AUGUST 1970 / 60c

AIR FORCE

and **SPACE DIGEST**

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

rance's swingwing Mirage G . . .

Aerospace Object Lesson in R&D Management

1940 Design began on ROC air-to-surface missile to fly down radar beam.

1944 KUD-1 Gargoyle, a radio-controlled dive bomb, was one of the Navy's first missile programs.

1946 Supersonic ASR-1 Aerobee used by USN in upper-atmosphere research programs.

1947 Navy's radar-guided Sparrow I was early operational air-to-air missile.

1949 Army's two-stage Bumper-Wac set altitude record of 250 miles, and speed record of 5,000 mph.

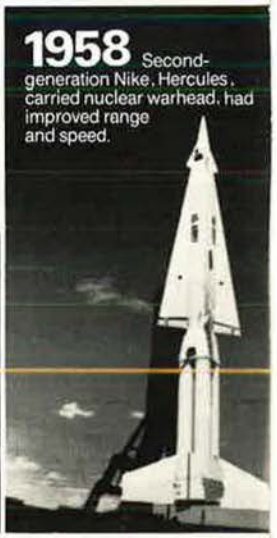
1961 Alan Shepard rode into history on May 5th aboard NASA's Mercury spacecraft "Freedom 7."

1955 Air Force's Bird Dog air-to-air missile had effectiveness of entire pod of HVAR rockets.

1957 Thor served USAF as intermediate-range ballistic missile, and later as a space booster.

1957 Genie, high-velocity, air-to-air missile gave USAF nuclear defense capability.

1958 Second-generation Nike, Hercules, carried nuclear warhead, had improved range and speed.



1961 Three-stage Nike Zeus anti-ballistic missile.

1962 John Glenn, in "Friendship 7," was first American to orbit Earth.

1962 Skybolt, intermediate-range air-launched missile.

1963 Thor-launched ASSET space glider studied Mach-18 atmospheric flight for USAF.

1964/66 Developments began on two major military space systems (pictures not released).

1968 Thrust augmented long-tank Delta delivers 16% increase in payload.

1968 Sixty-day space simulation tests of human capabilities and life-support systems for NASA.

1968 Dragon anti-tank/assault guided-missile was man-rated by the Army.

1968 First manned Apollo flight is pushed into orbit by S-IVB.

1951 Army's Nike Ajax was world's first supersonic anti-aircraft missile.

1952 Honest John, Army's tactical surface-to-surface missile, used conventional or nuclear warhead.

1952 McDonnell began building airframes and ramjet engines for Bendix/Navy Talos missile.

Three decades in missiles and space. It took teamwork.

Meet our great teammates: Army, Navy, Air Force, NASA, Great Britain, Canada, Japan, Comsat.

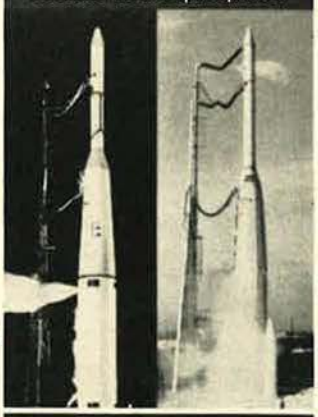
McDonnell Douglas has launched more satellites for our customers than any other industrial space team. □ Our customers consistently specified higher standards of reliability with advanced hardware. They got them. □ They expected on-time delivery followed by on-time launches. Together, we made it happen. □ We gained important technology in exotic materials, ablative reentry, environmental systems, systems integration, and life support systems. □ We teamed to put man in the loop, and his role continues to grow. □ For thirty years we've demonstrated the capability to lead any new space/missile program you can name. And to name a few new ones we're ready to lead: "Space Shuttle," "Space Station/ Base," and "Harpoon."

MCDONNELL DOUGLAS

1959 USAF's Alpha Draco flew Mach 5 in guided flight within the atmosphere.

1960 Quail decoy missile duplicates characteristics and radar image of B-52 SAC bombers.

1960 NASA's reliable, economical Delta holds record for launching most satellites and space probes.



1969 S-IVB gave historic Apollo 11 its final thrust to the moon.

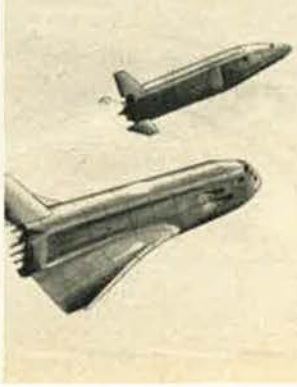
1965 NASA's Gemini III became world's first maneuverable spacecraft.

1965 Gemini VII orbited for two weeks—was target for first space rendezvous by Gemini VI.

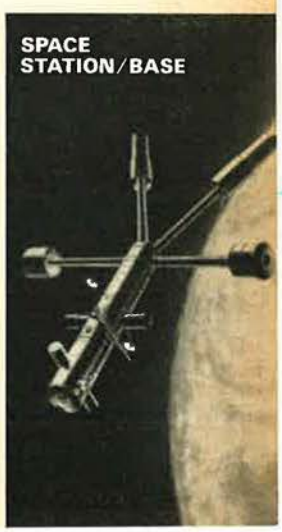
1970 Spartan long range interceptor missile for Army Safeguard Ballistic Missile Defense System.

1972 Orbital Workshop missions scheduled for NASA's Skylab program.

SPACE SHUTTLE



SPACE STATION/BASE



AA-4-69

Westinghouse has built 30,450 airborne radars since 1941. More than 1,100 of these are pulse-doppler systems. We're now flight testing radars with low-sidelobe antennas, digital signal processing, and integrated electro-optical systems for target identification and tracking.

You can be sure...if it's Westinghouse

Our most important space project is the voyage to Serendip.

In the eighteenth century, Horace Walpole wrote about three princes of Serendip who traveled in search of treasure.

The princes never found treasure. But they continually came across other discoveries that proved to be even more valuable.

To describe this phenomenon – that of making unexpected discoveries while in search of something else – Walpole coined the word "serendipity."

A useful word.

Today, serendipity is perhaps the most persuasive reason why our nation must continue with a strong, balanced program of space exploration.

Our investment in space has already paid us many direct benefits. Instant world-wide communication. Improved weather forecasting. New and vital means of national defense.

But even more important are the serendipitous applications now emerging from the technological and scientific advances made by our space program.

The techniques, products, and processes we've developed are helping us solve problems in air and water pollution. They're helping us increase the world food supply, control traffic, renew our cities, care for our sick. And the list is constantly growing.

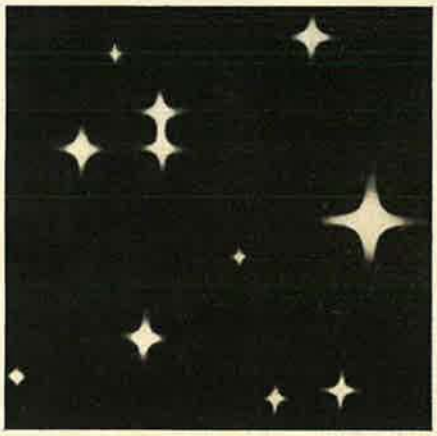
At UTC, where we specialize in rocket propellants and advanced propulsion systems, we are proud of the part we've played in America's space program. And all of us are looking forward to the expected and the serendipitous discoveries to be made in tomorrow's journeys.

To us, in the twentieth century, every voyage into space is a voyage to Serendip.

United Technology Center

DIVISION OF UNITED AIRCRAFT CORPORATION

SUNNYVALE, CALIFORNIA 94088



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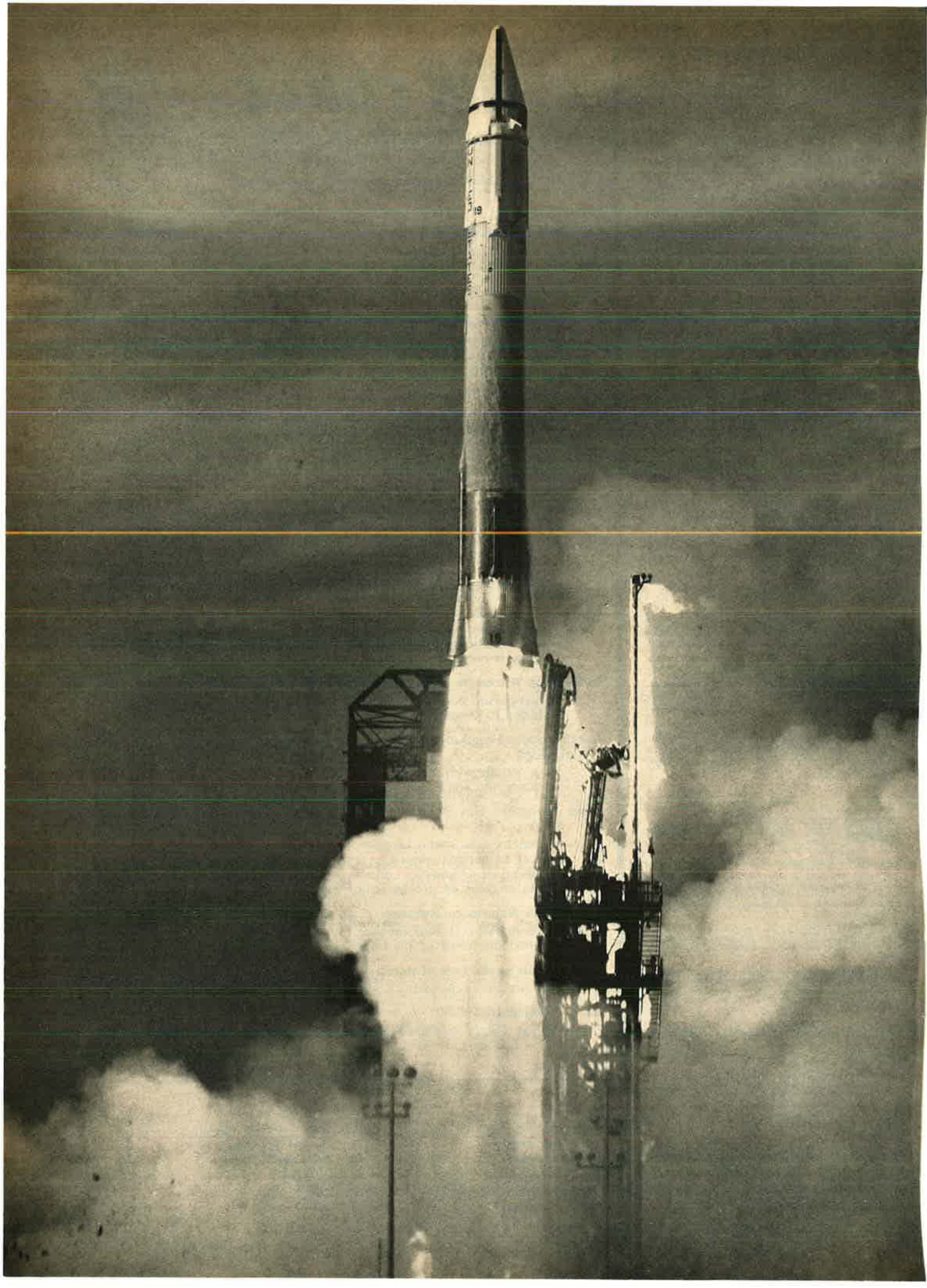
DEPARTMENTS



It will keep on outdoing itself through the 1970's.

General Dynamics will probably build a more versatile space vehicle one day. But right now, our Convair division's Atlas-Centaur stands all alone in bringing off the tough, varied jobs assigned to it.

Designed as an ICBM

Versatility was bred into Atlas from the start. Developed as an ICBM, it proved capable of launching human payloads —the Mercury astronauts—into earth orbit years ahead of any other U.S. booster.

In all, Atlas has logged more than 380 launches. And with Centaur, the nation's first high-energy upper stage, it has thrust seven Surveyors to the moon and two Mariners toward Mars.

With a record like this, Atlas-Centaur has now been selected to boost the INTELSAT IV series of communications satellites into orbit beginning in 1971.

What's next?

Proved reliable, accurate and cost effective, Atlas and Centaur, working together or in combination with other launch vehicles or upper stages, will boost new astronomical satellites into earth orbit, send interplanetary missions to Venus, Mercury and Mars, and send the first U.S. spacecraft to Jupiter.

General Dynamics' commitment to continuing work on a variety of space programs includes not only Atlas and Centaur, but scientific satellites, reusable space transportation, space experiment modules, and expandable space antennas as well. At General Dynamics we put technology to work solving problems from the bottom of the sea to outer space...and a good bit in between.

GENERAL DYNAMICS

1 Rockefeller Plaza, New York, N.Y. 10020

An Editorial

'SHOW AND TELL'

By John L. Frisbee

SENIOR EDITOR, PLANS AND POLICY

TWENTY-five years ago this month, mushroom-shaped clouds rose over Hiroshima and Nagasaki. They marked the end of World War II and the beginning of a new era in international affairs.

It is quite conceivable that nuclear weapons will never again be used directly in war. But whether they are or not, the turn of events and the fate of nations are—and for a very long time will continue to be—affected by their shadowy presence.

Twice in the last sixteen years, events of major importance have been resolved in favor of the side that possessed nuclear superiority. In 1956, the Hungarian Revolution, which could have triggered the destruction of the Soviet empire, was squelched by the USSR's localized superiority in nuclear weapons. At that time, the US had no nuclear-armed missiles that were operational, and our strategic bombers weren't truly global in range. Our allies, threatened by a few Soviet missiles of limited range and by nuclear-capable Soviet bombers, declined to provide either military assistance for the Hungarians or bases for US deterrent forces. Our nuclear bargaining power was neutralized and Soviet tanks rolled into Hungary. A crack in the iron wall of Soviet hegemony was sealed.

In October 1962, the tables were turned. A small force of US ICBMs and our much larger, by-now global, bomber fleet were decisive in forcing the Soviets to withdraw offensive missiles from Cuba.

Neither in 1956 nor in 1962 was a shot—nuclear or conventional—exchanged between the two superpowers, but in each case the outcome was decided by nuclear weapons at the ready.

The US was prepared in 1962 because we took seriously the erroneous forecasts of a missile gap, made in 1959 and 1960. The forecasts, based on the best intelligence information then available, turned out to be exaggerated. But if we had not heeded them, it is doubtful that the US would have launched a crash program to put missiles in the ground and to enlarge and improve our bomber force. Without the fairly wide margin of nuclear superiority we had in the fall of 1962, the Cuban crisis might well have culminated in a shooting war.

Now, Soviet expansionism is again on the move. A crisis, at least comparable in gravity to the Soviet missile presence in Cuba, is developing in the Middle East and the Mediterranean basin. Elsewhere in this issue of AIR FORCE Magazine, that increasingly perilous situation is discussed *(see page 16 and page 40)*. The USSR has moved ominously toward a centuries-old Russian objective, shared by Czars and commissars alike, of dominating an area that is of great strategic importance, both in itself and as a way-station to further expansion.

Underlying the Soviet drive into the Middle East is a major shift in the nuclear balance. Between 1968 and the summer of 1970, the US nuclear superiority of about 4 to 1 over the Soviets has evaporated. Rapid deployment by the Soviets of a variety of ballistic and orbital weapons, including the giant SS-9 missile, their construction of an ABM system, and the USSR's emergence as a major maritime nation have combined to virtually neutralize US strategic power except as a deterrent to a direct Soviet attack on the United States.

