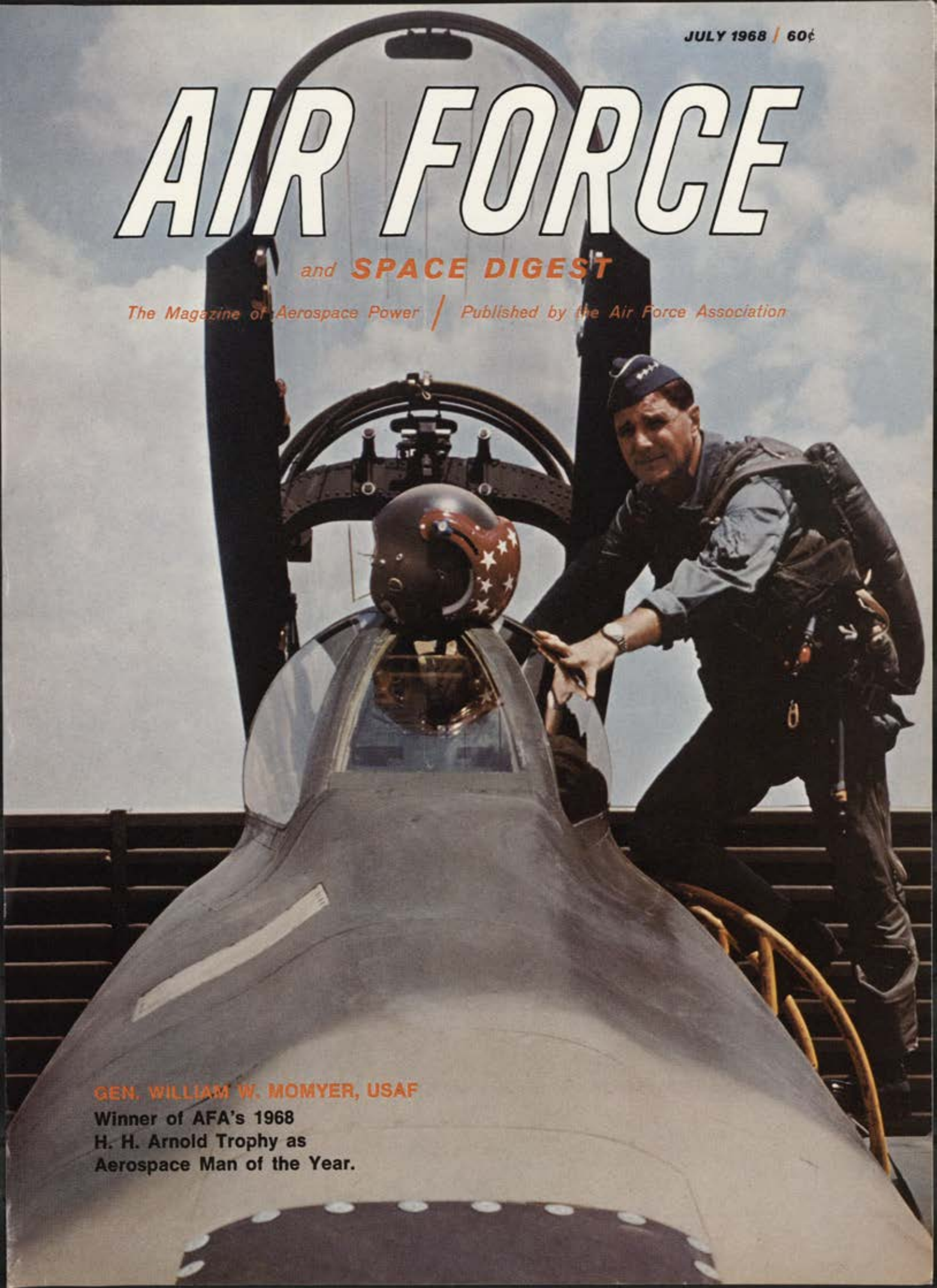
JULY 1968 / 60¢

AIR FORCE

and SPACE DIGEST

The Magazine of Aerospace Power / Published by the Air Force Association



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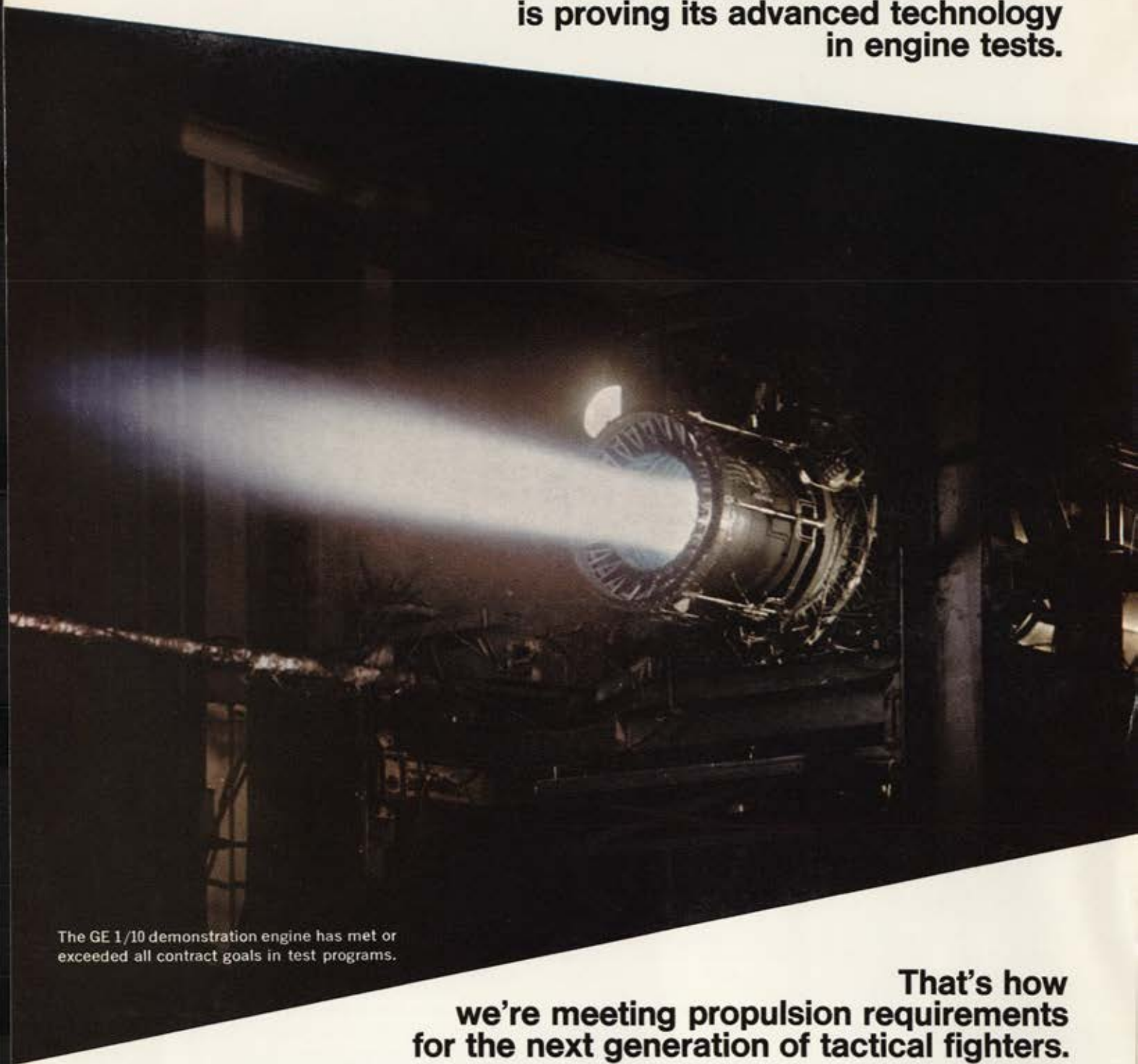

The GE 1/10 demonstration engine has met or exceeded all contract goals in test programs.

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GENERAL ELECTRIC

205-58

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The Delco 3200 (above right), our newest radio, is a single sideband transceiver with full frequency synthesis. Eight thousand channel selections from 2 to 10 MH_z. P.E.P. is 10 watts and the total weight with battery is just 10 pounds.

The Jungle Radio. The Delco 1900. The Delco 3200. Three sound answers to long-range portable communications problems.

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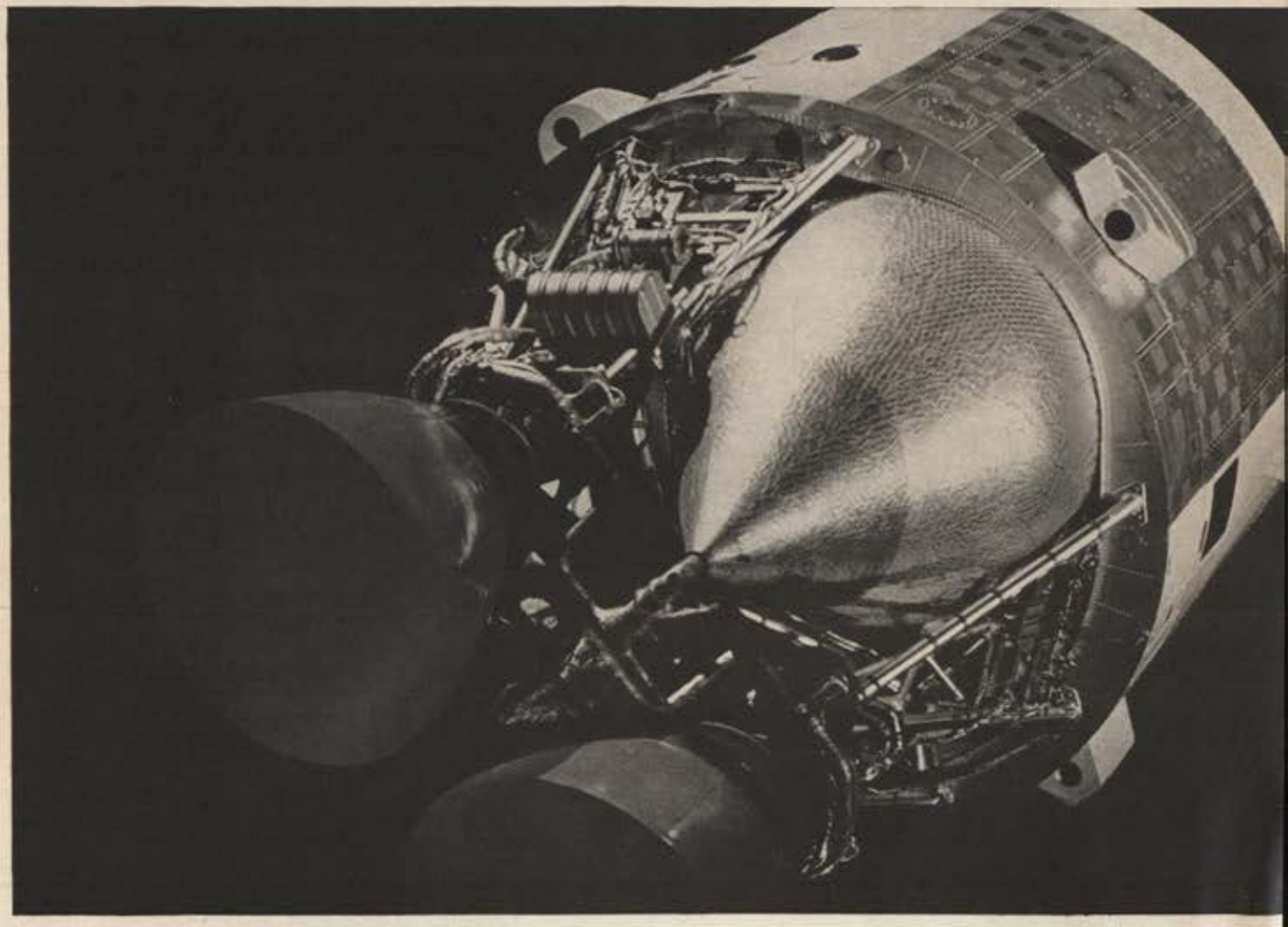

You don't have to go to science fiction movies to see far-out space vehicles. We've had one called Transtage flying since 1964. It's a robot spacecraft, piloted by computers, and it can do a variety of jobs. It has been taking on delivery routes in space, for example, carrying up to eight satellites on a single mission and placing them precisely in positions within desired orbits.

Transtage is a pretty sophisticated piece of machinery. After separating from the lower stages of the Titan III launch system, it's completely on its own.

It stops and starts its own engines, maneuvers precisely, and ejects satellites at predetermined points, all under the direction of its computer pilot. In most cases it eliminates the need for major propulsion systems on the satellites themselves.

Transtage has played a starring role in putting communication satellites into orbit, so far placing 18 of them in the "synchronous corridor" some 20,000 miles above the equator. These make up the Initial Defense Communication Satellite system—providing the first military global communications network in space.

Transtage pampers its payloads. For those requiring thermal balance, the spacecraft rotates, allowing direct solar heat to reach satellites that need warming, and placing in the shade those that need cooling. This is called "toasting."

Some vital statistics: The craft is 15 feet long and ten feet in diameter without its payload. It has an engine with twin thrust chambers powered by almost 23,000 pounds of propellant, and 12 attitude-control engines which put out 50,000 pound-seconds of power. It has an inertial guidance system, flight and thermal controls, an electrical power system, range safety receivers, and tracking and telemetry systems.

Transtage and the Titan III launch system have put more payloads into the important "synchronous corridor" than any other vehicle. Plans call for continued missions into the 1970s.

Transtage is delivering today with much of tomorrow's technology.

The several divisions of Martin Marietta produce a broadly diversified range of products, including missile systems, space launchers, nuclear power systems, spacecraft, electronic systems, chemicals and construction materials. Martin Marietta Corporation, 277 Park Avenue, New York, N.Y.

MARTIN MARIETTA

Memcor Division puts LTV Electrosystems into tactical radio production in a big way.

Now producing the AN/VRC-12 on a multi-year $86 million contract, Memcor has built more than 17,000 AN/PRC-9 and PRC-10 radios. The AN/PRC-25 back-pack radio reached delivery rates of nearly 5,000 a month during 1967 and production for the U.S. Army and allied nations is continuing.

Since LTV Electrosystems acquired Memcor in early 1967, Tom Norton has led the team to new production records, improved quality, research and development successes and new contracts.

Memcor adds a vital new dimension to LTV Electrosystems—more widely known for design and development of sophisticated special-purpose electronic systems and super-power RF transmitters. In addition to tactical radios, Memcor Division produces resistance products, rheostats, gyros for Bullpup and Walleye missiles, aircraft indicators, nuclear instrumentation and control systems, TACAN/DME equipment, and in development, a man-portable TACAN system.

The design and production capabilities of Memcor strengthen our ability to handle the toughest, hottest electronics missions our customers can throw at us.

LTV Electrosystems has the people (over 10,000), the facilities (14 plants in six states) to take on just about any electronics requirement the military needs: surveillance and reconnaissance systems, command and control systems, strategic communications, automatic controls, guidance systems, antennas, the world's most powerful RF transmitters...plus the diverse products of Memcor.

Let us put this proven capability to work for you.

For additional information on our full range of systems capabilities, please write: LTV Electrosystems, Inc., P.O. Box 6030, Dallas, Texas 75222.

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new dimension:

tactical communications

T. L. Norton,
Vice President,
LTV Electrosystems, Inc.;
General Manager,
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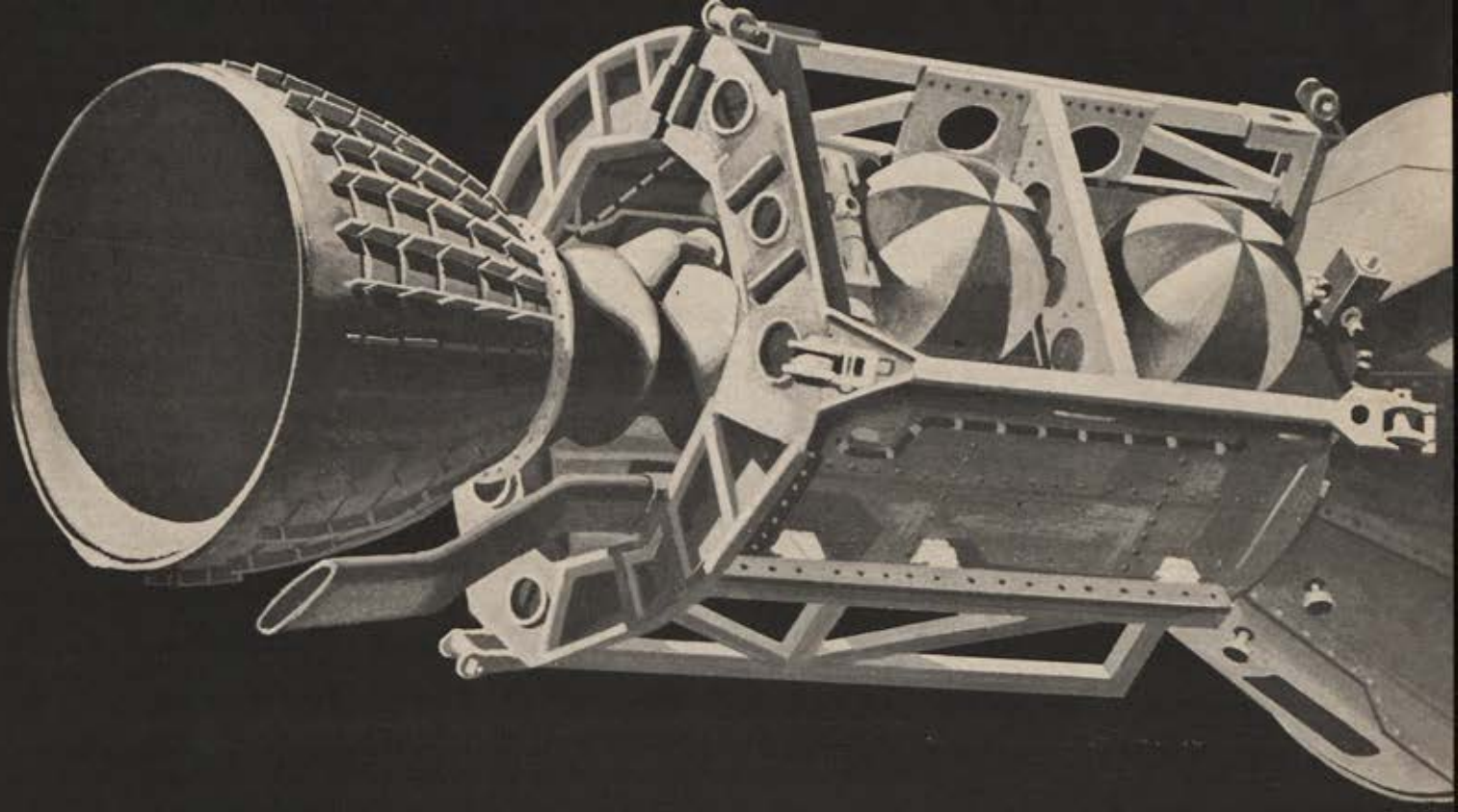

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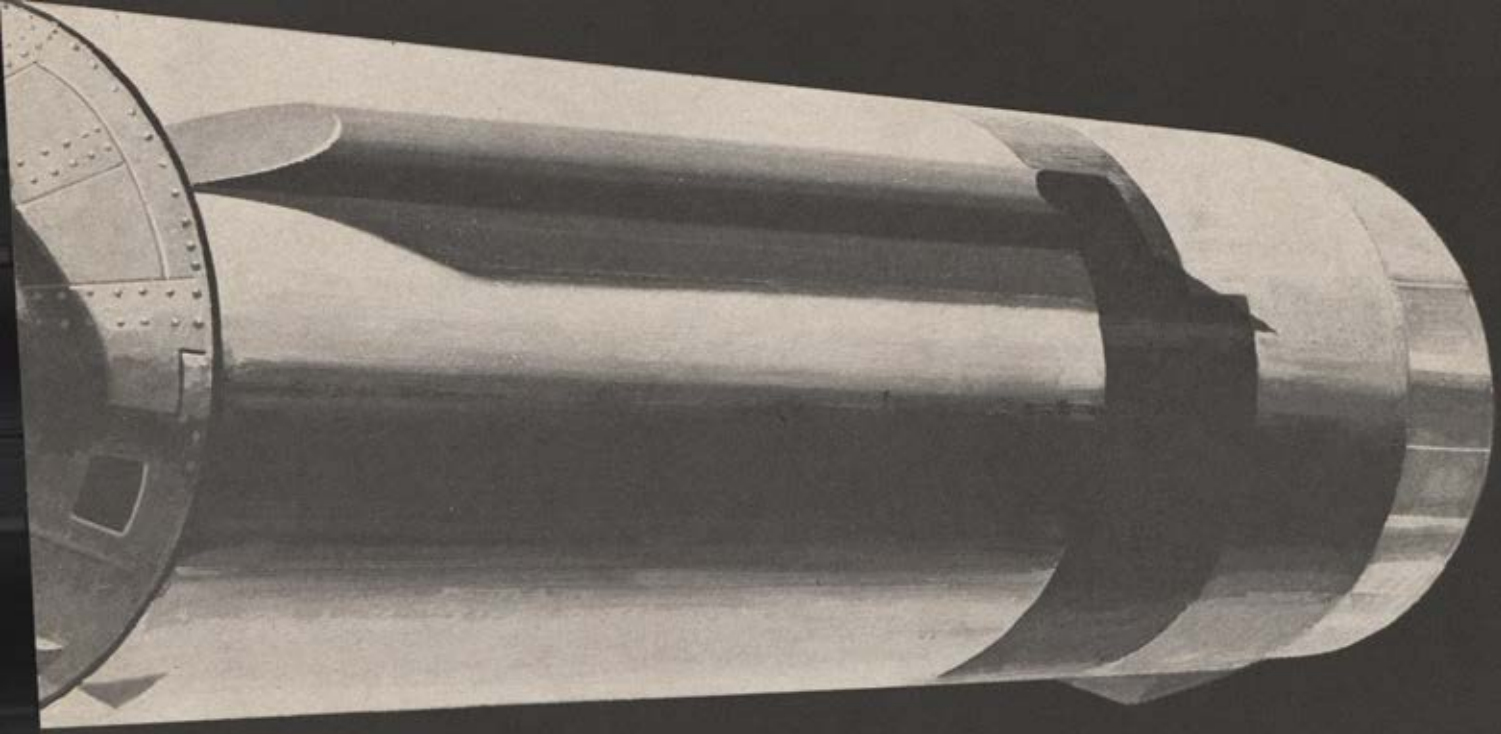

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belt. Advancing capabilities to harness sun rays for electric power. Contributing to superior tracking techniques. And uncovering many of the mysteries involved in earth and space orbit. To date, over 600 experiments have been sent aloft.

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Guest Editorial

Service for the Common Good

By Gen. Bruce K. Holloway, USAF

VICE CHIEF OF STAFF, UNITED STATES AIR FORCE

On June 7, USAF's Vice Chief of Staff, Gen. Bruce K. Holloway, addressed the graduating class at the Air Command and Staff College, Maxwell AFB, Ala. He prefaced his remarks, below, by explaining to the graduates that he was not *going to make the "usual" graduation speech, stressing "the importance and responsibilities of the profession." Instead, the Vice Chief issued a challenge to the graduates to prepare themselves now for the kind of wise leadership that will continue to be required of them in the retirement years. The Editors of* AIR FORCE/SPACE DIGEST *feel this address merits the widest possible readership and, accordingly, present General Holloway's views here:*

I'M GOING to talk about something that is far from your thoughts today—the retirement years. But I'm going to talk about them in the context of your remaining years in uniform, and suggest some ways in which you can continue to reap the satisfaction that comes from a life of service. What I have to say applies almost as much to the wives who share the triumphs and frustrations, the dangers and inconveniences, the excitement and companionship of military life.

I'll begin with these premises: *First,* all of you have made a firm commitment to a career of service to the nation. The system of personal values which you have assumed will stay with you for the rest of your lives. Most of you always will find a greater measure of fulfillment in public service than in activities of a personal orientation.

Second, just as the military and political sides of security are intertwined, so the management of foreign and domestic problems is interrelated and their solutions interdependent. I believe this is true to a greater degree than at any time in the last century. If we—and I'm speaking primarily but not exclusively of the military—cannot assure the security of the country and the protection of its vital interests, then our domestic problems may not be solvable on acceptable terms. On the other hand, if they aren't, it's doubtful that this nation will continue to have the energy, cohesion, and will to continue a role in international affairs that is vital to a stable, peacefully evolving world.

My *third* premise is that the professional competence you develop in the military service is a national asset which should not be put on the shelf at retirement.

Finally, everything a person does is in some way preparation for future responsibilities. This is true whether one plans it that way or not, but forethought is likely to produce more fruitful results than is chance.

These premises lead to certain conclusions. Baldly stated, they go something like this: The United States faces both external and internal challenges that have to be met simultaneously, if we are to continue on the course that was set down nearly two centuries ago in the Declaration of Independence and the Constitution. While you are on active duty, your primary responsibility is to guard against external threats to our security and national interests. Nothing is *more* important, but the correction of some fundamental internal inconsistencies is *equally* important. Many of the unique qualities and experiences of a military career are transferable to a role in helping to find creative solutions for domestic problems. Those of you who seek a continued life of service after retirement should think about imaginative ways in which your special competence can be applied to improving the total quality of American life. . . .

Over a period of three centuries—most notably in the last 175 years—this nation has grown from a series of scattered coastal settlements to the most powerful country in the world. There is nothing in history that equals its sheer physical accomplishments. Even more impressive, our physical growth was paralleled by the development of a system of government and a society dedicated to ideals of freedom and equality. These ideals were not always—and certainly not uniformly—lived up to.

In the physical process of building, resources were used wastefully. Often utility took precedence over beauty, and sometimes profit over propriety. Until recently, there was a minimum of planning, and much of that predated the revolutions in industry and transportation. As a result, some of our cities—or some parts of them—appear today as atrocities that couldn't have been created without malice aforethought. In the spiritual process, a great deal of attention was given to saving men's souls after death, but very

little to cultivating them here on earth. Success was likely to be measured more in terms of dollars than in less tangible accomplishments.

Many of these shortcomings and aberrations were symptomatic of rapid expansion. The wonder is that we did as well as we did—not that we didn't do better. The deficiencies that I've sketched so briefly generally were considered tolerable so long as the nation was figuratively an adolescent, and while the frontier existed as a safety valve. They no longer are tolerable in a mature society of unmatched wealth and power, but still preponderantly dedidicated to ideals and values that have been an inspiration to millions of people throughout the world.

The external and internal challenges we face are unique in detail, but not totally dissimilar from those faced by other nations in earlier days. Of those nations that have met somewhat similar challenges and survived, only two—or perhaps one and a half—are powers of the first magnitude today: the USSR and China. The means and methods they have used in managing their national problems are quite unacceptable to members of a free society. This adds a third element to the two challenges I have mentioned: the challenge to prove that representative government has served, and will continue to serve men better than any dogmatic, repressive oligarchy.

The task that this nation faces is staggering. Physically, it falls little short of a complete rebuilding of urban America. Large areas of the old cities must be demolished and replaced with modern structures or with open space. New cities must be built with an eye to both form and function. Our transportation systems have to be brought up to date. Air and water pollution and urban noise must be reduced or eliminated; natural resources used with greater wisdom.

All of this rebuilding should be done with an eye to improving not just the efficiency but also the quality of American life. But the quality of life isn't determined by material things as much as by more abstract values like human dignity, equality of opportunity, equality before the law, and appreciation of the arts and of the less material rewards of education. These abstract values aren't likely to flourish unless we hang onto some old-fashioned virtues like integrity, personal responsibility, and respect for the law.

Now, why do I feel that military people have a special contribution to make to this great national effort? Why do I feel that their training and experience should be channeled into constructive projects at every level of government, after they have completed their military service?

All of you have been trained for and have exercised leadership. You know the meaning of discipline, dedication, and individual responsibility. You will have spent your adult lives in a fully integrated society where every man and woman is judged by ability, regardless of race, color, or creed. As a result of constantly searching for better, more effective ways to get the job done, you should have developed a mental attitude attuned to constructive change. You will have participated frequently in the administration of training and education programs. Always you will have worked as members of a team with responsibility and concern for the welfare of those under you.

Each of you will have had extensive experience in some or several other activities that have been highly developed in the Air Force: planning, programming, and budgeting; systems analysis; the management of large organizations; development and use of extremely complicated hardware; integrating the work of specialists or military civic action —to name a few. Many will have dealt extensively with other governmental agencies at federal, state, and local levels. Others will have had frequent contacts with the educational institutions and industries that have so much to contribute to solving national problems.

I don't know of any profession other than the military in which such a large group of people accumulate an equally wide diversity of experience pertinent to the administration of great enterprises like those associated with the improvement of life in the United States.

During the next fifteen or so years you will live in various parts of this country and in foreign lands. I urge you to learn all you can about the problems of nation-building and nation-rebuilding. Where you have an opportunity to participate in civic projects, do so by all means. I hope your wives will, too. Take advantage of off-duty courses to improve your work as a military officer and to better prepare yourself for a life of continued service when you put down your military duties. I think you will find the continuing rewards of serving your country in more than one capacity to be very great indeed.

I think also that a fuller understanding of the issues that have created so much turbulence in American life will make you a better officer. The young men and women we take into the Air Force are products of contemporary American life. Two of its dominant characteristics—extremely rapid change and continued affluence—have not existed before to the extent and degree that they do today. No doubt too much has been made of the Generation Gap, but there is one, and I think it's wider than has been the gap between earlier generations. Perhaps too much publicity also has been given to a decline of moral and ethical standards, lack of respect for authority, the cult of violence, and the real or imagined frustrations of urban and suburban life. All of them exist, but at least some are less widespread and less virulent than they have been made to appear.

The majority of young people are decent, sincere, and self-respecting. I couldn't help but be impressed by that on my trip to Southeast Asia last week. They are more sophisticated and less likely to accept pat answers than their predecessors of a few years back. It would be disquieting if they were *less* sophisticated.

I think most of them are not as concerned with personal security, but more concerned with establishing an identity than were their parents, who grew up in the shadow of a great economic depression. They are far more inclined to question the traditional values of a society that until recently has been slow to recognize and act on some basic problems of human need. Some young people would scrap traditional values, without realizing that the fault lies not in the values themselves, but in a failure to live up to them. So all of the gaps and problems I mentioned do exist, I think to a greater degree than ten or twenty years ago.

You must provide the kind of leadership these young people will follow willingly. I hope you will persuade the best of them that an Air Force career offers unlimited opportunities for constructive service. It has been said—and truthfully—that the greatest social service a nation can do for its people is to keep them alive and free.

You also have a responsibility to those who do not stay with the Air Force. They should be returned to civilian life better equipped physically and psychologically for the demands of citizenship, and better trained for a productive part in the economic life of the nation.

To do all this, and to better prepare yourselves for future participation in public service, you will have to understand what makes this generation tick at a different pitch and tempo. This means developing a greater sensitivity to a wide range of domestic problems and their constructive solutions. Directly and indirectly, the nation's ability to protect its people, property, and interests depends on these solutions. This is a challenge for your active-duty years, and an opportunity to continue a life of service after retirement. I hope you will give it serious thought.—END

AIRMAIL

Technology and Inner City Strife

Gentlemen: I commend the commentary by William Leavitt in his incisive "Letter from the Inner City" in the May issue. What we do about the kind of man we have on earth is directly related to what we do about putting a man on the moon.

IRVING B. ZEICHNER
Atlantic Highlands, N. J.

Box Score

Gentlemen: I have just returned from a trip up north and have just [read] the [April] article by Allan R. Scholin. While it was well written, I was disappointed to find that some of the story was missing. . . .

There is a unique squadron in SEA [Southeast Asia] which goes about its business day and night, north and south, doing one helluva good job without any fanfare. They do not have the full weight of SAC behind them (no SEA story's complete without mentioning the B-52) and are not led by a WW II ace, so you very seldom read of their exploits. However, many in the squadron were flying combat in SEA in 1966 (myself included), and one young major who just left this month had been flying combat with the squadron since 1965, operating out of three different bases during that time. Many of our crew members now have over 300 combat missions and 750 combat hours.

As Mr. Scholin said, there is no typical day in the SEA air war. Today an O-2 directed our flight onto a road and river ford; three road cuts and a ford cut for BDA [bomb-damage assessment]. On the way home we looked over a ford we had cut yesterday and what our bombs had started yesterday had been completed by the river. The earth and gravel causeway was completely washed away. Three hundred trucks had used that ford just two nights ago.

Speaking of trucks, that's the main order of business at night. Dive bombing and strafing under flares dropped by a FAC, many of our crews have joined the 100-truck club, most of [the others] are knocking on the door. Most squadrons would settle for that score in a year. Our squadron will get more than five times that amount a month. Last month the truck total pushed 600, and late returns could top it.

Mr. Scholin spoke of a flight coming back with "one secondary." I wonder if Devil 71 appreciated the publicity. After all, he's stationed with us here at Phan Rang and must know that one of our crews would keep it a secret if that were his total BDA. From five to fifty secondary fires and explosions are normal with the record being well over 200, and that's for a single ship.

Our crews are no strangers to flak either. They pick up a little over 1,000 rounds a night while hitting targets in 37-mm, 57-mm, 85-mm, and SAM-defended areas. At debriefing we call it heavy when it looks like a carpet of red below followed by a canopy of white above. It's accurate when you hear it pop. In the last two years a lot of those gunners have been upgraded from three and five levels to seven and nine levels. As in everything, I guess practices makes perfect.

As far as close support goes, I could paper the walls of my room with letters of gratitude from ground troops we've supported. . . . The whine of our twin jets is a welcome sound to all friendly forces in South Vietnam.

I do not wish to run down the contributions made by other members of the air arm in SEA. The air war over here is necessarily a team effort. I just want to point out that we are a member of that team and hate to be left out of the box score.

By the way, if you haven't guessed from the clues I've left along the way, the squadron I speak of is the 8th Tactical Bombardment Squadron. We are the only B-57 squadron operating in SEA. We were also the first jet squadron to fly combat over here. If you would care to hear more about us, just ask any FAC or member of the ABCCC teams. Of course, they would probably know us by another name—Yellowbird.

MAJ. ERNEST L. CARLTON
8th TBS
APO, San Francisco

On the Job

Gentlemen: I have always enjoyed your magazine and consider the April issue one of your finest. Please permit me to comment on Allan R. Scholin's interesting article "The Air War in Vietnam—No Beginning, No End, No 'Typical' Days."

I realize that Mr. Scholin could not possibly mention every aircraft engaged in combat in Southeast Asia, but I must point out the contribution of the EB-66s of the 355th Tactical Fighter Wing, Takhli RTAFB, Thailand. Virtually no major air strikes are conducted into the heavily defended airspace of North Vietnam without the radar-jamming support of the vulnerable EB-66s, now outfitted as the first tactical electronic warfare squadron of the US Air Force.

You mention B-52 strikes. Every time that the '52s dropped their payloads at Con Thien or Khe Sanh, we were there.

You mentioned C-130s. Whenever they streamed tons of leaflets into North Vietnam, we were there.

You mentioned F-105/F-4 strikes at Hanoi. Whenever the strike force drove "downtown," we were there.

And we were there whenever the Navy's carrier jets cut the roads and bridges of Haiphong—jamming models to suppress radars; reconnaissance models to prevent technological or tactical surprise.

In the classic pattern, North Vietnam has amassed hundreds of radar sets to acquire and track air intruders. In this and all future conflicts, air warfare means electronic warfare—not as an addendum but as an integral part of strike operations.

I write this not merely to see my unit's name in print, but to let the fellowship of air warriors know that tactical electronic warfare has arrived and is here to stay.

CAPT. WALTER M. COSTELLO
355th Tactical Fighter Wing
APO, San Francisco

A-F-C-S!

Gentlemen: Your Ninth Annual Missile and Space Almanac, featured in the June issue of AIR FORCE/SPACE DIGEST, is again a fine product.

We in the Air Force Communications Service—that's A-F-C-S—want to challenge, however, your reportorial candor in listing two Outstanding Airmen of the Year for Air Force Systems Command—that's A-F-S-C!—*viz.*, paragraph 6, page 107.

We had hoped that the improper introduction of CMSgt. Alvin J. Johnson during the Outstanding Airmen program at Atlanta as being from Air Force Systems Command—and his own abrupt correction of the announcer's mistake—would mark "fini" to the problem. Your check of the above referenced paragraph, line 10, will indicate, however, that the same man who handled the public address at Atlanta must also have handled the reporting for the event. All this goes to say that CMSgt. Alvin J. Johnson is assigned to the 2049th Communications Group, McClellan AFB, Calif., and is one of the finest representatives the Air Force Communications Service — A-F-C-S, that is—ever sent to an AFA Convention as this command's Outstanding Airman of the Year.

Daily we in AFCS live with the age-old problem which faces many such service organizations and commands—"take 'em for granted." And we don't mind battling this situation nearly so much as we hate to be recognized as someone else. (And we're the first to admit that USAF acronyms can be puzzling, *viz.*, AFSC—Systems Command; AFCS—Communications Service; AFSC—AF Specialty Code, and we could go on.)

Accept our congratulations for another fine show in Atlanta, and for the continued outstanding support AFA gives to the "men in blue." We just like to keep the record straight. . . .

Joe H. Wilson
Chief, Information Division
Office of Information
Hq. AFCS
Scott AFB, Ill.

SAC Historical Museum

Gentlemen: Offutt Air Force Base, home of Strategic Air Command, also houses the Strategic Aerospace Museum. This facility traces the history of strategic bombardment aircraft through current SAC weapon systems.

The museum presently has on display several aircraft whose histories have become obscure over the years. We are seeking information regarding the past history of these aircraft. Included among them are a B-36, tail number 22217; a B-29, tail number 0-484076; a KC-97, number 0-30198; an ANEB-47, number 21412; a B-17, number 0483559; a B-25, number O-430363.

Anyone with information regarding the history of any of these aircraft is invited to contact this office.

In addition, a building has been proposed for the museum. It would house artifacts of every conceivable variety having a bearing upon the history of Strategic Air Command or stra-

(Continued on following page)

AIRMAIL

tegic bombardment, including World Wars I and II.

We would deeply appreciate the donation of any artifacts which might enhance the portrayal of SAC's history.

LT. COL. FRANK R. CHANDLER
Chief, Information Division
Offutt AFB, Neb. 68113

Thailand-Based Pilots

Gentlemen: I would appreciate receiving letters from pilots serving in Vietnam that have had several hundred hours of combat flying time over previous strategic positions held by the enemy forces.

Letters not to exceed 300 words for magazine article use. I would prefer hearing from present Thailand-based B-52 pilots, F-100 pilots based elsewhere in SEA, along with chopper pilots and F-105 pilots.

All letters will be answered. Please send data on what a typical day in the life of each one of the abovementioned pilots is like in general, including the sortie flown.

