payment for a full military career of thirty years or more.
- No increases in the flight-pay rates of general and flag officers over the existing rates, although some of these officers could receive lower rates of pay.
- A warrant officer flight-pay scale adjusted proportionately to the pay changes of commissioned officers. However, since warrant officer aviators remain in operational aviation duties throughout their careers, no twenty-five-year flight-pay cutoff is made. Warrant officer aviators will continue to be paid for their full flying careers on the basis of aviation service rather than service for pay purposes (Section 205, Title 37, United States Code).
- The proposed legislation would provide for a three-year transition period with save-pay provisions for those officers faced with pay reductions or denial of pay. This equity provision provides sufficient lead time for the affected officers to adjust financially and should coincide with the expiration of the current tour of duty of the majority of the officers affected.
- The proposed legislation would eliminate the existing language terminating entitlement to flight pay of officers of the grade O-6 (colonels or equivalent) and above as unneeded because of the changes that are proposed by this legislation. ■

Ed Gates . . . Speaking of People

THE MILITARY DISABILITY RETIREMENT SYSTEM

The military retirement system, often in the public spotlight this past year, figures to attract even larger and more frequent headlines in the months ahead.

The ever-increasing cost is one reason. The FY 1974 price tag on military retired pay is $5.3 billion, an increase of nearly $1 billion over FY 1973. Tied to the overall cost aspect is the recomputation issue, still boiling as fiercely as ever in some quarters.

Also helping to keep military retirement in center stage is the Defense Department's legislative proposal to sharply alter key nondisability retirement rules *(see page 60)*.

Finally, and also unresolved, is the matter of disability retirement ratings, accompanied by large tax breaks, for high-ranking officers. A House Armed Services subcommittee recently declared, "There are serious abuses in the disability retirement system, and these abuses must be stopped."

The subcommittee, backed solidly by the influential chairman of the parent Armed Services Committee, Rep. F. Edward Hébert (D-La.), is keeping a close eye on the services to see that reforms it recently ordered are actually carried out.

The subcommittee, headed by Rep. Samuel Stratton (D-N. Y.), has jurisdiction in the House over virtually all military retirement matters. It is particularly concerned with the mounting cost of retired pay, which explains, in part, why the group is dead set against any form of retired pay recomputation.

Meanwhile, the attention focused on the aforementioned issues has tended to obscure what some quarters insist are equally serious problems among other disability retirement rules. Here are inequities, the critics hold, that suggest the need for major revisions to long-standing statutes.

Existing disability retirement policies were adopted in the October 1949 Career Compensation Act (CCA). Basically, they have gone untouched ever since. The law directs that the government pin a specific disability percentage rating, ranging from ten to 100, on each service member judged to be physically unfit for duty.

The critics say this is an impossible task that creates confusion, frustration, bitterness, and lawsuits against the government.

Furthermore, in creating the CCA, Congress declared that all service members (with under twenty years of service) judged to be thirty percent or more disabled would receive retirement pay that is partially or fully tax-exempt. For example, if a man is found to be fifty percent disabled, the same percentage of his retired pay is exempt from federal and most state income taxes. Persons rated less than thirty percent unfit, on the other hand, are separated—not retired—under CCA.

No matter that the individual service member is a dedicated, talented careerist who may be within a few years of completing twenty years of service for normal retirement, CCA demands his ouster if he lacks that magic thirty percent.

Prior to the adoption of CCA, it is interesting to note, all officers who were retired for disability got seventy-five percent retirement, regardless of the seriousness of their ailments. Thus, many with only minor problems have drawn maximum retirement pay ever since.

Since 1949, the less-than-thirty-percent disability separatee, instead of receiving lifetime retirement pay, gets a lump-sum severance payment amounting to two months' basic pay for each year of service, up to a total of twenty-four months' pay. It is tax-free.

He may also qualify for Veterans Administration compensation, although the combined lump sum and VA payments normally are much less than military retirement pay. Still, that doesn't disturb the less-than-thirty-percent separatee as much as the fact that he is stripped of all military affiliation. He enjoys no traditional entitlements, no exchange, commissary, or club privileges, no rank, no right to put on the old uniform on occasion, no nothing militarily.

The many dedicated careerists, Academy graduates included, who have been eliminated since 1949 because they were unfortunate enough to receive only a twenty percent rating—more liberal raters might well have awarded the thirty percent or even higher—departed with a bitter taste in their mouths. Many of these careerists feel that fairness justifies altering the rules, to let them enjoy traditional privileges and be restored to their former rank.

It would cost the government almost nothing.

As can be imagined, establishment of thirty percent as the cutoff, from the very beginning in 1949, triggered a frantic scratching and clawing by persons with modest disabilities to attain the magic thirty percent rating. Heavy pressures have been applied on evaluation boards and members to render ratings that assure disability retirement instead of disability separation.

Many members with moderate ailments likely to produce less than a thirty percent rating have hired lawyers and gone to court against the government. These costly efforts to boost the percentage of disability rating are sometimes successful, sometimes not.

Compounding the confusion and frustration the CCA system has created for thousands of moderately disabled service people during the past twenty-three and a half years is the government's insistence that two agencies—the Defense Department and the Veterans Administration—dispense disability ratings. Here is a duplication of effort that cries for streamlining.

Each service and the VA render separate ratings. They often differ. There are many cases, for instance, in which the Air Force (or another service) rated a member twenty percent unfit, while the VA found him thirty or forty or fifty percent disabled. Sometimes the spread is even broader; one Air Force man who was declared ten percent disabled by his service was awarded an eighty percent finding by the VA. All VA disability compensation is tax exempt.

A higher rating by the VA, of course, doesn't change the initial rating by the service. However, where the military rating doesn't provide retirement, a lofty VA rating ensures the ex-serviceman a higher monthly VA disability compensation check.

Disabled service members occasionally do better under VA compensation, but, for nearly all officers, the VA payment amounts to far less income than military retirement pay. And then there's the unfortunate requirement of surrendering all military entitlements, of becoming, in fact, a military outcast.

Surely, that's going too far. It would seem that Congress, particularly starting with the Stratton subcommittee, might well take steps to rectify this situation for the less-than-thirty-percent members. Maybe no more money. But why not restore their traditional benefits and rank?

Plans are well advanced for the construction of an important new facility at the Air Force Academy. An ambitious project of the Air Force Academy Foundation, the new Education Center promises to add a vigorous and multifaceted dimension to academic life at the Academy. It is to act as a focal point for the stimulation of communication and understanding among all sectors of our society, particularly between the nation's youth and the military. Its sponsors are finding positive and enthusiastic support for . . .