It was ironic that we met the earlier Soviet challenge, in 1962, because we heeded inaccurate warnings of a Soviet drive for nuclear superiority. It is doubly ironic that *unequivocal* evidence of the USSR's race for nuclear superiority now is either ignored or discounted as self-serving propaganda. The result: Today the Middle East and the Mediterranean hang in precarious balance. Tomorrow—what?

In a recent address to Associated Press editors, Secretary of Defense Melvin Laird revealed considerable hitherto classified information on the Soviet strategic buildup. He told his audience: ". . . the information I am presenting to you is based on our own observations of what the Soviets are doing," not on Soviet discussions of their strategic forces. The Secretary had to be referring to satellite reconnaissance photographs, highly refined electronic intelligence, and other sources of information that didn't even exist in 1960.

Today's public skepticism about the realities of Soviet nuclear power, and its intended uses, is somewhat reminiscent of the skepticism that existed in the fall of 1962, concerning allegations of Soviet missile-site construction in Cuba. That earlier skepticism disappeared when photos of the Cuban missile sites, taken from high-flying U-2 aircraft, were made public. The American people, almost without exception, rallied behind the President.

We are reliably informed that one of this country's highest-ranking officials recently asked: "What does it take to awaken the American people to the seriousness of the Soviet threat?"

We don't claim to have a comprehensive answer. But one way might be to release some of the satellite photography on which US analysis of the threat is based. That was pretty effective in the case of Cuba.

The old grammar school game of "Show and Tell" isn't just for kids. It works for grownups, too.—END

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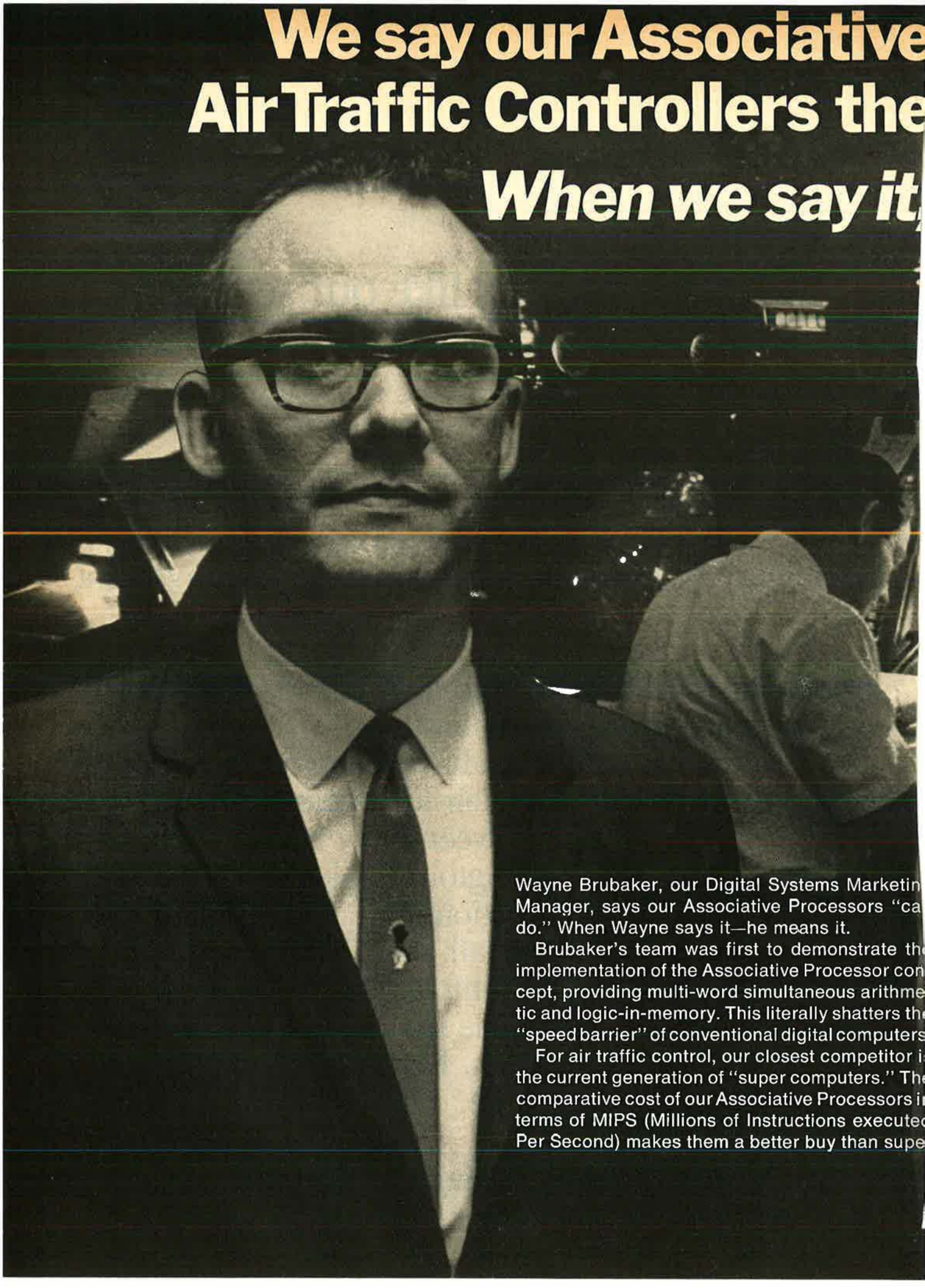


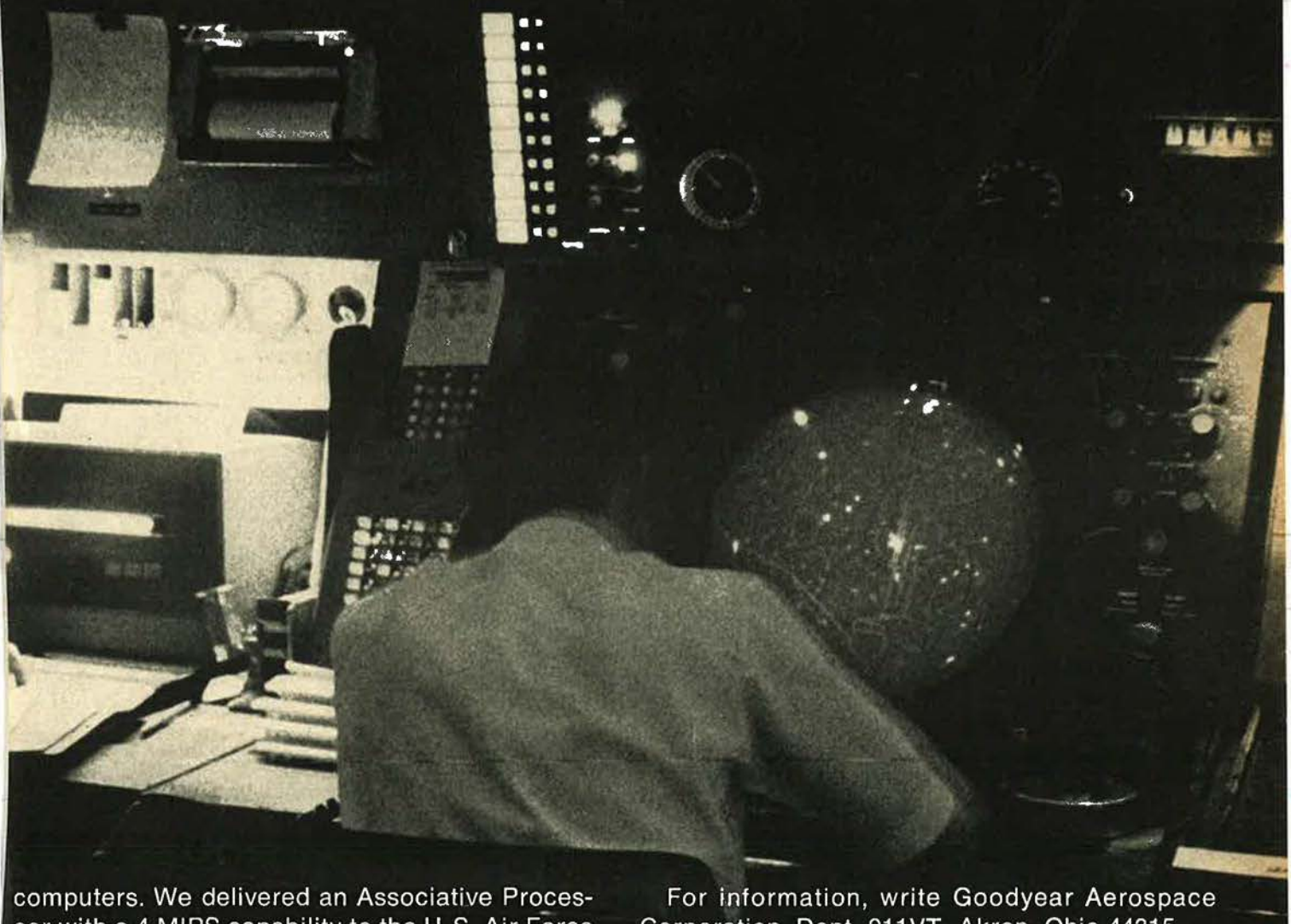
Wayne Brubaker, our Digital Systems Marketin
Manager, says our Associative Processors "ca
do." When Wayne says it—he means it.

Brubaker's team was first to demonstrate th
implementation of the Associative Processor con
cept, providing multi-word simultaneous arithme
tic and logic-in-memory. This literally shatters th
"speed barrier" of conventional digital computers

For air traffic control, our closest competitor i
the current generation of "super computers." Th
comparative cost of our Associative Processors i
terms of MIPS (Millions of Instructions executed
Per Second) makes them a better buy than supe

Processors will give help they need at lowest cost.

we mean it.



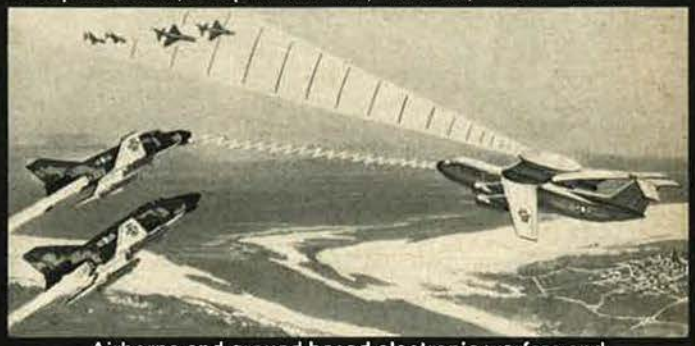
computers. We delivered an Associative Processor with a 4 MIPS capability to the U.S. Air Force last year. Today we have a 15 MIPS array under contract.

In addition to air traffic control, Goodyear Aerospace Associative Processors can provide significant benefits in radar, electronic warfare, communications and data base management systems.

While others study and talk about Associative Processors, Goodyear Aerospace has tamed the technology and has an operating system available for demonstration now.

When we say it, we mean it.

For information, write Goodyear Aerospace Corporation, Dept. 911VT, Akron, Ohio 44315



Airborne and ground based electronic warfare and radar signal processing tasks are already under way.

GOODYEAR AEROSPACE

AIRMAIL

Prisoners

Gentlemen: I want to compliment the Air Force Association for the June issue, dedicated to the prisoner of war problems. The Air Force Association continues to be a vital and instrumental factor in focusing public attention on this and other important issues.

It is our hope that Hanoi will realize that Americans do care about "just 1,500 men." When we stop to realize that some of these men have been in a captured or missing status longer than during any time in our nation's history, we feel the personal impact it has on them and their families.

Officially and personally, I extend my sincere appreciation to the Air Force Association for your steadfast efforts in behalf of our prisoners and missing personnel and their families.

ROBERT C. SEAMANS, JR.
Secretary of the Air Force
Washington, D.C.

Gentlemen: Please accept my thanks and gratitude for your excellent coverage of the plight of the prisoners in the June 1970 issue.

Your continued support always provides me with greater enthusiasm and hope.

EVELYN GUARINO
(Mrs. Lawrence N., POW wife)
Satellite Beach, Fla.

• *For a continuing report on the American POW/MIAs, see the article beginning on page 30 of this issue.*—THE EDITORS

The River Rats

Gentlemen: All of the Washington force joins me in expressing our sincerest thanks for an absolutely outstanding job in the June issue. I know you will be receiving other expressions of thanks from the various River Rats, but we are particularly grateful.

I have mailed additional copies to some of my civilian friends who finally will know "who we are."

Again, many thanks. Absolutely superb.

COL. T. H. CURTIS
Chief, Operational Test Div.
Directorate of Operations, OCS
Washington, D.C.

AOM Degree

Gentlemen: The University of Southern California offers, at twenty-four bases throughout the world, graduate studies leading to a master's degree in Aerospace Operations Management. The program is fully sanctioned by the Air Force, is generally taught in military classrooms, and, in fact, was specifically developed in 1964 by USC at USAF's request. (There also is a graduate study center at the Pentagon.)

Yet, a somewhat incongruous situation exists. The Air Force Institute of Technology has judged that this master's degree will not fill the degree prerequisite for enrollment in AFIT doctoral programs. The official AFIT opinion is that "there are no doctoral programs offered through AFIT, for which one can qualify on the basis of the master's degree in Aerospace Operations Management." The opinion is not a specific judgment, applying only to an individual applicant, but is a general rule applicable to all USC AOM graduates. The degree does have sufficient credibility, however, to prohibit entry into an AFIT master's program for the purpose of getting an "acceptable" master's degree.

The more than 1,000 students presently enrolled in this fine program, and its 500-plus graduates worldwide, should be aware of this situation. Those planning the master's as a terminal degree will have no problems. Those, however, planning doctoral studies through AFIT would be wise to get specific educational guidance regarding their educational future. (It is interesting to note that nearly all colleges and universities in the US offering doctoral programs in Business Administration, Systems Management, and related fields, consider the USC master's degree as an acceptable, if not very credible prerequisite.)

In order to compile data on the situation, I would appreciate hearing from as many MAOM degree holders as possible. Specifically, how many have applied for doctoral programs (through AFIT or otherwise)? How many are presently enrolled in or have completed doctoral work, and at what universities? A postcard will do; all replies will be acknowledged.

MAJ. WILLIAM SIMON, III
2202 Walker Dr.
Omaha, Neb. 68123

The Luxury Item

Gentlemen: The article by Maj. Joseph F. Tuso, "Navigator's Log: Jack Armstrong to the Age of Aquarius and Beyond," June 1970 issue, was well written, interesting, and credibly supports the premise that F-4 navigators are making a real contribution to the SEA war effort—*but*, as a former F-100 squadron commander (90th Tac Fighter Squadron, Bien Hoa, July 1967 to February 1968) with 187 missions, I feel a need to come out against the two-man concept for close-support and interdiction aircraft.

Let me first agree that the luxury of having someone in the back seat who can read off your release parameters, check your dive angle, and call off altitude is one I would have enjoyed many times. No doubt about it, the GIB can read the map for you while you're busy flying instruments, etc., and if I were commanding an F-4 outfit today, I'd tell my rear-seaters how much I valued them and I'd mean it.