RON BEERENS
302 Grace Ave.
Newark, N. Y. 14513

UNIT REUNIONS

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48th Tactical Fighter Wing Reunion

The reunion of the 48th TFW will be held August 9, 10, 11, 1968, at Las Vegas, Nev. For further information contact

Maj. G. A. Peterson
5445 Consul Ave.
Las Vegas, Nev. 89105
Phone (home) 737-6040
(duty) 643-2262 or -2268

98th Bomb Group Reunion Committee

A meeting of the men of the 98th Bomb Group, 1942-1945, to organize a reunion committee will be held at the Hyatt House, Denver, Colo., July 23-26, 1968. Contact

Rudolph Schmeichel
11829 Broadmoor Dr.
Dallas, Tex. 75218

Leadership Schools and Flying Encampments

Combined CAP Cadet Leadership Schools and Flying Encampments will be held at Reno-Stead Airport, Reno, Nev., from July 1 to August 13, 1968. Physicians and ancillary medical personnel are needed to operate a dispensary-type service and administer first-echelon medical care for any part of that period. Mondays are available for Reservists. Interested personnel may obtain further information by writing to

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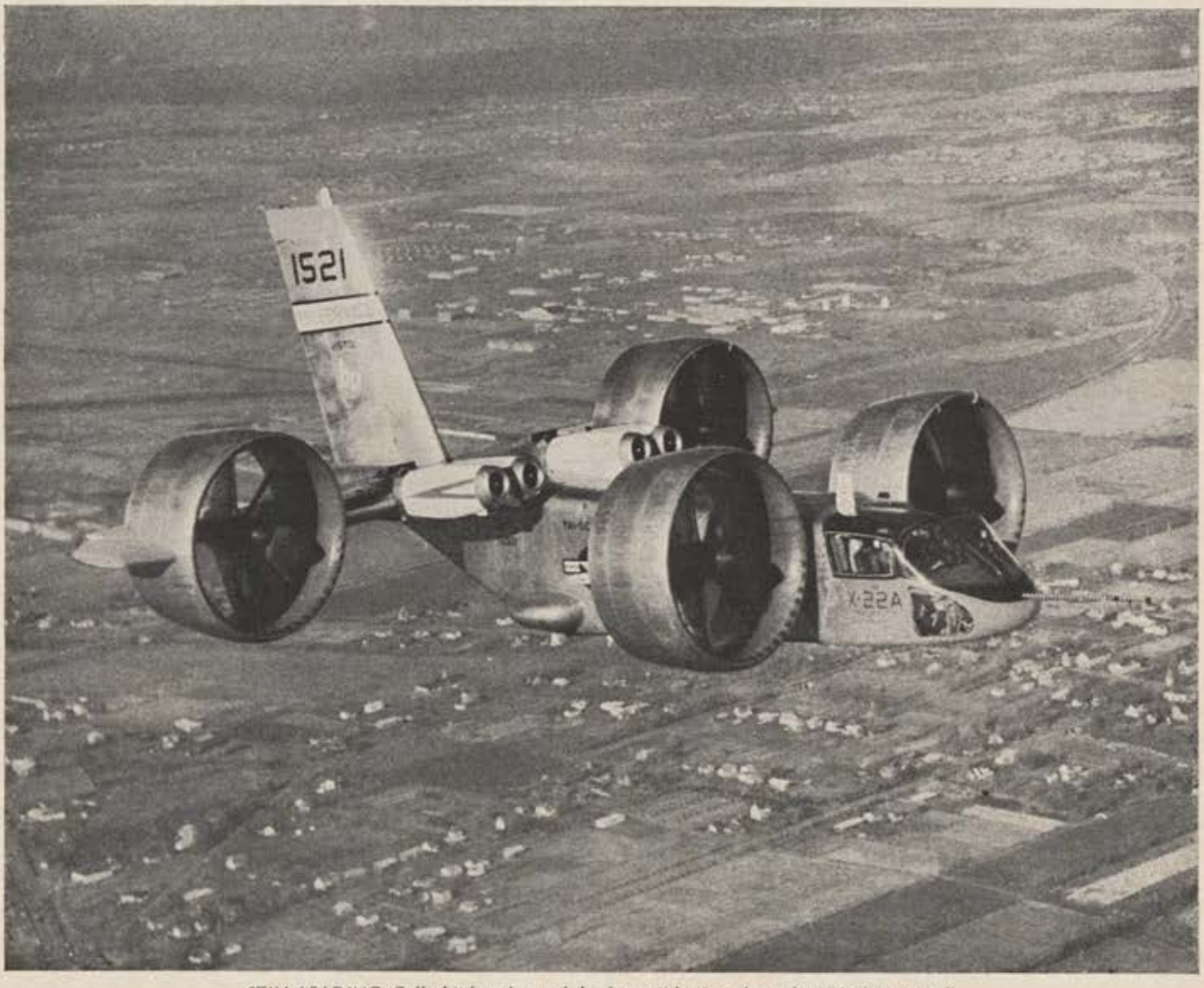

STILL LEADING. Called "the plane of the future" by its pilots, the X-22A may well foretell a new era of V/STOLs for military service and commercial transportation.

AIRPOWER IN THE NEWS

By Claude Witze

SENIOR EDITOR, AIR FORCE/SPACE DIGEST

The F-111A's Real Struggle

WASHINGTON, D.C. JUNE 11

Testifying in early March before the House Defense Appropriations Subcommittee, Lt. Gen. Joseph R. Holzapple, USAF Deputy Chief of Staff for Research and Development, said, "The F-111 is probably the most publicized airplane ever built."

Historians may one day dispute the General's generalization, but on the basis of currently available evidence it is hard to quarrel with.

So far as the US Air Force is concerned, its own version, the F-111A, still suffers from the image created in the early days of the project. The adjective "controversial" is automatically dropped in front of F-111A in most newspaper stories about the airplane. The technical and trade press has overcome this propensity, and sound articles are appearing under datelines of Edwards AFB in California and Nellis AFB in Nevada. Indications are that the F-111A, under observation by more sophisticated reporters, is being accepted as a weapon system in its own right, capable of the most accurate all-weather weapons delivery in air history.

The problem growing out of three accidents in Southeast Asia has been complicated by the spot press coverage of these events in an atmosphere where the true performance of the F-111A in combat necessarily remains classified.

There have been secret hearings on Capitol Hill, at which Air Force Secretary Harold Brown and Gen. John P. McConnell, USAF Chief of Staff, were questioned by House and Senate members. Secretary Brown is known to feel strongly that the true story on the performance of the F-111A on its missions out of Thailand should be made public. Members of Congress who have heard the accounts agree, and it is likely that a declassified version will be released by the end of this summer.

Some things are not secret. For example, there is the standing record of the number of major accidents in the first 10,000 hours of flying. The F-111A here is compared with other Century Series fighters:

Aircraft	*Major Accidents*
F-100	13
F-101	16
F-102	12
F-104	17
F-105	12
F-106	8
F-111A	5

The five F-111A accidents do not include one loss after the 10,000-hour mark was passed and one accident involving the Navy's F-111B version.

At this writing, in early June, USAF has only two test F-111A airplanes flying. By this time in July, it is expected the entire inventory will be back in the air after replacement of a defective hydraulic actuator valve in the elevon system. Basically, the problem was that a small rod, screwed into the assembly and then welded into place, worked its way loose under the stress of vibration. The welded joint had given way in an assembly recovered from an F-111A that crashed on May 8 on a flight out of Nellis.

As indicated, it is the unusual attention given to this airplane by the press that has complicated the USAF problem. In the background, of course, is the history of the TFX project, the Defense Department insistence on "commonality," the unhappiness of the US Navy with its F-111B version, the selection of General Dynamics Corp. as the prime contractor, and the political flavoring that was injected into the selection. It may be that USAF's biggest cross is the aura of totally unimportant issues that surrounds its newest and best weapon system.

One good example came up in the hearings where General Holzapple appeared. Congressman William E. Minshall of Ohio reads the weekly news magazines, and, in one of them, he found this sentence:

"The Air Force version [F-111A] can scarcely fly over Pikes Peak, altitude 14,110 feet, when fueled and fully loaded with bombs of the type used in Vietnam."

Before Mr. Minshall was through, he had cross-examined General Holzapple, General McConnell, Secretary Brown, and Secretary Flax about this single statement, offered without any authority and clearly from a writer of somewhat limited experience.

The Air Force witnesses were forced to explain that the statement has no meaning.

"It is anticipated," said General Holzapple, "that this airplane will be flown on the deck, at night, and in bad weather. There may be times when you would want to load it as you have described there and it would perform its mission in a very fine manner, and it would not have to fly over Pikes Peak. . . . We could load a B-52 so that it could not get off the runway, and I expect you could load a submarine so that it could not get off the bottom. But this does not make the system bad."

Dr. Flax concluded that the news magazine reporter was referring to overload conditions: "In other words, the F-111A aircraft, like any aircraft, is capable of getting off the ground with more bombs than it can take up to combat altitude."

Secretary Brown, questioned on another day, was a bit sarcastic. He referred to the magazine as "a well-known aeronautical authority," although it is a general news weekly. Dr. Brown said it is possible to hang enough bombs on the F-111A so that it will not fly above 15,000 feet. But that is not the standard bomb load, and the standard bomb load is as big as the bomb loads of other aircraft.

Secretary Brown insisted the magazine statement is not relevant. He indicated it is true that if you give the F-111A a load that is five times that put on any other aircraft, which is twice the load we will put on the F-111A, then it will not fly at 20,000 feet. But what does this prove?

General McConnell, who appeared with Dr. Brown, said only that the magazine "must be talking about a lot more bomb load than I figure it is capable of carrying."

A further subject of public, and press, interest has been the basic decision to put the F-111A in combat. It has been operating out of Takhli Royal Thai AFB, under the code-name Combat Lancer, since mid-March. Performance has been outstanding. All missions have been flown at night and usually in bad weather.

All of the necessary logistics, aircrew training, and cockpit time had been provided to ensure proficiency. There

were no accidents in the training program, which ran up about 2,000 hours of flying time.

The bombing missions to be encountered in Southeast Asia had been tested and evaluated, and the tests proved the clear superiority of the F-111A over other USAF tactical aircraft. The accuracy of its radar bombing surpassed that of such systems as the F-4 and F-105. Payloads, navigational accuracy, range, and the high-resolution attack radar all met USAF standards. The penetration aids and electronic countermeasures were effective against threats expected in Southeast Asia. At the closed hearings held in May, USAF witnesses offered evidence that their confidence had been justified by the airplane's performance over North Vietnam.

Testifying on February 27, only four days after the first detachment of F-111As passed its Mission Capability Evaluation, General McConnell testified that he personally had delayed deployment of the unit to Thailand.

"The Secretary and I would not want to send these aircraft over there until we were absolutely certain that the crews were trained as well as we could possibly train them in the United States, that all the equipment worked, and that we had the necessary maintenance know-how and equipment to send over there with them. That is the reason they have not been sent prior to now."

The first six F-111As, part of the 428th Tactical Fighter Squadron, 474th Tactical Fighter Wing, were deployed to Takhli on March 15 and flew their first mission March 25.

Among the men in charge of the F-111A project there is a strong feeling that much of the public image of their airplane derives from background that is alien to both the hardware at hand and the mission.

It is pointed out that, so far as USAF is concerned, the F-111A has enjoyed a "head-shed priority" unlike that of any other airplane. Only the early missile projects, the Thor and Atlas, received similar urgent attention to ensure their success. As in the missile program, the payoff is in the future.

We Learn Tomorrow—Not Yesterday

On May 28 Defense Secretary Clark Clifford made his first appearance before the House Committee on Appropriations, particularly the subcommittees on Defense and Military Construction, with Chairman George H. Mahon presiding. The transcript of this closed hearing, just released, is concerned entirely with a Pentagon request for a supplemental appropriation of $3.9 billion for Fiscal 1968, requested by President Johnson only about forty days before the end of the Fiscal Year, at the end of this month.

It is difficult to avoid feeling some sympathy for the new Secretary. He inherited a fiscal mess resulting, for the most part, from the failure of his predecessor to ever offer Congress an accurate estimate of what it costs to run a war. The man who has come closest to it is Senator John Stennis of Mississippi, who has screamed for a couple of years that he is being asked to "legislate and appropriate in this vacuum of facts."

Robert S. McNamara, who has moved on to become President of the World Bank, consistently underestimated what he would spend in Vietnam by margins that ran from $8 billion to $12 billion a year, and he had not stopped when he vacated the chair for Mr. Clifford.

Congressman Melvin R. Laird, a Wisconsin Republican, made it clear to Mr. Clifford that he still is not satisfied that the Pentagon is honest with its arithmetic. Mr. Laird pointed out that the request for $3.9 billion supplemental should be added to what the McNamara administration called a "zero supplemental." That was a program to reprogram, to shift funds originally voted for other defense purposes into the Vietnam coffers. The honest supplemental, Mr. Laird indicated, is really about $6.5 billion.

Said Mr. Laird:

"For the last two or three years the problem we have had in this committee has been the underestimation of defense costs. We have had to come forward here with a $10 billion or $11 billion supplemental in 1966, a $13 billion supplemental in 1967, and now this reprogramming plus new obligational authority request of over $6 billion which we are considering now. . . .

"I think the American people would like to know what these costs are, and I think if they had known them thirty months ago, we would not be in the financial crisis that we are in today."

Mr. Clifford, supported by Paul H. Nitze, his deputy who also served under Mr. McNamara, could only reply that unexpected things happen in warfare. This year, they happened in January and February: the increased effort of the Viet Cong starting with the Tet offensive and the seizure of the *Pueblo* by the North Koreans.

Figures placed in the record by Mr. Nitze show that our response to the *Pueblo* incident has cost $232 million. That was for aircraft deployment, Reserve callups, facilities, and other support. The aftermath of the Tet offensive, which is continuing today during the Paris "peace" talks, forced new expenditures of $2.3 billion. It is for deployment of troops, Reserve callups, aircraft and helicopters to replace those destroyed, munitions, equipment for our allies, and support.

Congressman William E. Minshall of Ohio did not mention Mr. McNamara's expressed aim of ending this war with no surplus bullets or beans, but he had a fitting challenge for Deputy Secretary Nitze. He asked him to pretend he was a congressman, "making an impassioned plea to the House of Representatives. What would you say . . . in support of this supplemental?"

He continued:

"What do you deem to be the cause. . . ? You mentioned the Tet offensive and the USS *Pueblo* incident. Do you attribute this in any way to the lack of proper intelligence or to things you could not possibly anticipate? Is it not only these things you could not anticipate, but perhaps because we were operating under too tight a budget to begin with?"

Mr. Nitze seemed to echo the McNamara defense in these situations; it is a defense that ignores the uncertainties of war and the fact that war contributed the word "snafu" to the American vocabulary.

"We are fighting a very large and unusual war in South Vietnam," he said. "The normal authorization and appropriation practices ordinarily are very sound, but they are designed primarily for a peacetime situation.

"I think in past wars appropriations have been granted in much larger lump sums. Certainly this was true in World War I and World War II."

No member of the committee disputed this observation.

The witness then observed:

"We have been operating under basically peacetime procedures with respect to the bulk of the authorizations and appropriations. This is difficult in a wartime situation and especially in a war as large as the current conflict in Vietnam. We have tried to do our best, but I think that in no war situation can anyone foresee the way in which things will evolve. One learns more month by month as the situation develops."

Mr. Nitze argued that the Fiscal 1968 budget was put to bed in December of 1966, and eighteen months can be crowded with new developments. This is a fact well known to military men all through history.

The Nitze-Minshall dialogue at this point is worth quoting because of what it reveals of the Administration's

(Continued on following page)

reasoning, leading inevitably to requests for supplemental funds to fight the war. The Deputy Secretary complained mildly that no action was taken when the Pentagon sent a "zero" supplemental to the Congress last February 12. Then:

MR. MINSHALL: It comes to my mind and the American people's mind, why wasn't that acted on?

MR. NITZE: I would not think it necessary to put this into my speech, but the fact is that it was simply overtaken by events; that is, *Pueblo* and the Tet offensive.

MR. MINSHALL: I am asking you because that is a job we have. I am asking you to give it directly to them, rather than going back and restating what you said to us.

MR. NITZE: Perhaps in this hypothetical television performance, I would omit the matter of having sent up a supplemental on February 12 and that it was not acted on, and I would then just restrict myself to the changes in the situation which have taken place since December 1966 to this point in time. The public as a whole knows that the war in South Vietnam has turned out to be a very difficult war, indeed. The Tet offensive, which was not foreseen, required a response on our part. The development of the situation in Korea at the time of the seizure of the USS *Pueblo* and the attack on the Blue House, the residence of the President of the Republic of Korea, which were not foreseen, are illustrations of the way in which the situation has become more serious and has required a greater effort on our part. The Department of Defense has gone forward in agreement with the committees of Congress to do in a timely way those things which were necessary, such as deploying additional forces, such as increasing ammunition production, such as increasing helicopter production, et cetera. These measures have to be paid for. It is appropriate that this supplemental be passed in order to fund the necessary defense of the United States.

MR. MINSHALL: You say it was not the fault of intelligence. The enemy had this capability. Do you not think that should have been cranked into your budget request, knowing he had the capability of a Tet offensive, knowing he had the capability of increasing his activity on the Korean front? Or are these things you think we should have ignored and sort of brushed under the rug until they happened, and then ask for the money? Is that the kind of operation we are conducting?

MR. NITZE: That is entirely incorrect. The point I was making was that in any war situation it is difficult to foresee exactly what the evolution of affairs will be.

Nobody, not even Mr. Minshall, repeated the question. It has not been answered, but the history of the war, particularly since the Gulf of Tonkin incident in 1964, tends to confirm the implications of Mr. Minshall's question. The truth is that defense costs are going up these days because the McNamara administration had not been paying for the war, and our capacity for dealing with its vagaries, such as the *Pueblo* and Tet, has been seriously eroded.

Mr. Nitze's insistence, in 1968, that he cannot foresee events to come stands in contrast to some of the Defense Department's efforts in the past. In his Fiscal 1967 budget presentation, Secretary McNamara made the assumption that the war should be budgeted only through June 30, 1967. He did admit he would need supplemental funds that year if his assumption was wrong, which it was.

From the testimony offered by Defense Secretary Clifford, it is not clear that he intends to reverse the pattern set by his predecessor. On the other hand, what he told the committee sounds far more realistic than the McNamara recitals of recent years. For example, Mr. Clifford used his opportunity to take issue with the Senate on its decision to cut $240 million off the Fiscal 1969 fund request for research, development, test, and evaluation. He asked that the money be restored in view of "the uncertainties we presently face."

Another aspect is that of Mr. Clifford's approach to the entire Southeast Asia problem. He testified that he believes we are committed under the SEATO treaty. And that if we do not meet the obligation we will have more trouble in the future as Russia and Red China observe our reticence. Mr. Clifford also has learned his lessons from the past.

"I know in my own heart that Communist aggression, if successful in South Vietnam, would not confine itself to South Vietnam," he said. "I know that it would spread into Laos and Cambodia, into Thailand and Burma, and on perhaps down into the Philippines and Indonesia, and then perhaps into the subcontinent of Asia. I do not care whether it is called the domino theory or not, but I believe we know that when that type of aggression starts you either stop it in the early stages or you stop it much later when it is infinitely more expensive."

Mr. Clifford then cited the example of Hitler, starting with his march into the Rhineland, into Austria and Czechoslovakia. Each time the German General Staff advised him not to do it, warning that the European nations would go to war, if necessary, to prevent it. Hitler, in Mr. Clifford's opinion, "banked on the unwillingness of the free nations to come in and make a defense." He continued:

"I believe a similar situation exists in Southeast Asia. I do not believe we can compare the cost of South Vietnam with no war. I think this is comparing apples with oranges. If you say, 'Had we not gone in there we never would have had to go in,' that would be an apt comparison.

"But if you say, 'We have learned from experience that if we don't go in early, then we get dragged in much later,' I think the comparison should be made in the following manner:

"We have lost some 23,000 to 24,000 men in South Vietnam. The cost to date may be, let us say, $50 billion, perhaps it is somewhat more than that if you include economic assistance. If you compare that with no cost at all then it has been an unwise decision."

He then suggested that the cost of Vietnam be compared with the cost of World War II and pointed out that it is the enemy that controls the level of fighting in South Vietnam.

"If they choose to fight harder they can do so, causing us additional casualties. I believe that is what they are doing now because of the negotiations in Paris. They are increasing our casualty list in an effort to put more and more pressure on our negotiators and on public opinion in this country."

The Clifford testimony certainly offers some contrast to that of his predecessor, Mr. McNamara, and to Mr. Nitze's rather abject discovery that normal appropriation practices are designed for times of peace, not war. It is late in the game, but not too late, for Mr. Clifford and Congress to cooperate. Mr. Clifford says he has learned much from past history, while Mr. Nitze says he "learns more month by month as the situation develops." As most military men know, these viewpoints can be reconciled. What we have learned from military history is that we must be prepared for what we learn month by month. —END

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AEROSPACE WORLD

News, Views & Comments

By Allan R. Scholin
ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

WASHINGTON, D.C., JUNE 14

Air Force Secretary Harold Brown and USAF Chief of Staff Gen. J. P. McConnell are in complete agreement on going ahead as soon as possible with the contract-definition phase of the Advanced Manned Strategic Aircraft (AMSA).

In testimony before the House Subcommittee on Defense Appropriations, made on February 26 but only recently released, both acknowledged that, despite objections of the Secretary of Defense, they were anxious to press on with AMSA development.

General McConnell was asked how much time the US is losing by not going to contract definition in Fiscal Year 1969.

"We lose another year," he responded.

"Will you gain anything by waiting, in terms of the state of the art?" asked Congressman Robert L. F. Sikes of Florida.

"In my opinion," General McConnell replied, "we have enough knowledge to proceed without undue risk."

"Do you support what has been said to us by General McConnell, that it is time to move head?" Mr. Sikes asked Secretary Brown.

"I made a recommendation that we should go ahead in Fiscal 1969 with contract definition," the Secretary replied. "On the other hand, I recognize that the Secretary of Defense's decision is based on a logical argument; namely, that until the threat is more clear and more serious than we now see it, we can probably get by quite well with our B-52s, unless the threat goes up. . . .

"I think the Secretary of Defense was concerned that with contract definition you locked yourself in, . . . that approval really means you have to spend $1.5 or $2 billion, and that you may be spending it the wrong way. . . .

"The design that we are now talking about . . . is flexible enough to be able to handle the kinds of changes in tactics that could evolve over the next fifteen years. . . . In my judgment, we can afford to take the next step without locking ourselves in completely, and the next step is contract definition."

☆

Cessna has delivered the first of 127 A-37B attack aircraft to the Air Force for operational testing at England AFB, La., and at Edwards AFB, Calif.

The A-37B is an improved version of the A-37A, which has flown more than 10,000 combat missions in Vietnam since last fall. Whereas the A-37A was a modification of the T-37 jet trainer, the A-37B has an all-new airframe, plus other improvements, including provision for aerial refueling, more powerful engines, dual elevator controls, and an improved fire-control system.

Both the A and B models employ two General Electric 2,700-pound-thrust J85 engines. In the A model, however, the thrust was derated to 2,400 pounds by enlarging the tail pipe to guarantee adequate thrust in Vietnam's hot climate. The J85-17s in the B model will deliver the full 2,700 pounds.

The B is designed to withstand 6 Gs at gross weight, up from 5 Gs in the A-37A. Both versions are now operating at a gross weight of 14,000 pounds. Maximum external ordnance load of the B is 5,680 pounds.

Though both the attack versions retain the two-seat cockpit, enabling them to be employed as trainers if needed, the A-37A has normally been flown in combat by a one-man crew.

Cessna A-37Bs are now coming off assembly line at Wichita, Kan. While A-37A, which has logged more than 10,000 combat sorties in Vietnam, was modified from T-37 trainer, A-37B is entirely new plane, incorporating aerial refueling, more powerful engine, improved fire-control system, and stronger airframe stressed for 6 Gs, vs. 5 Gs in A-37A.

Gen. J. P. McConnell, USAF Chief of Staff, received the National Geographic Society's Gen. Thomas D. White Space Trophy for 1967 for effective leadership and direction in development and utilization of USAF aerospace vehicles. The presentation was made by Air Force Secretary Harold Brown at the Society's Washington headquarters on June 3.

This has created some problems in that the pilot, seated in the left seat, preferred to roll in from the right for better visibility. The instrument panel in the A-37B has been redesigned to make it just as easy to fly from the right seat.

A deicing system has been added to the engine air inlets, an automatic engine starter installed, and ailerons and their control systems have been redesigned to lighten stick forces when the plane is fully armed. Flak curtains of layered nylon have been installed in the cockpit, and are being retrofitted to the A-37As.

☆

A long-range project to evaluate the effectiveness of airpower in Southeast Asia has been set up by the Air Force under the code-name of Corona Harvest.

"The evaluation will encompass all airpower employed in Southeast Asia from 1954 to the end of the conflict," according to the AF Regulation establishing the project, "with due consideration given to the changing objectives and restrictions associated with each new phase of US participation."

The Commander of Air University has been assigned over-all responsibility, with air staff elements, major commands, services, and separate operating agencies appointing project officers to work with AU.

Major goals of Corona Harvest are to (1) identify and define airpower lessons learned in SEA; (2) determine the validity of current USAF and joint concepts and doctrine, and recommendation modification and change where warranted; and (3) document the conduct of the air war.

☆

Twenty-eight years after the Battle of Britain, in which RAF Hurricanes and Spitfires turned back Nazi Germany's Luftwaffe and frustrated Hitler's plans to invade the British Isles, a movie recreating that epic air battle will be premiered in London on September 15.

Highlights of the film are dogfights between RAF fighters and German Messerschmitts and Heinkels. British airfields featured in the film are Duxford, Hawkinge, North Weald, and Northolt—all key bases in defending Britain in 1940.

The role of Lord Dowding, Commander in Chief of the RAF Fighter Command, will be played by Sir Laurence Olivier, while Rex Harrison plays Air Vice Marshal Sir Keith Park, 11th Group CO. Harrison was a flight lieutenant in Sir Keith's group during World War II.

Luftwaffe Commander Goering is played by the German actor Hein Reiss.

All RAF squadrons and pilots are anonymous in the film because the producers felt the Battle of Britain was so much a combined effort that it would be inappropriate if not impossible to single out individuals and units.

The film is being made with the full cooperation of the Ministry of Defence, RAF, and ex-Luftwaffe leaders. Technical advisers are Wing Commander Robert Stanford-Tuck, who became an RAF fighter ace during the Battle, and Gen. Adolf Galland, a top Luftwaffe fighter ace.

☆

A national laboratory to demonstrate innovations in individual and group instruction, including US Air Force applications of programmed learning, will be held in Washington, D. C., November 18 to 20, cosponsored by AFA's Aerospace Education

(Continued on following page)

Miscalculation by pilot performing F-105 flyby May 31 at US Air Force Academy created sonic boom which blew out numerous windows and caused some injuries from flying glass. Plane was participating in ceremony in which Thunderchief was presented for permanent display on Academy grounds. Four buildings, but not the Chapel, were damaged.

—Wide World Photos

Airmen complete mounting of F-105 for permanent display at Air Force Academy. Assembled from several battle-damaged aircraft, it honors Academy graduates who have served in Vietnam. At dedication, Fairchild Hiller, whose Republic Division built the Thunderchief, presented Falcon Foundation scholarship named for Lt. Karl Richter, 1964 graduate who died after F-105 bailout in Vietnam.

Prototype of Fiat G.91Y lightweight fighter-bomber-reconnaissance aircraft being built for Italian Air Force was displayed at 3d International Aeronautics and Space Show in Turin, Italy, early in June. Single-seater is powered by two GE J85-13 turbojets of 4,080 pounds thrust each.

USAF Brig. Gen. Howard Kreidler, right, heads Strike Command group drawing up joint operating concepts for 1970-75 period. Others are, from left, USAF Col. Benny Costello, Army Brig. Gen. Howard Cooksey, and Cols. Arthur McCartan, USAF, and Robert March, Army.

Foundation and the US Office of Education.

"Establishment of the National Laboratory was the outgrowth of a widespread survey of educational innovations conducted by the Aerospace Education Foundation," said Michael J. Nisos, the Foundation's Managing Director.

"The survey revealed that, while completely innovative systems are not yet available, significant innovative components . . . do, in fact, exist in a number of subject areas; and further, that both the producers and users of innovative materials deserve a new means of communicating their successes, as well as their failures, one to another."

Theme of the laboratory, which is limited to 1,500 registrants, is "Individualized Learning for the Inner City."

"Individualized learning was selected as a practice which has progressed to the point where it merits exposure as the prevailing theme," Mr. Nisos explained. "Further, individualized learning shows potential as a key to the solution of many urban problems in education."

☆

The Military Airlift Command has awarded contracts totaling approximately $285.8 million to twenty com-

NEW BOOKS IN BRIEF

America Is in Danger, by Gen. Curtis E. LeMay, USAF (Ret.), with Maj. Gen. Dale O. Smith, USAF (Ret.). "I make no claim to objectivity," General LeMay warns in his introduction. Objective or not, the book is studded with pithy criticisms of "armchair strategists," current US military philosophy, and unwarranted civilian interference in matters requiring "professional judgment." Funk & Wagnalls, N.Y. 346 pages. $5.95.

The Department of Defense, by C. W. Borklund. An uninspiring textbook-flavored history of the Defense Department with explanations of how it functions and interacts with other government agencies. Includes appendices and index. Praeger, N.Y. 342 pages. $6.95.

Flying Fury: Five Years in the Royal Flying Corps, by Maj. James T. B. McCudden, RFC. Fifty-seven confirmed victories were credited to McCudden, one of Britain's top World War I aces. Republication of his colorful memoirs, long out of print, will be welcomed by the cult rediscovering that era. Doubleday, N.Y. 356 pages. $6.95.

From the Wright Brothers to the Astronauts. The Memoirs of Maj. Gen. Benjamin D. Foulois, with Col. C. V. Glines, USAF. The evolution of airpower could hardly be traced more personally than through this colorful Air Corps leader whose career spanned the years from the Wright brothers to the space program. His own account of the progress and controversies he prompted makes interesting reading. McGraw-Hill, N.Y. 306 pages. $8.95.

Integration of the Negro in the U. S. Armed Forces, by Richard J. Stillman, II. A broad survey of the history, methods, and significance of Negro participation in the services. Extensively documented; includes statistics, bibliography. Praeger, N.Y. 167 pages. $10.

Let My People Go, by Florence Noland Bagnall. A fictionalized story of one prominent leader of the Nazi resistance in Yugoslavia in World War II and the hardships he suffered. Publishers Press, Salt Lake City, Utah. 253 pages. $4.95. Can be ordered from *Let My People Go,* 204 W. Foothill Blvd., Monrovia, Calif. 91016.

The Mediterranean Strategy in the Second World War, by Michael Howard. A statement of what the British-supported Mediterranean strategy was supposed to accomplish for the Allies. Praeger, N.Y. 83 pages. $4.

The Saga of the Air Mail, by Col. Carroll V. Glines, USAF. Some interesting tales about the pigeons, the balloons, the first clumsy, dangerous missions by private pilots and by the intrepid fliers of the Air Service and, later, the Air Corps, to get the mail through. For more on this subject, see Colonel Glines's article on page 82 of this issue. Photographs. D. Van Nostrand, Princeton, N.J. 180 pages. $5.95.

The 1968 Aerospace Yearbook. A comprehensive and valuable reference book on annual aerospace events, civil aviation and industry reports, new equipment, and government research and development. Books, Inc. 1250 Connecticut Ave., N.W., Washington, D. C. 20036. 364 pages. $11.

—MARIA T. ESTEVEZ

CONTINUED

mercial airlines for international airlift of military passengers and cargo in Fiscal Year 1969.

Commercial airlines currently carry about twenty-nine percent of MAC routine cargo and ninety-three percent of MAC passengers worldwide. Military aircraft carry priority equipment and combat troops. Eighteen of the twenty airlines operate flights to Southeast Asia.

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A pair of rescue efforts occurred in Southeast Asia in recent weeks that stand out even among the many tales of drama, heroism, and human interest in rescue operations.

One concerns Maj. Gerald T. Dwyer. An O-2 pilot, he was flying a forward air controller mission over enemy-infested territory near Kham Duc in South Vietnam when enemy fire shot off a portion of his right wing. The plane caught fire, and he bailed out. He was being shot at during his descent, but came down in trees that temporarily obscured him from the enemy.

Guided by another FAC overhead, he made his way to a small ravine. A rescue helicopter attempting the pickup encountered heavy fire and withdrew until fighter support could be summoned. The FAC spotted enemy positions on a nearby ridge and marked the target for a pair of F-105s.

"The ridge was so close that the concussion of the bombs lifted me off the ground, and I could feel the debris falling on me," said Dwyer. The F-105s stopped sniper fire from one direction, but Dwyer heard other voices nearby. When the Jolly Green Giant returned, it was met by more fire, taking several dozen hits which injured a crew member, and it had to depart.

"All of a sudden, just sitting there, a bullet hit a few inches from my right shoulder, and I looked up and there were five people, four carrying rifles and the other a pistol." Dwyer asked the FAC to direct a strike at them, and the bombs hit within twenty-five yards of his shelter. "It was just a little bit beyond them," he said, "but at least no more than those five made it into the ravine." Moments later, he heard the sound of a grenade being armed. It rolled right to his feet. "I just tried to burrow down into the

(Continued on page 24)

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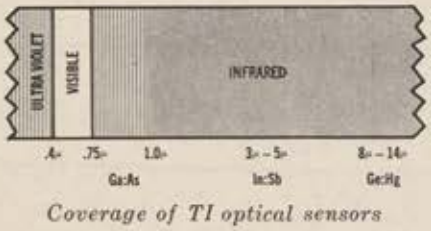

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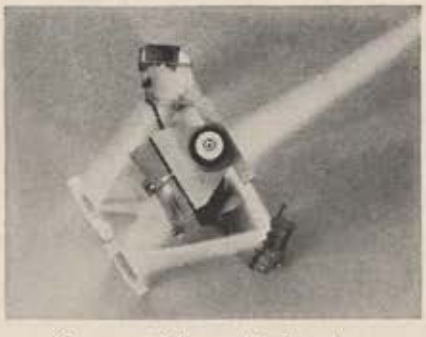

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TEXAS INSTRUMENTS
INCORPORATED

Maj. Gerald T. Dwyer, right, an O-2 Super Skymaster FAC pilot, spent two hours on the ground amid the Viet Cong, who shot him down, before he was recovered by this HH-3E Jolly Green Giant crew of the 37th Aerospace Rescue and Recovery Squadron, Da Nang AB, Vietnam. From left, the crew members who picked him up are Capt. Joseph J. Dillon, copilot; SSgt. James A. Bowers, flight engineer; Sgt. Vincent E. Deets, pararescueman; and Capt. Fred H. Otts, the pilot.

hole, which wasn't any real help, and closed my eyes. But nothing happened; it was a dud.

"I figured it wasn't going to do any good sitting there, so I decided to start shooting back at them." Emerging from his hole, Dwyer saw a VC only five feet away and emptied his .38 at him.

"I told the FAC I was in very serious trouble, and asked him to put ordnance in closer, because it didn't make too much difference who killed me. Each time the bombs were dropped, the enemy would duck their heads. When they'd duck, I'd sit up and shoot at them."

Then Dwyer charged the remainder, and they turned and ran. Soon afterward a second helicopter arrived and, amid sporadic enemy fire, succeeded in picking him up.

The other rescue effort turned into the most extensive in the entire war. It began when a Navy A-7 Corsair II was shot down southwest of Khe Sanh on May 31. Before it ended thirty-nine hours later, it required 189 aircraft sorties by FACs, HC-130 Crown rescue coordinator craft, helicopters, A-1s, F-105s, USAF and Navy F-4s, and Navy A-7s, the rescue of two pilots shot down during rescue operations, and, unfortunately, the apparent capture of a third.

First A-7 to be shot down was piloted by Navy Lt. Kenny Fields. His wingman called for aid, only to be hit himself a few minutes later. He nursed his crippled jet over water before ejecting, and was recovered.

It grew dark before Fields could be rescued that day. Next morning, two A-1E Skyraiders were met by heavy antiaircraft fire. Both took disabling hits and the pilots bailed out. Major William G. Palank was recovered minutes later by an HH-3E, but the other pilot is listed as missing.

Enemy ground fire continued to harass rescue efforts. Both Navy and Air Force fighters attacked enemy gun positions, but the second day ended with Fields still on the ground.

Next morning, another pair of A-1 Sandy pilots spotted Fields and guided a Jolly Green Giant to the scene. Meanwhile, FACs directed jet fighters into the area to hit enemy firing positions. Escorted by the A-1s, an HH-3E moved in, lowered its penetrator, and hoisted Fields aboard.

☆

Phaseout of several Aerospace Defense Command activities between now and July 1969 has been announced by the Defense Department.

ADC's Fourteenth Air Force headquarters at Gunter AFB, Ala., is being closed, with its subordinate units reassigned to the First or Tenth AF.

To retain the Fourteenth Air Force designation, initiated early in World War II when Gen. Claire Chennault's Flying Tigers were assimilated into the Air Force, ADC's 9th Aerospace Defense Division is being redesig-

CONTINUED

nated the 14th Aerospace Force on July 1. It operates ADC's Ballistic Missile Early Warning System (BMEWS), the Spacetrack System, and the NORAD Space Defense Center in Cheyenne Mountain near Colorado Springs, Colo., and will soon add the new Sea-Launched Ballistic Missile Detection and Warning System.

Headquarters of the 30th Air Division, Sioux City, Iowa, and its direction center are being deactivated this summer. Its mission is being absorbed by other ADC divisions.

Twenty radar squadrons will be eliminated by September 1. Fourteen sites will be transferred to FAA.

Three F-106 Delta Dart interceptor squadrons are being relocated to replace F-101 squadrons being disbanded, resulting in closing of Air Force facilities at Paine Field, Wash., and Grand Island, Neb.

NEWS NOTES—The **35th Tactical Fighter Wing,** Phan Rang AB, Vietnam, has won the **Colombian Trophy** for the lowest aircraft accident rate in a combat unit during the preceding year. The trophy was established in 1935 by the Republic of Colombia. The 35th, commanded by Col. Herndon F. Williams, flew more than 45,000 hours and completed 28,411 combat sorties in 1967 without a major aircraft accident. Elements of the wing during the rating period included three F-100 squadrons—the **352d, 614th, and 615th**—and the only B-57 unit in Vietnam, the **8th Squadron.** The Air National Guard's **120th Squadron,** of Denver, Colo., also flying F-100s, joined the wing earlier this year.

Two more ANG squadrons recalled late in January have arrived in Vietnam. The **174th,** of Sioux City, Iowa, is now operating with the **37th Tactical Fighter Wing** at Phu Cat, and the **188th,** Albuquerque, N. M., has been assigned to the **31st TFW** at Tuy Hoa.

The first of USAF's small fleet of **McDonnell Douglas C-9** aeromedical evacuation aircraft was to be rolled out at Long Beach, Calif., on June 17. Twelve are being built, with an option for more, to replace the C-118 Liftmaster and the C-131 Samaritan. The C-9, essentially a DC-9 commercial aircraft fitted to carry thirty litters or forty ambulatory patients, cruises at 520 miles per hour over a range of 2,000 miles. It will be operated by the Military Airlift Command's **375th Aeromedical Airlift** Wing, with headquarters at Scott AFB, Ill.—END

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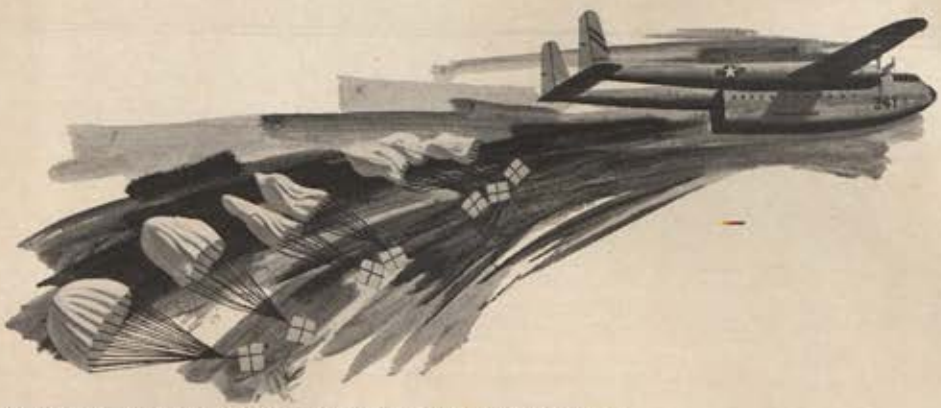

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AIR FORCE
JULY, 1968

The man to whom AFA awarded its H. H. Arnold Trophy as Aerospace Man of the Year has been called by General McConnell the Air Force's greatest tactical air technician. And why not? He saw at firsthand the successes and mistakes in tactical air operations in World War II, he wrote the book on joint combat doctrine, and as Commander of the Seventh Air Force he brought air-ground tactics to a new peak of effectiveness in South Vietnam while concurrently directing the air war over the North. Now he moves on to a new assignment ideally suited to his experience and interests . . .

Momyer and TAC: A Perfect Fit

By Allan R. Scholin
ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

RETURNING to his base at Thelepte, Tunisia, in his Curtiss P-40 after a bombing mission in February 1943, Lt. Col. W. W. Momyer and his wingman sighted a force of eighteen JU-87 Stuka dive bombers and three ME-109 escorts about to attack a US Army column. Unhesitatingly, they turned to engage the German planes. The wingman's plane was damaged in the first assault, but Colonel Momyer wheeled in again and again, destroying four planes and damaging seven others. Then, with his fuel almost gone, he turned for home. When he landed and taxied off the runway, his engine quit. His fuel tanks were dry.

This action tells a lot about the character and ability of Gen. William Wallace Momyer, whom AFA in April named its "Aerospace Man of the Year" for his superb leadership as Commander of the Seventh Air Force and MACV's Deputy for Air Operations in Vietnam. It stamps him first as one who isn't awed by the obstacles when a vital task needs doing; it marks him as a fighter pilot who knows the value of adrenalin in offsetting enemy odds but keeps it under control to zero in and demolish a target; and it demonstrates his ability to wring the last ounce of performance from his equipment.