The Education Center— A New Academic Forum for the Air Force Academy

By Lt. Gen. Thomas S. Moorman, USAF (Ret.)

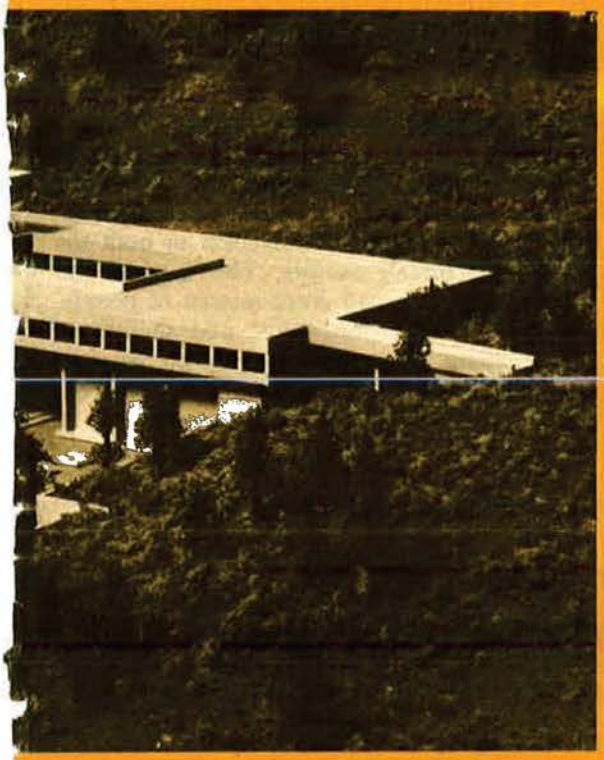
PLANNING was begun a few years ago on a major new institute devoted primarily to the study of military and civilian relationships. Known as the Education Center, it is to be built on the grounds of the United States Air Force Academy, north of Colorado Springs, Colo.

The planning and development of the Education Center was undertaken by The Air Force Academy Foundation, Inc., in the 1960s. The Foundation is a civilian-controlled, private, nonprofit organization, which raised funds and constructed the Academy's Eisenhower Golf Course, the 45,000-seat Falcon Stadium, and assisted in financing the Farish Memorial cadet recreation area. The Education Center project, however, greatly transcends the previous efforts of the Foundation.

The Education Center will be an open forum for the improvement of communication and encouragement of understanding between all sectors of American society. It will investigate those problems in which collaboration by representatives of society and its military can contribute particular expertise. Its methodology will be systematic programs of conferences, symposia, seminars, workshops, special study projects, and research ventures.

The Center will be under the policy guidance of an Education Association, a nonprofit, Academy-affiliated educational organization. The Board of Trustees of the association, with a majority membership of civilians and a civilian chairman, will be comprised of distinguished men and women from many professions. The director of the Center will be a civilian educator, and the staff will include civilians and the few military personnel necessary for effective liaison between the Center and the Air Force Academy. The programs

Model shows the clean lines of the planned Education Center to be built at the Air Force Academy.



will be originated by the director and staff, the Board of Trustees of the Center, the Academy faculty and student body, and by outside organizations whose programs have an educational purpose and whose objectives are consistent with those of the Center.

Center programming will place particular emphasis on the views and participation of youth. The involvement of youth in Center activities is one of its most important aims.

Among the advantages of locating the Center at the Air Force Academy is the Academy's dual status as a military base and an academic institution. It is a particularly good place to develop mutual understanding and respect between society and its military, between youth and the "establishment," and youth and the military.

In many ways, the Academy is a citadel of the establishment. But it also encompasses 4,000 aware young men who reflect all the attitudes, the questions, and concerns of youth throughout the nation. Further, the educational process at the Academy takes place in a dispassionate, ordered environment where there is adherence to the basic values of freedom of speech and inquiry. Not to be overlooked is that the Education Center can utilize the human and technological resources, as well as the support services, of the Academy in accomplishing its aims.

At the same time, the Center can bring an added dimension to the educational process at the Academy. Both the cadets and the faculty will have continuing opportunities to attend and participate in the Center's programs. In addition to the examination of civilian and military views, the Education Center programming will encompass topics equally wide ranging and of vital national concern.

Several subject areas have been selected for inquiry in the initial years of the Center operation. They include: Reexamination of the traditional values of our American heritage in light of contemporary views and problems; a study of both the positive and negative aspects of professional and voluntary public service, including what reforms are needed and how to motivate interest in both civilian and military public-service programs; an exploration of ways to bring technological advances into harmony with the social changes which they effect: an examination of both civilian and military expertise and research in the field of education; special attention to the possible application of air and space technology to solving environmental problems; programs that study international issues, giving special consideration to the proper balance of political, economic, psychological, and military factors; and programs involved in a search for new ideas for quality leadership development, and in motivation programs for both civilian and military organizations.

The total Center operation will be housed in a five-level structure located adjacent to the academic area at the Academy. The architectural concept has been completed and is designed to fit into the beautiful natural environment of the area.

The Center will contain 214,000 square feet, and the facilities will accommodate 1,000 conferees at a time, either in one large group or several smaller groups. A 650-seat auditorium and a series of large and small seminar rooms will provide a total of twenty-five meeting rooms adaptable to a wide variety of conference formats. Two dining rooms, seating a total of 550 conferees, and the auditorium, designed for alternate use as a 500-seat banquet meeting facility, will be serviced by on-premises food preparation areas. Eighty-six guest rooms and suites are provided for overnight accommodation of conference speakers and participants.

The author, General Moorman, served as Superintendent of the United States Air Force Academy from July 1965 until his retirement in August 1970. Previously, he commanded the Air Weather Service and the Thirteenth Air Force, and served as Vice Commander in Chief and as Chief of Staff, PACAF, from 1961 to 1965. General Moorman is currently Assistant Executive Vice President of the Air Force Academy Foundation.

A highly significant factor in the economics of the Center is that the Air Force Academy is Colorado's leading tourist attraction, visited by more than 1,000,000 tourists annually, and estimated to exceed 1,500,000 by 1975. To accommodate these tourists, the Center will include a visitor complex of exhibits, a 420-seat theater, gift shop, and snack bar. The exhibits, displays, and theater presentations will portray highlights of Academy programs and cadet life and will include examples of air and space research contributions to the improvement of science and the quality of life, such as miniaturization techniques, special heat-resistant materials, and advances in medical technology that have been applied to many civilian products.

To determine the economic viability of the Center, the Foundation contracted with a national independent research organization to do a comprehensive feasibility study encompassing all the operational variables related to the Center activities.