So the point is not that the extra head in back isn't useful; the point is he's a *luxury* and one we can ill-afford.

Let's face it. The only reason the F-4 has a back seat is because it was originally evolved as a Navy all-weather interceptor and the GIB was an RO. When the USAF couldn't get funded for a new fighter of its own, it adapted a proven Navy design to the USAF mission, and what a good decision that turned out to be! When the question of what to do with the back seat arose (remember this was in the days when we were having a tough time getting every one of our rated troops a minimum of 110 hours per year), someone must have decided that since we needed *some* two-seaters for transition (witness the F-100F), we might as well buy the existing airframe and keep the back seat.

Then came the SEA conflict, and what had been a good idea was car-

(Continued on page 14)

SCIENCE/SCOPE

The prototype of an advanced long-range radar, which can detect and analyze a target traveling faster than a bullet many miles away, is undergoing final testing atop an isolated mountain in Southern California. Controlled aircraft flights are being used to test its overall concept, stability, and reliability. The prototype, a scale version of a proposed long-range system called ADAR (for Advanced Design Array Radar), was built under a multi-million-dollar U.S. Air Force/U.S. Army contract. It is the most powerful radar yet built by Hughes in terms of radiated peak power.

When NASA's Synchronous Meteorological Satellite is launched in 1972 it will carry an instrument that can map the clouds over North America by night as well as by day. Called VISSR (for Visible Infrared Spin-Scan Radiometer), it is being built by Santa Barbara Research Center, a Hughes subsidiary. Earlier spin-scan cameras by SBRC, which are now taking daily cloud pictures from Applications Technology Satellites I and III, are limited to the visible spectrum. VISSR will also operate at infrared wavelengths to take nighttime pictures of "excellent" definition.

39 TOW missiles selected at random from the Hughes production line scored 39 perfect hits at Redstone Arsenal, Ala., recently under the U.S. Army's new "fly before buy" performance firings. TOW is a wire-guided missile for use by infantry or airborne troops against tanks, armored vehicles, and field fortifications.

A "mini" version of the U.S. Army's Manpack transceiver, developed by Hughes in a company-funded project, has pared the combat radio's weight from 24 lbs. to 15 (including batteries) while increasing the number of channels from 16,000 (2 to 18 MHz) to 280,000 (2 to 30 MHz). This much greater choice of frequencies enables the new Manpack to send and receive on many days when other radios are affected by atmospheric disturbances. Its added higher frequencies permit the use of smaller antennas.

A unique holographic technique for testing sandwich structures to detect flaws in the bonding of the honeycomb structure to the aircraft or spacecraft skin has been developed by Hughes research scientists. The new Hughes method uses a giant pulse ruby laser and thus does not require the massive table needed to hold helium-neon laser hologram systems rigid. Also, it is faster than present holographic testing techniques. A test specimen is stressed by being hit by a hammer, which also triggers the laser. Five to seven holograms are made on the same film in 1/1000 of a second. Areas where the honeycomb structure has failed to bond to the skin show up distinctly on the multiple-exposure hologram.

Automatic in-flight fault detection -- one of several advanced features Hughes has designed into the AWG-9 missile-control system for the U.S. Navy's F-14 -- enables the crew to check weapon system status before they commit the new fighter to an engagement. Four computer-controlled test sequences determine the status of AWG-9's weapon-delivery subsystems and a fifth checks the readiness of the Hughes-built Phoenix missiles. The results, shown on the missile control officer's tactical information display, tell him the F-14's mission capability at that instant.

Creating a new world with electronics

HUGHES

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ried out to what I believe is an absurd extreme—since there's a cockpit available, someone's got to sit in it. Why? When every day F-100s, F-105s, F-5s, A-37s (which can carry two but usually don't), and A-1s are attacking the same kinds of targets with the same ordnance and *equal effectiveness* (some would say greater) and only jeopardizing one man per airplane.

Somewhere there's a man who decided to man both F-4 seats on close-support and interdiction missions, and no matter how he rationalizes that decision, every time we lose an F-4 and two men die instead of one, he must bear the responsibility for that unnecessary second loss.

So, my hat's off to the GIBs, but only because they're doing an outstanding job on their half of a one-man job!

LT. COL. WILLIAM E. HAYNES, USAF (RET.)
Littleton, Colo.

Corn Seed

Gentlemen: Only now have I gotten around to reading [John F. Loosbrock's] excellent editorial ["Seed Corn for Survival"] in the May issue. Your editorials are consistently good, but this one relating seed corn to research and development was especially perceptive.

The analogy was appreciated especially in this family. I knew about the seed wheat as a child in Saskatchewan, and my wife knows exactly what you are remembering, having grown up, like you, on a farm, in Glenwood, Mills County, southern Iowa.

COL. WINN F. ZELLER, USAF (RET.)
Claremont, Calif.

• *Many thanks. Usually we get the brickbats and not the roses. Tell Mrs. Zeller that Glenwood is a metropolis compared to my home town—Lacona. When I was growing up, the population was 450. It's about the same now, mostly retired farmers and commuters to Des Moines. My father was a country doctor and we usually got "paid in pork," or vegetables, or labor, sometimes in coal, hardly ever in money.*—JFL

Acronyms

Gentlemen: Reference page 165 of your excellent May 1970 issue. Webster defines an acronym as "a word formed from the first (or first few) letters of several words, as *radar*, from *r*adio *d*etecting *a*nd *r*anging (italics added). SAC, TAC, MAC, GEEIA, SAGE, and several others give me no trouble, but CG, WWII, RCAF, etc., defy pronunciation.

COL. DONALD R. SMITH
DA (no acronym)
PACAF (acronym)
APO San Francisco 96553

Blond Knight

Gentlemen: In the June issue of AIR FORCE/SPACE DIGEST, I noticed the book review about *The Blond Knight of Germany*, by Col. Ray Toliver. You indicate the book lacks drama. It would seem to me this is quite to the contrary. I consider it one of the best biographies on a World War II fighter ace that has come on the market since books on World War II aces have been written.

Just as a contrast, read *Stuka Pilot*, by Oberst Hans-Ulrich Rudel. I would say this one is somewhat lacking in drama. Rudel probably had as outstanding a career as Hartmann. . . . But Rudel's book is far inferior to the book Colonel Toliver wrote. I get the feeling from reading Toliver's book that I almost know Hartmann personally.

D. E. "TEX" POWELL
Fullerton, Calif.

May Cover

Gentlemen: I would question the cover on your May 1970 issue.

According to the papers, the tiger-shark nose is not allowed in the area indicated. Some general, not realizing the psychological value of the tiger shark in that part of the country, said "No."

I feel any means of winning should be used. . . . You can't fight a war according to M. Queensberry's rules and win.

PAUL RUNEY
Richmond, Va.

• *The tiger-shark nose was OK at the time the picture was painted by Keith Ferris. The artist went along with the unit when it was deployed from* CONUS *to SEA and sketched the scene in flight. Since then, such markings have been prohibited because they reduce the effectiveness of camouflage.*—THE EDITORS

Joining the Team

Gentlemen: I did not realize the tremendous and essential job that the Air Force Association is doing to help keep our aerospace power ready for any eventuality and as a deterrent to prevent potential wars until I heard an inspiring speech by Maj. Gen. H. E. "Bus" Humfeld, USAF (Ret.), at a recent meeting of the Air Force Association in Waco. The entire population of this country should have heard that speech.

It was my privilege to fly and fight with Bus in the Twentieth Air Force on Tinian. Believe me, he is still carrying the fight to defend America.

As a result of his effective speech and as a consequence of the leadership of Bill Bushell in calling for an active and working membership in the Waco Chapter, it is my decision to become active in AFA. I would like to work with the team that is providing vital leadership to help keep our aerospace power ready for action and capable of meeting any challenge. . . .

My forthcoming book on ideological warfare—*A Nation of Crusaders*—will be published this fall. This documentary is designed to motivate our people to an ideological counterattack—in our churches, our schools, associations, clubs, military establishment, government organizations, and unions—against the very successful and heretofore uncountered ideological thrust of the enemy. . . .

COL. JAMES ERVIN NORWOOD, USAF (RET.)
Waco, Tex.

Help! Some Symbols!

Gentlemen: Since backing the fighting men who always get stuck with this nation's dirty work is part of what AFA stands for, I should like to make the following suggestions. I think AFA could help me publicize them.

Since the hippies stole Churchill's "V for Victory" symbol and reversed it, why not begin a campaign of reviving the original "V" sign with the thumb and last two fingers turned toward the face. Then we, too, would have a sign, a sign that means we're backing our troops to victory.

Also, as a proud graduate of Air Force ROTC, I think the nation's ROTC graduates should form an organization—or at least get a bumper sticker that says, "Commissioned Thru ROTC."

We need some symbols—quick!

B. C. FAIN
Beverly Hills, Calif.

Three Goofs and a Plug

Gentlemen: Reference your May 1970 publication of the 20th Annual Air Force Almanac . . . your attention is invited to the following errors:

On page 65 (an Organizational Chart) under the heading "Pacific Air Forces," line 5 of the attached units should read: "Hq. 41st Aerospace Rescue and Recovery Wing," not "Pacific Air Rescue Center." The Center

became a wing on February 7, 1969.

Page 66, column 2, the second and third paragraphs do a good job of telling the 3d ARRG accomplishments, however, they fail to state that the 3d ARRG is a subordinate unit of the 41st Aerospace Rescue and Recovery Wing (41st ARRW). Explaining that the 3d ARRG is a subordinate unit of the 41st ARRW would better show the relationship of this MAC combat-rescue unit to Pacific Air Forces.

On page 67, the caption beside the photo of a helicopter being refueled is in error. The helicopter is an HH-53 BUFF (Big Ugly Friendly Fellow), not the HH-3 Jolly Green Giant. I have seen this error before and must assume that the initial releaser of the photo put the wrong designation on it. One way to tell the difference at a glance is that the engines on a BUFF sit in pods on the side of the fuselage and the Jolly Green engines are inside the top of the fuselage. There are other technical differences, but this is the most obvious way of telling them apart at a glance.

Please don't think I am being critical of a magazine that is enjoyed by all of us here. Your stories and photos are always interesting, informative, and eye-appealing. AIR FORCE/SPACE DIGEST is a magazine that, no matter how "dog-eared" the copies get from being read over and over, is always enjoyed here at the 41st ARRW.

CAPT. WILLIAM K. WARREN
Chief of Information
Hq. 41st Aerospace Rescue and Recovery Wing (MAC)
APO San Francisco 96553

Hell's Belles

Gentlemen: I would greatly appreciate assistance in locating the whereabouts of veterans of the 316th Fighter Squadron, 324th Fighter Group.

Members of this unit have been holding triennial reunions since the squadron's deactivation in 1945. However, we're still out of touch with many former members of "Hell's Belles Squadron."

The 316th, which began combat operations as a P-40 outfit and was later equipped with P-47s, served from 1942 to 1945 in the Middle East and European Theaters.

As editor of our newsletter, I am about to begin the preliminary work on a detailed study of the squadron's history, and would like to hear from veterans of the outfit. Also, I'll be happy to send any 316th man a copy of the *316th Fighter Squadron News.*

GEORGE COHEN
R.R. #1, Box 78
Athens, Ohio 45701

UNIT REUNIONS

6th Combat Cargo Squadron

Members of the 6th CCSQ will hold their third reunion August 10-12 at the Ramada Inn, South Lake Tahoe, Calif. All interested members are asked to contact

Dale Root
Audubon, Iowa

Class 40-G

Flying School Class 40-G will hold its 30th annual reunion November 11-15, 1970, at the Menger Hotel, San Antonio, Tex. If you are a member of the class and have not been contacted, write

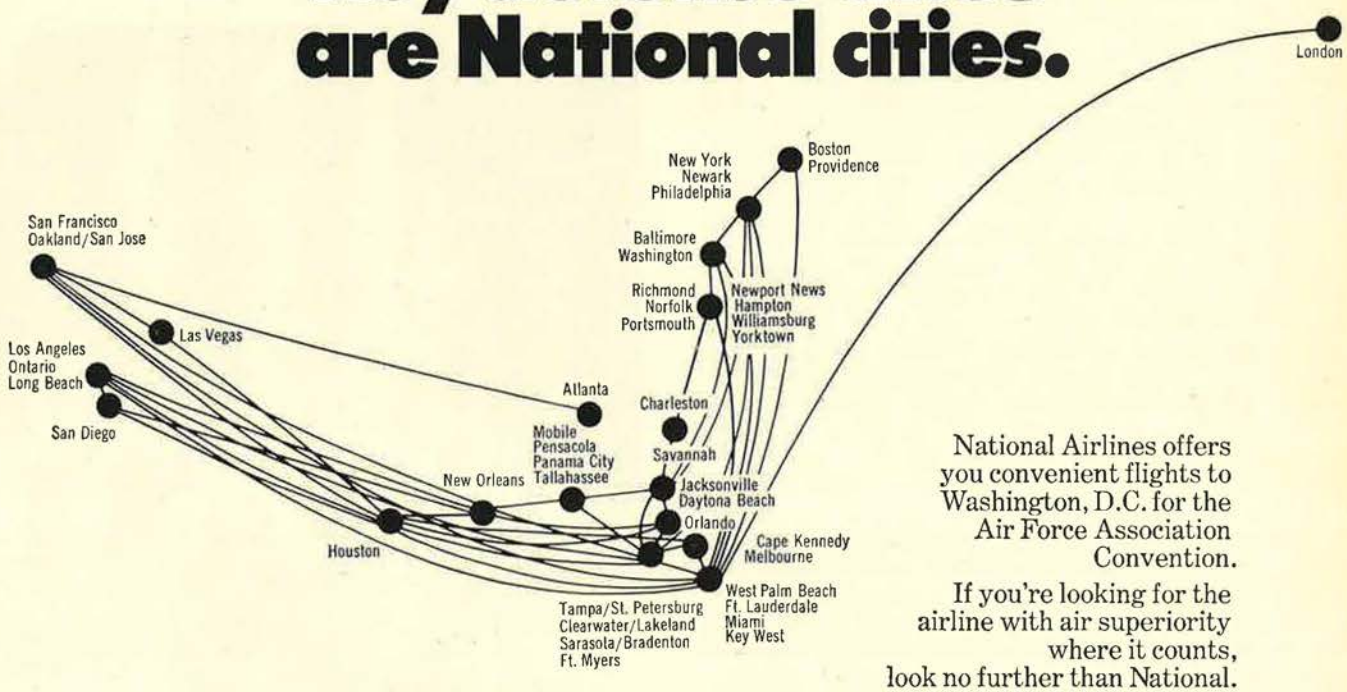
John R. Shields
370 Quentin Dr.
San Antonio, Tex. 78201
Phone: (512) 736-3891

99th Squadron, 9th Bomb Group

I would appreciate any information regarding scheduling of any reunions planned for the 99th Squadron, 9th Bomb Group (1944-1945).

R. A. Duvanish, Principal
Royal Oak High School
Charter Oak Unified School District
P.O. Box 9
Covina, Calif. 91722

Key defense cities are National cities.