General Momyer this month turns over his dual Vietnam posts to Gen. George S. Brown, and in turn becomes Commander of the Tactical Air Command upon the retirement of Gen. Gabriel P. Disosway. The move to TAC headquarters should be a rewarding one for General Momyer, not only because his career seems to have pointed him toward the job ever since he earned his wings in 1939, but because of the remarkable results he has achieved in two years as the top air commander in Southeast Asia.

Unfortunately, in the public eye at least, the successes of the air campaign he directed in Southeast Asia are obscured by the rash of random, almost suicidal, attacks by the North Vietnamese and Viet Cong in the past three months. But any disappointment General Momyer may feel is more likely to center on having to leave Vietnam at a time when, despite surface appearances, the US strategy he did so much to formulate and carry out could be about to pay off—not in complete victory, but in achieving the limited objectives of US policy in Vietnam. For it is apparent in Washington as well as in Saigon that the step-up in Communist attacks has a propaganda, rather than military, objective designed to strengthen the hand of Vietnam's representatives in Paris. The attacks are costing some allied lives, but they are taking a much heavier toll of the enemy. If the pressure of air assaults on enemy lines of communications in the North is maintained, such enemy losses must inevitably affect the length and outcome of the war.

To characterize General Momyer as being "disappointed" over the timing of his departure may attribute to him a sentiment he would not acknowledge.

(Continued on following page)

Succeeding General Momyer as Deputy for Air Operations, MACV, and Commander, Seventh Air Force, is Gen. George S. Brown. Before his promotion to four-star rank, General Brown was Assistant to the Chairman, Joint Chiefs of Staff. He is a 1941 graduate of West Point.

If anything pleased General Momyer more than talking with the pilots who flew combat missions in Southeast Asia, it was taking part in those missions himself. Here he straps himself into the right seat of a Cessna A-37A Combat Dragon at Bien Hoa Air Base, before departing on a close-support mission in South Vietnam. He has flown all the kinds of missions his pilots fly.

There could have been a number of disappointments in his two-year tour. He was not permitted to attack a number of targets in North Vietnam that, from a purely military standpoint, would have greatly impaired North Vietnam's ability to fight. As one result, he saw treasured pilots and planes shot down in attacks on targets of secondary significance. But he has fully understood, and painstakingly honored, the restraints imposed on his operations. And, within those restraints, he is confident that airpower has done everything that could have been expected.

He recently summarized the effects of that campaign in these words:

"We are preventing [the enemy] from deploying any of his air further south. . . . Now I don't think it takes too much imagination to realize what the consequence would be if we had MIGs operating, let us say, forty to fifty miles to the north of the DMZ, threatening our logistical installations like Da Nang, Chu Lai, Cam Ranh Bay, and those places. So any positive assessment would say that there isn't any question but that, from the classical point of view, we've gained air superiority, we've maintained air superiority, and we've denied his air the capability to effectively interfere."

The fact that North Vietnam has consented to the Paris talks is perhaps the best indicator of the results of General Momyer's air campaign. Hanoi's most insistent plaint has been that the US stop the bombing of North Vietnam. And Khe Sanh, as this magazine noted last month, represented not only a shattering defeat to North Vietnam but gave General Giap and his superiors a new, and disquieting, appreciation of airpower in its broader ramifications.

"I've never been discouraged about the effect that we're having," General Momyer said. "This is a task that takes perseverance, determination, and 'keep doing what you're doing.' There's no easy solution."

'Greatest Tactical Air Technician'

General Momyer was born in Muskogee, Okla., on September 23, 1916. His father died while he was young, and his mother moved the family to Seattle.

There General Momyer attended Broadway High School and the University of Washington, graduating with a Bachelor of Arts degree in 1937. A year later he was accepted for pilot training, and was commissioned on February 1, 1939. On that date, too, he married Marguerite Chapman Wilson, of Salt Lake City. They have a daughter, Jean, who is married to an Air Force fighter pilot.

His credentials to serve as TAC Commander were described in positive terms recently by Gen. J. P. McConnell, USAF Chief of Staff. "He is the greatest tactical air technician," said the Chief, "and knows more about the operations of tactical air forces than anyone else the Air Force has ever produced."

Much of that experience was acquired long before General Momyer went to Vietnam. As a second lieutenant in 1941, assigned to the US Military Attaché in Cairo, he served as technical adviser to the RAF's Western Desert Air Force in converting to the Curtiss P-40 fighter-bomber. Thirteen months later, now a lieutenant colonel, Momyer led the P-40-equipped 33d Fighter Group in a catapult takeoff from the USS *Chenango* to land at Port Lyautey, near Rabat, in the invasion of North Africa.

At that time, Air Force units were parceled out under control of Army commanders in the field. Air commanders found this too restrictive. Some squadrons had more targets than they could handle, while others in quieter sectors did little. Over the objections of lesser Army leaders, the theater air forces in March 1943 were put under direct control of the top Army commander in the theater (then Lt. Gen. Dwight D. Eisenhower), enabling him to concentrate them first on attacking enemy air, and then on interdiction and close support. After a year in which Colonel Momyer led his group on the North Africa cleanup, the taking of Pantelleria, and the Sicily and Italy invasions, during which he shot down four more enemy aircraft, he was sent home to become Chief of the Army-Air Force Combined Operations Board at Orlando, Fla., to work out new joint doctrine for tactical air operations with the Army. When the Tactical Air Command was formed in March 1946, Colonel Momyer was appointed Assistant Chief of Staff, J-5, Plans, a post in which he served until 1949.

General Momyer missed seeing combat in the Korean War. Graduated from the Air War College in 1950, he remained for three years on the faculty at Maxwell AFB, Ala., then attended the National War College. From there, he finally made it to the Far East as commander of the 8th Fighter-Bomber Wing in August 1954. He won his first star in December 1955 while commanding the 312th Fighter-Bomber Wing at Cannon AFB, N. M., his second as Deputy for Plans at TAC headquarters in September 1959. In October 1961 he went to the Pentagon as Director of Operational Requirements, and was Assistant DCS/Programs and Resources when he was picked to head the Air Training Command, with three-star rank, in August 1964. Two years later he went to Vietnam, where he rose to general in December 1967.

Full-Scale Ops, With Growing Pains

When he took over the Seventh Air Force in July 1966 from Lt. Gen. Joseph H. Moore, General Momyer acquired a command that was engaged in full-scale operations. F-105s and F-4s were bombing North Vietnam from bases in Thailand, F-100s and F-4s were supporting ground forces in the South, backed up by B-52s from Guam that hit enemy troop and supply concentrations. The Forward Air Controller (FAC) system was operating effectively, and an excellent network of intratheater air transport routes was in being. Facilities, however, were uniformly inadequate and overcrowded. Communications were substandard. Logistics were improving, but supply pipelines were often clogged, and this in turn hampered effective maintenance. Bomb stocks were adequate but distribution was faulty.

Those problems were unavoidable in the fast build-up of US forces in Southeast Asia. General Momyer's task when he took over was to unsnarl the bottlenecks,

(Continued on following page)

Back in the US to attend the AFA National Convention, where he was awarded the H. H. Arnold Trophy as AFA's Aerospace Man of the Year, General Momyer stopped off in Washington on April 1 to confer with President Johnson on progress of the air war in Southeast Asia.

—Wide World Photos

Nothing was more important to General Momyer than giving the Army ground forces in Vietnam whatever they needed in close air support. Here an F-100 Supersabre fires rockets into an enemy position.

push new facilities to completion, improve living conditions for Air Force personnel, and, above all, continue and step up air operations against the enemy.

He waded into all these problems with a fierce energy that belies his professorial appearance and quiet voice. From the first, he insisted that his staff travel in the field, to find out what people needed. Wherever they uncovered problems, he dispatched a team to find out what was wrong, and what it would take to set it right. Armed with the facts, he had no compunctions about going right to the source—PACAF, CINCPAC, or to Washington—to get whatever was needed.

Flying safety improved dramatically during his tour. The accident rate dropped from 21.4 per 100,000 flying hours when he assumed command to 5.2 by the fall of 1967. He was extremely sensitive, too, to the combat loss rate. Whenever losses seemed to be approaching an unacceptable level, he immediately called for a change in tactics.

"If you look at our loss rate in World War II," he told a group of reporters, "it ran about 9.5 per 1,000 sorties. In Korea it ran about 3.5 per 1,000 sorties. [In attacks over the North] we've been operating under 3, and in some months it's been down as low as 1.5. So I think on total balance, with the number of sorties that we're running, and the effort that we're putting out, this . . . is much more favorable than any war that we've previously fought." In operations in South Vietnam, he added, the loss rate was less than one-half of one percent.

Meanwhile, he continually hammered on wing and base commanders to get the support personnel out of the mud into dry quarters, to improve their food and recreational facilities — anything that would better their living conditions right now. With one-year turnovers, not many airmen would be around six months later to take advantage of long-range projects. He didn't neglect the latter, but he insisted on tangible improvements day by day.

It was General Momyer's practice to visit units in the field every Tuesday and Thursday. He didn't limit himself to Air Force bases, but dropped in on Army forces as well, questioning men, from privates to generals, on the adequacy or shortcomings of air support. From each tour he returned with a full sheaf of notes, ready to work with his staff on effecting improvements.

He was receptive, too, to ideas from others. When Col. Fred Blesse arrived at the 366th Tactical Fighter Wing at Da Nang as Director of Operations, he recommended that a 20-mm Gatling gun be mounted externally on the F-4 Phantom II to discourage enemy MIGs from moving inside the F-4's effective missile range. Colonel Blesse found little support for his idea until it came to General Momyer's attention. The first time F-4s equipped with the gun encountered MIGs, they shot down two. Pilots of the 366th now call themselves the Gunfighters.

His fact-finding trips to units in the field were not confined to discussions on the ground. He frequently climbed into an operational cockpit to fly combat missions. Whether they included strikes against targets in the North no one will admit, but his staff members say he has flown just about every kind of aircraft and mission his pilots were flying.

The famed MIG-shoot of January 2, 1967, was largely credited to General Momyer. "Let's send in a formation on top of an overcast as if they were on a strike mission, but make them all F-4s and all clean [without external bombs]," he's reported to have said. "If the MIGs come up, we'll be ready to pick them off as they break through the clouds." The 8th Fighter Wing, led by then Col. Robin Olds, shot down seven MIGs that day.

Ice Cream for the Troops

Every morning except Sunday, General Momyer's staff briefed him on the command's operational status —its ability to fight. The briefing included the status of every aircraft in the command, down to the O-1 Bird Dogs and U-3 Blue Canoes. Each afternoon at 5:00 o'clock, seven days a week, he met with his staff to plan operations for the next forty-eight hours, including a review of "frag" orders for the next day's missions. This was followed at 6:00 o'clock by an intelligence briefing on the ground situation. On Wednesdays at 9:30 a.m. he met with his full staff, each allotted ten minutes to brief him on highlights of their operations and to field his numerous questions.

He has a remarkable capacity for seeing everything on a base, and to recall even minor details, keeping his staff on the ball and prodding them to get things done. At one Wednesday meeting his civil engineer reported that construction of a hangar was to have

been completed earlier that week. "Well," General Momyer interjected, "it isn't. I flew over it yesterday and the roof isn't on yet."

On a visit to Bien Hoa, during a bull session with a group of airmen, General Momyer asked if they had any complaints. One commented that the dining hall served ice cream only twice a week. Next day at his briefing, the first thing General Momyer said, turning to his DCS/Materiel, was, "What is something in the food line that's in the greatest of American traditions?"

The DCS/M thought a moment and replied, "I guess it would be ice cream."

"I want the men at Bien Hoa to have ice cream every day, at every meal if they want it," General Momyer shot back. And they do, not only at Bien Hoa but throughout the theater.

In addition to his own schedule of meetings, General Momyer, as Deputy to the MACV Commander, attended MACV planning, operations, and intelligence briefings, and the weekly MACV staff meetings.

With all the other duties connected with running his command, he moved through the days and well into the night at a fast pace. Consequently, his meetings were normally brisk, with little time for by-play.

"The one time he really relaxed," a staff aide told me, "was when pilots were brought in to be cited for some outstanding performance. When he talks with them, he goes back twenty years. He leans back in his chair, puts his hands behind his head, and a big smile brightens his face.

"The pilots are invariably amazed at his detailed knowledge of the missions they flew. 'Let's see,' he'd say, 'that day you were in White flight and you came in from this altitude on this heading. You had to break left . . .' and on he'd go, right through the whole mission. He'll talk with these kids for the longest time, discussing bedrock details, and getting their ideas on tactics. Whenever he could get alone for a few minutes with just a line pilot, he was in his glory."

In what little spare time he had to himself, General Momyer enjoyed golf, photography, and—like nine-tenths of his men in Southeast Asia—taping and playing stereo music. He had a big hand in setting up tape centers at every base, so popular that reservations must be made days in advance to record from a large library of tapes and discs. General Momyer's preference is for piano music, from Peter Nero to Arthur Rubenstein.

When he assumes command at TAC headquarters next month, there should be no appreciable change in his procedures and habits. He may not enjoy the same top priorities for supplies and personnel available to him in Southeast Asia, but he has a genius for improvising, for taking whatever is available and turning it to maximum advantage. There may be a little more time for golf.

But best of all, for him and for the Air Force, he will be spending much of his time with the pilots and ground crews of his command, getting their ideas and imparting some of his own, from the vast store of experience, skill, and dedication that have made him the Air Force's "greatest tactical air technician."—END

GENERAL RYAN NAMED VICE CHIEF OF STAFF IN TOP-LEVEL SHIFTS

General Momyer's transfer from Vietnam to the Tactical Air Command is one of several top-level shifts scheduled to occur in August.

Gen. John D. Ryan becomes Vice Chief of Staff of the Air Force, moving to the Pentagon from Commander of the Pacific Air Forces. He succeeds **Gen. Bruce K. Holloway,** who takes over as Commander in Chief of the Strategic Air Command.

Replacing General Ryan at PACAF is **Gen. Joseph J. Nazzaro,** who has been SAC Commander.

Upon the retirement of **Gen. Maurice Preston,** his post as Commander in Chief, US Air Forces in Europe, will be filled by **Lt. Gen. Horace M. Wade,** DCS/Personnel at Hq. USAF. General Wade has been nominated for promotion to general.

A number of three-star shifts has also been announced.

Lt. Gen. Benjamin O. Davis moves from Commander, Thirteenth Air Force, Clark AB, Philippines, to Deputy Commander in Chief, US Strike Command, MacDill AFB, Fla., replacing **Lt. Gen. Fred M. Dean,** who becomes Commander, Allied Air Forces Southern Europe, with headquarters in Naples, Italy. New Thirteenth Air Force Commander is **Maj. Gen. Francis C. Gideon,** nominated for promotion to lieutenant general, who has been Commander, Warner Robins AMA, Robins AFB, Ga.

Succeeding General Wade as DCS/Personnel is **Lt. Gen. John W. Carpenter, III.** Replacing him as Commander, Air University, is **Lt. Gen. William K. Martin,** now Commander of SAC's Fifteenth Air Force, March AFB, Calif.

Lt. Gen. Jack J. Catton, currently DCS/Programs & Resources at Hq. USAF, succeeds General Martin, while **Maj. Gen. Lucius D. Clay, Jr.,** Deputy for Aerospace Programs, DCS/P&R, has been nominated for three-star rank to replace General Catton.

Lt. Gen. Seth J. McKee takes over as Assistant Vice Chief of Staff upon retirement in July of **Lt. Gen. H. T. Wheless.** General McKee's post as Commander, US Forces Japan, and Commander, Fifth Air Force, goes to **Maj. Gen. Thomas K. McGehee,** former DCS/Programs & Resources, nominated for promotion to lieutenant general.

Lt. Gen. John S. Hardy, who had been Commander, Allied Air Forces Southern Europe, moves to Ft. McNair, Washington, D.C., as Commandant of the Industrial College of the Armed Forces, succeeding **Lt. Gen. Leighton I. Davis,** who is retiring.

Succeeding **Gen. George S. Brown** as Assistant to the Chairman, JCS, is **Maj. Gen. John B. McPherson,** formerly Vice Director of the Joint Staff, JCS, also named for three-star rank.

Others nominated for promotion to lieutenant general are **Maj. Gens. Robert N. Smith,** who moves from Assistant DCS/Plans and Operations, Hq. USAF, to Vice Commander in Chief, USAFE; **Alvan C. Gillem, II,** SAC DCS/Operations, who takes over the 3d Air Division on Guam; **Samuel C. Phillips,** who retains his post as Apollo Program Director, NASA; and **John D. Lavelle,** who remains as Director, Defense Communications Planning Group, DCA.

For news of other reassignments, see "Senior Staff Changes," page 97.

Taking Away the Night...

Some of the great strides being made in the area of night-vision technology were revealed last month when the Army declassified three image-intensifying devices that, in effect, let a man see in the dark. Hundreds, perhaps thousands, of these devices have been distributed in Vietnam. But DoD planners have taken a low-key approach to these revolutionary pieces of equipment. They were developed on minimum budgets, and—disappointingly—no high-priority projects or study groups to devise special tactics seem in prospect to exploit this new technology, which could take away from the guerrilla his most important advantage—the use of darkness. Despite this, technology moves on, and soon the infantryman and airman alike may be able to say . . .

Oh Say, You Can See!

By J. S. Butz, Jr.

TECHNICAL EDITOR, AIR FORCE/SPACE DIGEST

LAST month the Army officially revealed that it has thousands of excellent night-vision devices which, for the first time, offer enticing possibilities for the average infantry soldier to "turn night into day."

Performance of these new devices is far advanced over frontline night-vision equipment of the past. Most important, they are "passive." That is, they amplify ambient moonlight, starlight, and even the natural phosphorescence of jungle plants. Consequently, any soldier using these devices does not risk immediate exposure of his position as he might with such optical infrared devices as the Sniperscope, or with intruder radar, or with other equipment that emits radiation.

Describing the performance of the devices in quantitative terms is difficult. In this case a demonstration is worth far more than either a picture or ten thousand words, and this is the way the Army got its message across at a recent Ft. Monmouth, N. J., press conference announcing the night-vision equipment.

The demonstration was held in a large theater. Newsmen lined the rear wall and were equipped with Starlight Scopes, the smallest of the new devices. The theater was darkened so that it was impossible to see one's shoes even after your eyes were accustomed to the darkness. Even under these conditions the Starlight Scope could be used to follow a skit being enacted on the stage more than 100 feet away. Several soldiers with rifles were surrounding some "Viet Cong" dressed in black kimonos. Details of face and dress were plainly visible, attested to by the audience's whistles when the kimono dropped away from one of the "Viet Cong" to reveal a shapely girl in a bathing suit.

Army officials reported that they were announcing the Starlight Scope and its stablemates reluctantly and that this amounted to a security declassification. They were forced into it because continued classification would prevent the free use of the devices in Vietnam. It was becoming impossible to get proper clearance for everyone using the scopes, and the demand for them reportedly has reached stampede proportions.

Three Devices Shown

The three devices which now are in large supply in Vietnam and were shown to the press are:

- **Small Starlight Scope (AN/PVS-2).** Its basic specifications are: range, 300 to 400 meters; field of view, 10.4°; magnification, 4 times; total weight, 5.75 lb.; resolution, 0.02°; length, 17.4 in.; diameter, 3.2 in. It can either be hand-carried for individual observation or quickly mounted on an M-16 or other rifle to deliver aimed fire.
- **Crew-Served Weapon Sight (AN/TVS-2).** A larger and more powerful version of the Starlight Scope which can be used to fire heavy weapons such as the .50-caliber machine gun effectively in darkness. Its

The capacity of passive night-vision devices to operate in total darkness (as understood by the average person) is illustrated at left. The quality of the picture produced by this low-light-level television camera is not affected when the room illumination is extinguished as it is in the lower photo. This General Electric camera is dated technically, since it was announced more than five years ago.

basic specifications are: range, 600 to 1,000 meters; field of view, 5.6°; magnification, 7 times; total weight, 16 lb.; resolution, 0.01°; length, 23.5 in.; diameter, 6.5 in.

• **Night Observation Device, Medium Range (AN/TVS-4).** It is in the same family as the previous two devices, but it is larger and generally used to observe from fixed positions or from vehicles or aircraft. Its basic specifications are: range, 1,000 to 1,200 meters; field of view, 9°; magnification, 7 times; total weight, including tripod, 44 lb.; resolution, 0.01°; length, 29 in.

First-Generation Systems

All three are called "first-generation" systems, and their sensitive elements are the same basic type of image-intensifier tube which amplifies the strength of available light by a factor of 40,000. As far as the average human eye is concerned, this means that the device allows a man to see in total darkness, *i.e.*, total darkness as defined by the average person.

The "first-generation" image-intensifier tube (*see below*) consists of three identical modules that are connected mechanically and optically in series so that the image is amplified in three steps. This input of light is focused by a lens on a fiber optics bundle which then projects it onto the phosphor of a photocathode. The light, no matter how faint, stimulates an emission of electrons from the photocathode. This emission is accelerated by a 15,000-volt field across the module, striking another photocathode. Amplification gain across the three modules is 40,000 times. A three-module tube measuring 25-mm across the sensitive element is used in the Starlight Scope and Crew-Served Weapon Sight, while a 40-mm tube is employed in the Medium Range device.

A number of combat incidents were cited at Ft. Monmouth to indicate that US forces now are suc-

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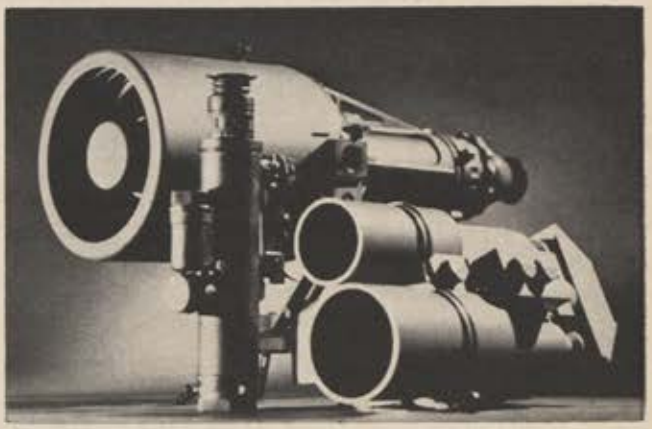
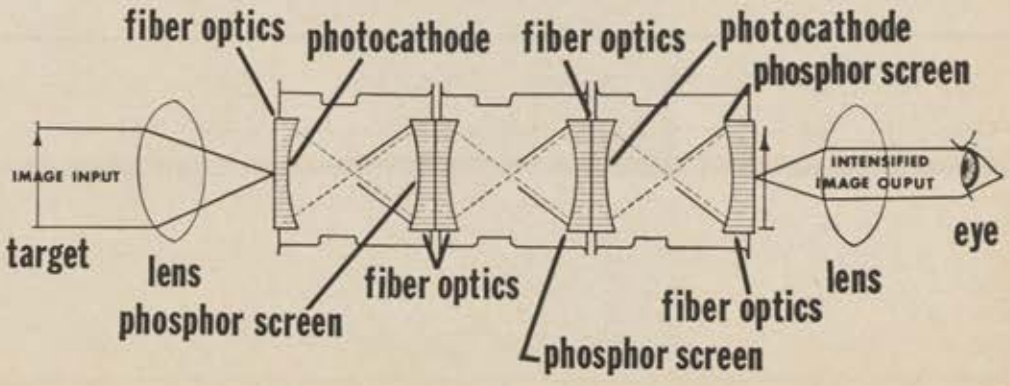


Three important new night-vision devices manufactured by Electro-Optical Systems, Inc., are shown above. The Starlight Scope is shown in the left foreground. The medium-range night observation device (NOD) is in the background. A related "active-passive" device is in the right foreground.



Sensitive element in all three of the newly announced night-vision devices is the image-intensifier tube, at right. Light striking the photocathode tube stimulates a stream of electrons which are accelerated by 15,000-volt field. Existing light is amplified 40,000 times.

Smallest of the new family of night-vision devices is the Starlight Scope shown above attached to a carbine. This equipment was developed by the Army's Combat Surveillance, Night Vision and Target Acquisition Laboratories, at Fort Belvoir, Va., which are directed by Dr. R. S. Wiseman.

cessfully employing the new night-observation devices, or NODs, as they are generally called. One USAF action involved an AC-47 "Puff the Magic Dragon" carrying three 7.62-mm Miniguns. This aircraft was operating without a flareship in the defense of a small village when the crew, using a NOD, spotted about 200 Viet Cong. Apparently, the VC thought they could not be seen unless flares were being dropped, and they continued moving across a rice paddy toward the village. The AC-47 fired several thousand rounds into the paddy and inflicted heavy casualties on the VC, who withdrew.

Medal of Honor Award

The Starlight Scope has also been involved in the award of a Medal of Honor. Second Lt. Robert Hibbs of Cedar Falls, Iowa, who was in the 1st Infantry Division, was leading a patrol when he detected with his scope two company-size VC forces moving toward his position. He maneuvered between the two units so that fire from his patrol caused the Viet Cong to fire on each other. As the Army patrol withdrew and called in artillery fire, Lieutenant Hibbs was mortally wounded, but he was able to follow standing orders and destroy his Starlight Scope.

The first of the night-vision devices were dispatched to Vietnam in the early weeks of 1966 and circulated through various units to obtain an across-the-board evaluation of their effectiveness. As might be expected, not all of the early experiences were favorable. This reporter was in Vietnam at the time and heard many comments about the new scope, although I was not allowed to look through one.

Air Force forward air controllers flew the Starlight Scope out of Tan Son Nhut Air Base in Saigon, and that first experience apparently left most of them disappointed. They complained that the field of view was not large enough and that after the moon went down they had to fly at extremely low altitudes to see very much.

During a visit to the 1st Infantry Division, the writer heard that a Starlight Scope had already been captured by the Viet Cong. At the time, the 1st Battalion of the 2d Infantry had orders not to let the device out of the battalion perimeter at night, and the battalion commander was personally responsible for it. Even under these circumstances it was possible to do some testing. Following a report that three VC were digging in a road less than 500 meters outside the perimeter, the battalion commander observed them with the scope and called for a 90-mm recoilless cannon. His plan failed, however, as the scope apparently was not mounted properly on the gun, and the first shot was wide. Even so, it was close enough to discourage the minelaying operation, at least in that spot.

In the intervening two years the three devices have entered mass production, and hundreds, perhaps thousands, have been issued in Vietnam. Electro-Optical Systems, Inc., has received the principal production contracts and is building the Starlight Scope and the

A more powerful device for use on crew-served weapons (at right) is also in mass production. It has about twice the range of the Starlight Scope even though it uses the same type of 25-mm image-intensifier tube. All three of the night-vision devices are now in service in Vietnam.

Medium Range NOD. Varo, Inc., is producing the Crew-Served Weapon Sight and the Starlight Scope. A broad base of industry experience also is available in this technology as Bell & Howell and Farrand Optical Co. participated in the engineering development of these equipments, and RCA, Raytheon, ITT, and Aerojet-Delft make the image-intensifier tubes.

Revolutionary or Evolutionary?

The present NOD situation in Vietnam undoubtedly is much improved. Many men have certainly become expert in their use. NOD represents the type of military development that lends itself to endless tactical innovations and that becomes extremely potent in the hands of experts. Use of the NOD in sizable numbers is also vastly preferable to an issue of one per battalion. Several small infantry units, equipped with NODs and working together, undoubtedly could pose a most serious threat to enemy infantry operating with the unaided eyeball.

All indications, however, still point to the need for substantial improvement in US night operations. A quote from a speech last November by a career weapon systems analyst before the annual meeting of the Association of the US Army is typical. This expert said, "Viet Cong preference for the night has made increased night operations by US Army units in Vietnam a must. Our considerable technical advantage over the enemy using night-vision devices and infrared equipment should enable us to wrest control of the night from him."

The main battle for the night, the battle to take it away from the guerrilla for all time, has yet to be fought. Even though great progress has been made in recent years in the development and production of night-vision devices, it is reasonable to question the slowness of the US military in accepting the challenge.

Certainly the challenge has been clear. Guerrillas traditionally have relied on the cover of night in their movements and in their attacks. In Vietnam today, where US ground- and airpower control the day so completely, the Viet Cong have been forced to place more reliance on the night than guerrillas from a previous day. Warnings of this situation were sounded years ago when Special Forces veterans pointed out that the lack of night-fighting capability would severely limit the Army's capacity to fight a limited war against guerrillas. These warnings were heeded in 1961 to the extent that a special advisory committee, convened by President John F. Kennedy and headed by Dr. Louis Alvarez, formally recommended that the development of night-vision technology be accelerated.

The technology base at that time was substantial, and an acceleration of effort was overdue, for the image-intensifier tube is considered to be a natural outgrowth of the near-infrared research that was used in the development of combat night-vision devices in both the Allied and Axis nations in World War II. This work with infrared never has ceased, and it has been broadened to include investigations with TV tubes and intensifiers that will amplify visible light as well. By 1957 a two-stage, cascade visible light image-intensifier tube was successfully demonstrated by Army scientists. All of the companies who now manufacture these image intensifiers have many years of experience in the field.

When the order to accelerate did come in 1962, a three-pronged program was instituted. The first objective was to produce the three first-generation devices described above. The second objective was to develop a family of cheaper, smaller, and more versatile systems that could be used to outfit the entire Army. This second generation will require the perfection of a new type of image intensifier, one that was said by Army experts to be in the early research stage in 1962.

The third objective was called "blue sky" and involved objectives such as a pair of goggles with lenses not much thicker than normal spectacles, which would provide high-quality night vision. Today such goggles are not nearly as "blue sky" as they were at the beginning of this decade. Solid-state materials that will amplify light are a hot research item, along with solid-state materials for electronic devices. Most physicists

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Largest of the recently declassified devices in use in Vietnam is the Night Observation Device, Medium-Range, at left. It has a range of 1,000 to 1,200 meters and is intended primarily for use on aircraft, ground vehicles, or in fixed positions.

Photo at left was taken through a Starlight Scope on a night so dark that it was impossible to see another person ten to fifteen feet away. As this photo illustrates, the Starlight Scope and other new night-vision devices present the possibility of eliminating the night and allowing troops to operate in "perpetual daylight."

believe it is just a matter of a few years before such night-vision goggles will become practical.

Unexpected progress was made in all three portions of the 1962 Army program. For example, the first-generation devices turned out to have far better performance and to be substantially lighter than initially specified. Original plans called for these devices to be evaluated in field trials in the US, with necessary improvements to be incorporated in the second generation, which would go to the troops. Early tests in 1965, however, proved so successful that the first generation was sent to Vietnam for evaluation.

An Excellent Record

Over-all, the technical record of the past few years can only be described as excellent. Even though night vision is a highly classified field, many signs point to remarkable progress. Astronomers, for instance, have been extremely active with light-amplification devices because they improve the capacity of telescopes. It is now possible for a properly equipped twenty-four-inch telescope to do most of the work of the 200-inch model on Mount Palomar. The Navy and Air Force have been as active as the Army, even though they haven't yet declassified any of their equipment. Industry also has pursued the light-amplification technology vigorously because it will lead to the development of improved TV sets, if nothing else. General Electric and Westinghouse both demonstrated low-light-level TV sets more than five years ago, which were at least the equal of the three Army NOD units except that they were heavy, bulky, and had a large power requirement.

Technology, then, cannot be called the pacing factor in the operational use of night-vision devices. The holdup is with management, and this holdup can only stem from the fact that the top levels in the Pentagon do not regard the night-vision capability as revolutionary. Instead they have kept it in the same category with hundreds of evolutionary developments such as machine guns, rifles, tanks, and automotive and communication equipment.

Passive night-vision technology has received none of the recognition afforded to other revolutionary techcal developments such as missiles, nuclear weapons, and the helicopter-borne Army. For night vision there has been no high priority, no special military management groups, no rush industry programs, no special study groups to devise optimum tactics, and no training curricula to prepare ground, sea, and air units for effective employment.

Instead, there has only been a low budget and a place on a list of evolutionary developments. Officials have said the Army has spent about $80 million on night vision in eight years. The other services probably have had similar budgets.

In spite of the low-key approach in the Department of Defense, night vision is certain to revolutionize the combat tactics of all the services during the next decade. The efficiency of night operations, which today is near zero compared to those in daylight, should increase many times, and probably will at least hit the fifty percent mark.

US ground units, in effect, will always have twilight conditions or better in which to pursue and engage an enemy. It should be possible to maintain contact and force a conclusion. If the enemy has his own night-vision capability, the decision should go to the side with the greatest firepower and capacity for maneuver. If the enemy does not have a night-vision capability, and is also deficient in mobility and firepower, he is in bad shape.

Since the Viet Cong and North Vietnamese units in South Vietnam currently fit this latter category, the revolutionary implications of a night-vision capability are obvious. Building this capability as rapidly as possible would have seemed a proper DoD objective over the past few years. Cost-effectiveness even appeared to be on the side of this development, for you could buy a Starlight Scope for every other US serviceman in Vietnam for a total cost of about $500 million. Compared to the current annual bill of more than $30 billion for the war in Southeast Asia, this would be a real bargain.—END

With the present tactical airlift fleet reaching probable retirement age by the mid-1970s, USAF is in the process of looking for a new aircraft to meet this need. A promising new design, the Light Intratheater Transport (LIT), is to go into contract-definition phase in FY 1969 and will be, in the words of the Air Force Secretary, "a very advanced aircraft with a range of 500 nautical miles, a speed of between 350 and 400 mph," and either V/STOL or STOL capability . . .

The Light Intratheater Transport

Flexible Airlift for the Front Lines

By Edgar E. Ulsamer

ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

ONE OF the most important lessons being learned in Vietnam is the need for better intratheater airlift, beyond the capability of the contemporary tactical airlift fleet, made up of C-7s, C-123s, C-124s, and C-130s, many of which will have reached "retirement age" by 1975 or before.

To meet this requirement, a light intratheater transport (LIT) is currently in concept formulation. LIT is described by Secretary of the Air Force Harold Brown as "a very advanced aircraft with a range of 500 nautical miles, a speed of between 350 and 400 miles," and either V/STOL or STOL capability. If the C-5 can be said to handle the "wholesale" side of airlift, LIT will do the "retail" job. In the view of the Department of the Air Force, this means rapid deployment, resupply, and emergency supply.

Secretary Brown recently elaborated on the requirement:

"In any situation, airlift must move cargo as close to the battle lines as possible, in appropriate amounts, and with the most efficient use of our equipment. (Supplying a large fraction of a theater's requirements by parachute can be expensive.) To complicate the problem, often the cargo is delivered to a fluid front line, and our supply system must expand and contract while it efficiently funnels cargo to the user.

"We have under study a number of methods to accomplish initial deployment of units by air and then replenish them. For example, satellite supply areas can be established around a major airfield and serviced by new light intratheater transports—the LIT—with either a vertical or short takeoff capability. The FY 1969 budget has funds for contract definition, a major step in development of the LIT. This aircraft, to be available in the '70s, will be able to make short takeoffs and landings, and may be capable of vertical takeoffs. As in the case of the C-5, our technology will result in a very advanced aircraft. Composite materials, for example, show great promise in both airframe construction and propulsion."

First Flight in 1973

First flight of the LIT is expected in 1973. The LIT requirement was formally set forth by the Tactical Air Command two years ago. Differences of opinion quickly developed, with some planners favoring STOL designs and others the V/STOL approach. Complicating the issue further were such crucial questions as to whether LIT should be small enough for actual retail delivery almost to the foxholes or whether it should be completely tied in with the C-5, which might require the LIT to have substantially greater range.

Further, in order to set definitive LIT specifications in terms of size, payload, range, and other performance criteria, it is necessary to determine just what aircraft types currently in the inventory the LIT is to replace. The intratheater tactical airlifters, excluding the Army's helicopters, range from the 5,000-pound-payload, 240-mile-range C-7A Caribou to the 45,000-pound, 2,587-mile-range C-130 Hercules. While it is possible to design and build an LIT with such broad range capabilities, any one design cannot meet all mission requirements. In addition, many Air Force planners feel that the C-130 offers certain unique capabilities and has a useful service life that will extend well into the 1970s so that its replacement is not necessarily urgent and, under certain conditions, not even desirable. If the C-130 is not to be replaced, however, either its

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Developed by General Dynamic's Canadair subsidiary, the CL-84, shown here during flight test at the NASA Langley Research Center, is one of three test aircraft that use the tiltwing principle currently favored by Air Force planners for the LIT design. NASA pilots rated the CL-84 "very impressive" after an extensive flight-test program.

production line must be reopened or an extensive modification and repair program would have to be undertaken, because of high use and high attrition rates in Southeast Asia.

To get the answers to such questions, a number of in-house DoD, USAF, and independent industry studies have been made. Principal among them was a seven-month study program completed by the Air Force in August 1967. It examined the most promising V/STOL technologies and associated design, cost, and schedule factors as applied to a C-123 replacement cargo aircraft. United Aircraft Corporation's Sikorsky Aircraft Div., Lockheed-Georgia Co., Lockheed-California Co., LTV's Vought Aeronautics Div., Boeing's Vertol Div., and McDonnell Douglas Corp. participated. V/STOL technologies examined included tiltwing, lift-jet, stowed rotors, lift-fans, and air deflection and modulation (ADAM). In May 1968 this study was extended to include designs for a STOL version of LIT by Boeing's Vertol Div., LTV, and McDonnell Douglas.

Findings into Recommendations

While some elements of this broad study effort are still continuing, the Air Force Systems Command (AFSC) and the Tactical Air Command (TAC) have condensed the principal findings into specific recommendations. They center on a "truly light" V/STOL assault transport with a 250-nautical-mile mission radius, a payload of five tons in vertical takeoff mode and eight and a half tons in STOL mode (hot-day takeoffs over a fifty-foot obstacle in 800 feet or less), and a cruise speed of 350 knots or more. The aircraft could be deployed direct from the continental US by virtue of a ferry range of 2,600 nautical miles.

In "overload condition," meaning longer STOL takeoffs and restriction to 2.5 G maneuvers (MAC standards) rather than the full 3 G design capability, the payload capability could be increased to seventeen tons. Boeing's Vertol Div. studies indicate that a five percent increase in aircraft empty weight might furnish seventeen-ton payloads with normal STOL takeoffs without sacrificing the combat (3 G) capability.

Gross takeoff weight of the light intratheater transport is to be below 100,000 pounds, preferably at the 85,000-pound level. With these basic specifications, LIT will be able to supply all standard US Army equipment, except tanks, up to battalion level (infantry and airborne battalions), and do so in pallets compatible with the C-5 Galaxy. LIT could also accommodate fifty combat troops and their equipment. Further, it would furnish a substantially improved successor system to the C-123 and eliminate the need for airdrops—an expensive, difficult, and at times (when the supplies fall into enemy hands) "counterproductive" logistics method.

An LIT meeting these specifications, Air Force planners say, will have two overriding advantages: Its V/STOL capability would substantially enhance its survivability in a combat environment over STOL designs, and its relatively high cruise speed would provide productivity and ton-mile costs that are truly cost-effective. One-way block time for the standard 250-mile radius mission would be fifty minutes.

Air Force planners say that the importance of survivability was underscored during the recent aerial supply campaign to Khe Sanh in Vietnam. "Vertical" aircraft are more difficult to intercept, and their ground exposure time is shorter than those of "conventional" aircraft because they need follow no set landing pattern. Further, LIT will be able to reap the benefits of low-level cargo extraction without special containers and with pinpoint accuracy. LIT will be able to move along only inches off the ground while the crew pushes the cargo out of the aircraft, cutting exposure time and offering the enemy a moving target.

Both Systems Command and TAC agree that, to realize the advantages of the STOL mode, a V/STOL aircraft should include high-flotation landing gear to permit STOL operations from unprepared sites. By combining the advantages of both modes in one vehicle, far more versatility can be attained than with a mixed fleet of STOL vehicles and helicopters.

One of the technologies examined by the Air Force and industry in connection with LIT was the stowed-rotor principle, shown here in a Boeing-Vertol artist's conception. Design combines hover capability with good conventional flight characteristics without compromising either operating condition. Development would be expensive and long, however.

Tiltwing Technology

Concurrent with the crystallization of the LIT concept, certain technical determinations were made by the Air Force and industry, focused on comparable effectiveness of individual designs as well as availability and risk of the underlying technology. With LIT's relatively high cruise speed and extended range requirement calling for good aerodynamic efficiency (lift/drag ratio), the helicopter approach showed little promise, in spite of its unmatched hover efficiency.

At the other end of the spectrum, the lift-jet, while ensuring excellent cruise capability, was deemed severely limited in the hover mode because of inherently high fuel consumption. In addition, the high-velocity downblast from lift engines militates against their use in LIT. In the trade off necessary to provide LIT with two such divergent capabilities as prolonged hover over unprepared sites and sustained fast cruise, the turboprop tiltwing approach emerged as the most efficient technology available at this time.