The research done by the firm stated that the quality reputation of the Academy, its setting, and the proposed facilities and programming will make the Education Center "one of the more attractive conference experiences in the country." It concluded that the revenue produced by the visitor complex will place the Center's operation, as a whole, in a secure financial position, thus enabling a continuing expansion of program activity, and will provide for ways of increasing the impact of the Center and its activities.

The construction cost of the Center is estimated at $12 million, and an additional $2 million will be required to furnish it with the latest audiovisual conference equipment and material. The Air Force Academy Foundation, Inc., is currently conducting a nationwide fund-raising campaign, with more than $2.5 million raised to date.

As my colleagues and I at the Foundation travel throughout the country to talk about the Education Center and to secure support for it from foundations, corporations, and individuals, we are finding a positive and enthusiastic response from many leaders in both the public and private sectors. This kind of response, from a broad cross section of people, and the interest, cooperation, and support of both civilians and representatives of the military, will bring this important educational enterprise into existence. ■

MAN'S BEST FRIEND

The February 2, 1918, class of the School of Military Aeronautics, Princeton, N. J., was transferred to Camp Dick, Dallas, Tex., as Squadron 4. Within a week, Squadron 4 was adjudged the most proficient in the camp and was ordered to the flying field.

Marching to noon mess the day of the orders, as the squadron passed the office of the CO, Colonel Stevens, several members of the squadron called out to friends who had just arrived from Princeton, assembled in front of the CO's office.

Colonel Stevens happened to see these infractions of military rule and immediately had Squadron 4 turned about, canceled its orders for flying, and confined the entire squadron to the camp.

The squadron had as a mascot a small white dog on whose back a pair of wings and the designation "4" had been painted with iodine. When the squadron was confined to the camp, the letters "SOL" were added to the dog's decorations.

A few days after that confinement, SOL was killed by an automobile driving through camp. A coffin was made for SOL, and she was given an elaborate funeral, using cabbage weeds as flowers. At the grave, imaginary volleys were fired, and Cadet Kelley jazzed taps on his trombone. In the prayer given at SOL's grave it was observed that, being unable to stand the disgrace and injustice that had been heaped upon her friends, SOL had thrown herself before an oncoming automobile and met a martyr's death.

News of the funeral leaked to the Dallas newspapers, which published the story, commenting that it was men like these who would honor and respect the women of France!

Needless to say, after the publicity Colonel Stevens released Squadron 4 from its confinement to the post.

—CONTRIBUTED BY IRA MILTON JONES, PRESIDENT, WORLD WAR I OVERSEAS FLYERS

(AIR FORCE *Magazine will pay $10 for each anecdote accepted for publication.*)

ACADEMY'S TOP GRADUATE FOR 1973

Clay Stewart relied on "proper values and incentive" to score a brilliant scholastic record and emerge as first in his class this year at the Air Force Academy. Helpful, too, was the motivation provided by his Air Force family. The brand-new shavetail, who takes the hurdles one at a time, has already set his sights on his next goal: "To be a first lieutenant" . . .

FIRST OFF THE FALCON RUNWAY

New 2d Lt. Clay A. Stewart

By James R. Patterson

James R. "Jimmy" Patterson is a frequent contributor to AIR FORCE *Magazine. A retired Air Force Reserve colonel living in Colorado, he is an astute and interested observer of people and events at the Air Force Academy.*

The brightest, newly minted second lieutenant from the Air Force Academy is Clay A. Stewart, twenty-two, son of retired Air Force Lt. Col. and Mrs. Arlo H. Stewart of Ogden, Utah. He won the title by graduating first in the 1973 class of 842 Academy seniors.

Lieutenant Stewart fielded the two top honors—Outstanding Cadet in the Graduation Order of Merit and the Academic Achievement Award. His four-year scholastic average was a hefty 3.95 out of a possible 4.0. Stewart was also a regular for seven semesters on the Superintendent's, the Dean's, and the Commandant's lists for academic and military excellence.

A self-possessed, quietly assured young man, Lieutenant Stewart sees nothing remarkable in his scholastic performance.

"It's simply a matter of having the proper values and the incentive," he says.

The top graduate credits his father, a former B-26 pilot and now a civil engineer at Hill AFB, Utah, and a brother, 1st Lt. Todd Stewart, with providing much of his motivation for an Air Force career. The younger Stewart wanted to be a pilot like his father and brother, who is a 1971 Academy graduate in the upper third of his class, but an eyesight deficiency prevented that.

As an undergraduate at the Academy, Stewart majored in international affairs, and this fall will continue his studies in that field to earn a master's degree at the University of Pittsburgh. After that, he wants to do intelligence work.

"I'd like to specialize in Middle Eastern affairs," Lieutenant Stewart said. "The area is becoming increasingly important because of the many problems related to its underdevelopment, to which has been added the oil-production problem."

Stewart is proficient in French and would like to study Turkish. He picked up a smattering of Turkish when his father was base civil engineer at Karamürsel from 1964 to 1966. He also is hopeful of learning other Middle Eastern languages.

As an undergraduate, Stewart was a member of the Ski Club, the Cadet Forum, the Public Relations Committee, and the Cadet Ethics Committee. In his senior year, he commanded the Second Squadron as a cadet lieutenant colonel. By virtue of his scholastic achievement, Stewart has had his name inscribed on the Academy's Hundred Year Honor Roll.

An openly sincere young man, the new lieutenant answered promptly when asked if he had been surprised at winning the No. 1 standing in his class.

"Not really," he said. "I knew it was going to be close, but since the end of my third class year, I thought I had a chance."

"And what is your next goal?" he was asked.

"To be a first lieutenant."

Tail-end Charlie in the Class of 1973 was Ronald R. Breckenridge of Newton, Iowa, who demonstrated that his last-place ranking did not reflect any lack of initiative or enterprise. Lieutenant Breckenridge was the first of his classmates to get married in the Academy chapel. ■

AFA Nominees for 1973-74

The AFA Nominating Committee met in Colorado Springs, Colo., on June 2, in conjunction with a meeting of the Air Force Association's Board of Directors. The committee, which consists of AFA national officers, the Board of Directors, and State Presidents or their designees, selected a slate of three national officers and twenty-one Directors (including a nominee for Chairman of the Board).

This slate will be presented to the delegates at AFA's 1973 Annual National Convention to be held in Washington, D. C., September 17–20.

By Don Steele
AFA DIRECTOR OF FIELD ORGANIZATION

Joe L. Shosid

Joe L. Shosid, Fort Worth, Tex., was nominated unanimously for the office of National President. Mr. Shosid, an assistant to Congressman James C. Wright (D-Tex.), also serves as President of Advertising Unlimited, Inc., a Fort Worth public-relations and advertising agency, and as a football and basketball official in the Missouri Valley and Southwest Athletic Conference, and the National Collegiate Athletic Association.