National Airlines offers you convenient flights to Washington, D.C. for the Air Force Association Convention.

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AIRPOWER IN THE NEWS

By Claude Witze
SENIOR EDITOR, AIR FORCE MAGAZINE

And Now, the Middle East

WASHINGTON, D.C., JULY 7, 1970

When the Israelis won that Six-Day War in 1967 they did it all alone. But when Richard M. Nixon started, six days ago, to warn us that the Middle East now is "dangerous" because it involves a potential "collision of the superpowers," he got a lot of help. It came from Russia, Israel, the United Arab Republic, and even from some of his usually dovish critics at home.

The President's alarm, sounded on a nationwide television interview with three of our most prestigious pontificators, was shaking only to that large part of the public that had not been reading much news, lately, about the Middle East. All eyes were on Cambodia, where the doves and the college malcontents expected the Administration to fall on its face. The press was standing by hopefully, and giving as little space as possible to Soviet activity in Egypt. There was one nationally distributed cartoon that depicted Mr. Nixon sitting on top of a big bomb. The weapon was labeled "Middle East," and the fuze was captioned "Soviet weapons and men." The President, looking comfortable on his round seat, was studying a map of Indochina.

It is interesting that, while our news and editorial effort was going to columns of wild concern over alleged escalation of the war in Vietnam, observers in capitals other than Washington seemed more aware of what was going on. The *Economist* of London, for example, warned in mid-June that the Mideast "does contain a danger, visible though not imminent, of a Soviet-American clash." The *Economist* reasoned that Mr. Nixon could not much longer delay a decision on whether or not he would sell more McDonnell Douglas Phantoms and Skyhawks to Israel. It was on March 26 that he announced the request had been turned down on an "interim basis" but that the refusal "will be constantly reappraised as the fact situation changes."

Well, the fact situation did change, despite the opinion of many that the cold war is over, and President Nixon obviously felt the pressure far more than the public realized. The increase in Russian military activity in Egypt and on the surface of the Mediterranean, the *Economist* pointed out, "made it more difficult for President Nixon not to do something publicly for the Israelis. Those at home who attack him for being too warlike in Indochina, or many of them, do not hesitate to urge on him a greater display of resolve to defend Israel against what they now regard as a Communist threat to its existence.

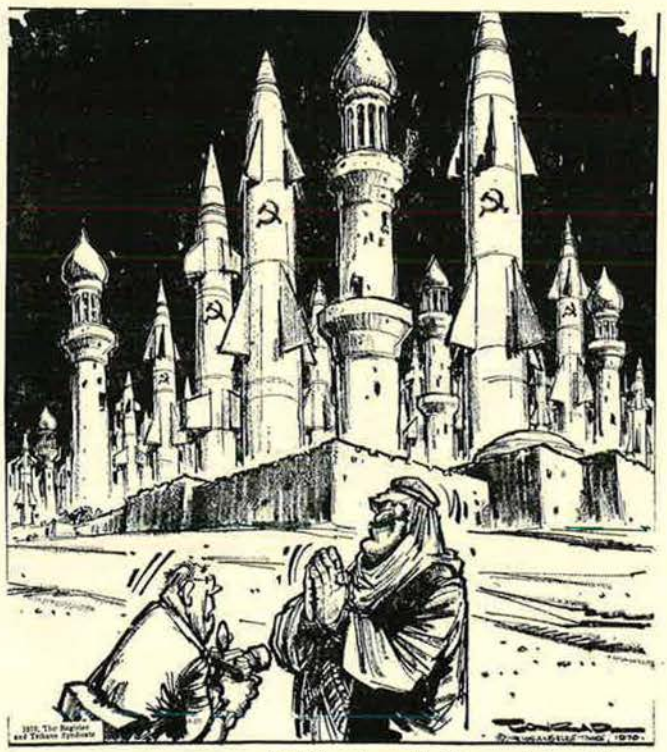
"The Israel lobby has shown once again how powerful it is. The signatures of well over 200 congressmen and nearly three-quarters of the Senate have been collected for two separate letters urging the President to comply with the Israeli requests. Collecting the signatures of legislators to a letter is a different matter from collecting votes, it is true; still, there are plenty of other indications that a wide body of opinion sees the Arab-Israeli conflict in plain black and white and can be rallied with ease to the defense of Israel, whatever it may feel about wars elsewhere."

The British publication did not go into names on this matter, but the roster of those who will support an Israeli war but not an American war includes such outspoken men as Senators Kennedy of Massachusetts, Goodell of New York, Percy of Illinois, McGovern of South Dakota, and Mathias of Maryland. There are additional names in the list, many of them loud and vociferous participants in the expensive seven-week debate over the Cooper-Church amendment to the Military Sales Bill. Senator Cooper did not join the appeal to help Israel; Senator Church did sign it. The debate they started, it should be pointed out, was expensive in the amount of time it wasted in a critical Senate year and in the tarnish it left on the Upper Chamber's record. The House of Representatives is expected to junk the amendment, or at least make sure it is modified.

As for what the Cooper-Church amendment could accomplish, if anything, it is impossible to quote an authority or give an informed opinion. After defeating efforts by opponents to add statements reasserting the President's freedom to act as Commander in Chief, the sponsors successfully offered a declaration that nothing contained in the measure denied the constitutional powers of the President. They then accepted a postscript reaffirming the President's right to exercise "that constitutional power which may be necessary to protect the lives of US armed forces wherever deployed."

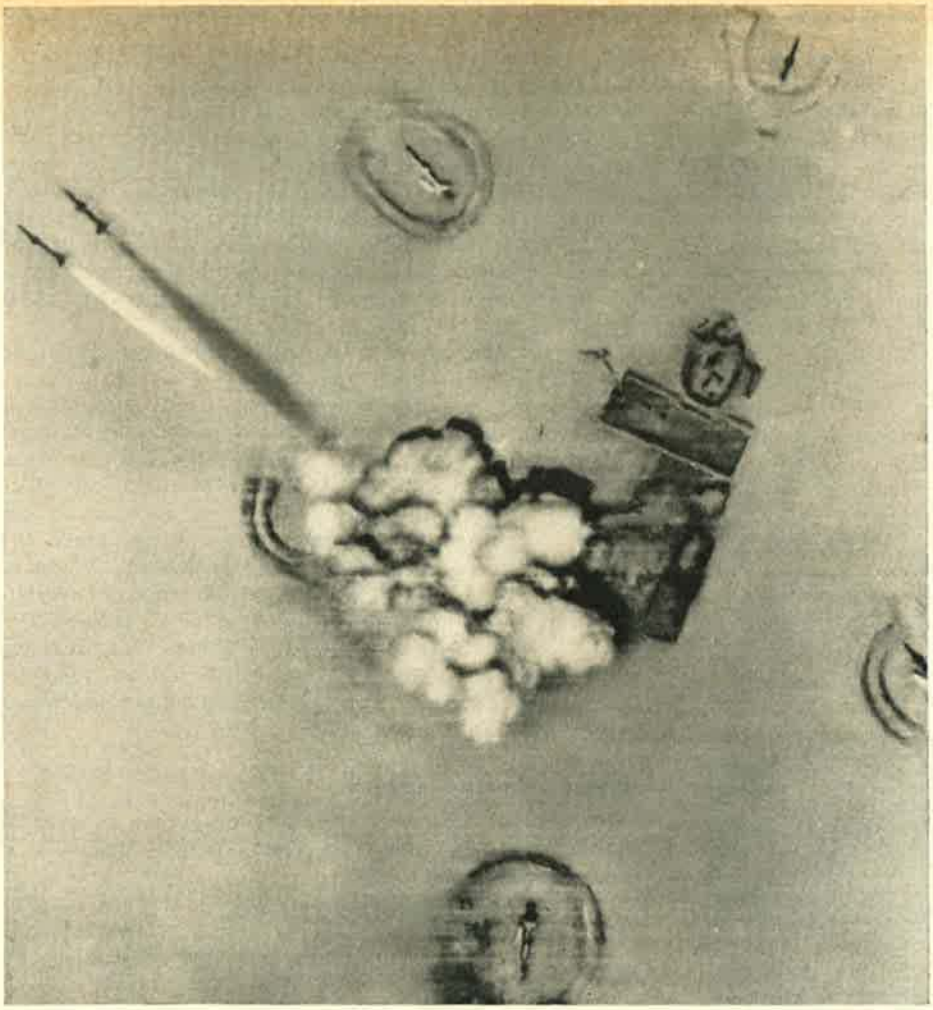
The President considers this "not a particularly precise document" and said so as he pronounced the Cambodian operation a success and turned his attention to the Middle East.

Without reviewing the entire history of the Arab-Israeli



—Paul Conrad; reprinted by permission of the Register and Tribune Syndicate, Des Moines, Iowa

"You Egyptians must be a very religious people . . . !"



Israeli military authorities say this is an Egyptian missile site somewhere in the Suez Canal area. It consists of a ring of six batteries, under attack by Israeli aircraft, whose bomb bursts are clear in the puffs of smoke. One missile, upper left, trails a white streak of flame as it leaves the launching spot, headed for an airborne target.

—Wide World Photos

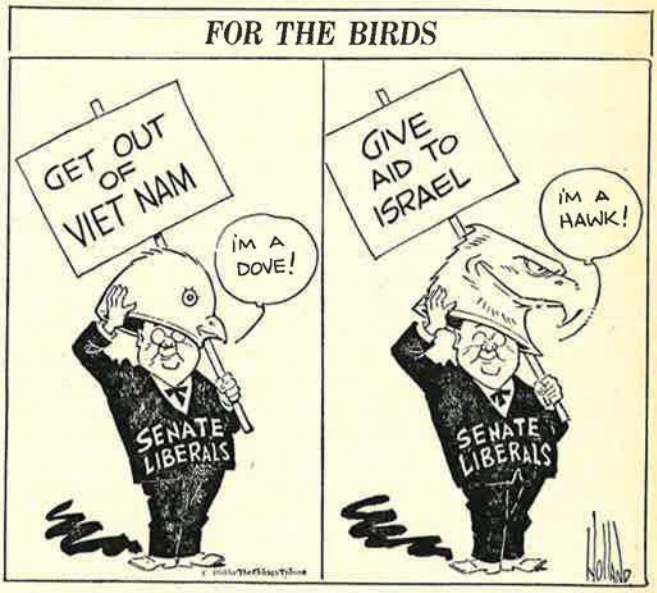
conflict, it should be recalled that the Administration proposed a diplomatic settlement of the crisis at the United Nations late last year. Israel and Egypt rejected the idea. Jewish organizations in the US launched a drive against the proposals, and numerous resolutions in support of Israel were offered in Congress.

In January of this year France announced it was selling 110 Mirage supersonic fighter-bombers to Libya, an ally of Egypt. American efforts to reach an arms-control agreement with Russia were rejected, and in March Moscow was reported to be supplying Egypt with advanced SAM-3 antiaircraft missiles and Soviet crews. It was not many years before that France was selling jets to Israel, a policy that was reversed by President Charles de Gaulle after the 1967 Six-Day War. It was in the Johnson Administration that the White House first was faced with the possibility of suffering political losses at home if Israel could not maintain a military balance.

Airpower is the critical item in the Middle East balance. There can be no jungle war, as in Vietnam; there is no place to hide. The first US combat aircraft sold to Israel were forty-eight A-4 Skyhawk fighter-bombers, delivered in 1968. Late the same year, it was announced that we would deliver fifty Phantom F-4s. At this writing, forty-two F-4Es have been delivered, and two more are on the way. An order for six RF-4s will be filled early next year. The rest of their planes are French, except for homemade trainers. For air-superiority missions, the Israelis favor the Mirage III, which carries cannons and a couple of Sidewinder missiles.

Israel is estimated to have 800 qualified pilots for an air force of about 300 airplanes. Egypt, it is reported, has 250 pilots for a stable of about 400 aircraft, a number that is rising. A more important part of the Israeli superiority is in personnel. Both their pilots and their ground crews rate as excellent; the Egyptians are inferior. One source says the Israelis can refuel a plane in seven and a half minutes. It takes the Egyptians forty. The Israeli Air Force, working with shorter missions and in less primitive

(Continued on following page)



—Holland in the Chicago Tribune, by permission

conditions, can get four or more sorties a day out of each aircraft, twice the rate obtained by the US in Vietnam.

USAF experts point out that Israeli youths are eager to serve their country; only the young men with top capability become pilots; their training is started while they are young. Because of the climate, there is no requirement for instrument training to the extent necessary in other parts of the world. The missions are short, eliminating air-to-air refueling. So far, there is no necessity for special training to deliver nuclear weapons. Cairo is only nine minutes from hostile Israeli airfields, a factor that lends additional import to airpower in this theater. It also explains why and how the Israelis are determined that airpower will be used to cut any war short, as it was in 1967, and a point the United States failed to grasp in Vietnam.

Of major interest to Americans would be a list of options open to this country, but any discussion of them would be more speculative than informative. So far as USAF is concerned, the key spot for visibility probably is headquarters of the Sixteenth Air Force, near Madrid. From there, it appears that Russia has a long-range plan to gain top influence in the Middle East and North Africa. The US Navy, peering from the decks of ships in the Sixth Fleet, knows that battleship diplomacy is of small avail

Now in the possession of Libya and ready to provide a haven for Russian-built aircraft, the 11,000-foot runway at Wheelus AB in North Africa was built by and for USAF.

when it faces a growing arsenal of Soviet airpower operating from land bases.

A key part of that system, ironically, will be Wheelus Air Base in Libya, where the US has invested more than $75 million over fifteen years. It has been turned back to the landlords and is destined to become a training base for UAR pilots and airmen. Russian-built fighters and bombers will be based there, once the Libyans fall more completely under UAR-Soviet control. The small Libyan Air Force itself was trained, for the most part, by USAF. And it has bought about a million dollars' worth of our equipment that was on the scene when USAF evacuated. Libya is a tiny country, now equipped with an immense and modern airpower terminal, one that constitutes a military vacuum. That it will be filled, and with Russian hardware and personnel, is hard to doubt.

The only name for what the Middle East generates today is anxiety. Here in early July, the Nixon Administration clearly is negotiating with a sense of urgency. The Russians themselves have offered suggestions for a settlement at the United Nations. It is described as a "move forward," but there has been no immediate reaction, a fact that may be attributable to the same motivations that pulled out the UN's Emergency Force on the eve of the 1967 war. After ten years on the scene to keep peace, US Secretary-General U Thant complied at once, you may recall, when Egypt's President Nasser demanded withdrawal.

In general, the feeling in Washington is that neither the United States nor Russia wants a confrontation. It will be avoided, but Russia will continue to build up its domination in the political arena of the Middle East while this country is less fortunate.

Probably the critical question is: What will Israel do if it is pinned flat against the wall?

The answer is that it will fight, as it must. And that it will do so, for the most part, with American arms. Israel is a customer in this sense, and it is part of the Nixon Doctrine that we will provide the hardware for our allies who must defend themselves. So far as the war of the minds is concerned, Washington has not yet made the best of its opportunity. Egypt could be Russia's Vietnam, if we make the point, loud and clear, that Russian imperialism has gone rampant in this case. After all, Hanoi continues to exist because it is fed by Russia, and we have not turned the city into a parking lot, which we could do. And, with nuclear weaponry, Israel could fight and win a one-day war against Cairo, if it had to.