Propulsion and fuel efficiency in hover is determined principally by the disk loading (pounds per square foot) of the propulsion device. In this area, the helicopter rotor scores highest, in the ten pounds per square foot range, and the direct-lift jet lowest at about 1,000 pounds per sq. ft. A properly sized turboprop tiltwing furnishes about forty pounds per square inch disk loading, which permits efficient hover as well as very good cruise efficiency at speeds up to 400 knots. (While other designs offer greater cruise speed, the 250-mile mission radius limits the value of higher cruise speeds.)

In addition, this technology has the virtue of extensive test; the first tiltwing completed successful transition from hover to forward flight ten years ago. Further, in case of a four-engine design, which is rated best, there is a good margin of safety in case of engine failure because of cross linkage between powerplants and propellers. Three tiltwing designs—the CL-84 of General Dynamics' Canadair subsidiary, LTV's XC-142A, and Boeing Vertol's VZ-2—have proved the feasibility of the concept in hundreds of flight-hours.

The principle is simple. In hover, the wing and propellers are tilted to the vertical position. In this position, the propellers provide the lift in the same way as do the rotors of a helicopter.

As the wing is tilted down for transition and forward flight, the slipstream from the propellers keeps the airflow over the wing at a reasonable angle, precluding airflow separation and wing stall. As the tilting action continues, the wing begins to contribute to lift at low airspeed since it is completely immersed in the propeller slipstream.

As the wing is tilted further down and speed is increased, the wing picks up more of the lift until the tiltwing flies like a conventional, fixed-wing, propeller-driven airplane.

A recent refinement of this concept resulted in the

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JOINT USAF/USA LIT PLANNING

LIT is being formulated on an interservice basis. In addition, LIT's present concept formulation is directly linked to a study by the Office, Secretary of Defense, the Air Force, and the US Army, of future intratheater transport needs. Both studies are expected to be completed this fall, and their joint findings will be reflected in LIT's final specifications and RFP (Request for Proposal), expected to be issued by January 1969.

Assistant Secretary of the Air Force Alexander Flax elaborated on this point in congressional testimony:

"We have been working very closely with the Army in defining the requirements for this new light intratheater transport. They have had a considerable voice in defining the task of this vehicle. They have made it complementary to their own force planning —that is, local helicopter airlift—or at least they have introduced this factor into the mutual planning."

Tilt-rotor principle varies from stowed-rotor approach insofar as the rotor functions as a propeller during cruise. Stowed rotor offers greater cruise efficiency than tiltwing and tilt-rotor methods, but is more complex and expensive.

elimination of the tail rotor, which had previously been necessary for hover stability and which proved extremely vulnerable. Tests by NASA-Ames and Boeing's Vertol Div. have proved the potential of a special aileron system combined with the so-called monocyclic pitch technique to furnish effective control of roll, pitch, and yaw for a tiltwing aircraft in hover.

STOL vs. V/STOL Controversy

The normal cost-effectiveness yardstick in airlift is "the-bigger-the-better." On a ton-mile-per-dollar basis, the argument is unassailable. It is less convincing when applied to tactical airlift, which is sporadic in nature and often revolves around relatively small payloads that have to be rushed to the battle area. Because of these random conditions, for example, the average payload for intratheater operations in Vietnam is substantially less than half of full capacity.

Payload size is a significant criterion in the choice of either a STOL or V/STOL approach for LIT. A large STOL aircraft with moderately short takeoff and landing capability (2,000 feet or more) presumably can be built for less money, and represents less of a technological risk than an aircraft of equal size and payload which also includes the vertical flight feature. In addition, a large STOL aircraft might even reap the benefits of technological fallout from commercial aviation programs. Boeing, for instance, is currently examining the possibility of building a special STOL version of its short-haul twin jet, the 737, according to a Boeing vice president. Also it appears likely that a larger STOL aircraft could perform so-called "multiple address" missions—that is, take off from a main terminal and in one sortie deliver cargo to two or three destinations.

A smaller V/STOL design, on the other hand, could unload at only one destination per sortie. On the average, it would get there faster since its loading would be confined to one delivery and it would fly a direct route. As a result, the small V/STOL is presumed to permit more flexibility.

Obviously crucial to the decision between STOL or V/STOL is the question of systems cost and total costs. Given air superiority and the availability of an adequate number of runways of more than 1,500 feet in length, STOL is more cost-effective. Most Air Force planners, however, do not consider these conditions realistic in future conflicts, especially in the light of experiences in Vietnam, where less than ten percent of the existing runways are available at any given time.

The alternative is the willingness to pay what Air Force calculations determine as a "moderate premium" for the V/STOL system. Tentative studies place this premium at about fifteen percent. V/STOL proponents suggest further that in terms of total costs this premium might be wiped off the books completely.

While it is difficult to establish costs of securing airstrips, of providing the combat troops necessary to protect the construction crews, and of building, repairing, and maintaining airstrips under different climatic and geographic conditions, these considerations obviously favor the V/STOL method which, in the forward areas, needs few or none of these facilities and services. Finally, it would be difficult to put a price tag on a mission that could only be flown by V/STOL aircraft, because no airstrip is available or because weather conditions do not permit STOL operation.

The Air Force V/STOL advocates base their case also on technological grounds. To build a truly sophisticated STOL aircraft with landing and takeoff capabilities below 1,000 feet appears to be as difficult and possibly as costly as building a V/STOL aircraft.

If such a STOL aircraft is to have a payload of twenty to twenty-five tons (as would seem necessary for STOL), the control and inertia problems may well exceed the present state of the art. By way of a benchmark, landing such a STOL aircraft would require a landing speed of about fifty knots, or half the aerodynamic stall speed, which means that the propulsion unit would have to be tapped for power to maintain a continuous, artificial airflow over the wings, high-lift segmented flaps, and controls. Engine failures under such conditions could be fatal.

Finally, a V/STOL LIT would furnish concomitant capabilities unattainable through STOL. Foremost among them would be an improved stopgap air rescue and recovery capability, including recovery of MOL crews. And in terms of national resources, it would revitalize the badly stalled V/STOL development program that will be needed to meet commercial aviation requirements of the decades ahead.—End

The nation's Medal of Honor winners—3,211 of them since the Civil War—are honored anew with the May 14 dedication and opening in the Pentagon of . . .

THE HALL OF HEROES

By Flint DuPre

THE Hall of Heroes, honoring the country's Medal of Honor men all the way back to the Civil War, has become a prime visitors' attraction at the Pentagon in a relatively short time.

Dedicated on May 14 by President Johnson, who awarded medals during the ceremony to the four latest heroes, including Air Force Capt. Gerald O. Young, the Hall of Heroes daily attracts hundreds of people.

The Hall is a display unit constructed in an alcove of the A (inner) Ring on the second floor, between corridors 6 and 7 of the Pentagon building. The Hall is fifty feet long and eighteen feet deep. At its center are huge replicas of the three separate Medals of Honor — the Army's version, the Navy's, and that of the Air Force.

A visitor can walk to either side of this well-lighted centerpiece and on the curving walls read the names of the 3,211 recipients of the Medal of Honor to date. The nameplates are metal, engraved with the name, rank, and service of each individual. These are arranged alphabetically by wars and campaigns, beginning with the Civil War and including Vietnam. The latter now has thirty-eight men so honored.

USAF's Captain Young earned his place in the Hall for heroic action as a helicopter pilot, flying from Da Nang Air Base on the night of November 8, 1967, in an effort to recover a number of soldiers surrounded by enemy forces. Though previous rescue attempts had resulted in the loss of two helicopters to ground fire, Young volunteered to escort another helicopter to the embattled area.

At the scene Captain Young was soon advised to abandon further rescue efforts. Though under intense fire, he hovered to help the survivors. Enemy weapons hit his own chopper, causing it to crash in an inverted position and burst into flames. He escaped the wreckage, continued to help wounded soldiers, and then tried to draw hostile forces away from the area, declining rescue attempts for himself. For seventeen hours he evaded the enemy by walking and crawling six miles to safety.

Captain Young, a native of Anacortes, Wash., received his Medal from President Johnson at the May 14 dedication ceremony. A former Navy enlisted man, Young now is a helicopter instructor pilot at Sheppard AFB, Tex. He is married and the father of two children.

Young is the fourth Air Force man to receive the Medal for Vietnam. The other three are: Maj. Bernard F. Fisher, for saving a fellow pilot's life; Capt. Hilliard A. Wilbanks, a forward air controller who protected a South Vietnamese Army battalion at the cost of his own life; and Maj. Merlyn H. Dethlefsen, who destroyed a key North Vietnam SAM site. (*See* AF/SD, *March '67 and March '68 issues.*)

Major Young is the fiftieth airman in history to earn the Medal of Honor in combat. The list stretches back to World War I and Capt. Eddie Rickenbacker, first to be so honored. Three other airmen received the Medal in that war; thirty-eight Army Air Forces men earned it in World War II; and the Korean War produced four Air Force winners, all posthumous.

All fifty names appear on the walls of the Hall of Heroes, along with two others—Capt. Charles Lindbergh and Maj. Gen. William Mitchell, whose Medals were "awarded by special legislation" for peacetime achievements.

—END

Capt. Gerald O. Young, fourth Air Force man to earn the Medal for heroism in Vietnam, shakes hands with President Johnson after receiving his Medal in Pentagon ceremony. In background are Marine Corps and Army men awarded the Medal at that event.

Four recent Medal of Honor winners for heroism in Vietnam stand at attention with President Johnson as Defense Secretary Clark Clifford dedicates the Hall of Heroes on May 14 in the Pentagon. Medal recipients, from left, are AF Capt. Gerald O. Young; Boatswain's Mate First Class James E. Williams, USN; Sgt. Richard A. Pittman, Marine Corps; and Specialist Five Charles C. Hagenmeister, from the Army.

Last year's crushing defeat of the Arab nations by Israel has only increased tensions in the Middle East as Arab leaders continue to fan the flames of hatred of the Jews, and the USSR continues to reequip and retrain the Arab air forces. This reequipping process is nearing completion, but the training of new pilots to replace those lost during the Six-Day War will take more time. The Arabs and their Soviet advisers are now aware that their methods and amount of training for last year's war were completely inadequate. Here is a country-by-country report on the situation today and prospects for . . .

THE ARAB AIR FORCES
Will They Try Again?

By Stefan Geisenheyner
AIR FORCE/SPACE DIGEST EDITOR FOR EUROPE

Illustrations by Gordon Phillips

CONTINUED tension in the Middle East is inevitable. The constant pressure brought to bear on Israel in the form of guerrilla warfare, inflammatory speeches by Arab leaders, and the USSR's speedy rearmament of the defeated Arab military forces are ominous signs which should not be underestimated. Granted, the strategic position of Israel today is infinitely better than it was one year ago when the Six-Day War took place in June, but the tactical situation of the young state is unhealthy.

In June 1967 the Arabs had to cope with and defend extended supply lines to the fronts, and their inability to do so brought on defeat. Now it is the Israelis who must defend those vulnerable lines—with far less manpower than the Arabs had.

The Arab air forces will play a major role in any future conflict by trying to interdict the flow of supplies to the Israeli front lines. The Soviet advisers now training the reborn Arab air arms will surely not permit any new aggressive move before there is a reasonable assurance that the Arabs have made some headway in mastering their equipment and have developed a workable command structure. It is anybody's guess how the Soviets have progressed toward this goal. The unbelievably low standard of expertise shown by the Arab air forces during last year's June war indicates, however, that the target date may lie well into the 1970s.

The Egyptian Air Force

Before June 4, 1967, the Egyptian Air Force consisted of 450 aircraft, including 250 front-line jets. Its losses during and after the war add up to about 350 planes. More serious than the destruction of materiel was the loss of some sixty hard-to-replace pilots. The Soviet Union had delivered about 275 replacement aircraft up to March of this year. The shipments included 140 MIG-21s, sixty Sukhoi-7s, more than twenty Tupolev-16 bombers, and an estimated forty plus helicopters and transports. Aircraft deliveries will continue but at a slower pace. It is assumed that the ultimate target is a first-line strike force of 300 combat planes. Thus the destruction of a major part of the Egyptian AF during the 1967 Six-Day War has already been offset, but something that the Soviet Union cannot replace is the loss of the tactical airfields on the Sinai Peninsula; this constitutes a serious handicap in Egyptian war planning.

Of Egypt's fifteen operational air bases, five (El Arish, Bir Gafgafa, Bir el Thamada, Gebel Libni, and Sharm el Sheikh) are now in Israeli hands. Another five, in the Suez Canal zone (Fayid, Kabrit, Abu Suweir, Deversoir, and Port Said) are within Israeli artillery range and cannot be used tactically. This leaves in the immediate battle zone five airfields around Cairo and on the eastern part of the Nile delta—Cairo International, Cairo West, Cairo Alamaza, El Mansura, and Inshas. All five bases are now in easy intercept and strike range of the Israeli fighter-bombers located in their newly acquired bases in the Sinai. These in turn, however, may be threatened by long-range Egyptian artillery and missiles, and as a result the westernmost Israeli bases are of dubious value.

Two other Egyptian airfields along the Nile are Beni Suef and the field at the oasis El Faiyum, west of the Nile. They are presently used for training and serve as a home for the reserve formations of the

(Continued on following page)

Egyptian air arm. Alexandria Airport and the fields in the western desert are too remote from the scene of operations and may be used only as staging airports and training bases.

Four additional military bases are located on the upper Nile and near the Red Sea. El Minya, Luxor, Ghardaka, and Ras Banas are in an excellent geographical location to house the EAF bomber groups. Their use as tactical bases is limited severely by their remoteness from the theater of operations. Jet bombers from these bases—which are beyond effective striking range of the Israelis—would probably stage through the western desert airports and attack Israel proper by flying low over the Mediterranean, since the direct route leading over the Gulf of Aqaba or the Sinai is under firm Israeli control.

Unless the Israeli AF gets the McDonnell Douglas F-4 Phantoms it desperately needs, it will not be able to repeat the surprise attack on the southernmost airfields as performed during June of last year. The Egyptians are forewarned and surely will provide the bases enough air cover to prevent a repetition. Without a modern long-range fighter-bomber, Israel does not have the means to strike at the strategic bomber bases of the Egyptians.

Highways as Fighter Bases

This asset on the Arab side, however, does not compensate for their shortage of tactical fighter bases along the Suez Canal zone. The Egyptians, under the leadership of their Russian advisers, have therefore begun to convert several stretches of the Cairo-Alexandria highway into runways. At least five locations are known where highways have been repaved with prestressed concrete, and trees hindering aircraft in their approach pattern have been cut down. In some locations an intricate cloverleaf pattern of approach aprons paved with concrete to let aircraft taxi on and off the main highway has been completed.

After the humiliation of having their air force destroyed on the ground during the Six-Day War, the Egyptians are now believed to be protecting their new aircraft with concrete and steel pyramid-like hangars along highways strengthened to serve as runways. Illustration shows conical shape of structures that would deflect bombs or rockets from Israeli planes.

The aircraft as such are housed in pyramid-like shelters (*see illustration*) constructed of steel girders and concrete blocks, which line the highway-airfields on both sides of the road at a distance of about 500 yards. Sliding steel doors are believed to protect the planes inside. If the shelters actually are constructed that way—no Western-oriented observer has yet inspected them—bombs and rockets would glance off the slanting conical surfaces, and the aircraft inside should be well protected.

From the air these shelters can hardly be distinguished from the surrounding territory as they are already overgrown by the dense vegetation of the Nile delta. The runways are protected by missile batteries and by radar-directed, computer-operated antiaircraft guns.

It remains to be seen, however, whether these emergency fields are not just as vulnerable as the conventional airfields. A cratered highway is just as useless as a cratered runway. Still, the highway system lends itself to better camouflage and deception methods since it is by no means sure to the attacker whether the so-called highway airfield is actually in use or not. In any event, the targeting problem becomes far more difficult, and taxes the reconnaissance and intelligence of the attacker to the utmost.

But it takes more than equipment, aircraft, and runways to make an efficient air force. The Russian advisers in Egypt clearly understand this. The training methods of pilots and ground crews are now patterned completely after those of the Soviet system. Before, many holdovers in the training system, mainly Royal Air Force methods, were used in conjunction with Russian methods. This led to considerable confusion in the everyday life of the EAF.

Soviet Methods Too Rigid

Air Marshal Sidki Mahmoud, former chief of the EAF, who was recently purged and sent to jail for fifteen years, is a well-educated man who could pass at any time as an RAF officer. He and a number of his staff supported the Western influence in the EAF, but their younger colleagues who had been trained in the USSR did not abide by Western methods. The result of this disagreement became evident in the Six-Day War. The structure of the channels of command was useless, the training deficient, and technical expertise was not evident.

EAF operational plans and navigation charts captured by the Israelis in June 1967 show shocking errors, primitive attitudes, and total inability to digest lessons of past encounters with the Israeli Air Force (IAF). Furthermore, a lack of flexibility, absence of operational air control, and rigidity of planning undermined the EAF's value even more than the morale problems that cropped up during the fighting. The Soviet advisers have a hard and perhaps impossible chore cut out for them.

The Soviet manuals covering the air force training procedures, likewise captured by the IAF, are certainly not adapted to Arab mentality, and if today they are actually used as standard guidelines in retraining the EAF an even more inept and inefficient force might emerge. Rigidity, inflexibility, and centralization are the principal features of the Soviet doctrine—some of the very factors that brought on the downfall of the EAF a year ago.

Egypt would have been better advised to stick with the RAF method, featuring flexibility and individualism—characteristics in which the Arabs excel. This writer knew Sidki Mahmoud well. As a staunch supporter of the RAF procedure and a friend of the West, his removal is a sad blow for the Western politics in the Middle East. As a plus, the State of Israel lost a capable and dangerous opponent. The indigenous aircraft and missile projects which were mainly supported by Mahmoud against pressure from the Soviets and their followers in Egyptian politics have come to a virtual standstill. The industrial and technological capacity of the Egyptian aerospace industry has been harnessed for repair and maintenance jobs, and the dream of an Egyptian space project has been—probably permanently—shelved.

The Syrian Air Force

Following the Egyptian AF, the Syrian AF had been the second strongest in the Arab alliance. Syria's air strength before the war was estimated at ninety to 100 aircraft, including forty first-line jets. Sixty aircraft were lost in the war, including almost all the jet fighter strength. By January 1, 1968, Soviet replacement deliveries had added up to fifty aircraft, forty of which were MIG-21s. It should be mentioned here that, according to Israeli sources, the general efficiency level of the Syrian AF was much inferior to that of the Egyptian AF.

Of Syria's ten militarily usable airfields, five—Latakia, Baniyas, Aleppo, Palmyra, and Hama—are too remote to be of much use tactically. The other five, T-4, Dameir, Seykal, Margrial, and Damascus International, are too close to Israeli-held territory—four to five minutes of flying time away. With Israeli troops barely thirty miles away from Damascus Airport, the Syrian AF and its bases have hardly more than nuisance value at present, if the radar and early-warning network are not thoroughly uprated. Training of the pilots under Soviet control continues, however, so as to enlarge the pool of jet-qualified Arabian flyers. Egypt cannot possibly train more than a thousand pilots so the extra 100 or 150 Syrians would be a welcome addition.

The Iraqi Air Force

Of all the Arabian air forces, the Iraqi AF demonstrated the best fighting qualities and the best organization in the Six-Day War. Iraqi pilots showed courage and élan. They managed to down a couple of Israeli aircraft in air combat during the initial attack, and, according to Israeli reports, they were the only Arabs who gave battle in the air and fought until their aircraft crashed in flames. The Iraqis also demonstrated a certain degree of "Baron von Richthofen" manners unknown among the other Arab forces. Israeli pilots who bailed out over Iraqi territory were treated well, as guests of honor, rather than tortured to death as they were in Syria.

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The Iraqi AF is beset with the same faults the other Arab air forces show: low technical efficiency, lack of operational planning, no operational air control, and a very low level of coordination. For example, the colonel in command of the Iraqi bomber wing led a strike of four Tupolev-16s against Tel Aviv on the war's second day. Two of the aircraft aborted shortly after taking off from Habbaniya Airfield near Baghdad; another landed at H-3 airfield near the Jordanian border to refuel and was promptly destroyed by Israeli fighter-bombers. The colonel's aircraft flew on, but the navigator missed Tel Aviv and instead hit Netanya, a much smaller town twenty miles north of the target. The bombs were dropped in the center of the city, and the plane was then shot down by antiaircraft batteries on its way home. Thus ended the only sizable bomber raid by any Arabian air force on Israeli territory.

The Iraqi AF suffered the least damage in the war since its airfields were out of striking range of the IAF fighter-bombers. The present strength of the Iraqi AF is estimated at 150 aircraft, seventy of them first-line combat jets.

The Mirage Complex

It is quite evident that many of the world's air force commanders are obsessed by the "Mirage complex" following the magnificent success of the IAF with this aircraft in the Six-Day War. In South America as well as in Europe the French Mirage has found new customers, and the latest addition will be the Iraqi AF, which is buying fifty Mirage Vs of the type developed according to Israeli specifications. The Iraqis do not mind paying for a Mirage V three times what they would pay for a MIG-21 since the Mirage has become a symbol of a successful air force. Even the Algerians are rumored to be negotiating with France for forty Mirage Vs.

The Israelis, who have test-flown the MIG-21 against the Mirage, say the two aircraft are about equal in performance. The Mirage has a better and more durable engine and will outperform the Soviet aircraft at lower levels. On the other hand, the MIG-21 has better range and probably is simpler in structure and therefore easier to maintain.

The Jordanian Air Force

The only Arab air force that did not fly any Soviet-made equipment, the Jordanian AF, fared worst in the Six-Day War. Its British-built Hawker Hunters were destroyed on the ground during the first minutes of the war. On the war's third day, Jordan borrowed three undamaged Hunters from Iraq and managed to down several Israeli aircraft in aerial combat. According to Jordanian reports, the Israeli pilots had become so careless during the latter stages of the war, so sure of not meeting any air opposition, that the Jordanian Hunters virtually joined up with the enemy fighter-bombers, shooting them down at leisure. These three Hunters were eventually destroyed on the ground.

On the eve of the war, Jordan had been in the process of converting its air force to F-104s, some of which were based in Amman. Only hours before the first Israeli attack, by a stroke of good luck, the USAF advisers with their Jordanian pupils in the cockpits of their Starfighters had left for a training mission to Turkey. Jordan is still negotiating with the US for a number of F-104As, and with the British for additional Hawker Hunters, seeking to build up to two squadrons of the latter.

Arabs are taking steps to see that disasters such as this MIG-17 destroyed on the ground at Gebel Libni will not occur again by increasing antiaircraft and warning measures.

The Other Arab States

The air forces of the other Arabian states—Lebanon, Kuwait, Saudi Arabia, Yemen, and the Persian Gulf sheikdoms—can be written off as military factors at the present time. Saudi Arabia recently acquired a number of Mach 2 British Lightning interceptors but will not be able to use them in the near future, at least not until pilot and ground crew training has been completed. Of the North African states, Algeria is in the process of building a strong air force. The goal is reportedly a 150-aircraft force. But the country's contribution in a war against Israel at present can be only marginal. Algeria has the same problem as all the other Arab states—lack of trained personnel and in particular lack of experience. Algeria's AF is being trained by Soviet advisers and promises eventually to become the best of all the Arab air forces.

The basic human material the Soviet advisers have to work with in all the Arab states is mediocre. This should not imply that the Arab lacks courage, intelligence, or willingness to perform his duties. He is simply the product of an inferior educational system, and it is difficult to teach the intricacies of a jet engine to someone who does not understand the simplest laws of physics. It will take the next generation of young Arabs, who have grown up under newly set up educational systems, to perform satisfactorily as soldiers in a technical age.

The over-all strategic picture in the Middle East could be changed only by the appearance of regular Red Air Force formations operating off extraterritorial bases under exclusive Soviet control. But it does not stand to reason that Moscow is willing to go so far as to risk a global war to preserve its image and prestige in the Arab world.—END

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'Now that we know there must be millions of millions of other planets like ours circling other suns in the far realms of space, it has at last become implausible that we men are the only self-consciously intelligent creatures in the cosmos. Think what possibilities this alone implies as we extend our knowledge into these realms! . . .'

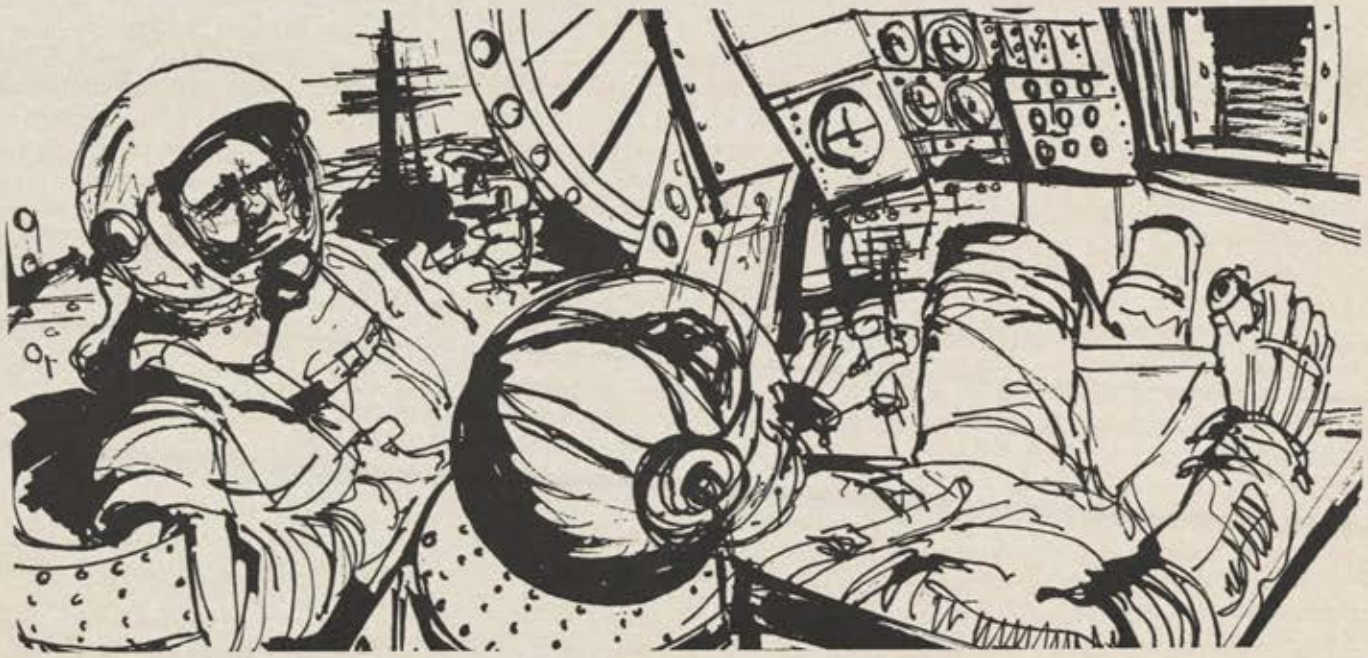
Why I'm for Space Exploration

BY LOUIS J. HALLE

THERE has been life on earth for over 2,000 million years now, and man himself goes back at least a million. Yet it is less than a dozen years since this life, developing and proliferating for so long, has at last emerged from our planet's atmospheric envelope into outer space. A scholar of a million years hence, wherever in the universe he is, may well regard the middle of our century as the turning point in the career of earthly life and, specifically, of our own species. I am, therefore, puzzled to find a marked lack of enthusiasm among my acquaintances at the prospect of man's liberation from this earthly prison.

What is the explanation?

There are those who want the resources now allocated to the exploration of space to be used for the support of more immediate and mundane causes. It is hard to argue with them except to the extent that there are grounds for doubting that what was saved on the space programs would in fact become available to feed, say, the hungry of India. (Since the vast governmental spending that goes with a war economy has proved to be an essential element in our economic prosperity, a more practical proposal might be that we should reduce the occasions for war spending and allocate what was saved to space exploration.) My impression, how-



ever, is that many are moved by a spiritual horror, deep-seated but unacknowledged, at the notion of even looking beyond our familiar planet, let alone leaving it.

Traditional religious beliefs are threatened by any vivid recognition of how small our planet is in a cosmos of thousands of millions of galaxies, each with thousands of millions of suns, many of which must have planets like ours, the whole spread over distances that a beam of light, traveling at 186,000 miles per second, would take several thousand million years to traverse. For some there is simply the child's fear of leaving, even in imagination, what is after all home—be it ever so humble. But I myself do not feel as attached as they do to this increasingly cluttered and polluted planet. I regard it as too small, and its prospects as a habitable environment for the long future worry me. Sometimes, when I have horrors of what may be, I find relief as Logan Pearsall Smith did when the world was too much with him: "I . . . think of space, and the unimportance in its unmeasured vastness of our toy solar system; I lose myself in speculations on eternity, reflecting how, at the best, human life on this minute and perishable planet is but a mock episode, as brief as a dream."

However, my enthusiasm for man's historic emergence into space has a more solid foundation. I suffer from intellectual claustrophobia. I feel like Chuangtzu's frog in a well, denied knowledge of the great world outside.

To change the figure, imagine some creature of lively intelligence confined to the lowest depths of the oceans, where the light of the sun never penetrates. Although it combined the curiosity of a Socrates with the mind of an Einstein, its confinement to an environment so limited would exclude it from the possibility of gaining the least notion of the real universe to which it belonged. It could not know as we know that there is more to that universe than salt water and a darkness relieved, at best, by phosphorescent gleams. It could not know that miles above there were sunlight and air, mountains tipped with snow, days alternating with starry nights. It could not know that the ocean was, together with land, merely the surface of one among countless spheres errant in space. From the remains of organic decay that sank to its level it might hypothecate the existence of life far above, as we have in the past drawn conclusions from the cosmic rays that penetrate our atmosphere to reach us. Still, the ontological speculations of even the most brilliantly endowed philosophical mind, confined to such an environment, would be fruitless and absurd. Any logical order that it formulated to explain being would be so pitiful in the limitations of its scope that such creatures as ourselves, relatively godlike by virtue of our larger world, might properly be moved to tears or laughter.

Imagine this submarine species, now, beginning to make technological progress that enables it to explore ever higher reaches of its environment in craft that maintain the pressure of its native deeps. Eventually it rises to the surface of the sea and begins the discovery of a world that it could not even have begun to imagine in the confines from which it has at last been released. Surely we men are in that position. Until recently we thought our earth constituted virtually the whole of the cosmos, of which it was the center. In the last 300 years, however, we have begun the discovery of a universe that earlier hominids had not even imagined. Of course this process has been upsetting of traditional convictions. We can no longer believe that God sits "up there" in the sky, as the deep-sea philosopher might find he could no longer believe in a God who dwells in eternal darkness, breathing salt water, after he had seen what a universe there was above the surface of the sea. But loss of the certainty that goes with ignorance is the price that must be paid for progress toward whatever the ultimate truth may be. The loss of darkness is the price of light. If we had not been willing to pay this price in the past we might still be offering human sacrifices to this or that Baal.

Now that we know there must be millions of millions of other planets like ours circling other suns in the far realms of space, it has at last become implausible that we men are the only self-consciously intelligent creatures in the cosmos. Think what possibilities this alone implies as we extend our knowledge into these realms!

It is true that Einstein's theory of relativity sets bounds to such converse as we might otherwise have with our kind elsewhere in space. Since a message cannot travel faster than the speed of light, it would take ten years to get one (by radio) to our nearest neighbor among the stars, and we would have to wait a minimum of twenty for the reply. We could not expect an answer from the nearest galaxy in less than four million years.

Relativity appears to set the same limit to the speed with which any spaceship could travel out from the earth. If it could attain the speed of light, a stay-at-home observer watching it through a telescope would see it disappear at that point—for the greater its speed (relative to him) the less its apparent volume, which would reach zero when it reached the speed of light. (As an object approaches the speed of light its volume approaches zero, its mass approaches infinity, and its constantly retarded time approaches the stopping point.) Therefore, it, too, limited to the speed of light, would take millions of years to the nearest galaxy.

What is fundamental to relativity, however, is that the speed of light is constant from the point of view of any observer, whatever his state of motion relative to other objects in the universe. To an observer on earth, a spaceship traveling away from it at 93,000 miles per second would be traveling at fifty percent of the speed of light; but to the occupant of the spaceship it would be motionless relative to the light. It would be traveling at 0 percent of the speed of the light, which would be streaming past it at 186,000 mps, and what the passenger would see was the earth moving away from himself and his motionless ship at 93,000 mps. As the speed with which earth and spaceship receded from each other approached that of light, the spaceship would approach the point of disappearance in the view of the observer on earth, but it would be the earth that was approaching the point of disappearance in the view of the passenger in the spaceship, who would experience no reduction in his own volume at all.

From his own point of view, the passenger in the spaceship, no matter how fast he appears to be going

Opposite, Great Nebula in Orion. It is implausible that we men are the only intelligent creatures in the cosmos. ▶

Edge-on view of spiral nebula in Coma Berenices. Science is no longer sure Einstein's "speed limit" is a barrier.

to the observer on earth, can always fire a propelling rocket and thereby increase his speed—and even when he has done so he will still find himself traveling at 0 percent of the speed of light, so that he has come no closer to any limit on how much faster he can go. Long after he has reached the speed of light and disappeared, from the point of view of the observer on earth, he can still go faster.

Here, however, I am leaving out a possible problem, that of accelerating the spaceship, because, if it has attained such a high velocity relative to the entire universe of stars that the stellar masses are moving past it at a speed approaching that of light, any further acceleration might produce gravitational effects that would reduce its volume toward the vanishing point—or such acceleration would prove virtually impossible because, as the ship's volume approached zero, its mass (which resists acceleration) would approach infinity. Concurrently, however, time would be slowing down toward the stopping point for the passenger, who would be aging so slowly as to approach immortality. The millions of years it might take him to reach the galaxy according to the clock of an observer on earth might, then, be only days or weeks according to his own clock.

The disputation of the scientists shows that all these matters are still uncertain, from which it follows that we don't really know that the first space traveler we sent out to a neighboring galaxy would not be able to make it well within his lifetime—even though it should take him millions of years by our own calendar.

Relativity has abolished absolute distances and absolute intervals of time. Its only remaining absolute is the constant velocity of light, which sets a limit to communication and, supposedly, to the speed of passenger travel. But 186,000 miles per second is, itself, not a fixed amount, since the length of a mile and the duration of a second are not fixed. Imagine an observer on earth who sees two spaceships pass each other traveling in opposite directions, each at a speed of 180,000 mps according to his measurements. For him, their speed relative to each other is 360,000 mps, almost twice that of light. But an observer in either ship sees the other passing at less than 186,000 mps, this being the limit of speed at which any object can travel relative to any observer, according to that observer's own measurements. This relativity of speed limits allows one to believe that, even though we could not send an electromagnetic signal to our nearest neighbor among the galaxies in less than two million years of our earthly time, we might send a messenger in a great deal less of his own time as an individual.

Today, I understand, there would be a problem of finding enough energy on earth to accelerate a spaceship up to the speeds I have been referring to. There are, however, such things as antiparticles, and when a particle collides with a corresponding antiparticle all the mass of both is converted into energy at the rate defined by Einstein's formula, $E=mc^2$, where m is the mass and c^2 is the enormous quantity that one gets when one multiplies the speed of light by itself—in other words, a prodigious amount of energy from a minuscule parcel of matter. Apparently the problem of energy for acceleration will be solved, then, if physicists ever learn how to construct antimatter in quantity.

Life, as we know it within the terms of our earthly prison, makes no ultimate sense that we can discover; but I cannot, myself, escape the conviction that, in terms of a larger knowledge than is accessible to us today, it does make such sense. Our position is simply that of the intelligent creatures confined to the ocean deeps. Now, however, that we are at last beginning to escape from our native confines, there is no telling what light we may find in the larger universe to dissipate the darkness of our minds. There is also the possibility that we may begin to populate new planets as, after 1492, we began to populate a new continent. Suddenly man's future seems boundless.

Of course we don't know what space exploration might lead to, or even whether it can come to anything at all. Would such uncertainty, however, provide a sufficient argument to justify the fish in remaining at the bottom of the ocean, once they had acquired the means to rise above it? I can imagine the debate that might go on in a deep-sea society between the traditionalists and the adventurous, but to me it is clear which side would represent progress and the hope of the future. —END

Louis J. Halle is a noted political scientist and specialist in international law who has held important US government advisory posts and has written extensively in the field of international relations. His most recent book is The Cold War as History. *He is currently associated with the Graduate Institute of International Studies at Geneva. The above article appeared in the April 6, 1968, issue of* The New Republic *and is reprinted here by permission.*

How goes the Soviet space program? . . . Who's ahead—we or they? . . . What about space cooperation between the US and Soviets? . . . Space vs. poverty spending? . . . Do you need a specific mission to undertake research and development? . . . What about duplication in the space program? A top space official gives his views on these topics . . .

Some Questions and Answers on the US Space Program

BY DR. EDWARD C. WELSH

Executive Secretary, National Aeronautics and Space Administration

LET ME list a few controversial questions [about the national space program] which are frequently asked and then try to answer them. That is a really tricky arrangement as I know ahead of time what the questions are even if I don't know what the answers should be.

The Soviet Space Program

The initial question is: *What is the status of the Soviet space program?*

Of course there are many specifics about their space program we do not know, but there are also many significant things we do know. First of all, they appear to have placed a higher funding priority on space exploration than we have. They see clearly the practicalities of space as a builder of national prestige and as a supplier of useful technology. This is evidenced by the fact that they are devoting at least twice the percentage of their gross national product to space activities compared with us.

Second, the Soviets have been accelerating the tempo of their space investment and their space performance. For example, on the performance side they had nine successful launches—all earth-orbiters—in a twelve-day period [in April]. This was the most active twelve days in the space history of any nation. So far this year they are surpassing last year's payload successes numerically, and, what is also significant, they are surpassing substantially the number of successful payloads launched this year by the United States. While our activity curve is moving down compared to 1967, theirs is headed up.

Third, they have made and are continuing to make major investments in space resources—particularly in manpower and facilities. There is almost a technology cult that has developed in the USSR these days, and much of its attention is focused on aerospace projects.

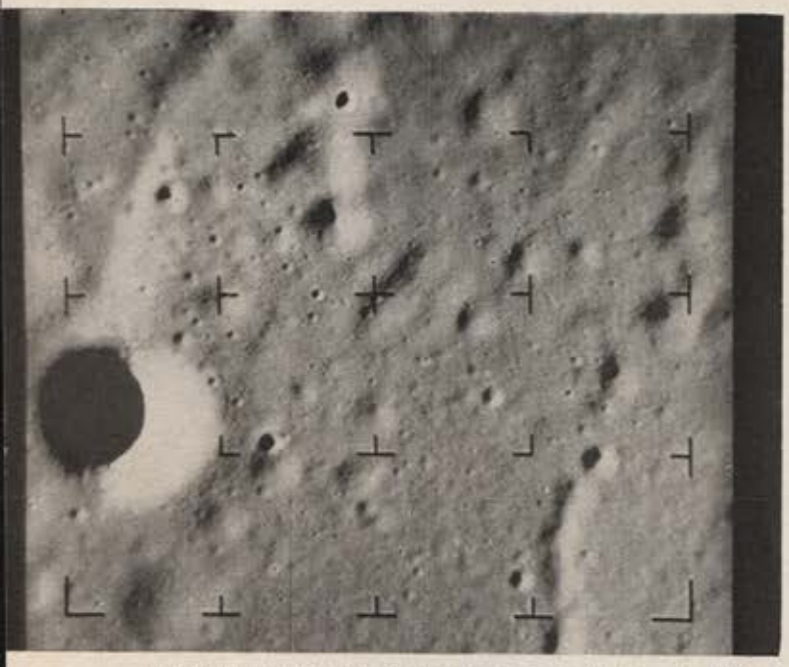
In generalized summary on this question I would say that the USSR has an orderly, persistent, and well-planned space program, including a vigorous project for a manned landing on the lunar surface. They do not seem to be handicapped by fluctuations in their budgetary thermometer, as we sometimes are. We can all be certain that, regardless of the speed with which the US pursues its space goals, the USSR will continue to expand its space effort.

Space Competition

The next question which frequently follows is: *Who is ahead in the space race?*

We could get into a lot of semantics just trying to figure out what being "ahead" means or even what a

An early product of the "orderly, persistent, well-planned" Soviet space program was Vostok booster, shown in rear view. One such rocket orbited Yuri Gagarin in first Vostok.



The US has generally been more successful than the USSR in lunar exploration. Here is moon's surface from about 12 miles up as seen by Ranger-9 in 1965, seconds before impact.