A World War II veteran, he currently is an Air Force Reserve officer with an M-Day assignment as Assistant Director of Information, Office of the Secretary of the Air Force, Washington, D. C.

A member of AFA for more than thirteen years, Mr. Shosid now serves as Chairman of AFA's Board of Directors; a member of its Executive, Finance, and Convention Site Committees; a member of the Board of Trustees of the Aerospace Education Foundation, AFA's education affiliate; and Chairman of AFA's Fort Worth Airpower Council. He has served as an elected National Director, a Vice President (Southwest Region), Chairman of the Organizational Advisory Council, a member of the Air Reserve Council, and as a State and Chapter officer. He has received AFA's Medal of Merit and Exceptional Service Plaque and was named AFA's "Man of the Year" in 1963.

Martin M. Ostrow

Martin M. Ostrow, Los Angeles, Calif., AFA's incumbent National President, was nominated unanimously for Chairman of the Board.

An attorney with offices in Beverly Hills, Mr. Ostrow also serves as president of three corporations: Wilshire Associate Investments, Applied Management Control, and World Leasing Corporation.

He is a veteran of World War II and the Korean conflict and a colonel in the Air Force Reserve with an M-Day assignment in the Office of the Judge Advocate General of the Air Force.

A member of AFA for more

Joe L. Shosid of Fort Worth, Tex., has been nominated to become AFA President for the next year, with current President Martin M. Ostrow nominated to become Chairman of the Board. These names and nominees for other national offices and directorships will be presented next month to delegates attending AFA's 1973 Annual National Convention . . .

Martin H. Harris

than fifteen years, Mr. Ostrow currently serves as Chairman of the Executive and Convention Site Committees, an Ex-Officio member of all AFA Committees and Councils, and a member of the Board of Trustees of the Aerospace Education Foundation. He has served as an elected National Director, a Vice President (Far West Region), Chairman of the Organizational Advisory Council, and as a State and Chapter President. He has received AFA's Medal of Merit and Exceptional Service Plaque and was named California AFA's "Man of the Year" in 1962 and 1969.

Incumbents **Martin H. Harris,** Winter Park, Fla., and **Jack B. Gross,** Harrisburg, Pa., were nominated unanimously for reelection to their respective positions as Secretary and Treasurer.

Mr. Harris is an industry research scientist and an officer in the Air Force Reserve. He also serves as a member of the Executive and Finance Committees and as a member of the Aerospace Education Foundation's Board of Trustees. He has served as an elected National Director, a Vice President (Southeast Region), a member of the Organizational Advisory Council, and as a State and Chapter President. He has received AFA's Medal of Merit and Exceptional Service Plaque and was named AFA's "Man of the Year" in 1972.

Mr. Gross, a colonel retired from the Air Force Reserve, is a prominent civic leader and businessman. He is now serving his eleventh term as National Treasurer, and also is Chairman of the Finance Committee, a member of the Executive and Convention Site Committees, and a member of the Aerospace Education Foundation's Board of Trustees. Mr. Gross has served as Chairman of the Board, an elected National Director, and as a State and Chapter President. He has received AFA's Medal of Merit, Exceptional Service Plaque, a Special Citation, was named AFA's "Man of the Year" in 1958, and, in 1964, received AFA's Special Gold Life Membership Card #5.

The following are permanent members of the AFA Board of Directors, under the provisions of Article X of AFA's National Constitution:

John R. Alison, Joseph E. Assaf, Edward P. Curtis, James H. Doolittle, A. Paul Fonda, Carl J. Long, Howard T. Markey, John P. McConnell, J. B. Montgomery, Martin M. Ostrow, Joe Foss, Jack B. Gross, George D. Hardy, John P. Henebry, Joseph L. Hodges, Robert S. Johnson, Arthur F. Kelly, George C. Kenney, Maxwell A. Kriendler, Thomas G. Lanphier, Jr., Jess Larson, Curtis E. LeMay, Julian B. Rosenthal, Peter J. Schenk, Joe L. Shosid, Robert W. Smart, C. R. Smith, Carl A. Spaatz, William W. Spruance, Thos. F. Stack, Arthur C. Storz, Harold C. Stuart, James M. Trail, and Nathan F. Twining.

Jack B. Gross

The twenty men listed on the next page and shown in the photographs are nominees for elected membership on the AFA Board of Directors for the coming year. *(Names marked with an asterisk are incumbent National Directors.)*

***William R. Berkeley,** Redlands, Calif.—AF civilian information officer. Former Chapter President; National Committee and Council member; Vice President (Midwest Region).

***John G. Brosky,** Pittsburgh, Pa.—judge. Former Chapter, State President; National Convention Parliamentarian; National Council member; Vice President (Northeast Region). Current National Committee member; Aerospace Education Foundation Board of Trustees member.

***Dan Callahan,** Warner Robins, Ga.—physician. Former Chapter President. Current National Committee member. Life member.

***Daniel F. Callahan,** Cocoa Beach, Fla.—NASA executive. Retired USAF major general. Former Chapter, State President; National Council member.

B. L. Cockrell, San Antonio, Tex.—AF civilian executive. Former Chapter, State President; National Council member. Current Vice President (Southwest Region).

***George M. Douglas,** Denver, Colo.—telephone company executive. Former Chapter, State President. Current National Committee member; Aerospace Education Foundation Board of Trustees member.

***Paul W. Gaillard,** Omaha, Neb.—telephone company executive. Former Vice President (Midwest Region); National Council member. Current Chapter President; National Committee chairman; Aerospace Education Foundation Board of Trustees member. AFA "Man of the Year" 1971.

Alexander E. Harris, Little Rock, Ark.—property management executive. Former Chapter, State President; National Council member. Current Vice President (South Central Region).

Gerald V. Hasler, Endwell, N. Y.—architectural design and remodeling corporation executive. Current Chapter, State President; National Committee member; Treasurer, Aerospace Education Foundation.

Joe Higgins, North Hollywood, Calif.—TV and motion picture personality. Former Chapter President. Master of Ceremonies and principal speaker at AFA and USAF functions around the nation, including AFA's Outstanding Airmen Dinner and its dinner honoring the Outstanding Squadron at the Air Force Academy. 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.

***Nathan H. Mazer,** Roy, Utah—industrial development bureau director. Former Vice President (Rocky Mountain Region); National Council Chairman; National Secretary. Current National Committee member; Aerospace Education Foundation Board of Trustees member. Life member.