Quotes of the Month

At a recent luncheon in Washington, Adm. Thomas H. Moorer, new Chairman of the Joint Chiefs of Staff, offered some morsels, such as:

". . . you hear on occasion that the Joint Chiefs of Staff always bicker back and forth. I never have understood why it is that the Supreme Court deliberates and the Congress debates and the Joint Chiefs bicker. . . .

". . . contrary to what one hears and reads on occasion, the Joint Chiefs do have the capability of responding in a matter of minutes to any kind of an emergency. . . . Many times you see that the Joint Chiefs did this and the Joint Chiefs did that, and in fact the Joint Chiefs may not have ever considered the problem. I just read the other day where I had made the recommendation that we invade Cambodia with two divisions of troops, at a certain meeting. The first point was that I wasn't at the meeting, and the second point was that there are not enough ships in the entire Navy, in both oceans, to carry two divisions; and, in the third place, one can probably arrive in Cambodia in a rowboat and be perfectly all right. . . . Be careful when you read that 'they did this and they did that.'"

* * *

Department of Amplification: In our June issue, "The Wayward Press," in this space, printed, side by side, as an "Interesting Coincidence," extracts from two books. One was from an excerpt from Seymour Hersh's *My Lai 4*, published by *Harper's* Magazine for May. The other was from the novel *Once an Eagle*, by Anton Myrer, published in 1968. The coincidence lay in the fact that the two accounts—one fiction and the other nonfiction—were almost identical.

As published in *Harper's*, the Hersh account was identified as a quotation from "a letter sent home by a GI to his family and later published in his local newspaper."

What the *Harper's* extract did not include was a note, which appeared in the appendix to Mr. Hersh's book, citing the Akron, Ohio, *Beacon Journal* of March 27, 1967, as the source for the GI's letter.

This has been called to our attention by several readers, including Mr. Hersh. We are glad to set the record straight.

—THE EDITORS

LETTER FROM EUROPE

By Stefan Geisenheyner
AIR FORCE MAGAZINE EDITOR FOR EUROPE

Antiskid Research

After touchdown, when an aircraft's speed falls below the limit where aerodynamic controls are effective, the mass of the aircraft has to be steered, controlled, and braked by the landing gear. If the runway is covered by a film of water, or slush and snow, the effectiveness of the steering and braking action is greatly reduced by a phenomenon called aquaplaning, during which the wheels lose contact with the runway surface. The aircraft is, therefore, in danger of skidding uncontrollably, with the threat of a serious accident if it leaves the concrete altogether.

Each year this phenomenon causes numerous minor and several major incidents. Quite often, extensive damage is suffered by landing gear and supporting structures if the aircraft is brought to a sudden halt by sinking into the soft terrain bordering runways.

Extensive research has gone into development of novel runway surfacing and antiskid braking systems. Today almost all civilian and military jet aircraft are fitted with antiskid systems. Transducers sense the rotation speed of all wheels during the braking action. Their speed is compared by the system, and if one or more wheels do not rotate as fast as the majority or come to a stop, this indicates that aquaplaning or skidding is taking place. The system's mechanisms immediately release the brakes of the wheels involved until the wheels once again have reached the common rotation speed.

Introduction of this system was a major step but did not provide absolute security for aircraft. Though kept on a straight course, an aircraft was still in danger of rolling and sliding off the end of the runway. The danger exists particularly in central and northern Europe, frequently the scene of bad weather conditions. This prompted the British Air Registration Board, the UK's counterpart of the FAA, to embark on an extensive runway-improvement research program.

The Board has been working on this problem for about fifteen years. The practical development of antiskid runway technology was initiated as early as 1956 and various systems have been under test since.

Grooved runways to prevent formation of large water surfaces were introduced first and currently are in use at some airfields. This was followed by such new developments as open-textured macadam surfacings, gritted surface treatments, and other texturing techniques. The latest type of runway surface under investigation utilizes an open grating surface the entire length and width, with the runway over a drainage trench to eliminate altogether the problem of water collecting on the surface.

Of the various systems tested during the past decade, many have offered excellent results, but have proved too expensive for widespread application.

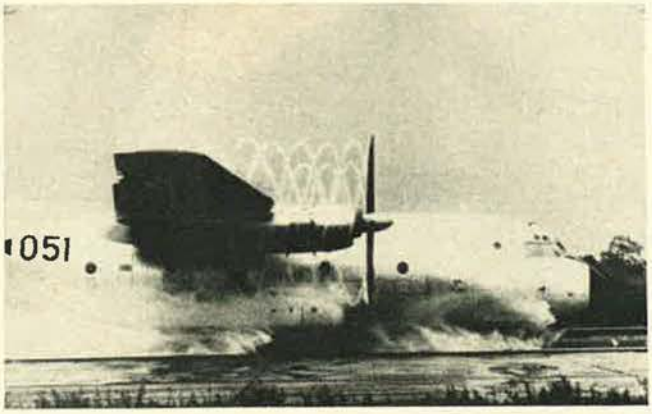
The prime requisites for runway surfacing are good water-drainage capabilty, durability, heat resistance, ease of application, and, most important, that the presently existing runways do not have to be extensively rebuilt. No surfacing that meets all these demands has yet been found. It is almost impossible to find a water-removal system that would not overtax the financial capacity of the average airport.

Despite the high costs involved, the Board's report recommends strongly that some type of developed treatment be applied to existing runways, and as a matter of considerable urgency. In the interest of flight safety, particularly in northern parts of the world, the work should be begun as soon as possible, the Board said. Airports and runways under construction or in the planning stage today should incorporate textured surfacing from the outset.

Anglo-French Engine for German Aircraft

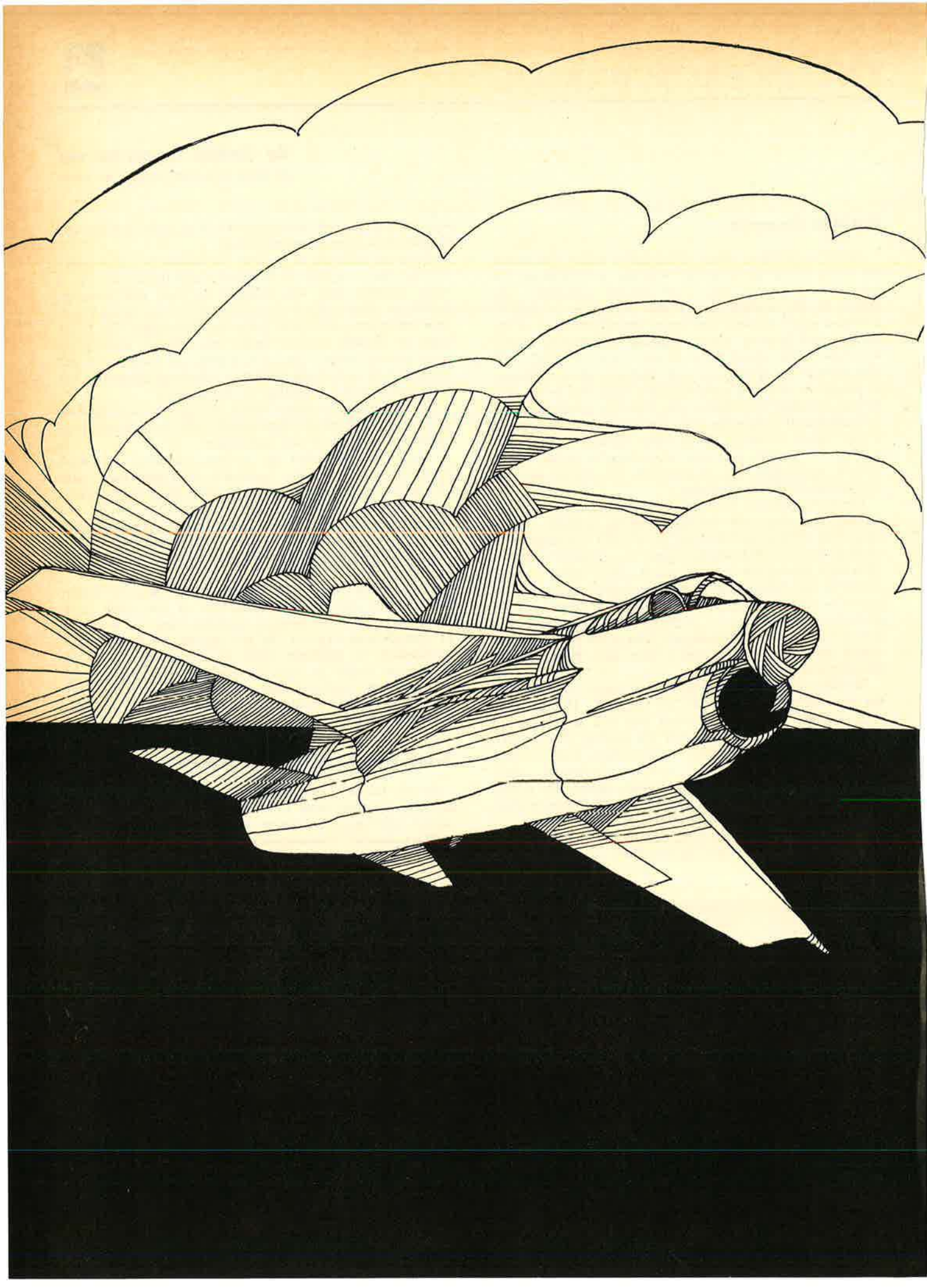
In the fall of 1964, SNECMA of France and Bristol-Siddeley Engines came to a then-secret understanding to jointly develop a jet-engine family for primary use in military aircraft. This engine project was designated M 45.

(Continued on page 22)



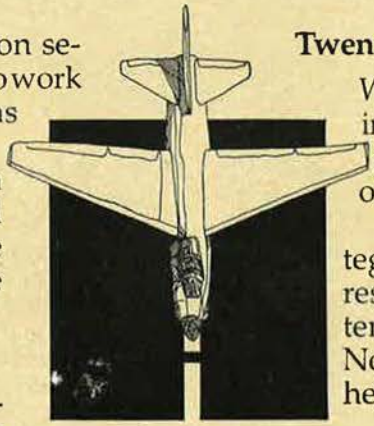
A German Air Force Transall transport undergoes a skidding test. Proper runway construction would eliminate the possibility of such accumulated quantities of water shown.

The VFW 614, Germany's first passenger jet airliner, is designed for economic operations on feeder and regional routes. Its twin jet engines are mounted atop the wing.



What goes on inside the A-7.

When LTV Aerospace Corporation selected our Electronics Systems Center to work on the program the assignment was clear: design, develop, and deliver an integrated navigation and weapon delivery system. A system that would help keep the A-7 one of the best close support and attack aircraft in the business.



Building the team

First, we committed a top management and engineering team to make sure things would go right.

Then we worked with LTV to define the best sensor and display subsystem anywhere.

At the same time, we began to refine the key to our system—the digital computer—known to us as System/4 Pi.

We put it all together, ironed out the bugs, delivered it to LTV on schedule.

LTV took the system and flew it. For over 20,000 hours.

Our system not only met every performance specification, it set a new record for accuracy.

Helping hand for the A-7

The A-7 now could claim to have tactical capabilities beyond those in any contemporary aircraft.

The key element in its special navigation/weapon delivery system is the IBM System/4 Pi tactical computer. By acting as a tactical coordinator, the System/4 Pi:

- Constantly computes the aircraft's position.
- Produces steering commands.
- Remembers exact locations of multiple sightings encountered during the mission.
- Solves the trajectory equations for the armament selected and the conditions of flight.
- And, in its spare time, performs self checks to make sure it's working properly.

Twenty years of systems integration

We've been at this business of systems integration and computerized navigation/weapon delivery systems since our work on the B-52 twenty years ago.

Since then, we've done systems integration on the B-70 and have had major responsibility in several aerospace systems including Titan, OAO, and Gemini. Not to forget the Instrument Units that helped Saturn get up and go.

Tomorrow is today

What we're working on today are new aerospace computers to help the next generation of aircraft perform even better. And we're moving ahead in a new field of astrionics to meet space navigation requirements.

These same skills in systems integration are being applied to several major projects—from long-range communications links to airborne diagnostic systems for new helicopters.

Some people say there's some kind of special talent to systems integration. Often true, but to us it's everyday business.

Not one, but a family of computers

System/4 Pi is more than one computer. It's a family. And it's ready to go to work in a wide range of applications where System/4 Pi's ability to expand without growing pains is especially important.

System/4 Pi's range from lightweight, compact computers for aircraft, satellites, and field equipment to multiprocessors for high-speed processing of large volumes of data.

Far from being laboratory prototypes, System/4 Pi computers are now used in over 20 defense and NASA programs.

IBM, Federal Systems Division, 18100 Frederick Pike, Gaithersburg, Maryland 20760.

IBM®
Federal Systems Division

The VFW-Fokker 614, due to enter service in 1972–73, is intended for use over very short stage lengths, and, with its STOL capability, could use short or unprepared airfields. The forty-passenger aircraft is being designed with easy maintenance as a major prerequisite.

In February 1965, an official agreement was signed, and it was announced that the M 45 engine would power the projected Anglo-French Variable Geometry (AFVG) strike fighter to be built by British Aircraft Corp. and Avions Marcel Dassault.

Since that date five years ago, the whole concept has been revised due to a variety of circumstances. The Anglo-French fighter was canceled by France's President Charles de Gaulle and Bristol-Siddeley Engines ceased operating as an independent company. Today it is known as the Bristol Engine Division of Rolls-Royce. In French military planning, the M 45 was replaced some years ago by the SNECMA M 53 design, and it seemed that the older engine was doomed to die along with the AFVG project.

The M 45 was given a new lease on life after cancellation of AFVG, when its potential became known to the general public. Vereinigte Flugtechnische Werke of Bremen, Germany—now VFW-Fokker—then had a revolutionary short-haul jet transport in the study stage, and the M 45's proposed size and thrust fitted the aircraft admirably. VFW decided to equip the aircraft with a civilian version of the M 45.

The aircraft, the VFW-Fokker 614, is a forty-seat short-haul liner due to enter service in 1972–73. It is intended for use in high-frequency operations over very short stage lengths for which no suitable jet aircraft had previously been developed or produced. It features an ability to operate from short unprepared fields, a landing weight equal to maximum takeoff weight, rapid turnaround, simplified maintenance procedures, and low operating costs even at the shortest stage lengths.

The German government, financing the venture by about sixty percent, decided to fund development of the M 45 as well, which probably kept development of the engine alive. The German version was designated M 45H-D, presently the only member of the projected M 45 family in the testing stage.

Fifteen months after initiation of the original M 45 program for the AFVG, a demonstrator M 45F, designed for component testing, was running in the SNECMA proving cells. The basic design came up to specifications, and go-ahead for the AFVG's M 45G was given. Several other versions, with and without afterburner, were projected. In any event, when cancellation of the AFVG came, the engine program was far enough along to warrant continuation.