The US has 12 hours of extravehicular activity (EVA) in space, against only 20 minutes for Soviet cosmonauts. Here Gemini-9's Eugene Cernan is taking his 1966 space walk.

"space race" is. So let's skip that for the moment and look at the picture statistically. An examination of the over-all space activity of the US and the USSR shows that to date we have put about 560 payloads into earth orbit or on escape missions, compared with about 310 by the USSR.

As for manned spaceflight alone, the record shows: 1,994 man-hours in space for the US compared with 533 for the USSR; sixteen manned flights for the US compared with nine for the USSR; twelve hours of EVA [extravehicular activity] for the US compared with twenty minutes for the USSR; and ten rendezvous and nine dockings of manned spacecraft, with the USSR not having made any attempts in these regards as yet. The Soviets have, however, rendezvoused and docked unmanned space vehicles on two occasions.

In communications, navigation, and meteorology, the United States has developed an operational lead, but the Soviets are now showing considerable activity in these fields, also.

In unmanned lunar and planetary performance, the US has been generally more successful—although that is a subjective judgment—but the USSR has certainly been more active with many more attempts and many more failures than the US. The Soviets pursue deep space exploration with a persistence that reveals clearly the high priority they place upon trying to be first in knowing the most about the planets.

Although we have placed the largest weight into orbit on a single launch by the world's most powerful rocket in use, it is estimated that the Soviets over the years have orbited a greater total weight than we have. We also can be confident that they will continue to increase the thrust and the capability of their launch vehicles.

In general, this brief review of our technological competition with the Soviets in space can be summarized by saying that we were behind them once but no longer are. However, their determination and their currently accelerated activity leave no room for complacency on our part, and, if we value technological leadership, a continually growing economy, and world respect, we must maintain a vigorous pace in our national space program.

Space Cooperation

The third question is: *Why do we not save money in planning our space program by cooperating more with the USSR?*

As you all know, it is this nation's policy—frequently stated by the President and the Vice President—to cooperate whenever such action would be of mutual advantage. We have seen opportunities which would seem to offer mutual benefits if accomplished through international cooperation, and we have made numerous proposals to that end. New ideas for international cooperation on a broad scale should continue to come forth. For example, what about a joint manned lunar surface laboratory? It does, however, take at least two to cooperate, and the Soviets have been reluctant. Just why they have been, I don't know, unless they are convinced that because they can get so much more information from us through our free press than we can from their closed society, the existing situation is more to their advantage.

I think such reasoning is unfortunate, if it is in fact the way they think. Actually, not much of the space program of either nation depends upon the guarding of technological secrets. Rather, both nations are engaged in a constant drive to solve problems—and certainly both could solve more problems more rapidly if there were more cooperation and less duplication in individual projects.

The argument that such international cooperation would save large sums of money is, however, a relatively hollow reed to lean on. Neither country would

want to fall behind the other as producers of hardware or as innovators. However, through effective cooperation in vigorous programs both countries could get more accomplished for the same total investment of resources.

This does not suggest that we should for a moment slack off on our efforts, or that they would on theirs. If we are wise, we will keep in the forefront of our thinking that a country which vigorously advances space technology gains much from new inventions and new managerial methods, as well as from increased employment and an increased gross national product. In a sense, to cut back sharply would mean a decline in the chances for international cooperation and, even more, a real possibility of losing our place as the world's leader in technology.

Space vs. Poverty

The next question is: *Why not postpone spending on space and concentrate on solving such problems as poverty?*

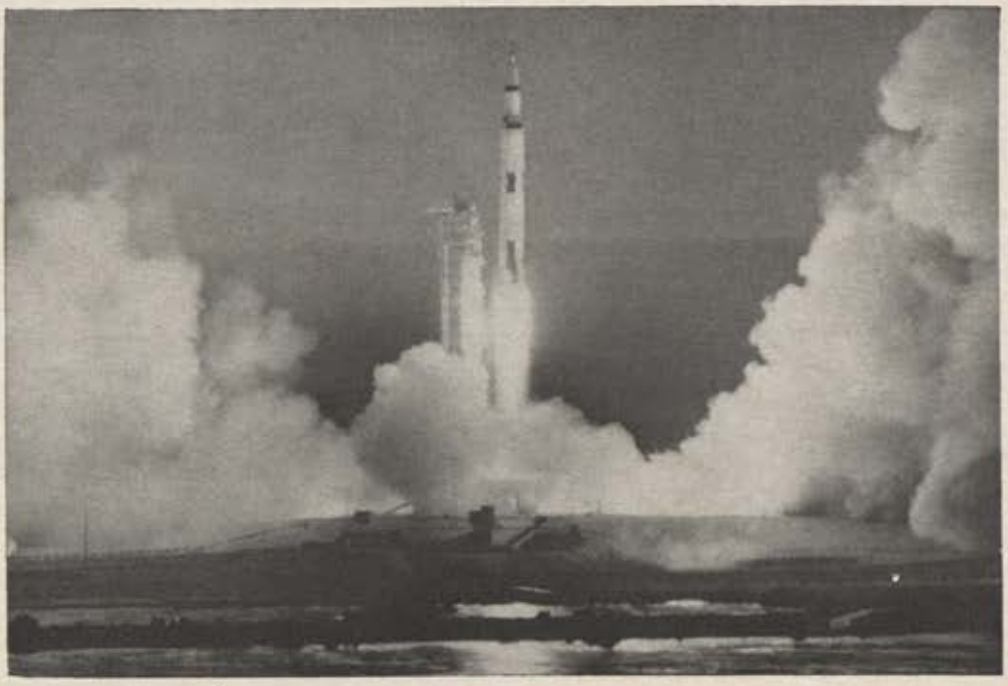
This may be the most frequently asked question of all, coming particularly from those who do not understand the nature and the impact of the space program. The answer can be either lengthy or brief, but it still comes out the same. It is almost too obvious to point out that funds spent on the space program are spent right here in this country, rather than out in space, and that the technology born through such efforts remains here to further private enterprise in many, many fields. It is probably not so obvious but just as true that there would be more poverty and more unemployment, almost automatically, if the space program were severely curtailed. I suggest to those who oppose our space effort that they give some additional thought to that very point.

We should all know that the US is stronger and wealthier because of its space program, and we also should know that such strength and such wealth make us better able to handle the other problems that confront us. As I have just said, space activity increases income, increases products, increases jobs, and creates new sources of employment through advances in technology.

There are those, of course, who are trapped by the illogical proposition that if the money involved were not spent on space and if the talents of the manpower employed were available for use elsewhere, such resources would automatically flow into projects of health, housing, crime, air or water pollution, education, and other problems of our complex society. Hence, they suggest that it would be better if we invested our resources in those areas instead of in space technology and space exploration. I do not agree. It is not an "either/or" situation. I have great confidence in the capabilities of this country to handle a number of high-priority projects at the same time; and I believe that the problems of poverty and its related ills deserve high priority—and I also believe that the space program likewise merits high priority. I never have been able to understand those who favor solving problems with the wasteful approach of "let's wait and maybe do it later."

Moreover, the methods for solving the many complex problems of our cities, for example, can and should be borrowed from the management techniques developed in the aerospace industry. I refer to what is frequently called "systems analysis"—the managerial approach which enables one to handle many related variables simultaneously and effectively. For emphasis, let me quote briefly from one of his recent statements on this subject by Vice President Humphrey, who is also Chairman of the National Aeronautics and Space Council:

> The systems-analysis approach—so highly developed in the space program—contributes importantly to community planning; municipal police and fire-fighting; improvement in our educational system; control of crime and delinquency; as well as the modernization of urban, regional, and national transportation systems. It is also applicable to projects for the elimination of water, air, and soil pollution; more effective



Mightiest US rocket system is the Saturn-5, the booster for the Apollo moon-landing program. The combination is shown here in the November 9, 1967, launch—the first flight of the Apollo vehicle and Saturn booster. The Apollo program draws on manned space technology accumulated through the Mercury and Gemini programs and uses knowledge of the moon gained from the Ranger, Lunar Orbiter, and Surveyor programs.

use of our natural resources, etc. These are vital fields for bettering man's life, and as such, provide some of the most compelling reasons for a dynamic space program.

Research and Development

The next question is: *Should we always have a specific mission, a specific requirement, before we undertake research and development?*

The answer to that question is so obvious that I will take little of your time in stating it. It is "no"! Yet, as obvious as the answer is there still seem to be a few people who miss it. . . . We never would have invented the wheel, let alone the automobile, the steam engine, electric lights, the telephone, or the airplane—if we had waited to draw up the precise mission to be accomplished by the research or if we had insisted upon determining ahead of time whether the end result was going to be practical or profitable.

The truth is that frequently the end product of research is unknown until the research has been accomplished and also that we frequently obtain a number of useful but unanticipated results from the same research investment. Should ignorance deter us from pursuing answers? No, we must engage in research vigorously, and since resources are not unlimited, we should be selective to a degree in pursuing development. Such selectivity, however, should be applied only to make it as certain as possible that we invest most of our resources where the potential of accomplishment appears greatest.

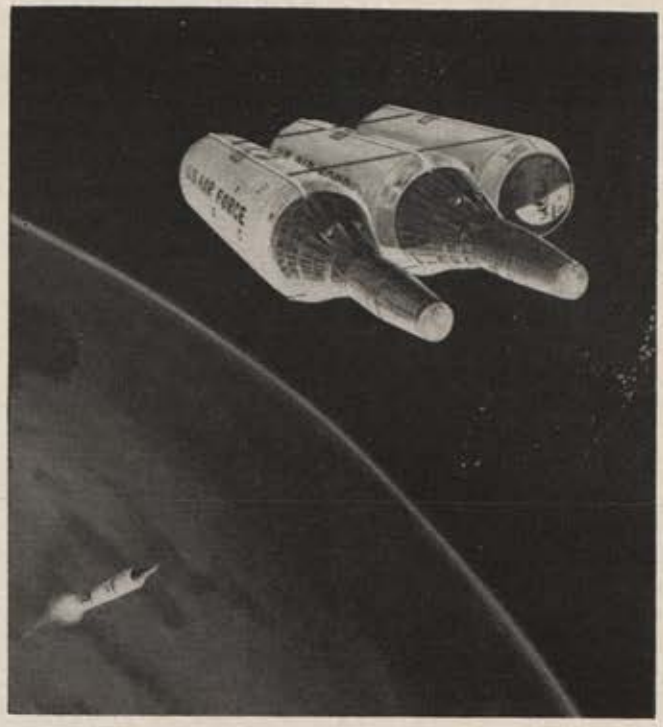
Duplication

The final question which I plan to take up in this discussion is: *Do the USAF Manned Orbiting Laboratory and the NASA Apollo Applications Program duplicate each other, and are they not therefore wasteful?*

The answer is that they are neither duplicatory nor wasteful. Of course we all recognize that there has been a substantial investment in both programs, and that to curtail or protract either one of them would add to the total costs in the long run. So, if our concern is over the possibility of waste in these two very important projects, examination might well reveal that the major risk of loss would come from attempting to curtail the flow of funds, delaying the payoffs from our investments.

The Manned Orbiting Laboratory has military experiments on board and its mission is to find out if manned spacecraft can carry out these functions better than if the spacecraft were unmanned. We must learn this in order to get the maximum defense in the most efficient way, and we cannot identify the way unless we try these experiments. You can be certain that if the results show that the missions can be carried out as effectively and as efficiently without men on board, that is the route we will follow, but we do not plan to base our defense plans on guesswork or solely on the figures of budget analysts.

When we look at the Apollo Applications Program we find that it has eighty-seven experiments scheduled, all of which call for different equipment, different orbits, and different timing than the MOL. To combine these two projects would be a little like joining two major departments of government together because both have



There is room in the US space program, says Dr. Welsh, for both NASA's Apollo Applications and USAF's MOL. Here MOL is shown in triple configuration in an artist's concept.

to do with people. To combine these projects would be more expensive, not less, and less efficient, not more.

* * *

I have made a number of references throughout these remarks to the adverse effects which would come from serious curtailment of our space program. That does not mean that the whole program would be ruined if there were to be some postponement or slowdown of some projects. But, I hasten to add that it would be far better if we were able to increase our space effort, instead. However, as one faces the political realities of the day it appears that curtailment is much more likely than is any increase. I hope we are wise enough to assign the cuts where they will do the nation the least harm.

This country's leadership continues to support the space program vigorously. Some people seem not to realize that just this January President Johnson asked the Congress for more money for space for the Fiscal Year 1969 than was appropriated by the Congress for space in Fiscal Year 1968. That was done in the face of many other high-priority demands for this country's resources and seems to me to be convincing evidence of his strong belief in the essentiality of the national space program.—END

Dr. Edward C. Welsh became Executive Secretary of the National Aeronautics and Space Council, the top White House policy advisory panel on space, in 1961. An economist and veteran public official, Dr. Welsh also served as one of the principal architects of the economic recovery of Japan after World War II. The above article is condensed from a speech given by Dr. Welsh on May 15, 1968, to the National Space Club in Washington, D. C.

'From society's point of view, research is useless in a practical sense unless it is exploited. Such exploitation requires some successful, aggressive, forward-looking, satisfactorily organized mechanism for development, trial, production, distribution, evaluation, and improvement . . .'

When Is Research the Answer?

BY DR. J. R. PIERCE

RECENTLY I unexpectedly heard that a large mission-oriented organization proposes to inaugurate a multimillion-dollar program of "basic" research. Among the reasons given was that their large program of "applied" research has proved ineffective in advancing their field of responsibility.

My violent and continued reaction has been that the organization needs basic research like it needs a hole in the head. My diagnosis is that people have not been doing their daily work well and thoughtfully, that they have not been doing their job better day by day, and that they now think that the magic of basic research will sweep away or supplant their troubles. My prognosis is that if they get and spend the money, and even if good research is done as a result, the organization and its mission will benefit not at all. No one will be in a position to interpret, exploit, and apply valid new findings and to reap new benefits.

This brings to my mind some unfortunate laboratories I have visited, which have no clear, pressing, and challenging obligations and are not making any very important contributions. These are the places most apt to boast that they do research. Often it is shoddy research; but, if [the research] were good, they would be in no position to use it to solve pressing and important problems.

I think also of organizations that spend money for research in universities, but that have no adequate mechanism for recognizing and exploiting any important potentialities that may be opened up. The research may be good work of national importance, but is it of any direct good to the organization which pays for it? If not, how can it be made useful?

I hope that no one doubts that good research is essential to technological progress, along with good and aggressive development, trial, production, distribution, and continual evaluation and improvement. Harvey Brooks [of Harvard University] has pointed out that whether research is basic or applied can depend on one's point of view. I think the distinction between good and bad research is more meaningful and useful. Good research substantially or usefully increases our understanding of important things or our ability to do important things.

The substantial or useful part is vital. Beyond some point, either polishing or extending results is not worth the effort. Sometimes polishing or extending is important for very practical reasons. Valuable as such necessary work is, it can be justified only by a real need for the results.

Important is more difficult than substantial or useful.

Important to what? Research can be important to medicine, communication, music, or to the understanding of the universe, including man. It is difficult to establish criteria that will separate important areas of work from unimportant areas; it is also difficult to establish criteria that distinguish between good and unimportant books, but no one doubts that there are both, and that people can somehow tell them apart, fallibly but well above chance.

Thus, good research should substantially or usefully increase our understanding of important things or our ability to do important things. While understanding for its own sake can be laudable and worthy, society will presumably pay most generously for understanding which leads to doing important things. And we all know how increased understanding can shove things forward.

But increased understanding can result in better doing only under favorable circumstances. The transistor spurred a vigorous electronic industry which, through development, manufacture, and distribution, was able to bring it quickly and effectively into use. Penicillin and other antibiotics would have been useless without a well-developed pharmaceutical industry and medical practice. New plastics and alloys have worked wonders in a wide range of advanced technology.

From society's point of view, research is useless in a practical sense unless it is exploited. Such exploitation requires some successful, aggressive, forward-looking, satisfactorily organized mechanism for development, trial, production, distribution, evaluation, and improvement.

In this country, bright go-getters fresh from the university can, with energy and enterprise, still get backing and found new businesses that leave older competitors in the background. But large organizations can be enterprising, too. If their development people are up to date and imaginative, they are continually frustrated by their lack of understanding and their inability to realize essential functions. These lacks hold them back. They know that only research can provide a way through or around their difficulties. Researchers see the same limitations, and good ones are receptive to both the needs and the ideas of others.

From this glowing picture of the path of progress, as real as it is admirable, let us turn to the organization mentioned in my first paragraph and to its problems and responsibilities. Is it doing well now? Probably not, as judged by its own admission that its applied research has not been successful. Probably, it cannot evaluate things well enough to tell the good from the bad. Is it full of bright people at the end of their tether, doing admirably but needing more understanding or better tools to do outstandingly better? Could it tell a good research result from a useless one? Could it make use of a good result? I doubt it.

If the organization does support basic research, and if by a miracle something potentially useful comes from this research, what then? Perhaps an enterprising outsider will exploit the research to his own profit and society's. That would be gratifying, but it wouldn't cure the organization's problems.

When, then, is research the answer in improving the performance or realizing the aims of an organization? The answer is: when such research is good research, and when effective use can be made of the understanding and inventions which good research provides.

The effective application of understanding and invention requires the effective and interrelated carrying out of many functions other than research, including development, trial, production, distribution, and continual evaluation and improvement. Good research may —or may not—find use through various fortuitous mechanisms of society. But unless the other functions necessary for its exploitation are provided and organized in a satisfactory way, even good research is unlikely to be the answer to the problems of an organization.

Indeed, unless these other essential functions are satisfactory, research carried out by or for an organization is not only unlikely to be effective, it is unlikely to be good research. Under unfavorable circumstances, research is a distraction from the urgent problems of an organization rather than a solution to them.—END

Dr. Pierce is Executive Director for Research, Communications Sciences Division, Bell Telephone Laboratories at Murray Hill, N. J. *The article is reprinted with permission from* Science, *Vol. 159, pp. 1079-80, March 8, 1968;*

What is the meaning of the phrase "peaceful purposes"—as used in the Space Treaty to which the US, Russia, and many other powers are now signatories? An analysis indicates that it means "nonaggressive" rather than "nonmilitary" and that the treaty does not necessarily prohibit the use of military personnel for space exploration and operations. Here, from a legal point of view, is a discussion of . . .

Outer Space for 'Peaceful Purposes'

BY EDWARD R. FINCH, JR.

THE RECENT treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, was signed by the President of the United States and by representatives of more than sixty other nations at a White House ceremony on January 27, 1967. Similar ceremonies were held simultaneously in London and Moscow.

Recommendations for the treaty's ratification was made by the United States Senate in a unanimous 88-0 vote on April 26, 1967. The necessary instruments of ratification were filed by the required number of states, including the United States, the United Kingdom, and the USSR on October 10, 1967. It is, therefore, now the law of the land for the United States.

States which did not sign this treaty include Albania, Paraguay, Cuba, Communist China, and Spain, each for its own reasons. Already approximately ninety states surprisingly have agreed to or signed the treaty without reservation. The treaty was registered with the United Nations on November 30, 1967, by the United States, the United Kingdom, and the USSR—the three depository governments.

All treaties present semantic problems, and this one is not an exception. It uses the phrase *peaceful purposes,* or an equivalent, repeatedly. President Johnson stated on May 7, 1966, at San Antonio, Tex.: "Just as the United States is striving to help achieve peace on earth, we want to do what we can to ensure that explorations of the moon and other celestial bodies will be for peaceful purposes only. . . ."

This brief commentary will analyze whether *peaceful purposes,* or a semantic equivalent, in this treaty means "nonmilitary" or "nonaggressive." The doubt on this problem amongst international lawyers is closer to resolution by reason of this treaty than it was before.[1]

In the treaty and its preamble, *peaceful purposes,* or a semantic equivalent, is expressly referred to in at least six places:

PREAMBLE

Recognizing the common interest of all mankind in the progress of the exploration and the use of outer space for peaceful purposes. . . .

Desiring to contribute to broad international cooperation in the scientific as well as the legal aspects of the exploration and the use of outer space for peaceful purposes. . . .

ARTICLE III

States Parties to the Treaty shall carry on activities in the exploration and use of outer space including the moon and other celestial bodies, in accordance

[1] Cooper, Crucial Questions on Space Treaty, 501 AIR FORCE & SPACE DIGEST 104 (1967); U.N.-U.S. Delegation Press Release No. 4111, December 3, 1962. See also 53 A.B.A.J. 703 (1967).

with international law, including the Charter of the United Nations in the interest of maintaining international peace and security and promoting international cooperation and understanding.

ARTICLE IV

. . . The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons, and the conduct of military maneuvers on celestial bodies shall be forbidden. The use of military personnel for scientific purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited.

ARTICLE IX

. . . If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. . . .

ARTICLE XI

In order to promote international cooperation in the peaceful exploration and use of outer space, States Parties to the Treaty conducting activities in outer space, including the moon and other celestial bodies, agree to inform the Secretary-General of the United Nations, as well as the public, and the international scientific community, to the greatest extent feasible and practical, of the nature, conduct, locations, and results of such activities. On receiving the said information, the Secretary-General of the U.N. should be prepared to disseminate it immediately and effectively.

It should be noted that when an express prohibition is intended, the treaty clearly does so, such as its prohibition against "the testing of any types of weapons" in outer space in Article IV. No such similar prohibition is recited against *military* activities per se. The treaty must be read as a whole. In the excerpt from Article IV, above, *military* personnel expressly are authorized "for scientific research or for any other peaceful purposes." How can it now any longer be said, in the light of this language, that *peaceful purposes* means "nonmilitary"? It can only mean "nonaggressive."

Also in Article IV above, "The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited." Certainly an orbiting research laboratory is a facility for scientific research and exploration. Thus, it is expressly authorized with military personnel to operate it, so long as no weapons of mass destruction are stationed thereon or therein in violation of the treaty. Further, in Article IV the words *any equipment* clearly are very broad and would include military or nonmilitary equipment as long as it is nonaggressive.

This treaty also may have expressly laid the groundwork toward settling another discussion among international lawyers—the right freely to conduct from outer space by scientific means the nonaggressive observation of celestial bodies, including the moon and earth. As the public has been informed repeatedly by the press, at least two states now parties to this treaty, and perhaps others, are conducting observations of earth from free outer space for nonaggressive, scientific, peaceful purposes, such as meteorological, for the use of all interested states. These are all in conformance with the new treaty, are for nonaggressive *peaceful purposes,* and are in accord with international law and the Charter of the United Nations.

In Russian the word for "military" essentially means warlike rather than pertaining to the armed services of a country, while in English "peaceful" is not regarded as the opposite of "military." We think of "peaceful" as "not aggressive." This is partly a problem of translation between the Russian and English languages. It was also clear to the United States that military personnel could be on a spacecraft engaged in the peaceful uses of outer space; in fact, for nine years military personnel have been used by both countries to orbit the earth in space vehicles on purely peaceful missions.[2]

This semantic analysis of *peaceful purposes* in Article IV, read in the context of the entire 1967 treaty, is further supported by a review of United Nations resolutions and learned writers of both the free and Communist worlds.[3]

The passage of the years, the standing major UN outer space resolutions and declarations, the famous Antarctic Treaty, the Nuclear Test-Ban Treaty, and the 1967 Outer Space Treaty all point to the now urgent need for a new and all-inclusive compilation and bibliography of space law through modern computer processes. From it could emerge valuable trends that "may set the stage for additional US-Soviet agreements such as a nonproliferation treaty to prevent the spread of atomic weapons."[4]

Until then, the 1967 treaty is another great step forward to assure nonaggressive *peaceful purposes* in outer space. In the meantime, we must not forget that under the 1967 treaty reference to *peaceful purposes* and other references to international cooperation in outer space for peaceful purposes do not preclude all military activities in outer space. Nonaggressive military personnel and scientific observation from space are necessary and desirable in the cause of world peace, if for no other purpose than to assure that all states abide by the 1967 treaty's prohibition on the orbiting of nuclear weapons or other weapons of mass destruction now prohibited. As one prominent space writer of the Communist world, Vladimir Kopal, stated in commenting on the 1967 treaty and its peaceful purposes:

> It is believed that the Treaty will contribute, at least to a certain degree, to diminishing the danger of a major armed conflict which would be waged in and through outer space. Moreover, it is expected that this achievement will encourage some other and perhaps even more important steps to this end. In the proper field of exploration and use of outer space it is hoped that the Treaty will be instrumental in reserving the results of space activities for peaceful aims, the betterment of mankind as a whole and the growth of capabilities of all nations irrespective of their degree of economic and technical development.[5]

It is submitted that the words *peaceful purposes,* as used in this 1967 treaty, clearly bear the semantic meaning of "nonaggressive." With this old semantic argument now clarified by this treaty, the more difficult international legal questions of space liability and the safe, prompt return of the "envoys of mankind" (astronauts or cosmonauts) and their space vehicles should now have the full attention of the nations' diplomats and international lawyers before the U.N. Committee on the Peaceful Uses of Outer Space, which meets this year.

[An agreement on "the rescue of astronauts, the return of astronauts, and the return of objects launched in outer space," was approved in the United Nations General Assembly on December 19, 1967, and signed by the three "depository nations," the US, USSR, and United Kingdom on April 22, 1968. It is now open for other nations' signatures. See also Vol. 9, William and Mary Law Review, page 630, 1968.—The Editors] —END

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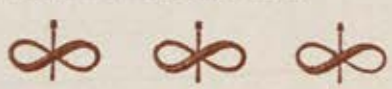
[2] STAFF OF SENATE COMM. OF AERONAUTICAL AND SPACE SCIENCES, 90TH CONG., 1ST SESS., Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (1967).

[3] LEGISLATIVE REFERENCE SERVICE, LIBRARY OF CONGRESS, REPORT PREPARED FOR THE SENATE COMM. ON AERONAUTICAL AND SPACE SCIENCES, S. DOC. NO. 26, 87TH CONG., 1ST SESS. (1961); LIPSON & KATZENBACH, THE LAW OF OUTER SPACE (1961); 7 AF JAG L. REV. (1965); SELECTED REFERENCES ON THE LEGAL PROBLEMS OF SPACE EXPLORATION, U.S. Senate Space Symposium (K. A. Finch comp. 1961); U.N. Doc. (A/AC 105/33/1967). The present writer has reviewed twenty-nine published and fourteen unpublished but unclassified agreements or multilateral declarations of the major powers wherein peace, mutual security, and nuclear space matters are considered.

[4] New York *Times*, April 26, 1967; Reuters report from Geneva, August 24, 1967. A Draft Treaty on the Nonproliferation of Nuclear Weapons was submitted by the United States and the Soviet Union at the Eighteen Nation Disarmament Conference on August 24, 1967.

[5] McGILL UNIVERSITY INSTITUTE OF AIR & SPACE LAW, THE SPACE TREATY OF JANUARY 27, 1967, AND RELATED PROBLEMS 3.



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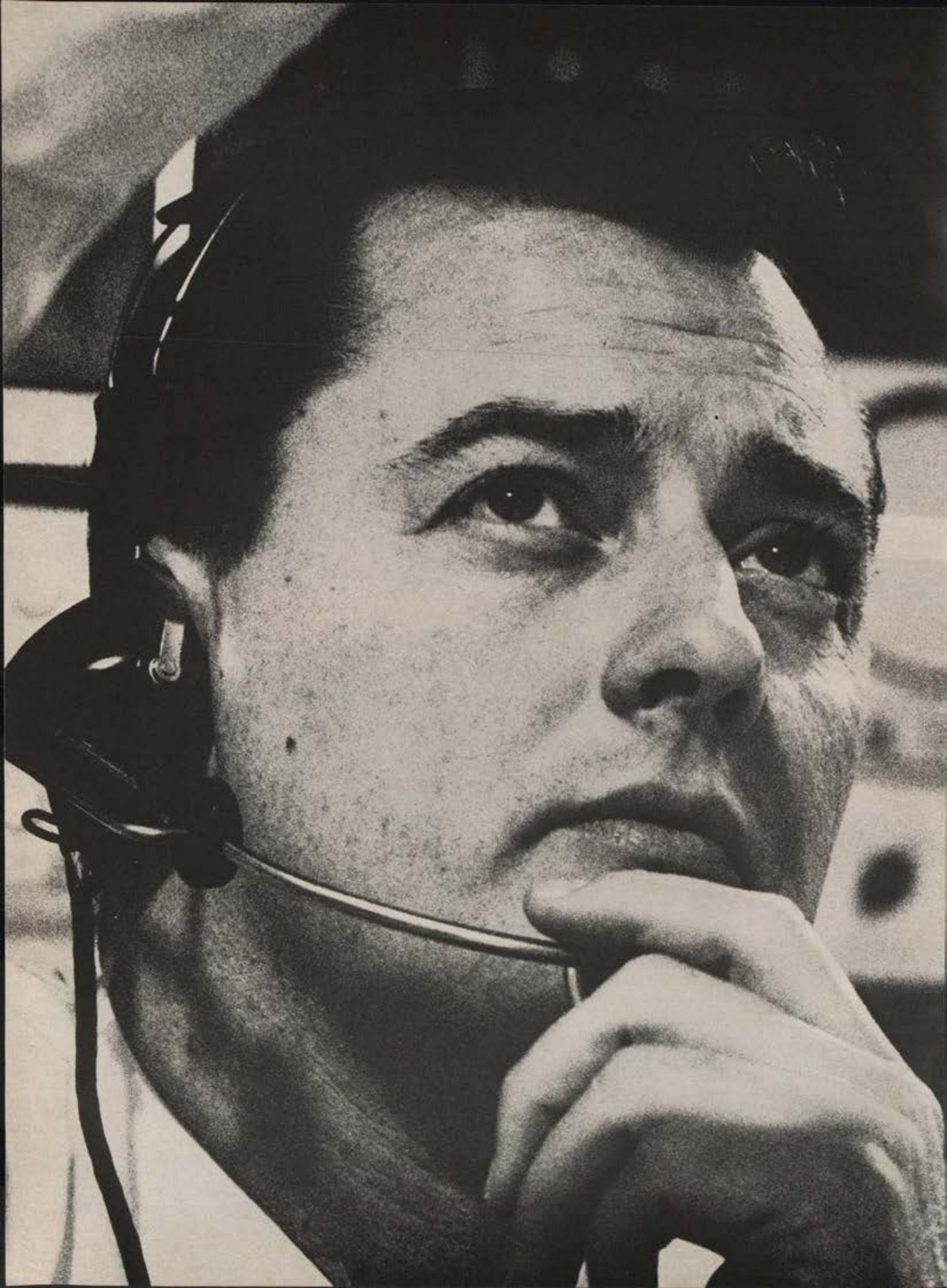

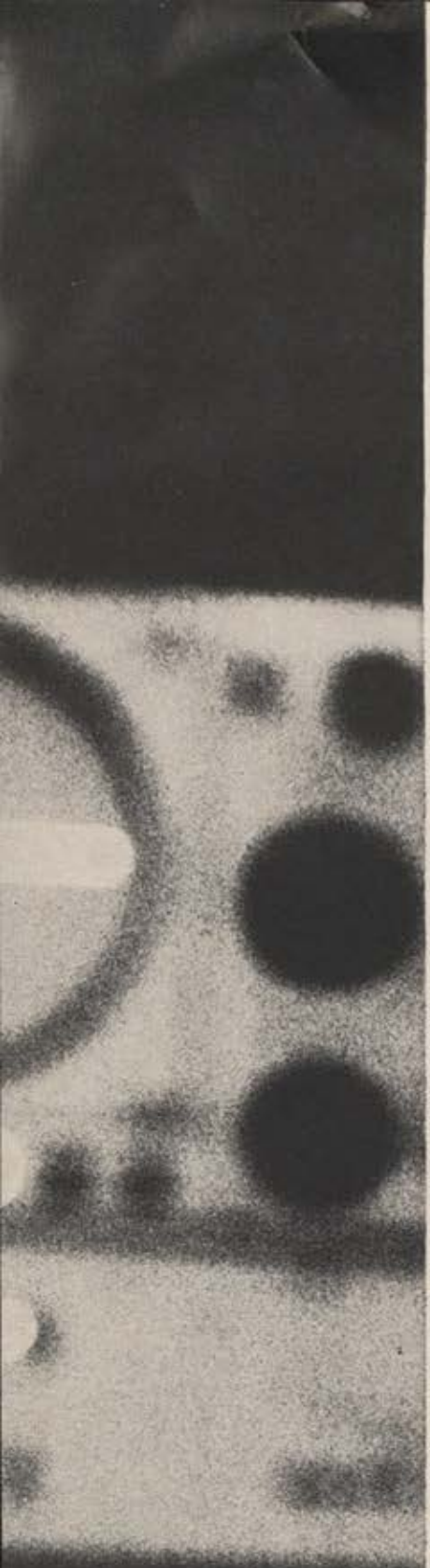

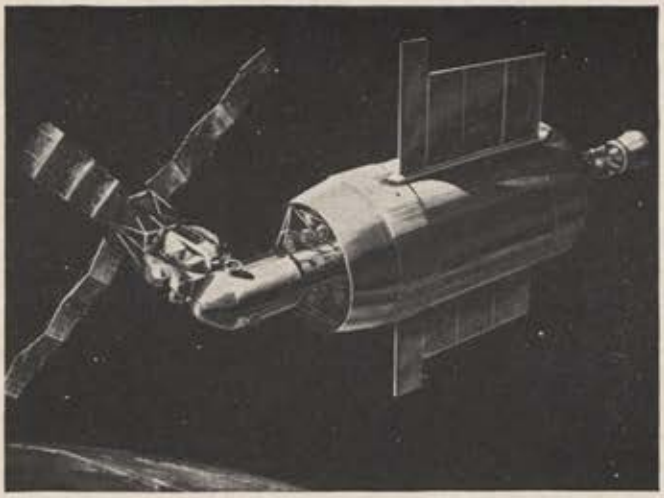

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AIR FORCE
JULY, 1968

Two aircraft types seem destined to dominate commercial aviation in the coming decade. One is the "airbus"—an advanced-technology, high-capacity trijet believed by many to be the first true all-purpose aircraft in commercial air history. The other is the supersonic transport. The US SST, to be built by Boeing, has met technical difficulties that will delay the first production model until 1976. Meanwhile, work proceeds on the Anglo-French Concorde, and there is now a possibility that some Concordes may be built under license in this country . . .

THE AIRBUS AND THE SST

Prospects and Possibilities

By Edgar E. Ulsamer

ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

TWO aircraft types seem destined to dominate commercial aviation in the 1970s and 1980s—the airbus (an advanced-technology, high-capacity trijet) and the supersonic transport. Recent developments have had major impact on programs for both types, with a trend toward international collaboration clearly discernible in both instances.

The airbus was originally conceived as a medium-size, medium-range aircraft. On this basis, both the Lockheed 1011 and the McDonnell Douglas DC-10 were committed to production this spring. (*See "Who Will Build the Airbus?", AF/SD, Jan. '68, p. 76.*)

Now both the manufacturers and the airlines believe that the airbus will become the first all-purpose aircraft in the history of commercial aviation, equally good for both short-haul and intercontinental traffic. The first airbus expected off the production line in 1971 (up to 345 passengers, plus cargo) will have a full payload range of between 3,200 and 3,300 statute miles. By the mid-1970s, however, range will reach better than 4,500 miles, more than enough for intercontinental operations. Lockheed's Vice President for the 1011, Robert A. Bailey, says the Lockheed trijet will reach a range of about 4,600 miles, and can be further increased to 5,000 miles.

Douglas Vice President and DC-10 Program Director J. C. Brizendine told this reporter that he expected the Douglas trijet to attain a full payload range of 5,180 miles, and said that "this airplane will become the replacement of the current 707/DC-8 intercontinental fleet in the 1970s and 1980s. As it stands now, the DC-10 has about twice the fuel volume we need for transcontinental operation."

General Electric's Manager of the CF6 Engine Program (the DC-10's powerplant), Brian Rowe, told AIR FORCE/SPACE DIGEST that the CF6 production engines would reach 43,000 pounds of thrust by mid-1973 and 45,000 pounds by mid-1975, from an initial thrust rating of 39,500 pounds. The Rolls-Royce RB 211 engines powering the L-1011 are scheduled for similar growth from the initial rating of 38,300 pounds and could even reach 50,000 pounds if required.

Both the L-1011 and the DC-10 have plenty of fuel space. Both designs also could be "stretched" to accommodate more passengers, a possibility being discussed with the airlines. With advanced technology engines, the trijets are considered to be at least as safe for overwater operation as contemporary four-engine designs because powerplants will be more reliable, according to the manufacturers.

Mr. Brizendine says that the trijets will offer head-on competition with the Boeing 747 jumbojet. Lockheed and McDonnell Douglas executives are confident that their aircraft will be able to hold their own in such a competition, claiming that the trijets when operated transcontinentally in standard mixed first-class/economy-class configuration offer better direct operating costs (DOC).

Mr. Bailey states that recent airline analyses showed the L-1011's DOC to be about three percent less than that of the 747. The 747's DOC, however, is better

than that of either the L-1011 or the DC-10 when operated in the theoretically possible 490-passenger configuration. However, on the basis of present airline orders, the trijets will operate with a capacity of fewer than 300, and the 747 at fewer than 400 passengers. The competition with the 747, according to Lockheed and McDonnell Douglas, is also likely to be carried over into the cargo field. Mr. Brizendine predicts that his company will eventually build a four-engine cargo version of the airbus, the C-4, which could carry a 200,000-pound payload transcontinentally. Lockheed is less sanguine about the market requirement for a straight freighter version of the airbus and instead is concentrating its studies, requested by a number of airlines, on a Quick Change (either cargo or passenger) version of the L-1011, according to Mr. Bailey.

International Ties of the Airbus

As the airbus grows toward intercontinental-range capability, its underlying manufacturing concept takes on international overtones. Mr. Brizendine predicts that, of the some 700 DC-10s his company expects to sell by 1983, between 300 and 400 will be purchased by foreign carriers. Lockheed's forecasts are similar and foresee that about 200 L-1011s will be sold in Europe alone by 1980. Both companies, as well as General Electric, acknowledge a trend toward "*quid pro quo* accords" in international aircraft sales, meaning that US manufacturers wishing to sell aircraft abroad will find it advantageous to arrange for manufacturing participation by the countries involved.

In choosing the British Rolls-Royce engine for its L-1011 (each aircraft will carry $2.5 million worth of Rolls-Royce engines and associated equipment, the largest foreign buy by any US aerospace manufacturer), Lockheed automatically instilled an international flavor into its design. This fact is expected to help sales of the aircraft in Europe. Thus far, of the 174 L-1011s sold for $2.61 billion, fifty were bought by British Air Holdings, essentially a sales agency for the Lockheed aircraft.

High-level sales teams comprised of McDonnell Douglas and General Electric executives meanwhile are busy seeking collaborative arrangements with European countries. An arrangement with Italy involving substantial component manufacture of the CF6 engine and component manufacture of the airframe reportedly is "very close to final realization." Mr. Brizendine points out that a similar arrangement already exists for the company's short-haul twin jet, the DC-9.

Both Lockheed and McDonnell Douglas have considered building their respective trijets under license in Europe but found that the cost of setting up a separate production line is too high.

A Concorde Made in the US?

Meanwhile, in February the Boeing Co. announced that construction of the US prototype SST would be delayed because of technical difficulties. The problem, discovered in wind-tunnel testing, comes from what engineers call "aeroelastic deflection," meaning that the SST's high cruise speed would result in pressures that would bend the structure. These effects, especially in the crucial control surfaces of the tail section, turned out to be greater than anticipated, requiring the structure to be strengthened. This, in turn, resulted in increases in weight that had the result of reducing range and payload.

Boeing and the Federal Aviation Administration's SST Program Office, which is overseeing the development program, agreed to redesign the prototype to meet the original specification—4,000-mile range with full payload at maximum cruise of Mach 2.7 (about 1,800 mph). Delivery of the first production model will be delayed at least until late 1976. The delay gives the market potential of the smaller and slower British-French Concorde a significant boost.

Presumably as a result, the Managing Director of British Aircraft Corp. Ltd. and Chairman of the Anglo-French Concorde Committee, Sir George Edwards, in May proposed the idea of building the Concorde under license in the US and the American SST under reciprocal conditions in Europe. To this reporter's question as to whether the Concorde's management group had as yet negotiated with the US aerospace companies concerning such an arrangement, Sir George replied, "Not really." However, unofficial talks are known to have taken place.

Sir George did indicate that his proposal has been brought to the attention of both the British and the US governments. To date, US government officials and airline executives have been noncommittal and in some cases unenthusiastic. The attitudes are based on technical and not political considerations and could change if the Concorde's flight tests this fall exceed industry expectations.