Edward T. Nedder, Hyde Park, Mass.—attorney. Former National Director; National Council member. Current Vice President (New England Region).

J. Gilbert Nettleton, Jr., New York, N. Y.—aerospace industry executive. Former Chapter President; National Director; Chairman of National Air Force Salute. Current Chairman, Aerospace Education Foundation Board of Trustees. Life member.

Jack C. Price, Clearfield, Utah—AF civilian executive. Former Chapter, State President. Current Vice President (Rocky Mountain Region); National Council member. Life member.

Edward A. Stearn, Redlands, Calif.—aerospace industry executive. Former Chapter President. Current National Committee member; Chairman, AFA Charity Golf Tournament Executive Committee.

***Hugh W. Stewart,** Tucson, Ariz.—attorney. Former Chapter, State President. Current National Committee chairman; Aerospace Education Foundation Board of Trustees member.

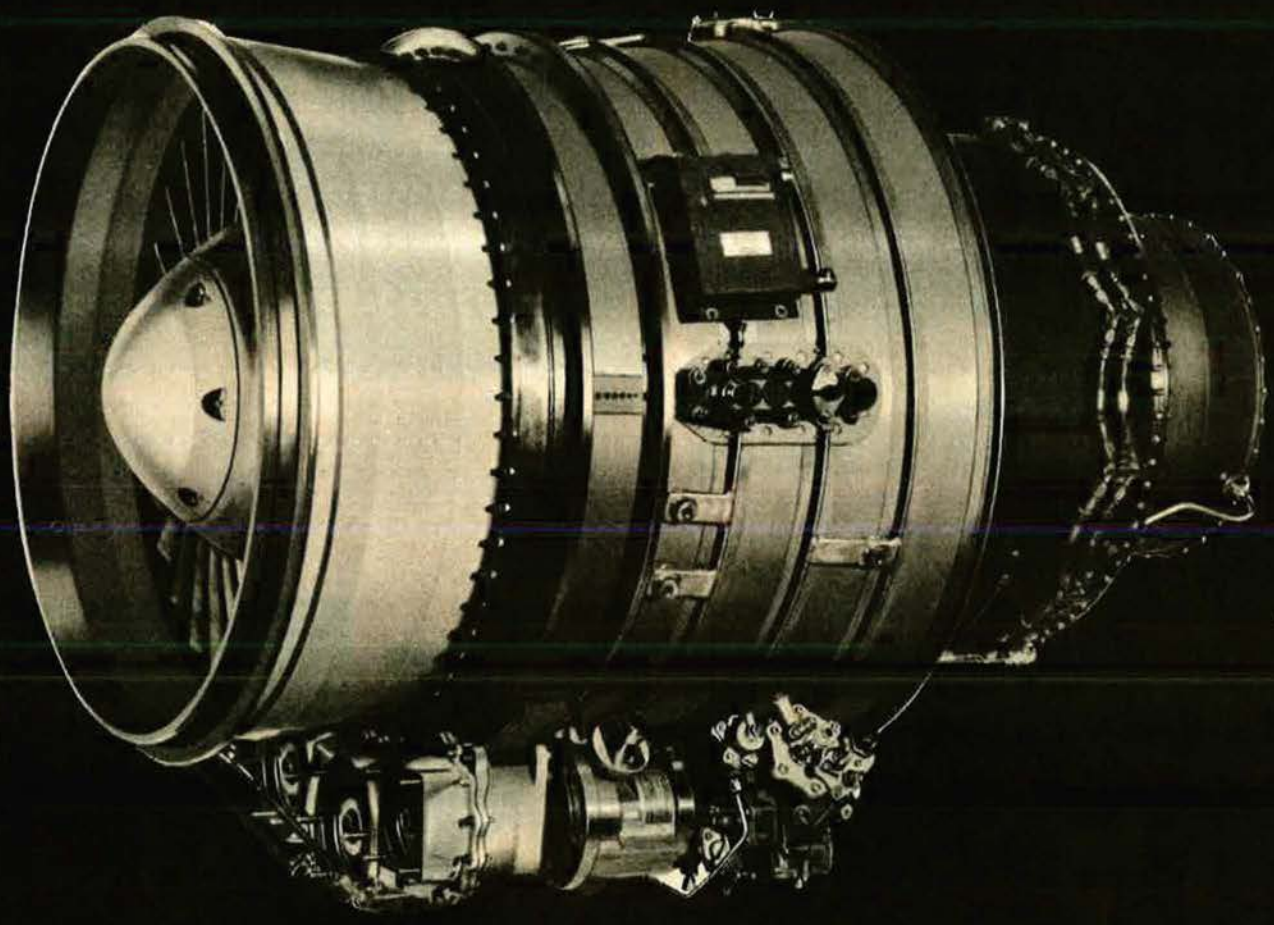
***Winston P. Wilson,** Alexandria, Va.—industry consultant. Retired USAF major general. Former Chief of the National Guard Bureau. Current National Council chairman. Life member.

***Jack Withers,** Dayton, Ohio—industry executive. Former Chapter, State President. Current National Committee member; Aerospace Education Foundation Board of Trustees member.

***James W. Wright,** Williamsville, N. Y.—chemical engineer. Former Chapter, State President; Vice President (Northeast Region); National Council member. ■

* Incumbent

Garrett considers the possibilities



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AFA News

By Don Steele
AFA AFFAIRS EDITOR

At the Delaware Galaxy Chapter's recent quarterly dinner meeting, Col. (Brig. Gen. selectee) Willum H. Spillers, Jr., left, 436th Military Airlift Wing Commander, presents the MAC Distinguished Civilian Certificate to Chapter President Hank Meinersmann "for his outstanding community relations activities with Air Force personnel and his support of the preseparation education program for airmen." Maj. Gen. Ray M. Cole, Twenty-first AF Commander, was the keynote speaker.

The newly formed Spudland Chapter, AFA's first Chapter in the state of Maine, held its Charter Night Dinner at the Loring AFB NCO Club on June 1. Principals in the program were, from left, Col. James H. McGrath, 42d Bomb Wing Commander and guest speaker; William Anderson, Alban Cyr, Mrs. Carole Hunter, and Merrill Bull, Chapter Vice President, President, Secretary, and Treasurer, respectively; and Col. Joseph T. O'Neal, Deputy Base Commander.

Preparing to tee off in the third annual "Stewart Open" at Wright-Patterson AFB, Ohio, are, from left, Col. Ray Horne, Director of T-43/Cargo Systems, ASD, and Chairman of the "Open"; Lt. Gen. James T. Stewart, Commander, Aeronautical Systems Division (AFSC); and Robert L. Hunter, Ohio AFA President-elect. Later, representatives from ASD and AFA's Wright Memorial Chapter, cosponsors of the Open, presented to the Air Force Museum Foundation $3,500, bringing the three-year total of Open contributions to more than $9,500.