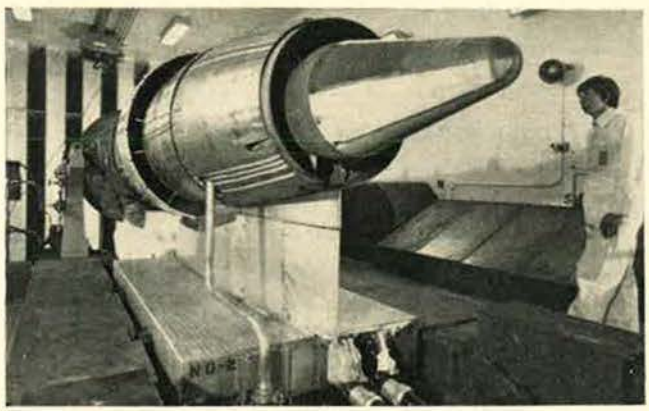
The German government, in collaboration with VFW, set the specifications for thrust and fuel consumption of the civilian engine, and SNECMA/Rolls-Royce soon discovered that only minor modifications to compressor and gas generator were necessary to meet demands.

The resulting engine, currently being bench-tested, is a turbofan in the 7,500-pound-thrust class that offers a growth capability into the 10,000-pound-thrust range. It features a twin-spool layout with a bypass ratio of 2.8 to 1 and an overall pressure ratio of 18 to 1. The high-pressure system comprises a compressor driven by a single-stage turbine, while the low-pressure system consists of a single-stage fan and a five-stage intermediate compressor driven by a three-stage turbine.

The heavy demands to be placed on the engine by the VFW 614's planned short-haul operation were specifically catered to in the M 45H design. It was assumed that the engine will spend thirty percent of its lifespan at takeoff or climb ratings with a complete takeoff and landing cycle occurring every twenty-two minutes.

The M 45 is, therefore, overdesigned in respect to durability. It runs at very conservative turbine-inlet temperatures which, under extreme conditions, do not surpass 1,979 degrees Fahrenheit. By current standards this is relatively low, but allows the frequent use of maximum power without impairing the engine's lifespan. Engine efficiency at such temperatures is not optimal and fuel consumption will be higher than in engines designed for maximum cruise performance. But, since no long-range requirement exists for the VFW 614, fuel economy does not play a major role in the design philosophy. It will be far cheaper in the long run to burn more fuel than to frequently replace a sensitive high-performance jet engine.

The work on the engine is well under way. The first bench engine ran in January 1969 and has since completed over 700 hours of testing. Six engines are scheduled for bench-testing, of which four are presently running. Despite



The M 45H engine is designed specifically to fill the rugged requirements of a short-hauler such as the upcoming VFW-Fokker 614. The M 45H is now in the bench-test phase.

rigorous test running far beyond the operating temperature limits, the engines so far have not shown any major defects and have demonstrated excellent mechanical reliability, a spokesman said.

The engine is designed for easy maintenance. Modular concepts employed in constructing the M 45H offer simple and rapid access to all parts and substantially reduce time for overhaul and repair. The major engine assemblies, fan, intermediate compressor, turbines, and the annular combustion chamber all can be removed or replaced without removing the engine from the airframe. It is presently estimated that the M 45H will require not more than five man-minutes' maintenance per flying hour.

By the time British Air Registration Board and FAA approval is granted in 1972, the engines will have logged over 5,000 hours in the air on flight development testing and about 4,000 hours on the bench.

In meeting the unusual and stringent requirements of modern short-haul operations, the M 45H is unique, its proponents say. Its properties make it a most attractive power unit for a wide range of commercial and military applications. The engine is currently under consideration for several three-engine aircraft designs and four-engine STOL aircraft operating from strips as short as 1,500 feet. It has a very good growth potential and can be fitted with thrust reversers, afterburners, or tailored to other specifications.

Europa 1 Test Series Concluded

The tenth development flight test of the ELDO (European Launcher Development Organization) Europa 1 rocket series took place early this June. As in previous shots the launch base was Woomera, Australia. The space shot concluded the third phase of the original Europa 1 program, scheduled to be followed in 1971 by launchings of the Europa 2 three-stage satellite launcher (*see also p. 58*).

ELDO is an organization set up by seven nations to create a family of European space vehicles that eventually will orbit communications, weather, and navigation satellites. In the original plan, the work and financial load were evenly divided among the participating nations, with Britain responsible for the rocket's first stage, France for the second, Germany the third, and Italy for the test satellite. The Netherlands and Belgium share the work and financial burden for range instrumentation and the tracking network. Australia supplies launch facilities.

The Europa 1 testing was divided into three phases stretching over six years during which ten vehicles were launched. The first phase included three launches of the first stage only, a derivative of the defunct Blue Streak IRBM once slated as muscle for Britain's deterrent efforts. It is fitted with two Rolls-Royce RZ.12 motors, delivering a nominal thrust of about 280,000 pounds. The motors burn kerosene and liquid oxygen. The three launchings—designated F1, F2, and F3—took place in June and October 1964 and March 1965. All were successful.

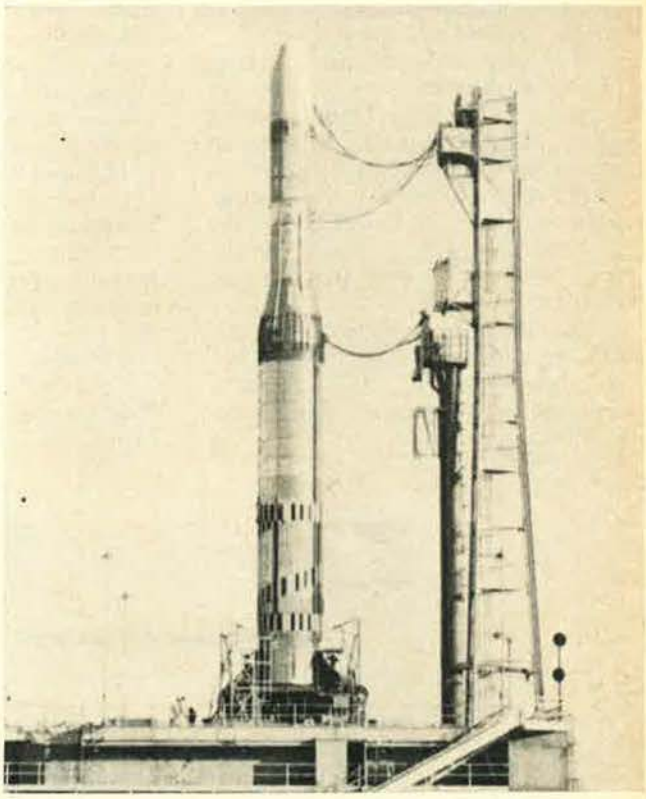
Phase II began with the successful launch of Europa 1 (F4) in May 1966. The vehicle consisted of a live first stage and two inert upper stages that carried a live test satellite. F5 was launched without incident in November 1966. All upper stages were inert. The shot served to test the stage-separation systems.

Vehicle F6/1 lifted off the launching pad in August 1967 with a live second stage and inert third stage and satellite. Due to problems with the first stage, the second could not be ignited. This launch was followed, in December 1967, with the backup vehicle, F6/2. The rocket functioned properly up to and including the cutoff of the first stage. The second stage failed to ignite.

This launch concluded Phase II, though the goals had not been reached. Financial pressure forced ELDO to enter the final Phase III without having verified to full satisfaction the performance of the vehicle. Phase III was inaugurated with the start of F7 in November 1968. The rocket consisted of three live stages plus satellite. The flight performance of the first and second stages, including separation, satellite-shroud jettisoning, and third-stage separation, was perfect, but the third-stage engine did not burn long enough to achieve orbital velocity.

The F8 launch took place in July 1969. The sequence of events and performance was almost the same as in the flight of F7. The motor of the third stage cut off prematurely and the flight could be termed a failure.

The last of the ten Europa 1 test launches, F9, lifted off this June. Almost everything went according to plan but, though the third stage burned longer than envisioned, orbital velocity was not reached because the aerodynamic satellite shrouds were not jettisoned. Their additional weight proved to be too high to be compensated for by the thrust of the third stage. Satellite and third stage crossed the North Pole and crashed into the Caribbean Sea off the coast of Guiana.



Woomera, Australia, launch facilities were utilized in the tenth development test short of the Europa 1 program, thereby concluding the series. Europe's launcher development project met with many undeserved setbacks, but plans are to go ahead with Europa 2 testing next year.

The Europa 1 program of ELDO has had an undeserved streak of bad luck, and the high hopes the Europeans had for the venture were not realized. In the meantime, Britain has decided to cancel its participation in ELDO as a paying member and prefers to invest its resources in its own national space program. The ELDO group will, however, continue to operate, and the launching of additional improved Europa 2 type rockets from the French base of Kourou in French Guiana is scheduled for 1971.—END

AEROSPACE WORLD

News, Views & Comments

By William P. Schlitz
NEWS EDITOR, AIR FORCE/MAGAZINE

WASHINGTON, D.C., JULY 6

While the remaining US troops have been pulled back into South Vietnam after operations against the enemy's Cambodian sanctuaries, US aircraft will continue to be used in an interdiction role there.

US aircraft reportedly are bombing newly established supply lines in northeast Cambodia and southern Laos. The US kept the interdiction option open to deal with enemy attempts to shift its main infiltration route westward in Cambodia to the Se Kong and Mekong Rivers and the few roadnets in that part of the country.

The US will not supply ground-support missions for South Vietnamese troops beyond the 21.7-mile limit set for US ground action in the Cambodian incursion.

Strong ARVN forces probably will be kept on the border, poised to strike against any major enemy effort to rebuild its destroyed Cambodian bases. As in the past, however, the main thrust will continue to be against the enemy deeply entrenched in South Vietnam itself.

One sidelight of the Cambodian incursion was the reassignment to a purely transport role of about a dozen C-123 aircraft that had been involved in spraying chemical defoliants and herbicides on jungle areas and crops belonging to the enemy. The nine-year-old program had met with increasing criticism and controversy, for political, budgetary, and scientific reasons.

Once the C-123s had concluded their mission of hauling out captured enemy arms, it was problematical whether a large-scale spraying operation would again be undertaken, according to officials.

A big Army Chinook helicopter lifts a sling-load of ammunition and equipment out of Firebase Speer, for a return flight to South Vietnam during the recent pullout from Cambodia ordered by President Nixon (see story above).

—Wide World Photos

☆

The Air Force early in July picked Boeing Co., Seattle, Wash., to develop the Airborne Warning and Control System (AWACS). The company will modify Boeing 707s to carry radomes piggyback on the fuselage, to provide "downward-looking" radar to detect incoming enemy aircraft.

The AWACS contract, which should help ease Boeing's financial troubles, has a potential of $2 billion. Up to forty-two aircraft may be used.

☆

The Air Force has reduced the number of flying hours for student pilots, in an economy measure intended to save $19 million annually.

Flight hours have been reduced about thirteen percent, from 240 hours to about 209 hours. This applies to USAF training facilities with the exception of Moody AFB, Ga., and Sheppard AFB, Tex.

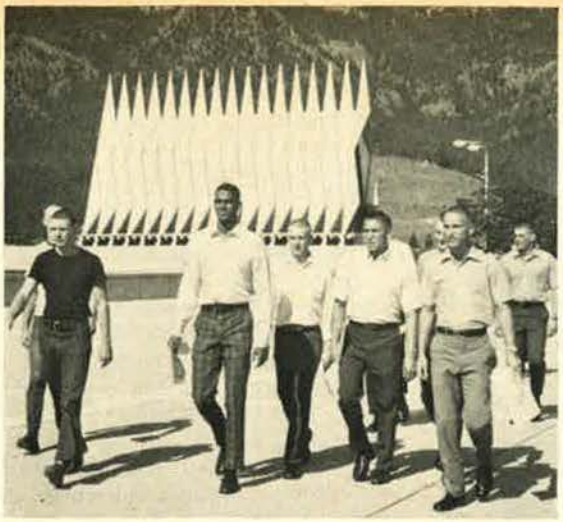
Sheppard is an installation being utilized for undergraduate training for pilots of the German Air Force. Moody's student pilots are to receive only 188 flying hours, a cut of twenty-one percent. The reduction at Moody "is to determine if additional savings can be realized with no compromise of training quality," the Air Force said.

USAF "will analyze the pilots produced at Moody AFB to determine if further adjustments should be made in the flying training program command-wide," the Air Force said. The time spent in training will be trimmed from fifty-three weeks to forty-eight weeks.

While time in basic instruction at all pilot training facilities will be reduced from thirty hours to sixteen hours, advanced training in T-37 jet trainers and supersonic T-38 trainers will be cut far less, USAF said.

☆

He sported a spiked mustache, a self-designed uniform, and flew around the country with a pet lion



The Air Force Academy this summer welcomed the largest class in its sixteen-year history—1,440 members of the class of '74. Following the traditional haircut, this group passes the cadet Chapel while continuing to the next processing station.

June was a big month for at least one former Air Force Academy cadet. Graduating from the Academy, Felipe S. Villafranca, Jr., right, of the Philippines, is sworn in as a second lieutenant in the Philippine Air Force. Doing the honors is Lt. Col. Pedro C. Pille, Assistant Air Force Attaché, Embassy of the Philippines, Washington, D.C.

named Gilmore as a companion. But beneath the showmanship, pioneer pilot Roscoe Turner maintained a determined spirit that was singular among the aviators of the 1930s.

He won the Thompson Trophy three times, and broke the transcontinental record oftener than any other flyer in history. Among his other awards were the Harmon Trophy, the Bendix Trophy, and the Distinguished Flying Cross.

He hobnobbed with celebrities and royalty, and besides his barnstorming and racing appeared in films and starred on radio. A hero to millions, he did as much as anyone in the early days to sell aviation to the public.

Before his death at age seventy-four in Indianapolis this June, Roscoe Turner stood with Rickenbacker and Doolittle as the three surviving giants of America's formative years of aviation.

☆

The Alps, which since time immemorial have stood as a massive natural barrier to ground invasion, presented a major technical problem to the Swiss in terms of radar air defense.

But following months of testing, Switzerland now has operational its new computerized air defense system. Called "Florida," the system was actually built in Fullerton, Calif., by Hughes Aircraft Co.

The problem of radar interference "had to be overcome by maximum ingenuity of electronic engineers and, in some cases, sheer invention," said Nicholas Yaru, a Hughes vice president. In this regard, "Florida" has a rightful claim to high sophistication among the world's air defense systems.

The system consists of military radar stations equipped with three-dimensional radar that provides simultaneous range, bearing, and height data. The radar net is linked to underground air defense centers where computers and such associated gear as display consoles keep track of aircraft aloft.

Should an aircraft be identified as hostile, the air defense commander can request its destruction by all-weather interceptor aircraft or surface-to-air missiles. Information on interceptor systems is stored in the computer. Civil defense forces also would be alerted.

"Florida" is very similar to other Hughes-built systems such as the BADGE net that went operational last year in Japan and the defense system that received final acceptance earlier this year by Belgium, the Netherlands, and Germany. That system is scheduled to be absorbed eventually into the NADGE (NATO Air Defense Ground Environment) network running from Norway to eastern Turkey.

—Wide World Photos

Charles A. Lindbergh voiced a serious note in a recent letter to Rep. Emilio Daddario (D-Conn.), in which he warned that civilization could be destroyed if man doesn't learn to "control the fantastic forces" of the technologies scientific knowledge has released.