US aerospace officials point out that building the American SST overseas, either in the form of components or completely under license, would require sanction by the US government and possibly by Congress.

Sir George did say that collaboration between the Concorde combine and the Soviet Union on an SST was unlikely because of the special range and payload criteria of Aeroflot, the Soviet state airline, and because the Soviet TU-144 was "progressing well" without outside assistance. He predicted that the TU-144 would make its first flight this summer, before the Concorde.

Sir George was cautiously optimistic about the Concorde's schedule and stressed that the aeroelastic problems encountered by the larger and faster American SST appeared to have been solved on the Concorde. He predicted that three production models of the Concorde would eventually be built—a standard international aircraft, for transatlantic operation; a shorter range, large passenger capacity aircraft for such routes as transcontinental US operations; and a large capacity intercontinental aircraft.

The possibility of US participation in the Concorde program is not rated as high. But if the first-generation Concorde should prove successful and lead to a larger design more in accord with the requirement of the US flag carriers, US manufacturers may well seek a cooperative arrangement with the Concorde consortium.—END

Twenty Years Ago—Operation Vittles

Two decades ago the Soviet Union made its move in what became the first significant eyeball-to-eyeball confrontation of the cold war between the US and Russia by closing down the overland access routes between West Germany and the city of Berlin. The Allies at first responded hesitantly and with indecision. Then the response became massive—in the form of an unprecedented airlift that kept Berlin alive. The confrontation finally ended with the Russians backing off. A victory, the first of the cold war, could be scored for the West, thanks to Communist underestimation of the ability of airpower to do a job . . .

THE BERLIN AIRLIFT

How Airpower Came of Age in the Cold War

By Lt. Col. Kenneth L. Moll, USAF

ON A muggy summer day in 1947, several B-29s flew over Berlin. As they roared low over the Soviet Military Government headquarters, Russian officers dashed to the windows and, in a comic-opera gesture of defiance, shook their fists at these symbols of American nuclear might. The following summer in Berlin, the belligerent Russian fists became more potent than all of America's atomic monopoly.

In retrospect, it appears inevitable that the Russians would have caused trouble in Berlin and Germany after World War II. Having expanded into Eastern Europe, the Balkans, China, and Korea, exerting postwar pressure everywhere they could, the Kremlin could hardly have been expected to forego the most tempting prize of all—Germany.

In London during World War II, the Allied European Advisory Commission had planned for German occupation. The Commission had divided Germany into three zones for the three major Allies (the French later were given a zone carved from the American and British areas), with the military governments to be located in jointly administered Berlin. At Potsdam, in 1945, the "Big Three" agreed that all of Germany should eventually be reunited, with Berlin its capital.

The European Advisory Commission had made no provision for British and American access to Berlin, 100 miles inside the Soviet zone. The US War Department objected to a specific allocation of rails and roads since these could be destroyed before the war ended. Later allocations could be made "at the military level." Answering criticisms that this was too vague, Ambassador John G. Winant, American representative on the Commission, said he had developed a close personal relationship with the Soviet representative. He did not wish to destroy this mutual confidence by demanding a specific access guarantee when it was implicitly promised by the whole agreement. "At the military level" only verbal guarantees were made. Prompted mainly by flying safety reasons, a written agreement for three Western air corridors to Berlin was signed in early 1946.

German questions such as currency and reparations soon sparked Allied differences with the Russians. At the Paris Council of Foreign Ministers meetings in mid-1946, Secretary of State James Byrnes learned that the Kremlin, while agreeing in principle to German reunification, would consent to no detailed plan for its consummation. The Russians wanted America out of Europe and were stalling so as to encourage German economic collapse and hasten a Communist takeover. In September 1946, Byrnes said in a speech in Stuttgart that American troops would stay in Germany: "We can't expect the Germans to work all-out unless they have some assurance that their country will survive. The pledge of American troops serves that purpose."

After the Marshall Plan was announced in mid-1947, the Soviets intensified their economic obstructions. By late 1947, Foreign Minister Vyacheslav Molotov was so abusive on such matters that Secretary of State George Marshall adjourned the Council of

With no guarantees on the overland access routes to Berlin, the divided city became an obvious target for the Soviet Union to apply pressure. The blockade forced the Allies to take to the air, and as a result the greatest airlift effort ever mounted took place. Here, a USAF aircraft is on its final approach to Tempelhof Airdrome, Berlin, with runways only 5,200 feet long.

Foreign Ministers sessions in London. It was to be the last such Council until 1949 after the Berlin Blockade.

The Blockade

In February 1948, the Soviets forcibly ousted the Czechoslovak government, except for Foreign Minister Jan Masaryk, who held his post; two weeks later he "fell" to his death under mysterious circumstances (which now, twenty years later, are being investigated by the Czech police). This was the first instance of a free and strong government falling victim to Soviet greed. At the same time, America's Military Governor in Germany, Gen. Lucius D. Clay, became so concerned about the atmosphere that he sent this warning message to the Department of the Army:

> For many months, based on logical analysis, I have felt and held that war was unlikely for at least ten years. Within the last few weeks, I have felt a subtle change in Soviet attitude which I cannot define but which now gives me a feeling that it may come with dramatic suddenness. I cannot support this change in my own thinking with any data or outward evidence in relationships other than to describe it as a feeling of a new tenseness in every Soviet individual with whom we have official relations. I am unable to submit any official report in the absence of supporting data, but my feeling is real. You may advise the Chief of Staff of this for whatever it may be worth, if you feel it advisable.

This message generated a flurry of staff work in Washington. Just two weeks before, Gen. Alfred Gruenther had briefed the President on ground forces strength. The Army was short everywhere; it had but 552,000 troops, of whom one-fifth were on occupation duties in Europe. Some two Army divisions and a Marine division could be counted on as available reserve forces for trouble spots. The trouble spots, Gruenther said, might be in Greece, Italy, Korea, or Palestine. Germany was not mentioned. Clay had two battalions in Berlin—about 3,000 troops—while the British and French together had 3,500 men in the city. The Soviets had 18,000 in Berlin and another 300,000 in the East Zone surrounding the city. After studying Clay's message, on March 16 the three services and the State Department made a joint intelligence estimate that war was unlikely within the next sixty days.

On March 20, 1948, in Berlin, the Soviets walked out of the Allied Control Council for Germany. They then announced that, contrary to all the rights which the Western powers had been promised, Allied military railroad passengers would be subject to inspection before they could cross the Russian zone en route to Berlin. Also freight trains were not to be allowed to leave Berlin without Soviet authorization. The West would not agree to these conditions and, on All Fools' Day, April 1, canceled the affected traffic.

General Clay reported to the Pentagon that he believed this was the event he had been worried about. He knew his military position was untenable; yet he resisted pressures to evacuate American dependents. He was against any appeasement or weakening, and told Secretary of the Army Kenneth Royall that he was going to send a test train with armed guards across the border to see what the Russians would do. "Please understand we are not carrying a chip on our shoulder and will shoot only for self-protection," Clay said. "I do not believe we will have to do so."

(Continued on page 72)


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In 1948 the bombed-out buildings of Berlin were still rubble after World War II raids. However, to these children playing on one of the ruins the big Air Force aircraft no longer meant bombs and destruction but food and supplies, from coal to toys and candy.

The Russians merely shunted the train to a sidetrack and let it sit several days until, as Clay relates in his book, *Decision in Germany,* "it withdrew rather ignominiously."

Then the Russians stopped outgoing passenger trains from Berlin, and expelled the Signal Corps teams that had manned communications repeater stations between the American Zone and Berlin. The Pentagon was worried. In Britain there was doubt also. Said a British general, "We should pull out while we can still do so without too much loss of prestige. In military terms, our exposed salient in Berlin doesn't make sense." On April 10, Clay wired Royall more arguments for resistance:

> When Berlin falls, western Germany will be next. . . . If we withdraw, our position in Europe is threatened. If America does not understand this now, does not know that the issue is cast, then it never will, and communism will run rampant. I believe the future of democracy requires us to stay. . . . This is not heroic pose because there will be nothing heroic in having to take humiliation without retaliation.

Although Soviet harassments increased during the next two months, the roads and canals were still open. For about eleven days of tension in early April, a "Little Airlift" hauled passengers and supplies for Western forces in Berlin. There was discussion of what else to do about the partial blockade, but nothing decisive was done except, of course, to protest.

On June 20, the three Western Allies issued new German currency. The West had delayed this step as long as possible, hoping to get the Russians to agree to a common all-German fiscal system and to stop printing inflationary bills with captured German plates. After the Soviet walkout from the Allied Control Council, the Western powers had secretly printed new money and distributed it throughout their zones (but not to Berlin) for exchange on the scheduled date. The Russians responded by introducing new currency in the Soviet Zone *and* in Berlin. The three Western powers announced on June 24 that in Berlin they would use their own new Deutsche marks, with a special "B" stamp added.

That was the day the Russians slammed the door closed completely. All rail, canal, and road traffic into and out of West Berlin was halted "due to technical [maintenance] difficulties." Only the three guaranteed-in-writing air corridors were unaffected.

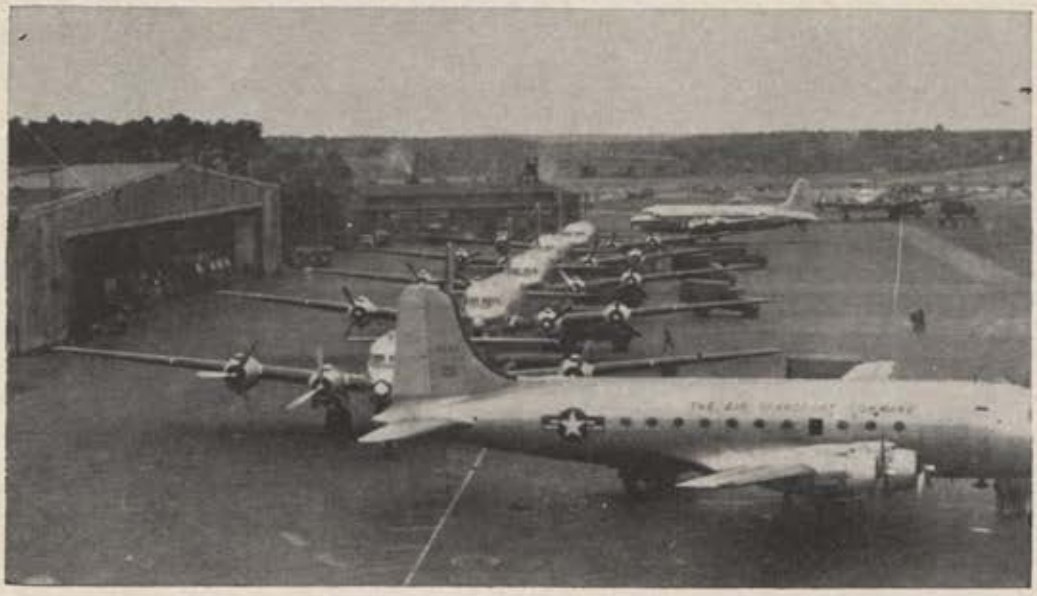
The American Strategy

In Berlin, General Clay discussed the situation with Lt. Gen. Albert Wedemeyer of the Army Staff. Wedemeyer suggested an airlift; he had seen one work over the Hump in the China Theater during the war. Clay, who had been considering the idea and at this time visualized "a very big operation" of 500-700 tons daily, called Lt. Gen. Curtis LeMay, American air commander in Europe. He asked if LeMay's planes could carry coal. LeMay answered, "Carry what?" Hearing the answer, "Coal," LeMay complained, "We must have a bad phone connection. It sounds as if you were asking if we have planes for carrying coal." Assured that this was correct, LeMay responded, "The Air Force can deliver anything!"

Thus, with a fleet of some 100 two-engine C-47s, "Operation Vittles" began to ferry food and coal to Berlin. On June 26, President Truman ordered the airlift to be a full-scale operation. Britain, too, was to help stretch out the thirty-day stocks on hand for West Berlin's two million inhabitants.

It hardly seems possible that by June 27, 1948, after four months of steadily mounting pressure on Berlin, nobody in Washington had done any solid planning for the situation which faced the United States. Yet according to W. Phillips Davison's definitive book, *The Berlin Blockade,* Secretary of Defense James Forrestal's meeting on that date with State and Defense officials was the first time that the problems were addressed squarely. Three alternatives were considered: to withdraw from Berlin, to stay and fight if necessary, or to delay making a decision while trying to negotiate a settlement.

No one then thought there was hope of expanding



C-54s lined the runways at fields all over West Germany during the height of the Berlin Airlift. General Clay estimated that a 4,500-ton-per-day airlift would be needed, but by the end of the effort more than 8,000 tons per day were being delivered.

the airlift for extended support of the beleaguered city, which had been importing some 15,000 tons of goods per day. Rather, discussion centered on whether or not two B-29 squadrons should be added to the squadron already in Germany, and whether two B-29 groups should be sent to England. It was hoped that perhaps these measures would intimidate the Russians enough to force early negotiations. While plans for the B-29 movements began, Mr. Truman pondered the alternatives. As to withdrawing from Berlin, Forrestal recorded in his diary that the plucky President said "there was no discussion on that point, we were going to stay—period."

Truman, already the underdog in the 1948 election race with Thomas Dewey, made his decision despite warnings of the Joint Chiefs of Staff that postwar demobilization had weakened the United States far too much to risk a showdown. Ambassador Robert Murphy, Clay's State Department adviser, has written in *Diplomat Among Warriors* that the JCS thought it would take eighteen months to prepare for a possible war. General Clay, on the other hand, thought that the Soviets did not want to risk war either—they had applied the squeeze far too carefully, retaining too many easy retreat routes for themselves. As the airlift started, Clay asked Washington to stand firm:

> We have to sweat it out, come what may. If the Soviets want war, it will not be because of Berlin currency issue but because they believe this the right time. I regard the possibility as remote, although it cannot be disregarded entirely. Certainly we are not trying to provoke war. We are taking a lot of punches on the chin without striking back.

Washington backed Clay. Somewhat unexpectedly, the British Labor government also showed resolution.

After fruitless negotiations with Marshal Vasily Sokolovsky, his Soviet counterpart, Clay proposed to Washington on July 10 that an armed convoy be sent across the border "equipped with the engineering material to overcome the technical difficulties which the Soviet representatives appeared unable to solve." Overruled, Clay tried again a week later only to be summoned home for consultations. Washington was wavering, and disagreed with Clay's estimate that there was only a one-in-four chance for war. Advocating withdrawal, one War Department official rationalized, "If you're damned fool enough to let somebody slam a door on your finger, the first thing to do is pull your finger out."

On July 20, Clay reported to the National Security Council that the Berliners were displaying "unbelievable" courage and resistance in the face of Soviet pressures. He expressed confidence that a 4,500-ton-per-day airlift could see Berlin austerely through the winter; 160 additional four-engine C-54s were needed. The Air Force Chief of Staff, Gen. Hoyt Vandenberg, was opposed to this as he felt it would take away the transport capability needed to conduct a strategic war, and also was opposed to the armed convoy idea which Clay and Murphy urged. In the end, Truman approved the airlift expansion and rejected the armed-convoy proposal.

Besides the C-54s, America sent seventy-five F-80 jet fighters to Europe to bolster the sixteen already there. Sixty B-29s had arrived in England, and there were now thirty in Germany. To this day it has not been released whether or not the B-29s had atomic bombs with them, although at the time *Aviation Week* proclaimed they "were not equipped with atomic bombs. The bombs are in the United States—twenty-four hours away by air transport and in the custody of the Atomic Energy Commission." An article in Air Force Magazine agreed on the basis of "available evidence," but noted that "the Kremlin has no real assurance of this." In any case, it was clear to all that United States airpower, primarily in transport but backed by tactical and strategic capabilities, was being strengthened in Europe.

While taking these rather feeble military measures, the US also tried through diplomacy to get the Russians to negotiate. The three Western powers sent a sincere but pathetic note to the Kremlin on July 6, which was rejected a week later by the Soviets. Then,

(Continued on following page)

Fresh milk, as well as many other items probably never before transported by airplane, were supplied the isolated city on a daily basis, preserving its economy as well as its life.

after several days of fencing with Foreign Minister Molotov, American Ambassador Walter Bedell Smith and the two other Western ambassadors in Moscow had an audience with Premier Stalin on August 2. Smith had been directed to see if he couldn't get the Russians to clarify the issues in Berlin. Supposedly created to overcome "technical difficulties," and attributed by Soviet propaganda to the currency issue, the Berlin Blockade quite clearly was due to neither of these reasons.

As Smith recounts in his book, *My Three Years in Moscow,* Stalin was affable, as he had every right to be in view of his (and Smith's) certainty that the airlift could not succeed. The Russians rarely flew in weather, and couldn't imagine anyone else flying in the German fogs; furthermore, they had seen Hermann Goering, using over 400 planes, fail to deliver even 100 tons per day to support the Stalingrad siege. Neither Stalin nor General Smith had seen the American airlift feats over the Hump to China. Smith, however, emphasized to Stalin that the Western powers were not prepared to abandon their rights in Berlin although they were more than willing to discuss any other items, including currency. Stalin's answer implied that the West had forfeited its Berlin rights by encouraging a West German government in the three Western zones. Smith replied that this would in no way interfere with four-power formation of a central German government. To Smith's surprise, Stalin leaned back, lit a cigarette, and smiled. "Would you like to settle the matter tonight?" he asked.

Stalin said he would agree to lifting the blockade if the West would use the Soviet Deutsche mark in Berlin. This seemed acceptable, but subsequent discussions with Molotov revealed that the Soviets also wanted the West to insinuate that a West German government was dead. In addition, Molotov interpreted blockade removal as not applying to those measures taken prior to June 24. It was a typical Communist use of the parley for delay. After weeks of meetings, including another one with Stalin, the four powers sent an ambiguous directive to Berlin with the order that the four military governors should work out the details on lifting the blockade. Since the Soviets already had broken up the Allied Control Council in Berlin, it was too much to expect that the Council could agree on those details that Smith had been unable to resolve with Molotov. This was a sad diplomatic defeat for the West and a crisis for Berliners' morale. Inevitably, the Berlin talks broke down completely on September 7, 1948.

The National Security Council met two days later to consider the collapse of diplomacy. Secretary of State Marshall pointed to the Communist-inspired riots which had recently smothered the Berlin City Hall, and concluded that time was on the side of the Soviets. Forrestal wanted the President to authorize planning for use of atomic bombs if necessary. But the National Security Council opted to wait. It was not winter yet, and though the airlift was still marginal, perhaps there were other possibilities for diplomacy to explore.

Following several exchanges of notes with the Russians, the US submitted a complaint on the whole situation to the United Nations on September 29. The United Nations studied the problem for many weeks and finally recommended a solution which was remarkably similar to the plan that Ambassador Smith had agreed to in August. Such a scheme already having failed, the Allies rejected the UN solution.

The Airlift Succeeds

While the diplomats studied and quibbled, and the B-29s sat unused on the hardstands in Cambridgeshire, the C-54 pilots and ground crews simply renewed their "forty-five-day TDY" orders and continued the sorties to Berlin. The airlift slowly picked up steam, and the threat of war diminished. In July, 2,000 tons a day were delivered, and almost half of that was carried by the British. In August, with the Hump's famous Maj. Gen. William H. Tunner now in charge of the US airlift and some 126 C-54s already on hand, the American share increased to 3,000 tons and the total to 4,000 tons daily. Berlin still had a thirty-day stockpile.

During the fall the Soviets tightened the blockade and formed their own government for Berlin; the only result was to stiffen the resolve of West Berliners to suffer through the winter. The Russians then increased harassing "incidents," such as radio interference, use of searchlights in the landing pattern, and air-to-air gunnery practice or buzzing in the corridors, but these tactics did not stop the airlift either.

A spell of bad weather in November and December was touchy—coal stocks got down to nineteen days. But British and American efforts were combined in

(Continued on page 76)

At last, jet engine maintenance gets off the ground.

This is one of those breakthroughs in aviation. Like the jet engine itself. Or when radar came in.

We've developed a maintenance system that keeps track of the wear in jet engines *while the plane is in the air*.

It's done by an electronic device which we hook up to various points in the engine. And which checks out the performance much the way an electrocardiograph checks your heart.

This will tell us more about our engines than any crew could ever observe during flight, or any maintenance man could ever see on the ground. We'll be able to see a repair job coming long before it's needed.

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We're calling this new program "Monitored Maintenance," and it's been approved by the Federal Aviation Agency.

It's now on some of our planes. And we're working on having it for our whole Astrojet fleet.

What a way to fly!

Fly the American Way

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To keep up morale, especially among the children, Air Force men initiated "Operation Little Vittles." Here Lt. Gail Halvorsen's aircraft trails packages of candy over Berlin.

one Task Force under Tunner, another airfield was opened in the French sector of Berlin, and there were plenty of aircraft. The US now had 300 of the nine-ton capacity C-54s, with 200 flying the corridors and another 100 in support or maintenance. (Ironically, the same job could have been done with about 100 of the twenty-five-ton C-74s, but only twelve had been procured; a dozen of today's new C-5As would have been enough.) In January 1949 the weather improved, and the daily haul was over 5,000 tons; it was evident to everyone that Berlin could be supported through the winter.

Eventually, in the spring, the Berlin Airlift reached an 8,000-ton average with a peak of 13,000 tons in one day. The 277,000 flights over a fourteen-month period carried 2.3 million tons to Berlin, three-fourths of it by Americans. It cost the US taxpayers some $300 million.

Nothing like it had ever been done before. Stories of humor, humanity, and heroism were endless. Typical was "Little Vittles," started by Lt. Gail Halvorsen with a few bags of candy tied to handkerchiefs for air-drop to the children of Berlin. A Tempelhof Airdrome monument tells a more somber story of the courage and sacrifice of sixty-eight American, British, and Germans who gave their lives for the airlift.

Because of the steadily increasing drone of the Skymasters which, cornucopia-like, continually extended Berlin's food reserves, the West never really had to make a decision beyond Clay's initial reaction to the blockade. The threat of the ground blockade gradually receded both in urgency and importance. Like the previous cold war crises in Turkey, Greece, and Western Europe, the 1948 Berlin Crisis did not die so much as just fade away.

Meanwhile, progress toward a US-oriented West German government was being made in Bonn, thanks to the Marshall Plan and to the blatant Soviet efforts in Berlin. The Western Europe nations which had signed the Brussels Pact in early 1948 had, by the end of the year, agreed to a common military organization. They had entered detailed discussions which were to lead to the North Atlantic Treaty Organization in April 1949. The West also started a counterblockade against East German trade that became increasingly effective in early 1949.

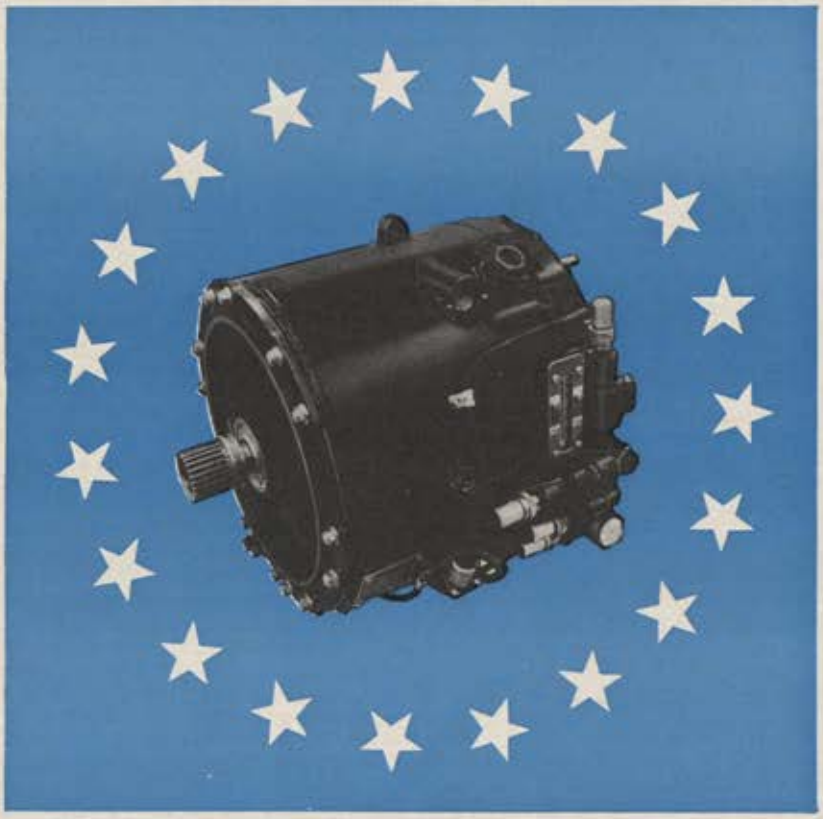
It was not surprising that the Russians decided to cut their losses. At the end of January 1949, Stalin answered a number of press questions, indicating among other things that the Berlin Blockade might be lifted if the West's counterblockade were ended. This opening led to secret Russian-American negotiations at the United Nations, ending in early May with the announcement that the blockade would be terminated. On May 12, 1949, trains and trucks began to roll toward Berlin from the west. That same day a West German constitution was approved, thus establishing within the month a West German Government under Dr. Konrad Adenauer. Although flights continued for another three months in order to build up enough Berlin stocks for any future contingency, the Berlin Blockade had ended.

Conclusions

The Berlin Blockade of 1948 was the first eyeball-to-eyeball confrontation of the United States and Russia in the cold war, and the Russians lost. It was a

(Continued on page 79)

Air traffic controllers during the airlift had a tougher job than the pilots, keeping a fantastic amount of traffic separated in the midst of the never good German weather.



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Members of the Navy Squadron VR-6 rejoice at the lifting of the Berlin Blockade. Although the blockade ended on May 12, 1949, the airlift continued through September.

hesitating, indecisive, back-pedaling victory for the West, but a victory nevertheless.

Having had three postwar years to digest their huge gains in East Europe, and recognizing that the West was beginning to straighten out the chaos of the West German economy, the Soviets made a grab for that country before it was too late. Shrewdly, the Kremlin saw Berlin as a pressure point which, depending upon how the West reacted, could yield one of two prizes. Pressure on Western rights in Berlin could obtain major concessions toward delaying West German recovery. This would give the Communists a greater chance to win all of Germany. Or, if the West refused to make such concessions in order to stay in Berlin, the continuing blockade would force them out ignominiously and Russia would take the lesser prize—Berlin itself.

With their plan completed by March 1948 (and sensed by Clay), the Russians began applying pressure in small steps (a technique strikingly like the tactics currently being employed by East Germany toward West Berlin). Knowing the Western desires for peace, the Soviets had only to keep the action below the boiling point of war, with always an avenue for graceful retreat in event of an unexpectedly violent Western reaction. On June 24, using the currency issue as a pretext, the blockade was sealed.

America, caught in a corner strategically and geographically, had but two means to call the bluff: ground forces and nuclear airpower. Yet American ground forces were hardly a deterrent to the Russians. Though Clay, Murphy, and the Berliners wanted to send an armed convoy to Berlin, many had doubts. Brig. Gen. Frank Howley, tough American Sector Commandant in Berlin, later offered his evaluation of the situation: "We would have got our *derrières* shot off." An armed excursion to Berlin would have demonstrated American resolve, but it simply was not compatible with the entire direction of American postwar policy. It was politically unacceptable, as well as militarily risky.

American nuclear airpower was displayed by the B-29s sent to Europe, and the use of atomic bombs was discussed in Washington after the blockade began. But it was all very quiet and secretive. For reasons that are still obscure, A-bomb deterrence was not exploited as it was later, for example, in the "massive retaliation" strategy of the 1950s or in the 1962 Cuban Crisis. Perhaps the reason is twofold. As revealed since by unclassified writings, including those of Forrestal and of David E. Lilienthal, Chairman of the Atomic Energy Commission at the time, the A-bomb stockpile in 1948 was much smaller than the public thought it was. A-bomb deterrence in the late 1940s existed much more in fancy than in fact. Secondly, America did not yet know how to apply deterrence effectively with those few A-bombs she *did* have. For instance, the B-29s did not help negotiations and succeeded only in preventing any escalation beyond the blockade, but it appears that Russia's basic Berlin strategy never intended such action anyway.

Lacking a decisive response to the blockade, America could only improvise and attempt pitiful negotiations. To everyone's amazement, positive results of America's nonviolent improvisation began to emerge in the summer of 1948. It began to appear that, just possibly, the airlift alone might be capable of supporting Berlin. The Soviets had underestimated the airway loophole. Also, the West Berliners, and indeed all of Germany and Western Europe, reacted to the aggression much more strongly than anyone on either side had expected. Repelled by the cynical use of Communist power, and reassured by the airlift, the Germans became such staunch supporters of Western freedom that the Soviets, instead of winning a prize, began to lose it. Western Europe, similarly warned of political danger and of economic danger to the Marshall Plan, aligned itself solidly behind NATO. At this point, Stalin called off the blockade.

From the strategic standpoint, all the odds had favored the Kremlin, and the US knew it. Yet, thanks largely to the efforts of Clay, the airmen, and the Berliners, plus Truman's determination, Western luck prevailed. Despite America's ineffectiveness on the ground and her inability to apply the deterrent power of the A-bomb, transport aircraft saved Berlin and possibly West Germany. The Communists, as was shown by the 1949 peace campaign and by the 1950 Korean aggression, were forced to devise new strategies in new areas.—END

Lt. Col. Kenneth L. Moll is assigned to the Joint Command and Control Requirements Group of the JCS. A 1950 West Point graduate, he flew F-80 fighter-bombers in Korea and T-39 jet transports in Vietnam. He has served also in Air Defense Command, Strategic Air Command, and Hq. USAF. This is his second article for AIR FORCE/SPACE DIGEST; *it is based on material in his history master's degree thesis, "Nuclear Strategy, 1945-1949," prepared at the University of Omaha.*

Bob Stevens'

"There I was..."

Can it already be twenty years since USAF's first big pilot reconversion program when Mustang and Thunderbolt jocks joined their two- and four-engined brethren in flying the big, fat, slow birds on the tightrope to Berlin? They did a lasting job. Berlin today may still have problems, but two-thirds of the city remains free.

SOMETHING **HAD** TO BREAK THE MONOTONY – AND, AS USUAL, IT WAS GI-INSPIRED SONGS AND DITTIES

TALK ABOUT FAST TURN-AROUND TIMES! GANDER AT THE BRIEFING TEAM AT WORK IN A C-54 AT 'BIG B'

AND THERE WERE THOSE BIERSTUBE LOTHARIOS–

WEARY? MAN, THOSE EARLY DAYS WERE *TOUGH* ON A GUY!

IT ALL SEEMED WORTH IT WHEN SOME SCRAWNY GERMAN KID OFFERED HIS OR HER MOST PRIZED POSSESSION TO YOU IN GRATITUDE~

For three months, from May to August 1918, the fledgling Air Service carried the mail in an experiment that proved the feasibility of regular airmail service. Surmounting the difficulties of undependable equipment and inexperienced pilots, the Air Corps completed more than ninety-five percent of the scheduled airmail flights. The job was then given back to the civilians until 1934, when, for another three-month period, military pilots took over the job. Beset by political pressures, inadequate equipment, and lack of preparation for the job, they were criticized from all sides and relieved of the mission after three months, but had set a magnificent record, flying 13,000 hours, 1.5 million miles, and carrying more than 777,000 pounds of mail . . .

When the Air Corps Carried the Mail

By Col. Carroll V. Glines, USAF

This article is based on the author's most recent book, *The Saga of the Air Mail*, which has just been published.

ONE ENTRY in the chronology of significant Air Force events is often overlooked. It shouldn't be, for this single event influenced the future of commercial aviation as few could have imagined at the time and even fewer now recognize.

The date was May 15, 1918. At 11:00 o'clock that morning, Lt. George L. Boyle, a young, inexperienced Army Air Service pilot, gave his modified Curtiss JN-6H the throttle at Potomac Park in Washington, D. C. Inside a specially built compartment where the front seat had been was the first load of official United States airmail. The Post Office Department had invited the public and press to witness this takeoff of "the first plane in history to carry mail at an announced time to and from designated places on a regular schedule irrespective of weather." For the next three months, the Air Service was to carry out a bold experiment to determine whether such a mission could indeed be accomplished.

As far as the press and the Post Office Department were concerned, Boyle's takeoff was the culmination of a public promise that already had been fulfilled.

What few knew then or later was that the flight almost didn't come off and when it did that the inexperienced Boyle lost his way and crashed at Waldorf, Md., only twenty miles away. The mail did not leave Washington by air until the next day.

But Boyle's abortive attempt was significant, and the success of the three-month experiment conducted by his fellow Air Service pilots proved beyond a doubt that mail could be flown "on a regular schedule irrespective of weather."

It is not quite clear who should be credited with the idea of first using airplanes to carry mail. Actually, the first aircraft flight with mail aboard which was sanctioned by a government postal system took place on September 9, 1911, when Gustave Hamel carried a mail pouch from Hendon, near London, to Windsor Castle—a distance of about twenty miles. Two weeks later in the United States, Earle Ovington was sworn in as "Airmail Pilot No. 1" and flew in a Blériot monoplane with a bag of mail in his lap from a field near Garden City Estates, Long Island, to a post office at Mineola, seven miles away. Between September 23 and October 1, 1911, he carried 32,415 postcards, 3,993 letters, and 1,062 circulars.

These early flights were admittedly stunts. But during the early years of World War I, several attempts were made to establish airmail service between major US cities. Finally, a reluctant Congress made funds available in the Fiscal Year 1918 budget to conduct an official experiment between Washington, Philadelphia, and New York.

According to most historical accounts, Second Assistant Postmaster General Otto Praeger was the spark plug behind the idea. No one in the Air Service was particularly interested in the fanfare that the Post Office publicists were generating. There was a war on, and the advance publicity did not mention that Air Service pilots would be tapped for the job.

The first man to be officially aware that he was to be actively involved in establishing the nation's first official airmail route was Maj. Reuben H. Fleet. Assigned to Washington as executive officer to Lt. Col. Henry H. "Hap" Arnold, Fleet's job was to worry about training pilots at thirty-four fields and trying to start a flow of combat pilots to France. Fleet, a broad-shouldered man who one day would be president of his own aircraft company, thought he had enough problems until he was summoned to the office of Secretary of War Newton D. Baker and asked to select four pilots, obtain six planes, and set up an airmail route linking Washington, Philadelphia, and New York. It was May 6. Fleet was told he had nine days to accomplish his objective.

When Fleet tried to explain that the Air Service had no planes that could fly from Washington to Philadelphia and New York, he was told that he had to find a way to make them do it. When he asked for six pilots instead of four, it was explained that the Post Office Department would choose the two other Air Service pilots based on recommendations from officials close to the Department.

Fleet immediately went to work. He asked Col. Edwin A. Deeds, Chief of Air Service Production, to modify six new JN-6H aircraft at the Curtiss Aeroplane and Motor Corp. at Garden City, Long Island. "Have your people leave out the front seat and the front set of controls," Fleet asked, "and put a compartment to carry mail bags up there."

Fleet also asked to have double gas and oil tanks installed to extend the range of the Jennies.

Fleet chose four of the best pilots he could find: Lts. Howard P. Culver, Torrey H. Webb, Walter Miller, and Stephen Bonsal. The Post Office Department asked the War Department to assign Lts. James C. Edgerton and George L. Boyle. Both were new graduates of the pilot training school at Ellington Field, Tex.

On May 13, Fleet assembled five of his six pilots at the Curtiss factory, having left Boyle in Washington. Mechanics, engineers, and pilots worked around the clock trying to get the six Jennies in shape to fly. By the afternoon of May 14, however, only two were ready to go. Leaving Webb in charge at Curtiss, Fleet flew an unmodified Jenny to Philadelphia while Culver and Edgerton followed in the two modified planes. That night at Bustleton Field, the trio spent all night trying to get the two mail planes in shape to fly. One gas tank leaked so badly that Fleet jammed a lead pencil in the hole to plug it up. The engines were badly in need of adjustment. By the next morning, one plane was flyable so Fleet brought it on to Washington.

While Fleet had been having his troubles trying to meet the 11:00 o'clock deadline set by the Post Office press releases, another Air Service officer, Capt. Benjamin B. Lipsner, was having his own difficulties. Detailed to the experiment at his own request, he was not a pilot and was in charge of the administrative details. What made him nervous was that President and Mrs. Wilson were to be on hand to witness the first takeoff and there was no mail plane in sight at 10:30.

Pacing back and forth, Lipsner knew he would have to take the brunt of any criticism if the plane did not appear. He had no idea where it was. There were no radios in planes then, and there had been no telephone report from Philadelphia that Fleet had departed.

The President and Mrs. Wilson arrived at 10:40 amid the scream of sirens, followed by new mail trucks with freshly painted signs saying "United States Air Mail Service." Postal officials swarmed around the

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Maj. Reuben H. Fleet steps from his plane after the journey from Bustleton Field, Philadelphia, Pa., to Washington, D. C., May 15, 1918. Map is still attached to his leg.

Lt. George L. Boyle takes off from Washington, D. C., on the historical first airmail flight by the US Army on May 15, 1918. Boyle used the modified Jenny that Maj. Reuben H. Fleet had just flown in from Bustleton Field, Philadelphia, Pa., to Washington in one hour and fifty-five minutes actual flying time.

President, wondering what to tell him when, over the buzz of the crowd, the unmistakable sound of a Jenny engine could be heard.

Fleet circled the Potomac Park field and landed. Photographers crowded around while he got out and showed Boyle the route he had flown. Fleet sensed from Boyle's questions that he was dealing with an inexperienced pilot, but it was not his choice that Boyle was to have the honor of making the first flight.

After an embarrassing delay because someone had forgotten to refuel the Jenny, Boyle took off, narrowly missing the trees at the far end of the field. The crowd dispersed. Lipsner went to his office to await the telephone reports that would tell him that Boyle had passed his mail bags to Lieutenant Culver waiting in Philadelphia. Webb had left New York with the southbound mail, and Edgerton was ready to receive it in Philadelphia for the final leg to Washington. Fleet had left for the White House, where he was presented with a gold watch to commemorate the event.

Boyle called just about on schedule but he was calling from Waldorf, Md.—twenty miles *southeast* of Washington. He had landed in a farmer's pasture and had nosed over, damaging the Jenny's prop. The other flights departed as scheduled except that Culver had only mail from Philadelphia aboard since he had no mail from Washington to take on to New York.

The three-month Air Service experiment was successful with more than ninety-five percent of the scheduled flights completed. When it was over, the job was given back to the Post Office Department. Civilian pilots took up where the military pioneers had left off. One snafu made those first flights memorable, at least to stamp collectors. One sheet of the world's first official government airmail stamps, issued especially for the occasion, was printed with the airplane upside down. W. T. Robey, an avid stamp collector, bought this sheet for $24 and made philatelic history. A few weeks later he sold the sheet for $15,000. Today, a single stamp is valued at about $4,000. A block of four (only seven such blocks are known to exist) is valued at more than $30,000.

Between August 1918 and 1927, the airmail was flown by the pilots and ground crews of the "U.S. Aerial Mail Service." Service was expanded in the years following, but flights on regular schedule, in all kinds of weather, presented new problems. Gradually, the difficulties were overcome and an encouraging percentage of successful flights was attained. Most of the larger cities were connected by airmail routes. Section by section, new feeder routes were pioneered. The Chicago-Cleveland leg was opened on May 15, 1919—the first anniversary of the original flights between Washington and New York. The Cleveland–New York leg began on July 1, 1919, the Chicago–Omaha section on May 15, 1920, and the Omaha–San Francisco route on September 8, 1920.

With the opening of this last leg, letters, traveling in daylight hours only, took three days to go from coast to coast. On February 22 and 23, 1921, Air Mail Service pilots recorded the first day-night mail flight from San Francisco to New York. Total elapsed time was thirty-three hours and twenty-one minutes. Actual flying time was twenty-five hours and sixteen minutes —at an average speed of 104 miles per hour over the 2,626-mile distance.

Once day-night operations were proved possible, radio service and flashing beacons were provided along the airways. Regular day-night service then was inaugurated officially on July 1, 1924.

Operations were transferred to private operators under contract to the Post Office Department in 1926 and 1927. But even then, the idea of sending letters by air had not been fully accepted by the public. Most businessmen sent carbon copies by train "just in case." The newly born airlines, realizing that their corporate lives depended on getting the public to send more mail by air, tried to work up interest. It was slow going, and some lines faded away or merged with larger ones.

It was inevitable that people would want to travel as fast as their mail. They came singly at first, usually on "life-or-death" missions or important business trips. It cost $400 to fly from coast to coast, and the average trip took thirty-two hours of flying time with fourteen stops en route.