Alexander P. Butterfield, Administrator of the Federal Aviation Administration, was the guest speaker at the Iron Gate, N. Y., Chapter's luncheon at the "21" Club on May 8. Chapter President Herbert O. Fisher, left, presents a set of Iron Gate Chapter blazer buttons to Mr. Butterfield as a token of appreciation for his outstanding presentation.

Col. Roy A. Lancaster, right, Commander, Vandenberg AFB, accepts an American flag from Zack Taylor, left, and Robert Hull, center, President and Vice President, respectively, of AFA's Robert H. Goddard, Calif., Chapter. The flag was presented recently in appreciation of the support given the Chapter by the base and its personnel.

More than 250 civic, military, and AFA leaders attended the Antelope Valley, Calif., Chapter's Fourth Annual Air Force Honors & Awards Banquet, which honored outstanding personnel at Edwards AFB. Shown are, from left, Brig. Gen. Howard M. Lane, Air Force Flight Test Center Commander; Mrs. Lane; Barbara Rowland, General Chairman of the event; Bob Duggan, TV personality who was the master of ceremonies; and Lt. Gen. Edmund F. O'Connor, Vice Commander, Air Force Systems Command, and the keynote speaker.

At a recent meeting of the Enlisted Widows Home Foundation Board, a check for $500 from AFA's Northern Virginia Chapter was presented to Foundation Board Chairman Dominick N. Maoono, USAF (Ret.). Participating in the ceremonies were, from left, Sergeant Masone; retired MSgt. Aubrey D. Turner, Foundation Treasurer; retired CMSgt. James H. Towler, Assistant Treasurer; retired CMSgt. Wm. M. Goyer, Board Member; retired CMSgt. Thomas W. Anthony, President-elect, Northern Virginia Chapter; and Dr. Albert Maltz, Board Member.

Wright Memorial, Ohio, Chapter President Ed Nett, center, presents an inscribed desk set to Sgt. Norman L. Wentland, Foreign Technology Division, AFSC, Wright-Patterson AFB's "1972 Outstanding Airman of the Year." Looking on is Col. George Weinbrenner, FTD Commander.

More than 100 members and guests attended a dinner meeting of the El Camino Real, Calif., Chapter on May 18, at which Col. Alfred M. Worden, Apollo-15 astronaut, was the guest of honor and speaker. Shown are, from left, Gil G. Morehouse, Chapter Councilman; O. W. Miller, Chapter Vice President and Treasurer; Ed H. Millson, Chapter Councilman; Colonel Worden; Chapter President Wm. H. Campbell; and Robert C. Vaughan, Chapter Councilman.

For the second consecutive year, the Alabama AFA's annual award to the Outstanding AFJROTC Unit in the state went to the unit at Butler High School in Huntsville. Shown with the trophy are, from left, Wm. J. Brown, Alabama AFA Awards Chairman; and from Butler High School, Cadet Cols. Roger Parrow, Gaham Breithaupt, Tom Byrd, and Bettina Males; retired Col. Ralph Newman, Aerospace Education Instructor; and retired MSgt. Fred Davey, Assistant Aerospace Education Instructor.

Col. Howitt E. Lovelace, Jr., Commander, Richards-Gebaur AFB, Mo., recently hosted a reception for the officers and board of AFA's Harry S. Truman Chapter. Among those attending were, from left, Brig. Gen. Donald W. Werbeck, Vice Commander, Air Force Communications Service; Col. Alvin J. Mosser, Commander, 442d Tactical Airlift Wing; Chapter President Charles H. Church, Jr.; and Colonel Lovelace.

During the South Carolina AFA's recent convention at Charleston AFB, newly commissioned 2d Lt. Carol Ann Beavers receives the State AFA's AFROTC Outstanding Achievement Award and congratulations from South Carolina's former Governor, Robert McNair. Lieutenant Beavers was the first young lady to be commissioned through AFROTC in South Carolina and was a member of the first graduating class of AFROTC cadets at Newberry College.

AFA State Contacts

Following each state name, in parentheses, are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

ALABAMA (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma, Tuscaloosa): **Cecil Brendle,** 3463 Cloverdale Rd., Montgomery, Ala. 36111 (phone 269-7252).

ALASKA (Anchorage, Fairbanks, Kenai): **Charles W. Lafferty,** 1045 Pedro St., Fairbanks, Alaska 99701 (phone 456-5167).

ARIZONA (Phoenix, Tucson): **H. J. Bills,** 50 S. 45th Ave., Phoenix, Ariz. 85031 (phone 272-3272).

ARKANSAS (Blytheville, Fort Smith, Little Rock): **Frank A. Bailey,** 605 Ivory Dr., Little Rock, Ark. 72205 (phone 988-3432).

CALIFORNIA (Apple Valley, Burbank, Edwards, Fairfield, Fresno, Harbor City, Hawthorne, Long Beach, Los Angeles, Merced, Monterey, Novato, Orange County, Palo Alto, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, Santa Barbara, Santa Clara County, Santa Monica, Tahoe City, Vandenberg AFB, Van Nuys, Ventura): **Ben F. Snell,** 11 Sharon Dr., Salinas, Calif. 93940 (phone 422-7571).

COLORADO (Boulder, Colorado Springs, Denver, Ft. Collins, Pueblo): **James C. Hall,** P. O. Box 30033, Lowry AFB Station, Denver, Colo. 80230 (phone 366-5363, ext. 459).

CONNECTICUT (East Hartford, Torrington): **John McCaffery,** 117 Bridge St., Groton, Conn. 06340 (phone 739-7922).

DELAWARE (Dover, Wilmington): **Franklin R. Welch,** Greater Wilmington Airport, Bldg. 1504, Wilmington, Del. 19720.

DISTRICT OF COLUMBIA (Washington, D. C.): **George G. Troutman,** 1025 Connecticut Ave., N. W., Washington, D. C. 20002 (phone 659-3900).

FLORIDA (Bartow, Broward, Daytona Beach, Ft. Walton Beach, Gainesville, Homestead, Jacksonville, Key West, Miami, Orlando, Panama City, Patrick AFB, Redington Beach, Sarasota, Tallahassee, Tampa, West Palm Beach): **A. W. Haymon,** 1421 S.E. 3d Ave., Ft. Lauderdale, Fla. 33316.

GEORGIA (Athens, Atlanta, Savannah, St. Simons Island, Valdosta, Warner Robins): **Donald L. Devlin,** 1651 McKinnon Dr., Savannah, Ga. 31404 (phone 234-0109).