☆

The Air Force Reserve Officers Training Corps has almost 500 four-year college scholarships to be awarded to students beginning their freshman year in September 1971.

The deadline for applying is November 14, 1970, and the scholarships should be of prime importance to high school students whose graduation will take place next spring.

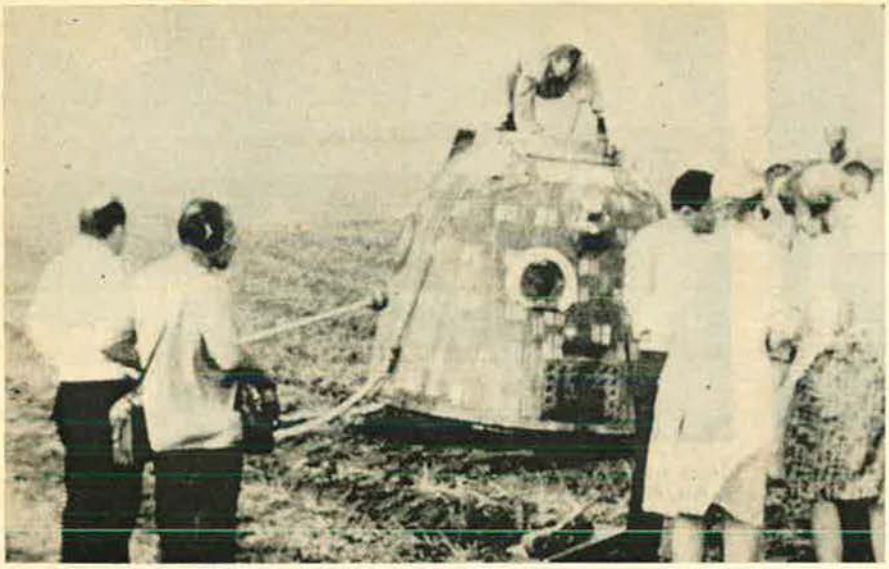
The ROTC scholarships provide full tuition, laboratory expenses, incidental fees, and an allowance for books. Recipients also will receive a nontaxable monthly allowance of $50 while on scholarship status.

Interested persons may write the Air Force ROTC Office of Information (AFROI), Maxwell AFB, Ala. 36112, for additional information.

☆

Russian Cosmonauts Andrian G. Nikolayev and Vitali Sevastyanov, in the manner of their American counterparts, underwent a period of bio-

(Continued on following page)



—Tass from Sovfoto

The Soviet Union's Soyuz-9 capsule is inspected by bystanders following the successful completion of its record-breaking eighteen-day flight. Many US experts believe the mission confirms convictions that the USSR intends to concentrate on an orbiting space-base program, similar to that planned by the US. Soyuz-9 had one other space first: a long-distance chess game with the ground.

medical quarantine and debriefing following their record-breaking eighteen-day flight aboard Soyuz-9 in June.

Apparently neither of the two men suffered any permanent health damage, although both experienced some difficulty adjusting to earth gravity after the weightlessness of space. They both lost a little weight during the mission and on return experienced difficulty sleeping because of "bed hardness" produced by gravity.

Soviet space officials, justly enthusiastic as to the outcome of the Soyuz-9 mission, indicated that it proved that not only was man capable of extended spaceflight of "at least two or three months," but could put in hard work in the process. They said that Soyuz-9 brought manned space stations one step closer to reality, and they mulled over the prospect of a future manned journey to Mars.

The cosmonauts were held to a strenuous schedule of exercise during the flight, and the ecology of their spacecraft was carefully monitored. For the long term, Soyuz-9 might be one of the initial indications that spacecraft for long missions may have to be equipped with artificial gravity.

As for the US space effort, NASA Administrator Thomas O. Paine announced further delays in the moon-mission schedule; Apollo-14 will not be launched before the end of January 1971, and Apollo-15 probably will take place in July or August of 1971. NASA also indicated it was considering canceling altogether some Apollo moon missions.

Chairman George P. Miller (D-Calif.), of the House Science and Astronautics Committee, listens to Edgar Cortwright, left, and Thomas O. Paine, right, NASA Chief, before a recent hearing convened to receive a report on Apollo-13's accident. Dr. Cortwright headed the group investigating the mishap. They stand over an oxygen-supply tank that underwent tests during the probe.

☆

A NASA experimental model reactor has achieved self-sustaining nuclear chain reaction, an important step in the development of a nuclear reactor for use in space.

The unit was built by North American Rockwell Corp.'s Atomics International division for NASA's Lewis Research Center, Cleveland, Ohio.

The Center is designing a high-temperature, fast-flux reactor that will generate electrical power to serve large orbiting space bases, space vehicles for manned interplanetary travel, or lunar bases.

The reactor power system can be built for a lifespan of from five to ten years, with its heat being converted to electricity by one of several systems currently under study.

The experimental unit is just twenty-three inches in diameter and twenty-three inches high. It contains 400 pounds of enriched uranium fuel and weighs 2,500 pounds without shielding.

☆

Participation in mercy missions is traditional for the USAF, but recently Air Force personnel have been involved in some far-flung humanitarian work of that kind.

The major one, of course, was the effort to bring assistance to the quake- and flood-devastated people of Peru (*see July AF/SD, page 22*). With entire sections of the country literally in ruins, a wide range of supplies, from food to communications equipment, was needed—and quickly.

Among those helping were C-130 Hercules crews from TAC's 317th Tactical Airlift Wing, who brought the first foreign aid of food and supplies to reach the striken area. Six of the aircraft, permanently stationed at Lockbourne AFB, Ohio, were reassigned to the Rotational Detachment of the 39th Tactical Airlift

Squadron, Howard AFB, Canal Zone, to fly missions to Peru.

With few landing facilities available in Peru, the C-130s frequently fell back on their routine method of airdropping supplies. In the first week following the disaster, the six C-130s in twenty-seven sorties air-landed or dropped 142 tons of supplies and equipment, transported 208 passengers, and air evacuated eighty people.

The C-130s soon were supplemented by Southern Command C-123s based at Howard AFB, C.Z.; Canadian and Brazilian aircraft; US Navy cargo helicopters from the aircraft carrier *Guam;* and US Army helicopters.

With supply bases set up in such accessible places as Lima and the coastal city of Chimbote, a helicopter fleet was pressed into service to transport relief "in-country."

Luke AFB, Ariz., was the focal point of another less massive but nonetheless dramatic mercy mission.

With a Phoenix hospital in dire need of a special heart-treatment serum, Capts. Robert R. Fuller and George W. Holland, of the 311th Tactical Fighter Training Squadron at Luke, had their F-100 airborne in less than an hour after being alerted for a flight to Los Angeles International Airport, where the serum was being brought by commercial airliner from Minneapolis.

Back at Luke just hours later, the serum was transferred to a helicopter piloted by Majs. Richard Cowles and Bobby Lay, of Detachment 15, Western Aerospace Rescue and Recovery Service, who delivered it to the hospital.

And on the high seas, men of the 57th Aerospace Rescue and Recovery Service Squadron, Lajes AB, Azores, recently participated in two separate emergencies, when a British and a Greek ship each called for help in treating injured men. HC-130 aircraft responded, and parachuted air rescuemen near the ships, which they boarded to help save the injured men's lives.

☆

The boon to world communications promised by the technology of satellite communications has long since become a reality.

But even countries regarded as poor and underdeveloped are cashing in on the comsat opportunity.

Recently in South Korea an earth station went into operation that will provide highly reliable, around-the-clock, commercial voice, television, and data communications between that small Asian nation and any other country also possessing an earth station.

Initially the Korean facility will link the US, Philippines, Hong Kong, Republic of China, and South Vietnam through the station. Service to other countries will be dictated by future traffic.

The station, near Kumsan, South Korea, was built by Philco-Ford Corp., which will provide a year's maintenance and operations. The facility will be part of the International Telecommunications Satellite Consortium (Intelsat), an organization of seventy-five countries that operates the global comsat system.

(Continued on following page)

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the first and last

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Thunderbirds

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Thirteen companies from seven nations have teamed up with the Lockheed Missiles & Space Co. to build a large-capacity communications satellite for use in the late 1970s.

The satellite, visualized as relaying scores of television programs and thousands of telephone calls around the world simultaneously, would be part of the existing global system of satellites and earth stations operated for the International Telecommunications Satellite Consortium.

The new space vehicle could be orbited as early as 1975. The system would provide communications coverage from global scope down to selected small regions.

The satellite's proposed high power and capacity would permit Intelsat's seventy-five member countries greater operational flexibility and the use of simpler ground stations.

Lockheed is enthusiastic about the international makeup of its project membership. "The companies have major technical skills to contribute, and we want international participation in this international program," Lockheed program manager Joseph J. Knopow said.

The satellite's electric power system, consisting of solar cells, is crucial to operations, and would have to be capable of functioning during such adverse conditions as eclipses of the sun.

In a related event, Colombia marked the beginning of operation of its Intelsat satellite terminal this spring, with a televised Papal blessing from the Vatican and a program from Japan's World's Fair at Osaka.

☆

NASA resumed test flying its wingless M2-F3 experimental lifting body in early June above the Mojave Desert at Edwards AFB, Calif. The vehicle is being used as the basis for development of the space agency's planned space shuttle.

The craft was air-launched from a B-52 at 45,000 feet, and former X-15 pilot William H. Dana then put it through a series of maneuvers before initiating a 180-degree turn for landing on a runway on Rogers Dry Lake. The flight was described as "letter perfect."

Northrop Corp. rebuilt the aircraft from its M2-F2 lifting body, which was severely damaged in an accident while landing in May 1967. Prior to that, the M2-F2 had made sixteen successful flights since its maiden one in July 1966.

The rebuilt craft was returned to Edwards in 1968, where a modification program took place. For increased stability, a new third vertical fin was added at the rear of the vehicle between the two existing fins. The nose structure was reinforced, and a newly designed fuel tank was installed.

☆

The Federal Aviation Administration says that the US civil aircraft fleet increased ninety percent in the decade of the 1960s. However, in 1969 the fleet's growth rate was only five percent, the lowest in recent years. That rate compares to nine percent in 1968 and an average ten percent in the previous three years.

The FAA says that 133,814 civil aircraft were eligible to fly at the end of 1969, compared to 70,747 at the conclusion of 1959, and 127,164 at the end of 1968.

Of the aircraft accounted for, more than ninety-seven percent, or 130,806, were general aviation aircraft; the air carrier fleet stood at 3,008, about 1,000 more planes than at the end of 1959.

Very dramatic was the growth of the rotorcraft category in general aviation, according to the FAA. The total of 2,586 at the end of 1969 was ten percent above the 2,350 of the previous year, but nearly 500 percent more than the 525 at the end of 1959.

☆

NEWS NOTES—CMSgt. Paul W. **Airey,** who served as first **Chief Master Sergeant of the Air Force** from April 1967 through July 1969, was to retire from service July 31. His final post was with ADC's 4756th Combat Crew Training Squadron, Tyndall AFB, Fla. He'll reside in Panama City, Fla.

June marked the fifteenth anniversary of **SAC's** use of the **B-52 Stratofortress** as part of the deterrence force. In 1955 the first B-52 was turned over to the 93d Bomb Wing, Castle AFB, Calif. (*For more on the durability of the B-52, see the article on page 56 of this issue.*)

In late July, roll-out ceremonies were to be held at Long Beach, Calif., for McDonnell Douglas' **DC-10,** first of the world's wide-bodied trijetliners.

Col. Robert M. **White,** nominated in December by President Nixon for promotion to brigadier general, will be the first astronaut to achieve that rank. He won his astronaut wings with a flight of the X-15 research aircraft to a 314,750-foot altitude. Currently Deputy Director of the F-15 System Program Office at Aeronautical Systems Division, Wright-Patterson AFB, Ohio, he will take over command of the **Air Force Flight Test Center,** Edwards AFB, Calif., this month.

Capt. Richard L. **Klass,** of the Air Force Academy Faculty, has been named a **White House Fellow.** Captain Klass is one of seventeen selected from thirty-one finalists. He will spend a year as an assistant to White House staff members, the Vice President, Cabinet officers, and other top government officials.

On July 1, Neil **Armstrong,** first man on the moon on July 20 of last year, took office as the **chief of NASA's aeronautics program.**—END

Accuracy and firepower are displayed in this sequence of photos taken during firing of the first live US Army TOW missile ever launched from an aircraft. In the second frame, the missile, fired from an Army Cheyenne chopper, is shown just prior to impact on a tank hull. TOW is a tube-launched, optically tracked, wire-guided missile that is designed especially to destroy tanks. In recent performance tests it had twenty-eight hits in as many shots.

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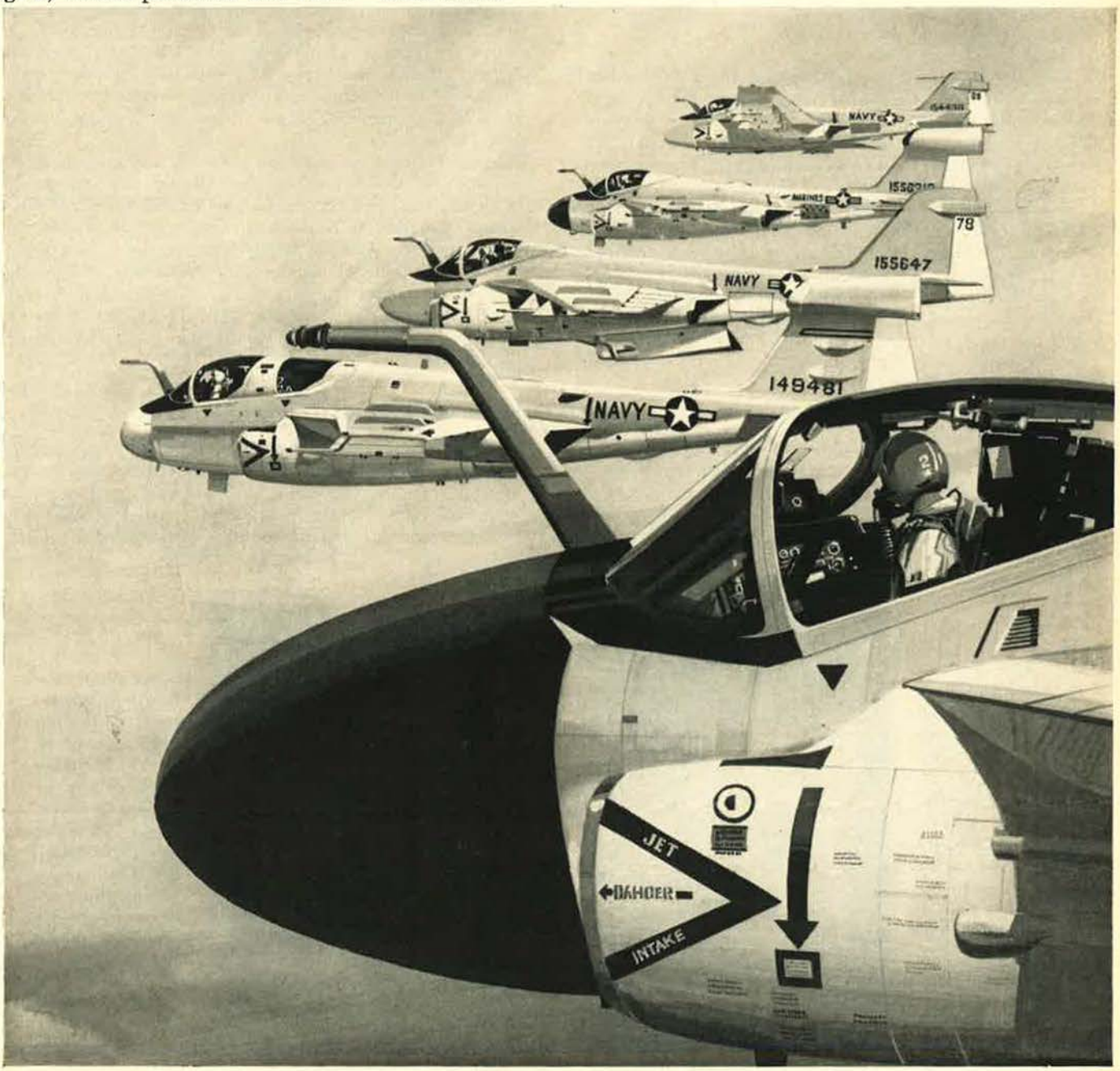

POW ACTION REPORT MIA

Air Force Association units and other groups throughout the country have launched vigorous campaigns in behalf of American servicemen who are prisoners of war or missing in action in Southeast Asia. In order to keep our readers informed of POW/MIA developments in Washington and elsewhere, and to provide an exchange of ideas and information among supporting units and organizations, AF/SD is inaugurating this column. It will appear each month, so long as the government of North Vietnam persists in its illegal and inhumane treatment of imprisoned Americans.