Airmail pilots at first treated passengers as interlopers who looked over their shoulders and asked too

Maj. Gen. B. D. Foulois, left, Chief of the Air Corps at the time the Army took over carrying the mail once again in 1934, did not agree that it was a black day for the Air Corps. In his opinion, the service and the public gained more than they lost, in terms of experience and education, from the difficult task.

many questions. But the airline owners soon realized that the income from passengers was "gravy" because the planes had to make the trips anyhow.

Progress was rapid after 1927. The relatively primitive mail planes with only one or two extra seats were replaced with larger craft capable of carrying twelve passengers or more. After Lindbergh's epic flight in May 1927, national interest in commercial aviation boomed. Lindbergh toured the country urging cities and towns to establish airports and pointed out the rapid growth that was to come.

Airports were carved out of the landscape all over the country, and the Post Office Department was flooded with petitions from communities requesting airmail service. By the end of 1933, the original 218-mile airmail route had expanded to 27,079 miles. During that year, the contract airmail carriers flew more than thirty-five million air-miles.

In 1934, the growing air transportation industry received a severe setback. Following a period of growing dissatisfaction among airline operators and charges of fraud and collusion in obtaining contracts, President Roosevelt canceled all airmail contracts on February 9, 1934. The job of flying the mail was turned over to the Army Air Corps, then under the leadership of Maj. Gen. Benjamin D. Foulois.

Some writers have called the period "a black chapter in the history of American military aviation." It was not so, at least as far as Bennie Foulois was concerned. He considered February 9, 1934, one of the three most significant dates in Air Force history. (The first was December 17, 1903, when the Wright brothers first flew. The second was March 19, 1916, when the 1st Aero Squadron took off for Mexico to look for Pancho Villa on the first air combat mission in US history.)

Why did General Foulois quarrel with the historians? "Because we always learned more from our failures than our successes," he told me. "We had a tenth-rate air force in 1934, consisting of obsolete airplanes and untrained pilots. The Depression was on, and the Congress couldn't see putting any money into military aviation. The tragic deaths of the Army pilots during those four months focused attention on the pitiful state of the Air Corps as nothing else could."

Actually, the entry of the Army Air Corps into the airmail business again was not a planned move. General Foulois had been invited to attend an informal meeting with Second Assistant Postmaster General Harllee Branch on the morning of February 9 to discuss a number of aviation policy matters. During the conversation, Branch casually asked Foulois, "If the President should cancel the airmail contracts with the commercial operators, do you think that the Air Corps could carry the mail to keep the system operating?"

Foulois thought a moment. There were no cargo planes worthy of the name in the inventory, and none of his pilots had flown regular routes on instruments or at night. However, the old bombers and observation planes could be converted for mail carrying, and the pilots could get some badly needed training which had been curtailed because of the shortage of funds. The funds of the Post Office Department would surely be transferred to the Air Corps. The route structure and volume of airmail carried might have to be reduced because there simply weren't enough Air Corps planes and pilots to duplicate the routes and poundage flown by the airlines.

"Yes, sir," Foulois replied. "If the President wants us to carry the mail, we can do it."

"How long would it take you to get ready?"

Foulois hesitated. He assumed that he would have time to make adequate plans, that all the postal facilities along the routes would be made available, and that he would be provided the necessary funds to operate the planes and pay per diem to the men. With these things assured, flying the mail would be an excellent peacetime test of men, organization, and equipment. He did not know that none of these things were assured and that none of them would come about in full measure. If there were to be failures, he reasoned, they wouldn't occur because Foulois' pilots and mechanics hadn't done their best.

"We could be ready in about ten days," Foulois replied casually, not realizing that the ten days were starting *at that very moment*!

Foulois had a leisurely lunch, then returned to his

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During the 1934 attempt, pilots are changed on US Army Douglas B-7 airmail plane during a stop at Elko, Nev.

office to discuss the possibility with his staff. Afterward, he decided to report his meeting with Branch to Gen. Douglas MacArthur, then Army Chief of Staff. MacArthur met him at the door. "Foulois," he said, "a newsman just told me that the President has released an Executive Order giving the Air Corps the job of flying the mail. What do you know about it?"

This was General Foulois' first notice that the Air Corps would definitely fly the mail. The President had told the press that the Army pilots would begin coast-to-coast operations on February 19 and that all airline contracts were canceled at midnight that same day.

Foulois was shocked, and it was many years before he learned what had happened after his meeting with Branch. The President and Postmaster General James A. Farley had already decided that the contracts were to be canceled, but a firm date was needed. Foulois had provided that date unwittingly when he had told Branch he could be ready within ten days.

Foulois was now committed. Working around the clock, he and his staff decided what units would supply planes and pilots. After discussions with Post Office officials, it was decided that the airmail route structure would be reduced so that the twelve major cities in which Federal Reserve banks were located would be the major terminals and the airways would connect them. Thus, twelve routes would be operated instead of the twenty-six being flown by the airlines. The routes were divided into three zones, with Maj. B. Q. Jones, Lt. Col. Horace M. Hickam, and Lt. Col. H. H. "Hap" Arnold in charge of the Eastern, Central, and Western Zones, respectively. Two hundred officers, 350 enlisted men, and 148 planes were earmarked for mail duty. Instructions were issued to strip the planes of armament, seats, and nonessential equipment. Radios and basic instruments were installed in a few of the planes. By February 15, pilots were making familiarization flights along their assigned routes.

Meanwhile, detractors were criticizing the Administration for the contract cancellation and pointing with alarm at the woeful condition of the Air Corps planes and the inexperience of Army pilots at flying on instruments or at night. Foulois and his staff knew the sad plight of the organization. Very few Army pilots had extensive instrument and night-flying experience for a very simple reason: lack of equipment. None of the planes had the *latest* equipment and very few even had landing, navigation, or cockpit lights. The techniques of flying the newly developed radio beams had been devised by the airline pilots, and only a dozen or so Army pilots knew the basic principles, let alone had any experience or practice. Without instruments or radios in the planes and no training time authorized because of budget limitations, there was no opportunity to learn.

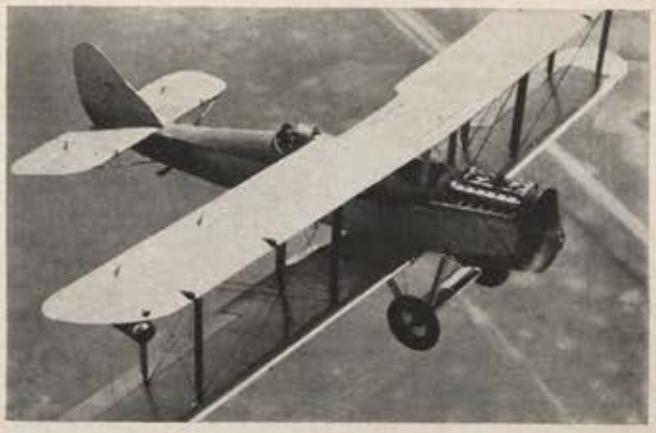
Foulois issued instructions on May 16 to the three zone commanders to "govern their operations with a view to safeguarding lives and property at all times, even at sacrifice to airmail service." He added that the zone commanders must carefully consider the "experience of personnel, suitability of aircraft, night flying equipment, and blind flying equipment."

Almost as this message was being dispatched, an incoming message was telling Foulois of two fatal accidents that had just occurred in Hap Arnold's Western Zone. Lts. J. D. Grenier and E. D. White had crashed to their deaths in a snowstorm while flying an A-12 between Cheyenne and Salt Lake City. Within a short time, Lt. J. Y. Eastham was killed near Jerome, Idaho, when his twin-engine B-7 crashed in a fog at night. Both accidents happened on familiarization flights, and there was no mail aboard.

At the time of the two fatal accidents, Eddie Rickenbacker was in Los Angeles preparing to fly the last commercial airmail flight from coast to coast in TWA's new DC-1. He told the press that the deaths of the three Army pilots was "legalized murder" and predicted that many other pilots would die if the Administration persisted in making the Army fly the mail. With great fanfare, Rickenbacker took advantage of a strong tail wind and landed in Newark to set a coast-to-coast record of thirteen hours and four minutes. He landed just ahead of a violent snowstorm which presaged the worst flying weather the nation had experienced in half a century.

The Air Corps mail operation started smoothly enough as scheduled, but on February 22 Lt. D. C. Lowry crashed to his death south of Toledo, Ohio, with mail aboard. Another pilot crashed near Marion Station, Md., but was not seriously injured. A short time later, Lt. F. I. Patrick, en route to supervise pilots on the midwest run, was killed near Denison, Tex. He was alone and had no mail aboard.

In each of the fatal accidents, weather had been a contributing cause, but the lack of proper instrument and radio equipment and blind flying experience were the major factors. As could be expected, the press, egged on by the airline interests, leaped on these acci-



An Army airmail plane piloted by Halson A. Collison passes over country west of Cheyenne, Wyo., on regular run.

dents as proof that the Air Corps could not do the job.

Another accident occurred the next day. A plane, ferrying a group of mail pilots to their duty station, was forced down off a New York beach. Lt. C. F. McDermott, one of the passengers, drowned. Again, the newspapers reacted violently. On the same day, however, an airliner crashed in Utah killing eight passengers with little mention in the press.

Foulois tightened his restrictions on the zone commanders and issued detailed instructions regarding weather and night operations. The bad weather continued, and the press waited for the next fatality. It came on March 9 when Lt. Otto Wienecke crashed in an O-39 near Burton, Ohio. That same night, Pvt. E. B. Sell, a passenger, was killed near Daytona, Fla., when a B-6 lost an engine on takeoff. Almost simultaneously, a radiogram from Hap Arnold reported the deaths of Lts. F. L. Howard and A. R. Kerwin in a takeoff crash at Cheyenne, Wyo., while flying an O-38.

The press reaction to three fatal accidents in different parts of the country on the same day was explosive. For Bennie Foulois, it meant a confrontation with President Roosevelt in the White House, who demanded: "When are these airmail killings going to stop?"

Foulois' answer was prompt. "Only when airplanes stop flying, Mr. President," he said.

For the next ten minutes, Foulois told the author, he received the worst tongue lashing of his life. Foulois sensed the real reason was not the deaths but the bitter anti-Administration editorials and news stories that followed each accident. The only guidance that Foulois received from his commander in chief at this meeting was to "stop those killings." From that moment on, he realized that he was to be the villain in the airmail drama, an embarrassing episode in the Roosevelt Administration's first term.

Foulois asked and received permission for a ten-day standdown period during which instruments and radios could be installed on all planes to be used on night runs. On March 19, operations resumed and things looked brighter. Brand new Martin B-10s were placed on mail runs, and pilots were ordered through an instrument course at Wright Field conducted by Capt. Albert F. Hegenberger. The route structure was reduced further, and the weather became more kindly.

On March 30, however, one more pilot was killed. Lt. Thurman Wood, flying an A-12, crashed during an approach to Davenport, Iowa. He had flown into a severe thunderstorm and, in trying to reverse course, lost control and spun in.

Foulois was told that the Air Corps would not have to carry the mail beyond June 1. On May 7, the last coast-to-coast run began in San Francisco. Fourteen hours and eight minutes later, the mail was delivered in Newark. Rankled by Eddie Rickenbacker's publicity, the Air Corps pilots wanted to beat his record in a B-10. They didn't match his time of thirteen hours and four minutes, but they figured they had won a moral victory. Foulois' pilots had made three more stops than Rickenbacker had and had flown 279 more miles on their assigned route.

On June 1, the last pouch of airmail was delivered by an Air Corps pilot and an important chapter in the history of the Air Force came to a close. The three months of hardship, packed with tragedy, had called attention to the pitiable state of American airpower as nothing else could have, short of war. Valuable lessons were learned, not only by the Air Corps but the nation as well. That's why Foulois considered it a significant milestone.

A load of mail from a US Post Office truck is put aboard an Army airmail aircraft during a stop at Denver, Colo.

In a letter to General Foulois after the last flight, Postmaster General Farley predicted that "the country and the Congress will, without doubt, give more adequate support to the Army, will see to it that it has the most modern equipment obtainable, and that sufficient funds are provided for the flyers to have the additional hours of flying which has so long been needed." He thanked Foulois for the commendable service his men had rendered and added, "Had it not been for the Army Air Corps the country would have been without any airmail service for a period of more than three months. It is a notable fact that not a single pound of mail was lost during the time the Army had flown the airmail."

The Air Corps left the airmail business without any other words of praise, but it had set a magnificent record. The pilots had logged more than 13,000 hours of flying time, had flown more than 1.5 million miles, and had carried more than 777,000 pounds of mail. A number of speed records had been set between points on their routes. But their greatest accomplishment was their valiant struggle to provide a vital service to the nation. They knew the personal odds involved, but they knew that what they were trying to do collectively was worth the risk.

Historians can forget the three-month mail-carrying experiment of 1918 and condemn the three-month experience of 1934 if they want to. In this fiftieth anniversary year of those original airmail flights, however, maybe it is time we gave those brave pilots, crewmen, and supervisors the credit they are due. We owe them more than they have ever been given credit for before.—END

The author, Colonel Glines, is Chief of Public Affairs for the Alaskan Command. During his years in the Air Force, which have included teaching AFROTC and heading the Magazine and Book Branch in the Pentagon, he has written numerous books and contributed frequently to AIR FORCE/SPACE DIGEST *and other magazines. Most recently he has been doing a series of historical articles for AF/SD including "The Day Doolittle Hit Tokyo," April '67, and "The Forgotten War in the Aleutians," March '68. This article is based on Colonel Glines's new book* The Saga of the Air Mail, *just published by D. Van Nostrand Co., Inc.*

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LETTER FROM LOS ANGELES

By Irving Stone

WEST COAST EDITOR, AIR FORCE/SPACE DIGEST

More Booster for the USAF Buck

Air Force planners for space operations are witnessing a tug of war between future booster requirements and the paucity of dollars available for new programs. And the dollar shortage appears to be winning.

Against this background, a general wrapup of future space booster requirements was outlined recently by Maj. Gen. J. S. Bleymaier, Deputy Commander for the Air Force's Manned Orbiting Laboratory (MOL) program, at a joint American Institute of Aeronautics and Astronautics/Aerospace Corporation symposium in Los Angeles.

The MOL is a critical program for the Air Force. General Bleymaier didn't target the MOL specifically in his analysis, but it's known that any substantial growth version of this space vehicle would be too large and too heavy for the capability of the Air Force's currently projected Titan IIIM booster. The Titan IIIM, an improved version of the operational Titan IIIC without its upper transtage, would use longer, strap-on, solid motors and higher-thrust, liquid engines in the core vehicle, to produce approximately one-third more push than the 25,000-pound-payload capability of the Titan IIIC from the Eastern Test Range. For launch from the Western Test Range for polar orbit, applicable to the MOL and most Air Force space launches, payload capability would be lower because of loss of the effect of the earth's west-to-east rotational speed.

The major capability gap in the present inventory of space boosters lies between the Titan IIIC (approximately 25,000 pounds of thrust) and the National Aeronautics and Space Administration's Saturn V, for the Apollo lunar program, with its payload capability of approximately 250,000 pounds. But the focus obviously is on a payload capability in the general midrange of this considerable span.

General Bleymaier declares, "I think there can be no doubt, however, that the 100,000-pound booster, or something in the general neighborhood of that capability, is our next logical step in booster development. How long it will be in coming depends upon many factors. Not the least of these are the tightening squeeze on space funds—especially evident in the drop in the 1969 civilian space budget—and the fact that advanced space programming is beginning to show an unfortunate loss of momentum. The pacing factor is not, as it was in the early days, the state of the art; it is the state of the budget and the resultant necessarily cautious slowdown of the complex machinery of program decision and approval . . . ."

Nevertheless, General Bleymaier views the underlying situation objectively. Actual degree and immediacy of the need for a 100,000-pound booster still is a subject for lively debate, he admits, as the data essential to a decision is accumulated. Detailed study of projection of current missions does not provide a definitive answer to the question.

The projections for future systems do not always reveal a need for greater payload capabilities than those available, primarily because mission planners consistently tend to plan future systems around known launch vehicle capabilities. Especially in today's climate of increasingly stringent requirements for justification, review, and re-review of proposed programs, the payload planner does not want to propose a system keyed to a launch capability that does not exist or is not firmly programmed, General Bleymaier underscores. But there's little doubt, he contends, that if the larger payload capability were to be developed, payload planners would be quick to put it to good use.

A number of approaches for configuring a 100,000-pound-payload booster are being studied. Extensive feasibility studies have been made of a joint NASA/Department of Defense intermediate launch vehicle for operation in the mid-1970s which might include as its third stage a lifting-body vehicle with variable-sweep wings to facilitate controlled landing on airfields. An alternate possibility for this third stage might be an Apollo-type space capsule. Payload capability of this intermediate launch vehicle would be somewhere in the range of 25,000 to 250,000 pounds, but no decision has been made for development of such a booster, General Bleymaier emphasizes.

Among growth possibilities for the Titan boost vehicle to fill existing payload gaps, the prime candidate is the Titan IIIG. This configuration, as yet merely a projection, would use an increased diameter (probably 180 inches) for the liquid-propellant core vehicle, plus two 156-inch-diameter strap-on solid motors, to provide a capability of approximately 100,000 pounds of payload in low earth orbit. Another variation involving 120-inch-diameter, strap-on, solid motors coupled to a liquid-propellant core vehicle with only its first stage increased in diameter could loft a 42,000-pound payload.

In an unconventional assault on the booster cost problem for the past three years, the Air Force has been studying the concept of a new breed of launch vehicle which it calls (unofficially) "the big dumb booster" (BDB). This minimum cost design was the subject of an extensive briefing for the industry the latter part of May at USAF's Space and Missile Systems Organization (SAMSO). This concept represents an approach 180 degrees divergent with traditional Air Force thinking on space launch systems.

Basic thinking on the BDB is that tradeoffs must be made among various booster requirements to produce a compromise vehicle design of minimum cost. For instance, if heavier hardware can be used of lower unit cost and

inherently higher reliability, greater simplicity of design becomes possible, General Bleymaier points out. The key to such a booster, he adds, is the propulsion system, and some few further low-cost developments in propulsion technology will be necessary before the minimum cost vehicle can become practical reality. As it shapes up now, the propulsion system would be the simplest of designs, utilizing a storable bipropellant with pressure-fed stages fitted with single ablation-cooled engines. The first stage would be designed to be recovered after letdown in the sea and refurbished for reuse.

Even with low production runs, such a "large economy-size" booster, it is felt, could put payloads in the 40,000-pound class into low polar orbit for less than $100 per pound without recovery of the first stage. With first-stage recovery, plus other design cost savings, it's possible that this cost can be cut by more than half, General Bleymaier contends. By comparison, for the 1970 time period it's anticipated that delivery cost to low-altitude orbits will be approximately $450 to $500 per pound and delivery to a synchronous equatorial orbit (approximately 22,300-mile altitude) would be about ten times that much.

Details of the BDB configuration were not revealed by General Bleymaier, but indications are that the basic version would be about twenty-seven feet in diameter and perhaps 300 feet high. Development time through the first flight would be about five years. Industry estimates are that the development costs may run somewhere between $700 million and $1 billion.

General Bleymaier does reveal that there is a healthy variety of opinion within the Air Force concerning the best approaches to minimum cost. The BDB, as a revolutionary about-face from the deeply ingrained perfectionism of traditional aerospace design, generates both great enthusiasm and some uneasiness among Air Force engineers and those of the aerospace industry, he admits. But there is little doubt, he adds, that the concept of designing for minimum cost must be a main current of thinking for future space boosters.

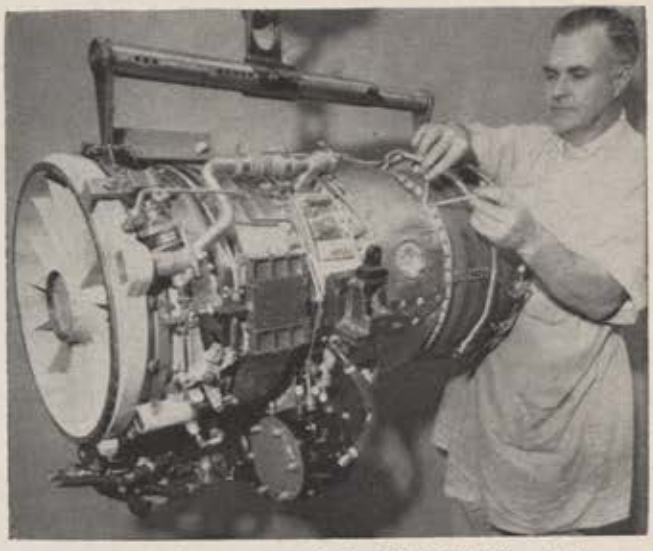
Aerospace engineers agree with General Bleymaier's sentiments for minimum cost, but some feel that the development costs for the BDB plus the budget squeeze makes it unlikely that this booster will be approved for development by higher authority.

It is a routine matter for Air Force development planners at SAMSO to examine the feasibility of new boosters. One of the recent efforts has been a group of studies called "Savings in Space Operations" which analyzed throwaway (unrecoverable) and recoverable boosters. The recoverable boosters were vertical and horizontal takeoff configurations, both being configured for horizontal landing on return to earth. These have been examined in the context of existing technology, and it is evident that they could be built within the next five to seven years.

But there's the question of justification. In the case of all new boosters the problem is to amortize the cost of the system, and this is viewed in context with the current systems which have a good capability. In the associated cost-effectiveness analyses and the tradeoffs involved, the total cost of the systems on hand always defeat the cost necessary to develop a new system. Thus, it always appears that a next-generation booster will not be built unless the decision is made that the constraints being used are merely representative. For example, the effectiveness analysis is always performed within a given "mission model"—the number of missions and payloads per year are specified to indicate the number of launches and the range of payloads. With the limitations of such a mission model there usually is no way to justify a new booster system.

Also, weight of the payload required to be lifted is not

(Continued on following page)



Technician works on one of six GE YJ85-19 turbojet engines, each with 3,015 pounds of thrust, that power the Lockheed XV-4B Hummingbird. Four provide direct lift, while two are horizontally mounted for forward thrust, plus providing vertical thrust in hover and transition.

Rolled out at Lockheed's Marietta, Ga., plant on June 4, XV-4B will be employed in testing handling qualities and control systems for VTOL planes. Flight tests of Hummingbird, only US development aircraft with direct jet lift capability, will begin in August at Marietta plant.

Originally built for US Army, Hummingbird has been modified for Air Force tests at Lockheed's "Possum Works" in Marietta. Note air inlets for four direct-lift engines in upper fuselage. Plane will be used in developing control characteristics for future Air Force VTOL fighter projects.

always the crux of the problem because any reasonable range of payload weights could be handled now with the existing stable of boosters. With the Titan III booster several ways could be devised for putting together a very heavy payload in orbit by multiple launches. This is the philosophy that would militate against the development of a new system such as the BDB, unless the anticipated frequency of launches plus payload requirements warrants the expenditure to develop the booster.

The question of a manned, maneuverable, and recoverable upper stage presents a different situation, since no such stage has yet been built. It's not like starting off to build a new booster when a stable of boosters already exists. SAMSO has examined multipurpose, manned, reusable spacecraft, and it appears that if the vehicle is planned to be used more than a dozen times or so, reusability pays off, just as it does for an aircraft. With reuse there are significant savings very early in the program, hence it makes sense to design reuse into the vehicle from the beginning. SAMSO will "defend" such a program this year before the Defense Department.

The vehicle would be a logistics spacecraft with a manning capability for up to nine astronauts. The configuration likely will be a lifting body with a footprint (landing area confines) greater than that utilized for the X-15 research aircraft. However, the management of deceleration energy and landing approach for the lifting vehicle would be similar to that for the X-15. Variable-geometry wings is one concept being examined for the landing phase to provide a capability which closely approaches high-speed jet aircraft performance.

The conceptual study for the lifting vehicle was completed in March and is being evaluated. Aerospace companies involved in the study included McDonnell Douglas, Martin, and General Dynamics. Lockheed Missiles and Space Co. has been working on a different concept for the Air Force's Aeronautical Systems Division. The studies are being coordinated, and the efforts have included examination of some fifty different configurations generated by ASD's Flight Dynamics Laboratory. Basically, SAMSO looks at the operational application of the vehicle, while ASD examines what new technologies are necessary. It's likely that a preliminary design study will be initiated by SAMSO within a year or two, to be followed by a contract-definition phase, probably in the early 1970s.

The manned maneuverable logistics vehicle concept also would be adaptable to an escape device for space station personnel. Last November SAMSO completed a basic study relating to escape. The analysis considered the emergencies, their severity and durations from the point of view of relationship of the space station, the logistics vehicle, and the rescue places on earth—the Western Test Range and the Eastern Test Range. Indications are that the astronaut in the space station probably couldn't be reached in a matter of hours, perhaps as much as twelve hours, and that all the fatalities which might occur probably would happen in a matter of minutes. Thus it appears much simpler and more practical to provide the space station with an escape vehicle to permit the astronauts to quit the space station rather than have them wait in the disabled station for possible rescue with some earth-launched vehicle.

SAMSO hasn't yet approached the stage of picking specific technologies or to design the escape system, but this phase of the work may be initiated this year. SAMSO and NASA are coordinating their efforts through the Escape Technical Review Committee, comprised of personnel from both organizations, for the exchange of ideas and data.

Tacnavsat Contracts

Parallel nine-month studies of an Air Force tactical navigation satellite (System 621-B) are being conducted by Hughes Aircraft Co. and TRW Systems Group under $491,500 and $492,464 contracts, respectively, from USAF's Space and Missile Systems Organization.

The satellite will have triservice application for a quick precision-fix for high-speed aircraft in tactical missions, and for ships and ground forces. Teledyne Systems Co. and Texas Instruments Co. will be subcontractors to TRW in the study. Hughes will be assisted by Magnavox and General Precision. *(See also p. 174, April '68 AF/SD.)*

Drop Tests of SRAM

Drop tests of a wing-mounted dummy version of the Air Force's AGM-69A short-range attack missile (SRAM) have been initiated with a B-52 flying low at high speed over the Smoky Hill bombing range near Salinas, Kan. The tests are targeted to provide data on the missile configuration's aerodynamic characteristics and to verify design of the missile mount and launch mechanism. Drops of SRAM dummies from a B-52 were conducted late last year.

Meanwhile, indications are that problems are being encountered in the development of the solid-propellant pulsemotor for the missile by Lockheed Propulsion Co., subcontractor for the rocket motor.

The missile now is in development at Boeing for USAF's Aeronautical Systems Division for application to the FB-111 and late versions of the B-52, as a nuclear-tipped weapon for standoff launch against strategic targets. The models G and H of the B-52 are now expected to be in service until the mid-1970s.

Beryllium Rudder Flies

An Air Force YF-4E Phantom is being used as a flying test-bed for a developmental version of a beryllium rudder. Constructed by McDonnell Douglas under a structural beryllium technology program sponsored by USAF's Flight Dynamics Laboratory, Wright-Patterson AFB, Ohio, the rudder will be subjected to sixty hours of testing within the next nine months. Maneuvers will produce critical load conditions for recording of strains and actuator loads.

The beryllium installation in the experimental F-4 weighs about twenty-two pounds less than the sixty-four-pound conventional aluminum rudder used on the production F-4s, as a result of weight savings in the rudder structure, associated balance weights, and the elimination of a flutter damper because of the beryllium rudder's stiffness and lighter weight. Beryllium has a strength comparable to aluminum but is approximately four times stiffer and about thirty percent lighter.

Boron Door for F-104

Boron-epoxy-laminate fire-access door for the F-104 has been developed by Lockheed-California Co. in a research program sponsored by USAF's Aeronautical Systems Division's Materials Laboratory, Wright-Patterson AFB. Five of the doors will be subjected to laboratory and flight trials to establish feasibility of the boron laminate for production of future aircraft components.

Lockheed-Georgia Co. is working on development of coating compounds to improve fatigue endurance in metals. Research is being projected to couple corrosion resistance characteristics with the fatigue coatings for application in paints for sealants.—END

THE BULLETIN BOARD

News and Comment about Air Force People . . .

By Jackson V. Rambeau

AFA DIRECTOR OF MILITARY RELATIONS

A Break for EAD Reservists (Part II)

In the January issue of AIR FORCE/SPACE DIGEST (page 96), we indicated that a new active-duty officer promotion system would be put into effect as an outcome of H. R. 2, the so-called Reserve Bill of Rights. The Senate Armed Services Committee, in its report, urged the Air Force to adopt a promotion system which would give Reserve officers on EAD who had had a break in service a better opportunity for promotion consideration. As we went to press, the Air Force was about to announce the implementation of such a system after earlier denials that changes were under way.

Basically, the criteria will be changed from total dependence on the number of years of active-duty commissioned service to one of date of rank. Reservists and Guardsmen recently recalled would be some of the first beneficiaries of the new system. As an example, a Reserve lieutenant colonel who was called to active duty in January 1968, and had a date of rank of mid-1966, will automatically be considered by the full colonel selection board which meets in November 1968. Under the old system it would have been several years before he would have been eligible.

This new system also to some extent solves the problems of those officers who had commissioned service before they were twenty-one years old, since everything is based on last date of rank, whether on active duty or in the active Reserve. Understandably, only satisfactory years in the Reserves will count in such a system.

The new date-of-rank promotion system will go into full effect with those promotion boards meeting in 1969. The Air Force estimates that about ten percent of the officers on active duty will be affected by this new promotion criteria.

Maj. Robert E. Turner, now of Aerospace Defense Command, receives Air Force Cross from Lt. Gen. Arthur C. Agan, ADC Commander. Flying an A-1E Skyraider in Southeast Asia, Turner penetrated overcast and took repeated hits from ground fire in breaking off attack on remote base.

In memory of Lt. Karl Richter, 1964 Academy graduate who was killed after 198th F-105 mission over North Vietnam, Fairchild Hiller Corp. presented USAFA an annual Falcon Foundation scholarship and this portrait by Maxine McCaffrey.

Some Interesting Second Careers

The formation of Harlan C. Parks & Associates, specializing in counseling corporate management in the marketing of consumer products to Armed Forces Exchanges and Commissary Stores, was announced recently. Harlan C. Parks is a retired Air Force major general and a former Chief of the Army and Air Force Exchange Service. "A combination of backgrounds has made me aware of the opportunities for greater efficiencies in the marketing of products to the $5 billion military market," General Parks said. "Our new consulting service will seek to assist the corporate management of consumer-product manufacturers in serving this vast and complex market."

Maj. Gen. Harold Emmett Humfeld, USAF (Ret.), has accepted appointment by Howell Instruments, Inc., Fort Worth, Tex., as technical assistant to the President, for military affairs. Before his retirement, he was Director of Maintenance Engineering in the Office of the DCS/Systems and Logistics, Hq. USAF. Howell Instruments designs and manufactures equipment for civil aerospace and other industries, as well as for military requirements.

Appointment of Brig. Gen. Gladwyn E. Pinkston, USAF (Ret.), as Manager of Government Agency Marketing for the Eastern Area of the RCA Service Co. has been announced. After thirty-two years with the Air Force, General Pinkston retired February 1 as NORAD Assistant Chief of Staff, in Colorado Springs, Colo. In his new assignment, he will be responsible for marketing activities with foreign governments, NASA, the FAA, AEC, USIA, AID, and the Departments of Commerce, State, and Transportation.

Councils Named

AFA President Bob Smart has appointed the following AFA Councils (*see photos on next page*):

Military Manpower Council—Chairman, LT. GEN. WILLIAM D. ECKERT, USAF (RET.), New York City; GEN. CHARLES L. BOLTE, USA (RET.), Alexandria, Va.; MAJ. GEN. DANIEL F. CALLAHAN, USAF (RET.), Cocoa Beach,

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Fla.; SMSGT. STANLEY W. EDWARDS, USAF, McCoy AFB, Fla.; COL. F. H. LAMARRE, USAF (RET.), Arlington, Va.; COL. EDWARD M. LIGHTFOOT, USAF (RET.), Washington, D. C.; GEN. FREDERIC H. SMITH, USAF (RET.), Washington, D. C.; and CAPT. FREDERIC A. WYATT, USNR, North Hollywood, Calif.

Civilian Personnel Council—Chairman, DONALD S. DAWSON, Washington, D. C.; W. JAMES ABERNETHY, Washington, D. C.; THOMAS E. CINDRIC, Laurel, Md.; CHARLES W. KING, Andrews AFB, Md.; JAMES B. MINOR, Washington, D. C.; DR. EDWARD C. WELSH, Washington, D. C.; HUGH E. WITT, Washington, D. C.; and JOHN E. ZIPP, Denver, Colo.

Airmen Council—Chairman, MSGT. RICHARD J. NORMAN, AFRES, 1st AF Reserve Region, Andrews AFB, Md.; CMSGT. THOMAS W. ANTHONY, ANG, 113th Combat Support Sq., Andrews AFB; MSGT. DANIEL A. GOSS, AFRES, 911th Military Airlift Gp., Pittsburgh, Pa.; MSGT. WILLIAM M. GOYER, Assistant to Deputy for Reserve Affairs, Office, Secretary of Air Force; CMSGT. PAUL HOLLINGSWORTH, USAF (RET.), Austin, Tex.; CMSGT. THOMAS J. LAVINE, Hq. AFSC, Andrews AFB; and SMSGT. JESUS MORADO, Air University, Maxwell AFB, Ala.

Medical Advisory Council—Chairman, DR. M. I. MARKS, El Paso, Tex.; DR. TOBY FREEDMAN, El Segundo, Calif.; DR. CURTIS D. ROBERTS, Jackson, Miss.; DR. ALBERT H. SCHWICHTENBERG, Albuquerque, N. M.; DR. DAVID WAXMAN, Kansas City, Mo.; DR. DON S. WENGER, Washington, D. C.; and DR. BARNETT ZUMOFF, New York, N. Y.

New Emphasis on the Reserve Forces

Recently we asked a series of questions of J. William Doolittle, appointed to the new position of Assistant Secretary of the Air Force for Manpower and Reserve Affairs. These questions pertain primarily to the Air Reserve Forces. In a subsequent interview we hope to question him on many active-duty matters.

Q. As the first Assistant Secretary of the Air Force for Manpower and Reserve Affairs, you are undertaking a responsibility that is somewhat new. How do you visualize the change that this new position involves?

A. I would say that the establishment of this position is not as much a change in responsibility as it is a change in the level of emphasis. Except for purely statutory responsibilities such as the Air Force Board for Correction of Military Records, the area of interest and the functions

(Continued on following page)

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of the job are much the same as those of my predecessors. The difference, I believe, was rather clearly indicated by the Congress in Public Law 90-168 (Reserve Bill of Rights) and in the hearings preceding the enactment of this law. In creating this position, the Congress has placed matters concerning the people of the Air Force on the same administrative level as those concerning funds, facilities, and weapon systems. Also, the inclusion of Reserve Affairs in the title indicates the increased emphasis and attention which is directed toward this important part of the total Air Force.

Q. Another part of the congressional action was the creation of the Office of Air Force Reserve. Has this new office in fact assumed the role which Congress intended?

A. The Office of Air Force Reserve is in existence and is functioning as a focal point for the Air Force Reserve within Headquarters USAF. Naturally, there are many changes yet to be made in the substructure of reserve management, but these will be accomplished in a timely manner. Maj. Gen. Tom Marchbanks, Chief of Air Force Reserve, is moving ahead enthusiastically with the dual task of managing and revising management, and we can already see evidence of increasing staff interest in Air Force Reserve matters.

Q. Has the establishment of the Office of Air Force Reserve had any impact on the function of the National Guard Bureau with respect to the Air National Guard?

A. In our new organization, the Chief of the National Guard Bureau and the Chief of Air Force Reserve have comparable responsibilities and comparable placement in the structure of the Air Force. Each of them has direct access to the Chief of Staff, and each is at liberty to present his own program. Although the time for observation has been brief, I have seen evidence that Maj. Gen. W. P. "Wimpy" Wilson and General Marchbanks have established a very positive coordination of effort and good communications with my Deputy for Reserve Affairs, Dr. Ted Marrs. They are all working together to strengthen the Air Force by strengthening *both* its reserve components. I would say that both the Air National Guard and the Air Force Reserve are in a better position administratively now than before the reorganization.

Q. What is the physical condition of the Air National Guard and the Air Force Reserve? How about their combat readiness and their responsiveness to Air Force needs?

A. Fortunately, we have some good recent data on that question in the form of partial mobilizations in January and May of this year. In both instances, we are highly pleased with the condition and response of our reserve components. Units recalled in January entered active duty with over ninety-nine percent of their assigned personnel on duty. The assigned strength varied from 100 percent to sixty-six percent, depending on whether the specific units had been restricted in their premobilization manning. At present, all the mobilized units are combat ready. They have their unit equipment on hand and in use, and are being employed within the active Air Force structure. Three Air Guard tactical fighter squadrons already are flying combat missions in South Vietnam. Other Guard and Reserve units are scheduled to join them.

There is another aspect of responsiveness. After the Berlin Mobilization in 1961, we restructured our reserve-component organizations to a group structure which provides a high degree of flexibility in selecting and using reserve capabilities. This was put to the test in May when we ordered to active duty only those elements of each group which were clearly needed, thus avoiding disruptions in the lives of many Guardsmen and Reservists whose active duty would have been useful but not essential.

Q. How about the future of the Air Guard and Reserve?

A. Again, I have to talk in terms of responsiveness. A number of our Guard and Reserve units already have undergone changes in assigned missions. Some Air Force Reserve units are now being reorganized as associate units, a concept of operations which will provide added utilization and effectiveness for the jet-transport fleet of the Military Airlift Command. There undoubtedly will be additional changes in the future, as we continue to review, restructure, and redesign the over-all Air Force for maximum responsiveness to meet changing requirements.

Each of these changes is accompanied by a certain degree of trauma, but these changes are what make the Guard and Reserve a part of our planning for the future. As long as our citizen-airmen respond to the need for change, I believe we will continue to have viable and useful ANG/AFReserve programs which enhance the missions of the total Air Force.

Q. Where are we going to get the pilots to man the Guard and Reserve?

A. As the Air Force Association is well aware, the problem of procuring and training pilots to meet our force requirements is a common problem of the active Air Force, the Guard, and the Reserve, and it has been complicated by the Southeast Asia conflict. We have refined our methods of computation and scrubbed the apparent requirements repeatedly, and I believe we now have a statement of requirements for rated officers in the reserve components which is generally accepted as realistic. The Air Force is now working with the Office of the Secretary of Defense to determine a realistic method of meeting these requirements, and there is a good chance for some progress in this area.

Q. What about the second mission of the Air National Guard as a state force? Didn't the report of the National Advisory Commission on Civil Disorder have some questions on the Guard's ability to perform its mission in civil disturbances?

A. Yes, the Kerner Report designated three areas in which it believed the Guard could be improved: riot-control training, officer qualification, and increased representation of Negro personnel in the membership of the Guard. As for the first of these, last summer we undertook a program of special riot-control training for Air National Guardsmen to prepare them better for this part of their "State" mission. The training we provided was that prescribed for active Army and Army National Guard troops for the same mission.

As to officer qualifications, we formed a "blue-ribbon" study group headed by a retired Air Force general, Maj. Gen. Curtis R. Low. This group examined policies and procedures, studied statistics on the performance of officers of the Regular Air Force, Air National Guard, and Air Force Reserve, and concluded that our standards and controls assure the same high quality and professional competence among all officers who wear the Air Force uniform.

Q. What about increasing the participation of Negroes in the Guard and Reserve?

A. We are just completing an experimental program in the New Jersey ANG which has been a success. Given a special five percent increase in drill pay strength, the N. J. ANG has in less than ten months enlisted eighty-six percent of its quota of 128 new Negro recruits. In addition, there are sufficient numbers now processing for enlistment to more than guarantee complete attainment of the quota. We are applying the lessons we have learned from this effort to a plan for a nationwide effort, not only in the Guard but also in the Reserve. The details are not yet firm, but I can assure you that we will undertake a posi-

tive and aggressive program to make the membership of the Air Guard and Reserve representative of the population from which it is drawn.

Q. What are the prospects for the National Guard Technician Retirement Bill?

A. The answer to this is, of course, in the hands of Congress, but I can assure you my office is aggressively responding to the requirements of the Congress in this important matter. We recognize the essentiality of providing good support to the key technician programs of both Guard and Reserve.

SENIOR STAFF CHANGES

B/G Paul N. Bacalis, from Dir., Spec. Projects, Hq. USAF, to Cmdr., 14th Strat. Aerospace Div., SAC, Beale AFB, Calif., replacing B/G Douglas T. Nelson . . . **B/G Harry C. Bayne,** from Chief, Strat. Offensive/Defensive Div., JCS, to Chief, European Div., J-5, Joint Staff, JCS, replacing M/G Winton W. Marshall . . . **M/G Abe J. Beck,** Sr. AF Member, Mil. Studies and Liaison Div., WSEG, DDR&E, OSD, to Cmdr., Warner Robins AMA, AFLC, Robins AFB, Ga., replacing M/G Francis C. Gideon . . . **B/G Joseph H. Belser,** from Cmdr., 35th Air Div., ADC, Hancock Field, N. Y., to Vice Cmdr., 1st AF, ADC, Stewart AFB, N. Y., replacing B/G Frederic C. Gray.