HAWAII (Honolulu): **Campbell Palfrey, Jr.,** E. F. Hutton Co., Inc., 700 Bishop St., Honolulu, Hawaii 96813 (phone 521-2961).

IDAHO (Boise, Burley, Pocatello, Twin Falls): **Clarence E. Hall,** 3531 Windsor Dr., Boise, Idaho 83705.

ILLINOIS (Belleville, Champaign, Chicago, Deerfield, Elmhurst, O'Hare Field): **William A. Johnston,** 302 Harvard Dr., O'Fallon, Ill. 62269 (phone 632-2021).

INDIANA (Indianapolis, Lafayette, Logansport): **Oliver K. Loer,** 268 S. 800 W., Swayzee, Ind. 46986 (phone 922-7136).

IOWA (Des Moines): **Ric Jorgensen,** Box 4, Des Moines, Iowa 50301 (phone 255-7656).

KANSAS (Topeka, Wichita): **Earl Clark,** 4512 Speaker Rd., Kansas City, Kan. 66106 (phone 342-7030).

LOUISIANA (Alexandria, Baton Rouge, Bossier City, Monroe, New Orleans, Ruston, Shreveport): **Louis Kosposti,** 2808 Stonewall, Shreveport, La. 71109.

MAINE (Limestone): **Alban E. Cyr,** Box 160, Caribou, Me. 04736.

MARYLAND (Baltimore): **James W. Poultney,** P. O. Box 31, Garrison, Md. 21055 (phone 363-0795).

MASSACHUSETTS (Boston, Falmouth, Florence, Lexington, L. G. Hanscom Fld., Taunton, Worcester): **Arthur D. Marcotti,** 215 Laurel St., Melrose, Mass. 02146.

MICHIGAN (Dearborn, Detroit, Kalamazoo, Lansing, Marquette, Mount Clemens, Oscoda, Sault Ste. Marie): **Stewart Greer,** 18690 Marlowe Ave., Detroit, Mich. 48235 (phone 273-5115).

MINNESOTA (Duluth, Minneapolis, St. Paul): **Victor Vacanti,** 8941 10th Ave., Minneapolis, Minn. 55420 (phone 854-3456).

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Across the fallow land
And don't you like these nice white flowers
I'm holding in my hand?

—GILL ROBB WILSON

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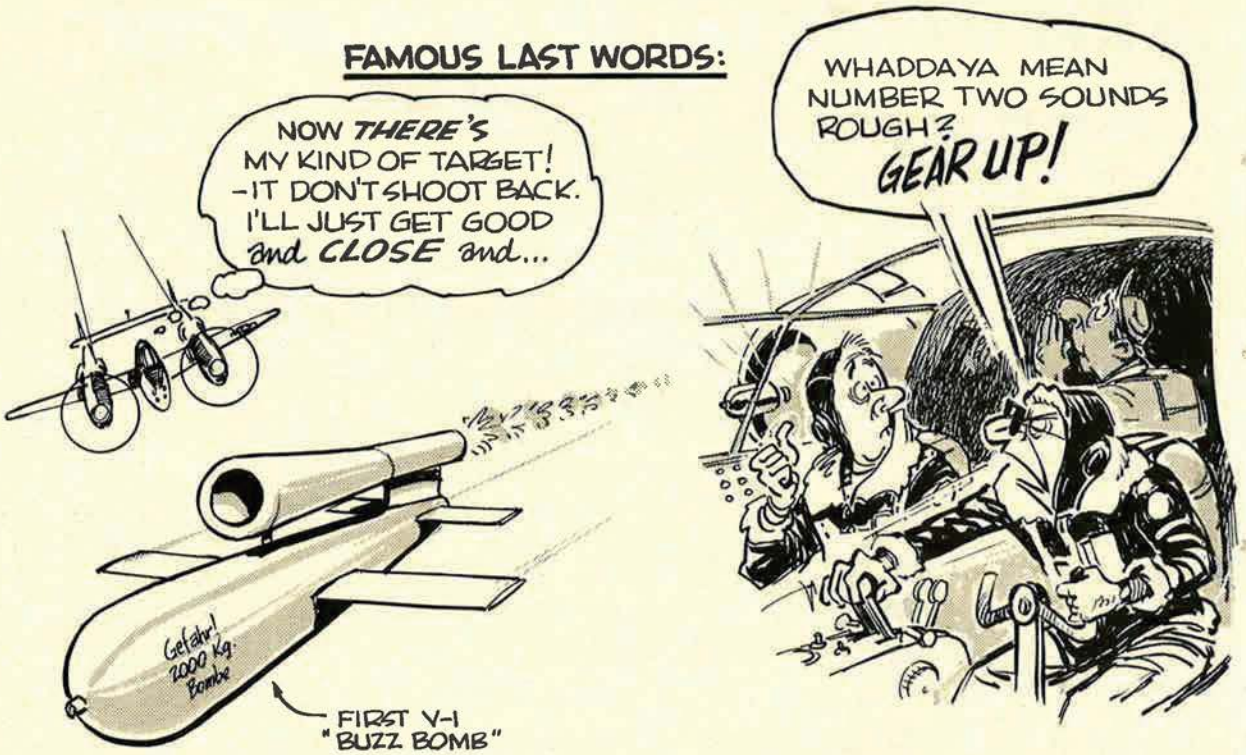