M/G William W. Berg, from Dep. ASD, Mil. Pers. Policy, OSD, to Dir., Manpower and Org., DCS/P&R, Hq. USAF, replacing M/G William B. Campbell . . . **B/G Robert A. Berman,** from Asst. DCS/Maint. Eng., Hq. AFLC, Wright-Patterson AFB, Ohio, to DCS/M, USAFE, Lindsey AS, Germany, replacing M/G George M. Johnson, Jr. . . . **B/G Cleo M. Bishop,** from Cmdr., 831st Air Div., TAC, George AFB, Calif., to Dep. Cmdr., 5th ATAF, Vicenza, Italy . . . **M/G Clyde Box,** from Cmdr., 3d AF, USAFE, England, to Dep. IG, Hq. USAF, replacing M/G Neil D. Van Sickle . . . **M/G George S. Boylan, Jr.,** from DCS/Plans, MAC, Scott AFB, Ill., to Dir. of Aerospace Programs, DCS/P&R, Hq. USAF, replacing M/G Lucius D. Clay, Jr. . . . **L/G George S. Brown,** from Asst. to Chairman, JCS, to Dep. Cmdr. for Air Ops, MACV, and Cmdr., 7th AF, PACAF, Tan Son Nhut AB, Vietnam, and promoted to General, replacing Gen. William W. Momyer.

B/G Harmon E. Burns, from DCS/M, 7th AF, PACAF, to Asst. DCS/M, ATC, Randolph AFB, Tex. . . . **M/G William B. Campbell,** from Dir., M&O, to Asst. DCS/P&R, Hq. USAF, replacing M/G Thomas K. McGehee . . . **L/G John W. Carpenter, III,** from Cmdr., AU, Maxwell AFB, Ala., to DCS/P, Hq. USAF, replacing L/G Horace M. Wade . . . **L/G Jack J. Catton,** from DCS/P&R, Hq. USAF, to Cmdr., 15th AF, SAC, March AFB, Calif., replacing L/G William K. Martin . . . **M/G Lucius D. Clay, Jr.,** from Dir. of Aerospace Programs, to DCS/P&R, Hq. USAF, and promoted to L/G, replacing L/G Jack J. Catton . . . **M/G Joseph J. Cody, Jr.,** from C/S, AFSC, Andrews AFB, Md., to Cmdr., Electronic Systems Div., Hanscom Field, Mass. . . . **B/G George P. Cole,** from Cmdr., 12th Strat. Aerospace Div., SAC, Davis-Monthan AFB, Ariz., to Asst. DCS/M, SAC, Offutt AFB, Neb., replacing M/G Roland A. Campbell . . . **M/G Paul T. Cooper,** from Vice Cmdr., SAMSO, AFSC, Los Angeles AFS, Calif., to C/S, AFSC, Andrews AFB, Md., replacing M/G Joseph J. Cody, Jr. . . . **B/G Maurice A. Cristadoro, Jr.,** from Dep. for Engineering, ASD, Wright-Patterson AFB, Ohio, to Asst. DCS/Development Plans, AFSC, Andrews AFB, Md., replacing B/G Felix M. Rogers . . . **B/G Gilbert L. Curtis,** from Cmdr., 63d Mil. Airlift Wg., MAC, Norton AFB, Calif., to DCS/Plans, MAC, Scott AFB, Ill., replacing M/G George S. Boylan, Jr.

L/G Benjamin O. Davis, Jr., from Cmdr., 13th AF, PACAF, Clark AB, P. I., to Dep. CinC, USSTRICOM, MacDill AFB, Fla., replacing L/G Fred M. Dean . . . **M/G Howard A. Davis,** from ACS/Studies and Analysis, Hq. USAF, to Vice Cmdr., 8th AF, Westover AFB, Mass. . . . **L/G Fred M. Dean,** from Dep. CinC, USSTRICOM, MacDill AFB, Fla., to Cmdr., Allied Air Forces Southern Europe, Naples, Italy, replacing L/G John S. Hardy . . . **B/G John A. Des Portes,** from Cmdr., 47th Air Div., SAC, Castle AFB, Calif., to C/S, US Taiwan Defense Cmd., Taipei, Taiwan, replacing B/G Carlos M. Talbott . . . **B/G Rexford H. Dettre, Jr.,** from Cmdr., 30th Air Div., ADC, Sioux City, Iowa, to Asst. DCS/Plans, ADC, Ent AFB, Colo., replacing B/G August F. Taute . . . **M/G Leo F. Dusard, Jr.,** from Dir. of Pers. Trng. & Educ., DCS/P, Hq. USAF, to C/S, ATC, Randolph AFB, Tex., replacing B/G Lester F. Miller . . . **M/G Andrew J. Evans, Jr.,** from Dir. of Dev., DCS/R&D, Hq. USAF, to Cmdr., USAF Tactical Air Warfare Center, TAC, Eglin AFB, Fla., replacing M/G Albert W. Schinz . . . **M/G Francis C. Gideon,** from Cmdr., Warner Robins AMA, AFLC, Robins AFB, Ga., to Cmdr., 13th AF, PACAF, Clark AB, P. I., and promoted to L/G, replacing L/G Benjamin O. Davis, Jr.

M/G Alvan C. Gillem, II, from DCS/O, SAC, Offutt AFB, Neb., to Cmdr., 3d Air Div., SAC, Andersen AFB, Guam, and promoted to L/G, replacing M/G Selmon W. Wells . . . **B/G Robert N. Ginsburgh,** Chmn's. Staff Gp., JCS, add'l duty as Armed Forces Aide to the President . . . **M/G Lee V. Gossick,** Systems Program Dir., F-111 Program, assigned add'l duty as Vice Cmdr., ASD, AFSC, Wright-Patterson AFB, Ohio . . . **B/G Louis G. Griffin,** from DCS/P, MAC, Scott AFB, Ill., to Cmdr., 63d Mil. Airlift Wg., MAC, Norton AFB, Calif., replacing B/G Gilbert L. Curtis . . . **M/G Ernest C. Hardin, Jr.,** from DCS/O, TAC, Langley AFB, Va., to DCS/Plans, PACAF, Hickam AFB, Hawaii, replacing B/G Richard A. Knobloch . . . **L/G John S. Hardy,** from Cmdr., Allied AF Southern Europe, SHAPE, Naples, Italy, to Cmdt., Industrial College of the Armed Forces, Ft. McNair, Washington, D. C., replacing L/G Leighton I. Davis . . . **B/G William S. Harrell,** from Vice Cmdr., 10th AF, ADC, Richards-Gebaur AFB, Mo., to Asst. DCS/M, ADC, Ent AFB, Colo. . . . **M/G Elbert Helton,** from Dir., Log. Div., J-4, USEUCOM, Germany, to DCS/M, ATC, Randolph AFB, Tex., replacing B/G James W. Little . . . **B/G Henry L. Hogan, III,** from Cmdr., 810th Strat. Aerospace Div., SAC, Minot AFB, N. D., to Dep. Dir., SAFOI, OSAF, replacing B/G James F. Hackler, Jr.

Gen. Bruce K. Holloway, Vice Chief of Staff, Hq. USAF, to CinC, SAC, Offutt AFB, Neb., replacing Gen. Joseph J. Nazzaro . . . **B/G Clayton M. Isaacson,** from Asst. DCS/O, USAFE, Lindsey AS, Germany, to Cmdr., 35th Air Div., ADC, Hancock Field, Syracuse, N. Y., replacing B/G Joseph H. Belser . . . **M/G George M. Johnson, Jr.,** from DCS/M, USAFE, Lindsey

(Continued on following page)

Portrait of a 1941 Flying School Class reunion: Class 41-C, Maxwell AFB, Ala., held a reunion in May at Andrews AFB, Md. The class originally included 233 men; 153 finished the training and served in WW II. After the war 46 stayed in service; 15 are still on active duty. The class produced three generals and a parcel of colonels. After 27 years, 70 classmates could be contacted; 25 of these (and 15 wives) attended the reunion, coming in from all parts of the US. Several cut short European vacations to be on hand. A 30th anniversary reunion is now planned for 1971 in San Francisco, but the '68 gathering was so agreeable that a warmup for '71 may be held next year. —J. Rambeau (Class 41-C)

AS, Germany, to Cmdr., Oklahoma City AMA, AFLC, Tinker AFB, Okla., replacing M/G Melvin F. McNickle . . . **M/G Glenn A. Kent,** from DCS/Plans, AFSC, Andrews AFB, Md., to ACS/Studies and Analysis, Hq. USAF, replacing M/G Howard A. Davis . . . **B/G Richard A. Knobloch,** from DCS/Plans, PACAF, Hickam AFB, Hawaii, to Cmdr., 1001st Air Base Wg., HEDCOM, Andrews AFB, Md., replacing B/G Douglas C. Polhamus . . . **B/G Jack C. Ledford,** from Dir. of Inspection, OTIG, Norton AFB, Calif., to Cmdr., 12th Strat. Aerospace Div., SAC, Davis-Monthan AFB, Ariz., replacing B/G George P. Cole . . . **M/G Lawrence S. Lightner,** from Dir., Legislative Liaison, OSAF, to Cmdr., 3d AF, USAFE, England, replacing M/G Clyde Box.

B/G James W. Little, from DCS/M, ATC, Randolph AFB, Tex., to DCS/M, 7th AF, PACAF, Vietnam, replacing B/G Harold E. Burns . . . **Dr. Theodore C. Marrs,** from Dep. for Res. Forces, to Dep. for Res. Affairs, Office of Asst. Sec. AF

New DCS/Personnel at Hq. USAF, effective August 1, is Lt. Gen. John W. Carpenter, III, winding up three-year tour as Commander of Air University, in which he effected notable advancements in curriculum and administration. World War II bomber pilot had earlier served principally in research posts.

(Manpower & Res. Affairs) . . . **B/G Sherman F. Martin,** from Asst. DCS/Plans, to DCS/Plans, SAC, Offutt AFB, Neb., replacing M/G John S. Samuel . . . **L/G William K. Martin,** from Cmdr., 15th AF, SAC, March AFB, Calif., to Cmdr., AU, Maxwell AFB, Ala., replacing L/G John W. Carpenter, III . . . **B/G George E. McCord,** from Dep. Asst. DCS/P for Military Personnel, Hq. USAF, Randolph AFB, Tex., to Dep. Chief, Army-AF Exchange Service, Dallas, Tex. . . . **M/G Thomas K. McGehee,** from Asst. DCS/P&R, Hq. USAF, to Cmdr., US Forces, Japan, and Cmdr., 5th AF, PACAF, Fuchu AS, Japan, and promoted to L/G, replacing L/G Seth J. McKee . . . **Mr. William J. McGraw,** from Chief Engineer, Dep. for Range Engineering, to Dir., Directorate of Range Engineering, AF Western Test Range, AFSC . . . **L/G Seth J. McKee,** from Cmdr., US Forces, Japan, and Cmdr., 5th AF, PACAF, to Asst. Vice C/S, Hq. USAF, replacing L/G Hewitt T. Wheless.

M/G Melvin F. McNickle, from Cmdr., Oklahoma City AMA, AFLC, Tinker AFB, Okla., to C/S, AFLC, Wright-Patterson AFB, Ohio, replacing M/G Kenneth O. Sanborn . . . **M/G John B. McPherson,** from Vice Dir., to Asst. to Chairman, JCS, Washington, D. C., and promoted to L/G, replacing L/G George S. Brown . . . **B/G Lester F. Miller,** from C/S, ATC, Randolph AFB, Tex., to Dir. of Pers. Trng. & Educ., DCS/P, Hq. USAF, replacing M/G Leo F. Dusard . . . **B/G William L. Mitchell, Jr.,** from Chief, W. Hemis. Div., J-5, Joint Staff, JCS, to Dir. Ops, J-3, NORAD (CONAD), Ent AFB, Colo. . . . **Gen. William W. Momyer,** from Dep. Cmdr. for Air Ops, MACV, and Cmdr., 7th AF, PACAF, to Cmdr., TAC, Langley AFB, Va., replacing Gen. Gabriel P. Disosway . . . **B/G Rollin B. Moore, Jr.,** from Cmdr., 349th Mil. Airlift Wg., Hamilton AFB, Calif., to Chief, Field Office of AF Reserve, Robins AFB, Ga., and promoted to M/G . . . **B/G John R. Murphy,** from Dep. Dir., to Dir., Legislative Liaison, OSAF, replacing M/G Lawrence S. Lightner . . . **Gen. Joseph J. Nazzaro,** from CinC, SAC, Offutt AFB, Neb., to CinC, PACAF, Hickam AFB, Hawaii, replacing Gen. John D. Ryan.

B/G Douglas T. Nelson, from Cmdr., 14th Strat. Aerospace Div., SAC, Beale AFB, Calif., to Asst. DCS/Plans, SAC, Offutt AFB, Neb., replacing B/G Sherman F. Martin . . . **B/G Robert A. Patterson,** from Dir. Plans and Hospitalization, Office of Surgeon General, Hq. USAF, to Cmd. Surgeon, USAFE, Wiesbaden, Germany, replacing M/G Raymond T. Jenkins . . . **B/G**

Brig. Gen. Robert N. Ginsburgh, left, succeeds Col. James U. Cross as Armed Forces Aide to the President. A West Pointer with doctorate from Harvard, General Ginsburgh serves on personal staff of Chairman, JCS, as well as in White House. Colonel Cross, nominated for star, becomes Assistant to Commander, 12th AF.

Robert L. Petit, from Dep. Dir. of Ops for Strike Forces, DCS/P&O, Hq. USAF, to C/S, 7th AF, Vietnam, replacing B/G Louis T. Seith . . . **B/G Felix M. Rogers,** from Asst. DCS/Dev. Plans, to DCS/Plans, AFSC, Andrews AFB, Md., replacing M/G Glenn A. Kent . . . **Gen. John D. Ryan,** from CinC, PACAF, Hickam AFB, Hawaii, to Vice C/S, Hq. USAF, replacing Gen. Bruce K. Holloway . . . **M/G John S. Samuel,** from DCS/Plans, SAC, Offutt AFB, Neb., to Sr. AF Member, Mil. Studies and Liaison Div., WSEG, DDR&E, OSD, replacing M/G Abe J. Beck.

M/G Albert W. Schinz, from Cmdr., Tactical Air Warfare Center, TAC, Eglin AFB, Fla., to DCS/O, TAC, Langley AFB, Va., replacing M/G Ernest C. Hardin, Jr. . . . **B/G Louis T. Seith,** from C/S, 7th AF, PACAF, Vietnam, to Dep. Cmdr., 7th AF and 13th AF, PACAF, Udorn, Thailand, and promoted to M/G, replacing M/G William C. Lindley, Jr. . . . **M/G James C. Sherrill,** from Spec. Asst. for Strat. Mobility, JCS, to Cmdr., 22d AF, MAC, Travis AFB, Calif., replacing M/G Joseph A. Cunningham . . . **M/G Robert N. Smith,** from Asst. DCS/P&O, Hq. USAF, to Vice CinC, USAFE, and promoted to L/G, replacing Gen. Jack G. Merrell . . . **B/G William W. Snavely,** from Dir. of Proc. Pol., OASD (I&L), Washington, D. C., to Dep. Cmdr., Oklahoma City AMA, AFLC, Tinker AFB, Okla. . . . **B/G Carlos M. Talbott,** from C/S, US Taiwan Defense Cmd., Taipei, Taiwan, to Vice Cmdr., 10th AF, ADC, Richards-Gebaur AFB, Mo., replacing B/G William S. Harrell . . . **B/G Alex W. Talmant,** from Cmdr., 4258th Strat. Wing, SAC, U Tapao, Thailand, to Cmdr., 47th Air Div., SAC, Castle AFB, Calif., replacing B/G John A. Des Portes . . . **M/G John W. Vogt,** from Dep. for Plans & Ops, PACAF, Hickam AFB, Hawaii, to Asst. DCS/P&O, Hq. USAF, replacing M/G Robert N. Smith.

L/G Horace M. Wade, from DCS/P, Hq. USAF, to CinC, USAFE, and Cmdr., 4th Allied Tac. AF, Lindsey AS, Germany, and promoted to General, replacing Gen. Maurice A. Preston . . . **M/G Selmon W. Wells,** from Cmdr., 3d Air Div., SAC, Andersen AFB, Guam, to DCS/O, SAC, Offutt AFB, Neb., replacing M/G Alvan C. Gillem, II . . . **B/G Walter E. Williams, Jr.,** from Cmdr., 140th Tactical Fighter Wing, TAC, Buckley ANG Base, Colo., to Vice Cmdr., Tactical Air Warfare Center, TAC, Eglin AFB, Fla. . . . **B/G Louis L. Wilson, Jr.,** from Dep. Dir., Operational Req. & Dev. Plans, DCS/R&D, Hq. USAF, to Vice Cmdr., SAMSO, AFSC, Los Angeles AFS, Calif., replacing M/G Paul T. Cooper . . . **B/G Jowell C. Wise,** from Cmdr., Wright-Patterson AFB, Ohio, to Dep. Cmdr., Ogden AMA, AFLC, Hill AFB, Utah, replacing B/G Buddy R. Daughtrey.

NOMINATED FOR PROMOTION: To **General** (effective August 1): George S. **Brown,** Horace M. **Wade.**

To **Lieutenant General** (effective August 1): Lucius D. **Clay,** Jr., Francis C. **Gideon,** Alvan C. **Gillem,** II, John D. **Lavelle,** Thomas K. **McGehee,** John B. **McPherson,** Samuel C. **Phillips,** Robert N. **Smith.**

To **Major General:** Rollin B. **Moore,** Jr.

To **Brigadier General:** Cleo M. **Bishop,** James U. **Cross,** Robert F. **Long.**

RETIREMENTS: M/G Winton R. **Close,** L/G Leighton I. **Davis,** L/G Harold C. **Donnelly,** Gen. Gabriel P. **Disosway,** M/G William E. **Elder,** B/G Frank B. **James,** M/G Raymond T. **Jenkins,** B/G Douglas C. **Polhamus,** Gen. Maurice A. **Preston,** M/G Neil D. **Van Sickle,** L/G Hewitt T. **Wheless.**—END

Plan now to attend...

AFA's 1968 BRIEFINGS & DISPLAYS

September 16-17-18 • Sheraton-Park Hotel • Washington, D.C.

Some forty-seven major aerospace/defense firms will present their latest equipment and make formal presentations to top audiences of military and government personnel at the Air Force Association's 1968 Aerospace Development Briefings and Displays at the Sheraton-Park Hotel in Washington, D. C., September 16-17-18. These companies will occupy some 60,000 square feet of exhibit space at the hotel, all of which was reserved more than five months in advance of the event.

The Briefing and Display Program was conceived and pioneered by AFA five years ago. It combines displays of equipment with formal, ten-minute company presentations in the booth, followed by three-minute question periods. During each morning of the three-day event, the attendees are assembled into parties of fifteen to twenty persons each and escorted to each of the six or seven briefings in the group they select. In the afternoons, attendees may select any of the forty to fifty briefings offered. Morning attendees are guests of the Air Force Association for lunch at the hotel, and afternoon attendees are guests at a daily reception.

Registration is required for attendance at the Briefings and Displays, but there is no registration fee and no charge for attendance at the daily luncheons and receptions. Since attendance quotas are established for each military and government office, advance registration is necessary. This can be accomplished right in the attendee's duty office, where special forms and instructions will be available around August 1. Special Project Officers will be assigned to coordinate registration and attendance. Those desiring to attend should be on the lookout for bulletins on this event and inquire as to the availability of registration forms.

This program is officially approved for attendance by military and government personnel, and transportation to and from the Sheraton-Park Hotel is provided at the Pentagon and major installations in the Washington area. More than 4,000 persons attend the briefings each year. The quality and value of this program is best demonstrated by the fact that Vice President Hubert Humphrey has attended the past two years and praised both the displays and the presentations.

The Briefings and Displays Program is held in conjunction with AFA's Annual Fall Meeting, which includes an Aerospace Seminar and Industry-Air Force Luncheon; and the annual Air Force Anniversary Dinner Dance. Mark the dates of September 16-17-18 on your appointment calendar now and watch for additional details on the Fall Meeting and the Aerospace Development Briefings and Displays. Last year some eighty-seven percent of the attendees stated that they found the Briefings and Displays informative and helpful in their work. You are invited this year!

PLAN NOW TO ATTEND

Vice President Hubert H. Humphrey attended the 1966 Briefings & Displays (above), and personally elected to attend again in 1967 (below) so that he could be brought up to date.

A total of 4,514 key government, military, and industry personnel and educators attended AFA's 1967 Briefings & Displays.

MICHIGAN'S HOYT S. VANDENBERG CHAPTER

cited for extremely effective programming which has focused widespread attention on the Air Force Association mission.

AFA's **Hoyt S. Vandenberg Chapter** of Detroit, Mich., together with the Association of the US Army, the Navy League, and nineteen industrial firms, recently cosponsored the Thirteenth Annual ROTC Awards Dinner honoring the ROTC Cadets and Midshipmen from eight **Michigan colleges and universities.**

Held in Detroit's Cobo Hall, the banquet was attended by more than 500 persons, including leaders of industry, government, the military services, and military service organizations.

Virgil E. Boyd, President of the Chrysler Corp., was the featured speaker and delivered an inspiring message. Mr. Boyd was introduced by **Edwin O. George,** President of the Detroit Edison Co.

During a unique ceremony, awards were presented to ninety-six Cadets and Midshipmen. A group of attractive young ladies representing the various ROTC units assisted the following dignitaries in presenting the awards: **W. D. MacDonnell,** President, Kelsey-Hayes Co.; **James L. Davenport,** General Personnel Supervisor, Michigan Bell Telephone Co.; **John B. Olson,** Vice President and General Manager, Detroit *Free Press*; **Gordon F. Goyette, Jr.,** Assistant Director of Advertising and Public Relations, Parke-Davis and Co.; **Donald C. Pippel,** General Operations Manager for Special Military Vehicle Operations, Ford Motor Co.; **Jack L. Mustard,** Vice President, Precision Products Group, Ex-Cell-O Corp.; **Richard B. Wallace,** Treasurer, The *Evening News* Association for the Detroit *News*; **W. R. Kiefer,** Executive Vice President and General Manager, LTV Michigan Division.

AFA National, Regional, State, and Chapter leaders pose for a group photo following the Hoyt S. Vandenberg Chapter's Thirteenth Annual ROTC Awards Dinner recently held in Detroit, Mich., and attended by more than 500 persons.

Harry A. Bruno, center, recipient of the H. H. Arnold Chapter's "Hap Arnold Award" for aerospace pioneering, poses with the award, and with Chapter President Norman MacKinnon, left, and Chapter Secretary Col. F. S. Gabreski, USAF (Ret.), the nation's top living fighter ace. The award was presented at the Chapter's recent Awards Dinner and Charter Night program. Lt. Gen. John C. Meyer, Operations Director of the Joint Staff, JCS, was the guest speaker.

Also, **J. Lawrence Buell, Jr.,** President, Formsprag Co.; **Edward W. Schenning,** General Manager, Plymouth Division, Burroughs Corp.; **Arthur W. Wild,** President, Continental Aviation and Engineering Corp.; **Arthur Mullen,** Chairman of the Board, Sheller-Globe Corp.; **Eldon Fox,** Vice President (Public Relations), Bendix Corp.; **Dean E. Richardson,** Executive Vice President, Manufacturers National Bank of Detroit; **Fred A. Kaiser,** Marketing Consultant, Michigan Consolidated Gas Co.; and **A. Dean Peirce,** Vice President (Sales), Great Lakes Steel Corp.

Boyd Stockmeyer, General Chairman for the event, also served as master of ceremonies. Mr. Stockmeyer is president of the Detroit Bank and Trust Co. Cochairmen **Fred E. Kauffman,** Director of Public Relations and Advertising, Kelsey-Hayes Co., and

During the Arnold Air Society Conclave Luncheon, National Commander Richard H. Wainscott, standing left, from the University of Florida, presents a Citation of Appreciation to Col. William N. Boaz, Jr., AAS National Adviser. Seated left to right are Ronald J. Kitson, Conclave Chairman, Manhattan College; Lt. Gen. John W. Carpenter, III, then Commander, Air University; and Angel Flight National Commander Kay Kirkpatrick, Louisiana State University.

William Diehl, Jr., center, guest of honor at the Hudson, N. J., Chapter's 20th Anniversary Dinner Dance, displays a plaque presented to him by the Chapter during the program. With Mr. Diehl are, from left, William J. Caputo, Past Chapter President; Joseph Bendetto, Chapter President; Gen. Jimmy Doolittle, AFA's first National President and a founder of the Association; and James P. Grazioso, chairman for the dinner program and toastmaster.

Jerome Green, a former Vice President for AFA's Great Lakes Region, were assisted by **Richard Mossoney** and **Irving Kempner,** Hoyt S. Vandenberg Chapter President and Secretary, respectively, and Michigan State AFA President **Norman Scott.**

Other AFA leaders attending included National Secretary **Glenn D. Mishler;** Great Lakes Regional Vice President **W. M. Whitney, Jr.;** Chapter Presidents **Dorothy Whitney** (Claire Chennault), **Orville Roberts** (Dearborn), **John Van Dyken** (Kalamazoo), **Marjorie O. Hunt** (Mount Clemens), and **Jack Cherry** (Akron); and Detroit Chapter Vice President **George Prindle.**

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The twentieth National Conclave of the **Arnold Air Society** and the thirteenth National Conclave of the **Angel Flight** recently convened in New York City's Statler Hilton Hotel.

More than 2,000 persons attended the four-day Conclave, which included a series of business sessions for both organizations, a luncheon, receptions, an Awards Banquet, a fashion show, and a Military Ball.

Distinguished participants included **Gen. John P. McConnell,** Chief of Staff, USAF; **Gen. Laurence S. Kuter,** USAF (Ret.), an AFA National Director; **Lt. Gen. John W. Carpenter, III,** at that time Commander of the Air University; and **Howard T. Markey,** a past National President of AFA.

At the Awards Banquet, Mr. Markey served as master of ceremonies, and General McConnell, the featured speaker, received the Society's General **H. H. Arnold Award** for his "outstanding contributions to military aviation and aerospace progress."

General Carpenter's keynote address highlighted the opening session; and the luncheon address by General Kuter, a former Commander in Chief of the North American Air Defense Command, dealt with our use of airpower in Southeast Asia. **Cadet Ronald J. Kitson,** National Conclave Chairman, served as master of ceremonies at the luncheon.

The **"Angelaires"** from Southern Illinois University provided outstanding musical entertainment at both the luncheon and the Awards Banquet.

The Society's other major awards were presented to: **Senator A. S. Mike Monroney** (D.-Okla.) — the Paul T. Johns Award "for outstanding contributions to aeronautics and astronautics"; **Dr. Edward C. Welsh,** Executive Secretary of the National Aeronautics and Space Council—the John F. Kennedy Award "for outstanding contributions to space research and development"; **Maj. Gen. Leo F. Dusard, Jr.,** Director of Personnel Training and Education, Hq. USAF—the General Muir S. Fairchild Award "for outstanding contributions to aerospace education"; **Maj. Gen. Victor Haugen,** USAF (Ret.)—the Eugene M. Zuckert Award "for outstanding contributions to Air Force professionalism"; **Maj. George C. Mohr,** Chief, Vibration and Impact Branch, Aerospace Medical Research Laboratories —the General Hoyt S. Vandenberg Award "for outstanding contributions to aerospace development in the field of science"; **Maj. Richard J. Gowen,** US Air Force Academy—the Lt. Theodore C. Marrs Award "for outstanding contributions to the Air Force while a junior officer"; and **Milton Caniff,** creator of the syndicated cartoon strip "Steve Canyon" and an AFA National Director—selected as the 1968-69 Honorary National Commander of the AAS.

Among the many other awards presented to individuals and units at the Conclave were the following: the Maryland Cup, awarded to the **Eagle Squadron from the University of Puerto Rico** as the most outstanding AAS Squadron in the nation; the Capt. Frank S. Hagan Trophy, awarded to the **Lt. Philip Bek Squadron from Michigan State University** as the second most outstanding squadron; and the General Claire Chennault Trophy, awarded to the **General Billy Mitchell Squadron from the University of Iowa** as third most outstanding squadron.

Also, the Purdue Cup went to the **Minuteman Flight from Bowling Green State University,** Ohio, as the outstanding Angel Flight in the nation as selected by the Angel Flight National Headquarters; and the Samuel E. Anderson Award went to the **General Lauris Norstad Flight from the University of Minnesota** at Minneapolis as the outstanding Angel

(Continued on following page)

SOL A. ROSENBLATT

New York attorney Sol A. Rosenblatt, one of the original founders of the Air Force Association and its first National Secretary, died May 4, 1968. Mr. Rosenblatt was, at one time, general counsel to the Democratic National Committee and, during World War II, he served in the Army Air Forces, rising to the rank of colonel.

Flight in the nation as selected by the Arnold Air Society National Headquarters.

In addition, the Eagle Trophy was awarded to the **Thunderbird Squadron from the Oklahoma State University** as the AAS Squadron that has contributed the most to civic affairs; and the Capt. Samuel A. Woodworth Trophy was awarded to the **Harl Pease, Jr., Squadron from the University of New Hampshire** as the AAS Squadron with the most outstanding international service program.

Because it was impossible to select between the finalists for Most Outstanding Area Commander, two men were honored. Each received a saber in recognition of his achievements. They are **Chester T. Kelley,** Area C-2 Commander, Louisiana State University; and **Virgil A. West,** Area F-2 Commander, University of Nebraska.

Angel **Jane Boekelheide,** a sophomore from the University of North Dakota, was crowned **"Little General"** at the Military Ball. Runners-up were **Marlene Lansman,** Otterbein College, Ohio; **Cheryl Charles,** University of Arizona; and **Linda Lee Payne,** Memphis State University.

Distinguished guests included **Dr. Theodore C. Marrs,** Deputy for Reserve Forces, Office of the Deputy Undersecretary of the Air Force (Manpower); **Maj. Gen. Alonzo A. Towner,** Deputy Surgeon General of the Air Force; **Maj. Gen. Joseph L. Dickman,** Commander, First AF (ADC), Stewart AFB, N. Y.; **Brig. Gen. Donald F. Blake,** Commandant, AFROTC; **Brig. Gen. Joe T. Scepansky,** Commander, USAF Recruiting Service; and **Col. Jeanne M. Holm,** Director of Women in the Air Force.

* * *

AFA's **Santa Clara County Chapter** recently hosted the Mid-Year Conference of the California AFA at Rickey's Hyatt House Hotel in Palo Alto, Calif.

The Conference Agenda included a State Executive Committee Meeting, an AFA Leaders' Workshop, a briefing on Air National Guard activities, a Cocktail Party, and a Dinner Dance.

In conjunction with the Conference, the **California Air National Guard** held a Commander's Conference during the day and joined with the State AFA for the evening functions.

The dinner program featured **Dr. Theodore C. Marrs,** Deputy for Reserve Forces, Office of the Deputy Undersecretary of the Air Force (Manpower), as the speaker. In addition, a representative of the California Air National Guard made a presentation on the unit's activities.

Among the more than 100 who attended were **Brig. Gen. George W. Edmonds,** Deputy Adjutant General for Air, California Air Guard, and Chairman of AFA's Air National Guard Council; **Brig. Gen. Marvel Taylor,** Commander, 144th Aerospace Defense Wing, California ANG; and **Brig. Gen. Raymond J. Kopecky,** Commander, 146th Military Airlift Wing, California ANG.

AFA National and State leaders attending included Far West Regional Vice President **Will Bergstrom;** National Directors **Robert Vaughan** and **Jack Withers;** State President **C. A. DeLaney;** State Vice Presidents **Robert Lawson** and **Gene De Visscher;** State Secretary **Stanley Hyrn;** State

Film starlet Carolyn De Vore, Los Angeles Chapter Secretary, presents a trophy for top two-man Los Angeles recruiting office to TSgt. Eugene Emfinger, left, and TSgt. Tony Frizzell, of USAF Recruiting Detachment #609. Six other awards were presented.

SMSgt. John R. Schumann (center), representing the twenty-two Outstanding Airmen honored at the Air Force Association's 22d National Convention, made his own presentation during a recent visit to AFA National Headquarters when he handed a check to Executive Director James H. Straubel—the 1968 Outstanding Airmen's contribution to AFA's Aerospace Education Foundation. At left is Michael J. Nisos, Education Foundation Managing Director.

During a recent Iron Gate, N. Y., Chapter Meeting, Chapter Founder and Past President Mac Kriendler, center right, presents a check for $26,000 to the Aerospace Education Foundation. Executive Director James H. Straubel, left, accepts for the Foundation. To the left of Mr. Kriendler is Chapter Treasurer James Austin, and right is Chapter Secretary Larry Farrell. The money represents a portion of proceeds from the Chapter's annual Air Force Salute.

At the new Savannah Chapter's Charter Night Dinner, Georgia State President Lt. Gen. Troup Miller, USAF (Ret.), standing, right, presented the charter to Chapter President James A. Evans, Jr., standing, left. Seated are Chapter Vice President William Kelly and Mrs. Evans. Dr. Theodore C. Marrs, Deputy for Reserve Forces, Office of the Deputy Undersecretary of the Air Force (Manpower), was the speaker. Savannah Mayor J. Curtis Lewis was also a guest.

In a ceremony at Ent AFB, Colo., Colorado Springs community leaders joined base officials in honoring the Ent Noncommissioned Officer and Airman of the Quarter. Sgt. Ronald R. Barlow (center) and A1C Charles B. Olwell, Jr., were presented deeds to one square foot of Pikes Peak by Norman Coleman, second from left, representing the Chamber of Commerce, and $25 US Savings Bonds by Jack Chandler, Vice President of Colorado Spring's Chapter.

Treasurer **Robert Szabo**; and former National Director **Ken Ellington. Bruce Mikesell**, President of the Santa Clara County Chapter, served as arrangements chairman.

* * *

CROSS COUNTRY . . . Gen. Carl Spaatz, first USAF Chief of Staff, a founder of AFA, and a former Chairman of the Board of Directors, recently received the 1968 **Thomas D. White National Defense Award.** The award is given annually to a citizen who has contributed significantly to national defense and security during the years preceding the award. . . . The *Kelly Observer*, unofficial newspaper published weekly for personnel of Kelly AFB, Tex., recently put out a "Special Edition" devoted to publicizing **AFA's Alamo Chapter . . .** About eighty people, including nineteen Academy nominees, attended the **Colin P. Kelly, N. Y., Chapter's** Eighth Annual Air Force Academy Nominee Orientation Meeting recently. Chapter President **Richard Baynes** conducted the meeting that included a film on the Cadet honor code, a slide-briefing on the Academy, a talk on Air Force ROTC, a talk on Air Force careers open to Academy graduates, and remarks from Academy graduates now stationed at Griffiss AFB.

Coming events: Beaver Valley Chapter, Pa., Air Show, July 13-14 . . . **New York State** AFA Convention, Rome, August 24 . . . **Michigan State** AFA Convention, Detroit, September 14-15 . . . **AFA's Fall Meeting** and Aerospace Development Briefings, Washington, D. C., September 16-18 . . . **New Jersey State** AFA Convention, McGuire AFB, October 12 . . . **California State** AFA Convention, Fresno, October 18-20 . . . **Massachusetts State** AFA Convention, Hanscom Field, October 26 . . . **Ohio State** AFA Convention, Oxford, November 2-3 . . . **Aerospace Education Foundation Symposium**, Washington, D. C., November 18-20 . . . **Florida State** AFA Convention, St. Petersburg, November 22-23 . . . **Idaho State** AFA Convention, Boise, December 7.

—DON STEELE

Send for FREE Information on AFA's Low-Cost Insurance Programs!

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• CIVILIAN GROUP LIFE INSURANCE

• FLIGHT PAY INSURANCE

• COMPREHENSIVE ACCIDENT INSURANCE
(Coverage Up to $100,000)

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AFA's low-cost Military Group Life Insurance features *equal coverage,* up to $20,000, for flying and nonflying personnel at *the same low premium.*

This eliminates the penalty of lower coverage for the man on flying status whose death is caused by illness or ordinary accident.

The accidental death benefit was recently increased to $12,500—a *substantial increase* in this benefit for every age.

The only exception to these provisions is that a flat sum of $15,000, regardless of age, will be paid for death caused by aviation accident while the insured is serving as pilot or crew member of the aircraft involved.

AFA Military Group Life Insurance carries no hazardous duty restriction—no waiting period for coverage of personnel assigned to a combat zone. This insurance plan was designed as a service to our members, and we believe we serve best by continuing to offer the broadest possible coverage consistent with safety for all policyholders.

Policyholders may also keep their insurance in force at the low group rate after they leave the service, and until age 65—provided their coverage has been in effect for at least a twelve-month period prior to their date of separation.

Net cost of insurance has now been reduced by dividend payments for five consecutive years . . . in addition to major benefit increases made in the policy during the same period.

Other benefits include guaranteed conversion privilege, waiver of premium for disability, choice of settlement options, and a choice of convenient payment plans, including payment by allotment for those on active duty.

All Air Force personnel on active duty, in the National Guard, and in the Ready Reserve are eligible to apply for AFA Military Group Life Insurance.

More than 17,500 participants carrying over a quarter of a billion dollars life insurance in force have selected this unique program—truly the best protection available for all service families.

CIVILIAN GROUP LIFE INSURANCE

This program offers AFA's nonmilitary members $10,000 of needed insurance protection at the lowest cost we know of for any group term coverage which offers equal benefits:

Double Indemnity is a unique feature of this plan, covering almost all accidental deaths, including death caused by aviation accident unless the insured is acting as pilot or crew member of the aircraft at the time of accident.

Coverage may be continued at low group rates to age 65, when it may be converted to any permanent plan of insurance then being offered by the Underwriter, United of Omaha, regardless of the health of the insured person.

The plan also provides many other benefits including waiver of premium for disability, and a choice of convenient settlement options.

Any member of AFA, man or woman, who is not on active duty or in the National Guard or Ready Reserve, and who is between 20 and 60, is eligible to apply except for members who have left military service but still retain AFA Military Group Life Insurance. (Residents of Ohio, New Jersey, Texas, and Wisconsin are not eligible for this group coverage, but may apply for similar coverage at comparable rates.)

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AFA *guaranteed* Flight Pay Protection is available to rated personnel on active duty. This insurance protects active-duty members on flying status against loss of their flight-pay income because of injury or illness. Protection is guaranteed even against preexisting illnesses after a policy has been in force for a period of twelve consecutive months.

Grounded policyholders receive monthly payments equal to eighty percent of their flight pay (tax free) for periods up to two years if grounding is caused by aviation accident and for periods up to one year for grounding caused by illness. Because they are tax free, these payments are essentially the equivalent of full government flight pay, which is taxable income.

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This unique accident insurance coverage, available to *all* AFA members regardless of age, offers worldwide, full-time protection against all accidents except those involving crew members in aircraft accidents.

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Insurance is also provided for nonreimbursed medical expenses of over $50, up to a maximum of $500. Under the Family Plan, every family member receives this valuable extra coverage.

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THIS IS AFA

The Air Force Association is an independent, nonprofit airpower organization with no personal, political, or commercial axes to grind; established January 26, 1946; incorporated February 4, 1946.

Objectives

• The Association provides an organization through which free men may unite to fulfill the responsibilities imposed by the impact of aerospace technology on modern society; to support armed strength adequate to maintain the security and peace of the United States and the free world; to educate themselves and the public at large in the development of adequate aerospace power for the betterment of all mankind; and to help develop friendly relations among free nations, based on respect for the principles of freedom and equal rights to all mankind.

Membership

Active Members: US citizens who support the aims and objectives of the Air Force Association, and who are not on active duty with any branch of the United States armed forces—$7 per year.

Service Members (non-voting, non-officeholding): US citizens on extended active duty with any branch of the United States armed forces—$7 per year.

Cadet Members (non-voting, non-officeholding): US citizens enrolled as Air Force ROTC Cadets, Civil Air Patrol Cadets, or Cadets of the United States Air Force Academy—$3.50 per year.

Associate Members (non-voting, non-officeholding): Non-US citizens who support the aims and objectives of the Air Force Association whose application for membership meets AFA constitutional requirements—$7 per year.

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State Contacts

Following each state contact's name and address 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.

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