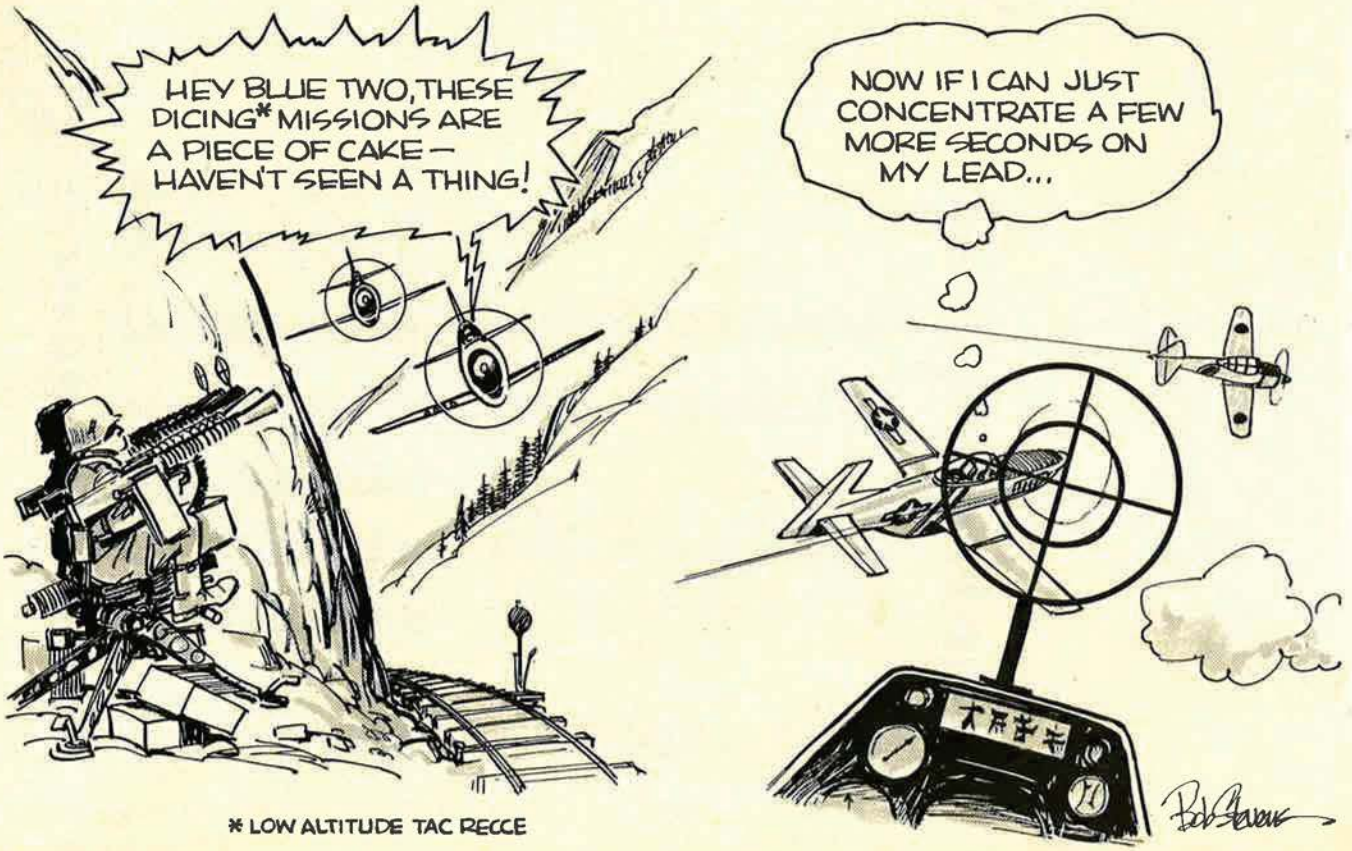

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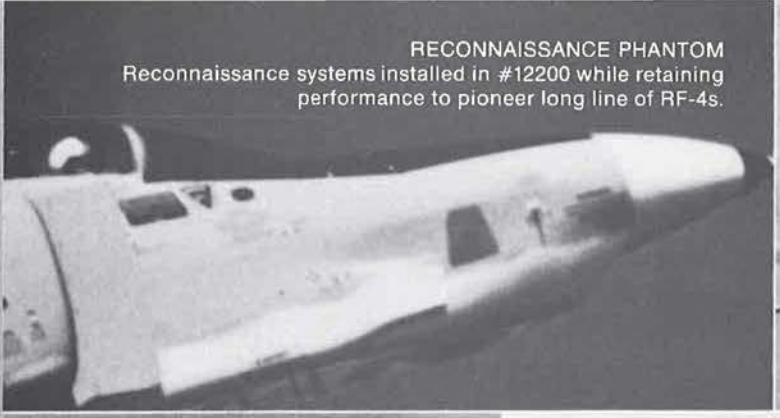

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Phantom #12200 was scheduled to roll off our production line as a Navy F-4B fighter. But a carrier deck never became its home. Instead, #12200 was assigned duty as a prototype aircraft, and modified again and again to test advanced concepts and improvements for today's multi-mission Phantom and for controlled-configuration air-frames of the future.

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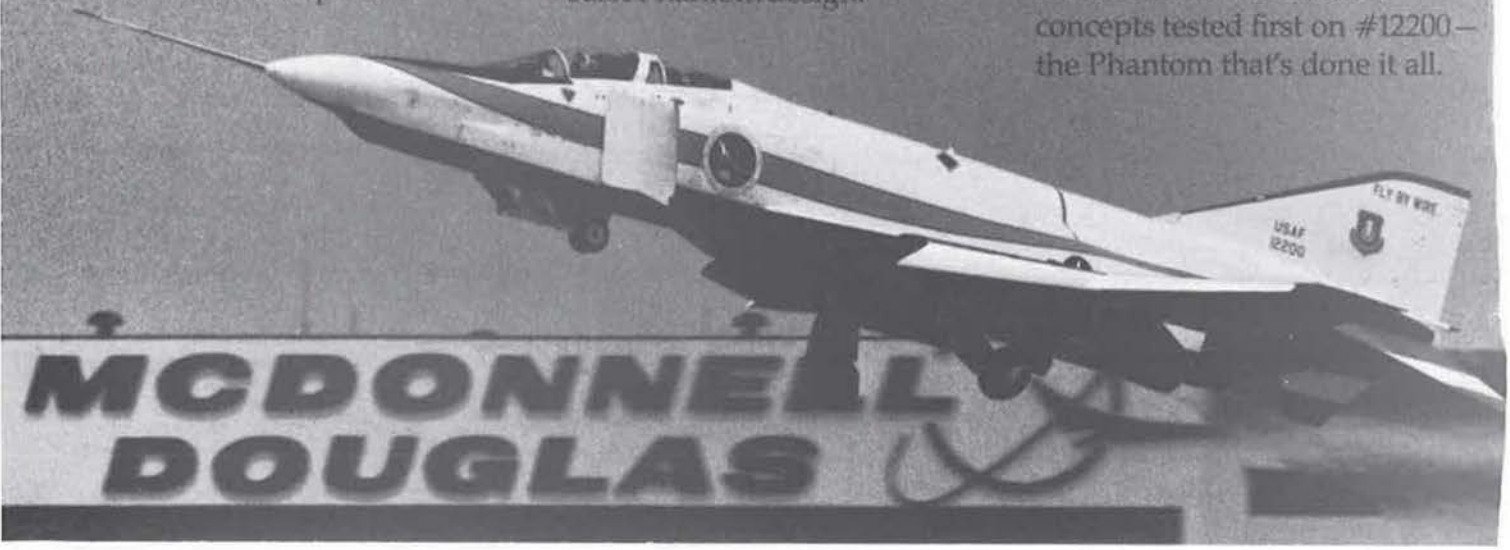

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