How Long?

"A child asks: 'Where is my daddy?' A mother asks: 'How is my son?' A wife asks: 'Is my husband alive or dead?'

"Communist North Vietnam is sadistically practicing spiritual and mental genocide on over 1,500 American prisoners of war and their families.

"How long?"

This quotation has been entered in the *Congressional Record* every day since January 26, 1970, by Rep. William J. Scherle (R-Iowa), as a continuing reminder to all members of Congress, and the world, that more than 1,500 American servicemen are prisoners of war or are missing in action in Southeast Asia.

Congressman Scherle, long active in support of the cause of MIA/POWs, says he will keep on entering his statement in the *Record* every day "until all the American prisoners of war are released." He, along with scores of other members of Congress, is determined to "keep the pressure on" until the Communists give a complete accounting of the men they hold prisoner and until humane treatment of these Americans is assured.

"The Committee of Liaison"

On June 26, a group calling itself the "Committee of Liaison with Families of Servicemen Detained in North Vietnam" released the names of 335 Americans it claimed are being held prisoner in North Vietnam. The list, it turns out, is a compilation of the same names released by the same group on three previous dates—January 15, March 11, and March 27, 1970.

The Committee of Liaison, a group of private individuals, is an offshoot of the New Mobilization Committee to End the War in Vietnam ("The New Mobe"), and was formed in January of this year. Its purpose is to receive the names of prisoners of war from the North Vietnamese government, and to pass on to relatives information concerning these men. The organization, according to its own information sheet, was formed at the request of the government of North Vietnam.

According to a New York *Times* story on June 26, North Vietnam has reportedly declared that the list of names released by the Committee of Liaison on that date was complete and that North Vietnam does not hold any men who are not listed on it.

The Department of Defense, however, calls the list "incomplete and unacceptable," and has said that the names of *at least* forty men believed to be in the hands of the North Vietnamese are missing from the list. In support of its contention, DoD released photos that have been published in North Vietnamese newspapers of two Americans identified as prisoners, whose names are not on the list (*see photos, below*).

In a statement on June 26, Daniel Z. Henkin, Assistant Secretary of Defense for Public Affairs, said, "It should be noted [that] this privately compiled and unofficially released list makes no reference to our men held prisoner by Hanoi and its agents in South Vietnam, Laos, and Cambodia. The unofficial release of an inaccurate and incomplete list of names from unofficial sources," he said, "can only add to the great anguish of the hundreds of wives, children, and parents of the more than 1,500 servicemen who are listed missing or captured."

National League of Families

On June 30, a newly incorporated organization officially opened its Washington, D.C., headquarters with the expressed hope and prayer that it could "go out of business tomorrow." The National League of Families of American Prisoners and Missing in Southeast Asia, formed in late

This photo of Navy Lt. James J. Connell appeared in a North Vietnamese newspaper on July 21, 1966, six days after his capture. Lieutenant Connell's name was not on the list released by the Committee of Liaison on June 26 of this year.

USAF Capt. Edwin L. Atterberry was captured in August 1967, and a few weeks later this photo of him appeared in two North Vietnamese newspapers. DoD says his name and at least thirty-nine others are missing from the June 26 list of POWs.

Sen. George Murphy (R-Calif.) and Sen. Bob Dole (R-Kan.), with Mrs. J. B. Stockdale at opening of League of Families office. Senators Pell (D-R.I.); Thurmond (R-S.C.); Boggs (R-Del.); and Jordan (D-N.C.); and Congr. Fish (R-N.Y.) and Bob Wilson (R-Calif.), also attended.

May, is a direct result of the meeting of families held on May 2, reported on in these pages in the June issue.

Membership in the League is confined to families of US servicemen and civilians who are prisoners of war or missing in action. Membership at this writing totals about 3,000 families.

Mrs. James B. Stockdale, wife of a Navy captain who has been a prisoner in North Vietnam since September 1965, is Chairman of the Board of the new organization. She was formerly National Coordinator for the original League of Families, which she founded and which became the nucleus for the present League.

Vice Chairman of the League is Mrs. Kenneth W. North, of Wellfleet, Mass., wife of an Air Force major identified by the League as a POW. Thirteen other family members, including nine wives, three mothers, and one father, serve on the Board of Directors. Six of these, the father and five wives, are from Air Force families. They are: Col. Edwin Brinckmann, USA (Ret.), of Shalimar, Fla., father of Air Force Lt. Col. Robert E. Brinckmann (MIA); Mrs. Arthur J. Cormier (TSgt.-POW), Bay Shore, N.Y.; Mrs. Robert C. Davis (Capt.-MIA), Burlington, N.J.; Mrs. Arthur S. Mearns (Lt. Col.-MIA), Los Angeles, Calif.; Mrs. Samuel R. Johnson (Lt. Col.-POW), Plano, Tex.; and Mrs. Bobby G. Vinson (Col.-MIA), of Alexandria, Va. Mrs. Vinson also serves as Assistant National Coordinator for the national office.

Mrs. Iris Powers, of Lutz, Fla., the mother of an Army warrant officer who is missing in action, is the National Coordinator. Another member of the permanent staff, all unpaid volunteers, is Office Manager Mrs. Kevin J. McManus, from Brightwaters, N.Y., wife of an Air Force captain imprisoned in North Vietnam. The all-woman staff will be assisted by volunteer workers recruited from local MIA/POW families.

The offices of the National League of Families are at 1 Constitution Ave., N.W., Washington, D.C. 20002. The space is being provided at no charge by the Reserve Officers Association, which owns the building. It is within easy walking distance of the Capitol and the offices of all members of Congress.

The Air Force Association will make its facilities and staff personnel available to support the League in any way it can be of assistance. We are confident that in this, we speak for every member of AFA.

The nonprofit, nonpartisan organization is being financed by the families themselves and through contributions from concerned individuals and organizations.

The Fairchild Hiller Corp.

Fairchild Hiller Corp. continues to lead industry in publicizing the plight of the American MIA/POWs, with creation of special display units to distribute information about the prisoners at trade shows and public gatherings. This is the latest of many actions taken by that company.

A year ago, in August 1969, Fairchild Hiller initiated a company-wide letter-writing campaign. More than 10,000 employees—nearly ninety percent—wrote to the government in North Vietnam. Thousands more letters were sent to other governments, and to UN representatives, urging them to use their influence in Hanoi. Fairchild Hiller President Edward Uhl personally wrote to the heads of 100 other companies, inviting them to join in the campaign. And, at Mr. Uhl's urging, the National Association of Manufacturers sent a circular to all its members suggesting they encourage their employees to write letters.

Fairchild Hiller followed up its letter-writing campaign with public-service messages in leading newspapers across the country, and in magazines. In response to requests, to date they have distributed more than 100,000 poster reprints of these messages. In late April, Fairchild Hiller took out full-page ads in two Washington, D.C., newspapers, publicizing the May 1 rally for MIA/POWs, held in Constitution Hall.

Late last year, Fairchild Hiller made available to families of prisoners and missing servicemen, and to others, a special Christmas card that carried a message telling the receiver how he could help. They filled requests for more than 50,000 cards.

Our thanks, and that of the MIA/POW families, to Fairchild Hiller employees, to their President, Edward Uhl, and to Maston M. Jacks, a former USAF information officer and now Fairchild Hiller's Manager of Information Service.

* * *

Next month: more on the Committee of Liaison, and reports from the states of Florida, New Mexico, California, Texas, and New York.

—MAURICE L. LIEN

Mrs. Wilmer N. Grubb and her son, Jeff (left), meet Maj. Fred N. Thompson, a POW released by Hanoi; Mrs. Kevin J. McManus, a POW wife; and AFA President George D. Hardy, at the office opening. Mrs. Grubb's husband, a USAF major, was identified as a POW in propaganda photos in 1966, but his name was not on the June 26 list.

Lessons for the US Aerospace Industry

AIR FORCE
AUGUST 1970

Mounting pressures in the United States for greater frugality in the development and acquisition of weapon systems have caused painstaking examination of how other countries and their aerospace industries handle research and development. Any search for how to design, develop, and produce weapon systems efficiently and at the lowest possible cost invariably leads to the unique and highly successful techniques evolved by France's only privately owned aerospace industry—Avions Marcel Dassault—manufacturer of the celebrated Mirage family of aircraft . . .

The Designers of Dassault

Men Who Take One Step at a Time

By Edgar E. Ulsamer
ASSOCIATE EDITOR, AIR FORCE MAGAZINE

THE favorite cartoons of Marcel Dassault, the unconventional genius of France's aerospace industry, illustrate three ways of designing aircraft.

The first cartoon spoofs America. It shows row upon row of computers, manned by legions of programmers along with stacks of memos, studies, and analyses.

The second caricatures the Soviet Union. It shows hordes of workmen being exhorted to greater efforts by a political commissar.

The third drawing shows three men toasting a just-unveiled aircraft. One of the men, in artist's smock, is clearly delighted with his newest creation.

"The third cartoon," a senior official of the company recently pointed out to this reporter in Paris, is "the Dassault way."

Behind the three cartoons lies a good measure of truth, and part of the explanation for the astounding and enviable accomplishments of the French aerospace company Avions Marcel Dassault.

With a total work force ranging from a post-World War II low of about 3,000 to a more recent high of 8,000, Avions Marcel Dassault has designed and developed some 200 flying prototypes of high-performance military aircraft in three decades. Since World War II it has produced about 3,000 technologically advanced combat aircraft of the Ouragan, Mystère, and Mirage series, including a supersonic strategic bomber. Over the same time period, two executive jet aircraft have been developed (the Mystère 20 and Mystère 10, marketed by Pan American World Airways in the United States as the Falcon and Mini-Falcon), as well as a commercial jetliner program. More than two-thirds of the military aircraft were produced for export to sixteen foreign countries.

What amazes foreign visitors even more is the minuscule number of designers, engineers, and top executives who actually create and manage such a large number of designs and programs. When the Mirage family of aircraft was Dassault's principal project, the prototype development team numbered fewer than 230 design engineers and some thirty top-rated managers. During the initial phase of a new project, the company assigns generally no more than twenty-five designers and two or three managers to a given program. In the case of the Mirage III, which has a production run of about 1,400, a team of twenty-five engineers, some fifty draftsmen, and fewer than 100 craftsmen catapulted the program from contract award to first flight of the prototype in less than thirteen months. By comparison, each of the three US teams which responded competitively to the request for proposals on the Air Force's F-15 air-superiority fighter was larger than the Dassault team that created, from scratch, one of the world's most successful military aircraft.

Dassault's 'Earned' Monopoly

In increasing numbers, US government and Air Force leaders have been analyzing the Dassault management procedures with an eye to adapting some of its cost-

saving techniques. The key to Dassault's "cost-effectiveness," in the view of US management experts, is its austere approach to research and development, reminiscent of American techniques of twenty-five years ago, and quite similar to the present, highly efficient practice of the Soviet aerospace industry.

Because Dassault had been able to design combat aircraft configurations successfully since winning the French government's contract for the Ouragan fighter series in 1948, the company has developed a mastery in extrapolating from one aircraft design to the next, changing only those components that it was absolutely necessary to change to achieve whatever performance variation from the previous design might be required. A Dassault executive pointed out, however, that the continuity of its program was initially earned in strenuous competition, beginning with the initial Mirage contract in 1957.

As the only privately owned French aerospace company currently operating (Dassault acquired the Breguet Co. in 1967, thereby assuring its participation in what otherwise would have been a competing program—the Anglo-French Jaguar single-seat attack and two-seat trainer development effort), it clearly depends on superiority in design to survive against its much larger, government-owned competitors. Further, as a company spokesman pointed out, "Our successes are not solely the result of the quality of our products but are helped by the lack of US competition."

Except for Northrop's slower F-5, which was neither designed for nor operated by US forces, the only US aircraft Dassault views as directly competitive is Lockheed's F-104, "which dates back to 1954 and has not only not been improved since, but actually degraded in quality when built abroad under license." The company does not view the F-4, F-14, F-15, or the MIG-23 as competitors because they are much larger, have different performance characteristics, and cost more.

The multirole combat aircraft (MRCA), to be developed jointly by the British and German as well as possibly other European aerospace industries, is considered a potential competitor, but Dassault is not convinced that the MRCA will "progress in the presently envisioned way."

After World War II, the Dassault formula for reducing costs and risks by extrapolating from previous designs and by progressively improving tried and proved component and design features was first applied to the Mach 0.8 Ouragan fighter. From this design Dassault evolved three different MD 452s, one by adding lateral air intakes, another one with a different engine, and a third one by completely redesigning the wing. Later, a second improvement was suggested by a USAF test pilot, which involved yet another wing design employing a new profile, as well as a thrust increase for the powerplant. The combination became the Mystère 4, of which 420 were built. Included in this total were 225 Mystère 4s bought for NATO use by the United States under an "offshore" Military Assistance Program (MAP) contract. Finally, by further increasing the wing's sweep angle and improving its aerodynamic efficiency, and by wringing still more thrust out of the engine, Dassault produced the Supermystère, which is still in the inventory of the French Air Force.

The Many Faces of Mirage

With the merits of the incremental design approach clearly established by the Ouragan-to-Supermystère evolution (total production about 1,100 aircraft), the Dassault company further refined the process with its next family of aircraft, starting with a light twin-engine interceptor, the deltawing Mirage I. Employing a rocket engine for added maneuverability at altitude, the Mirage I depended completely on ground-based radar and had only limited range. Its basic design criterion was

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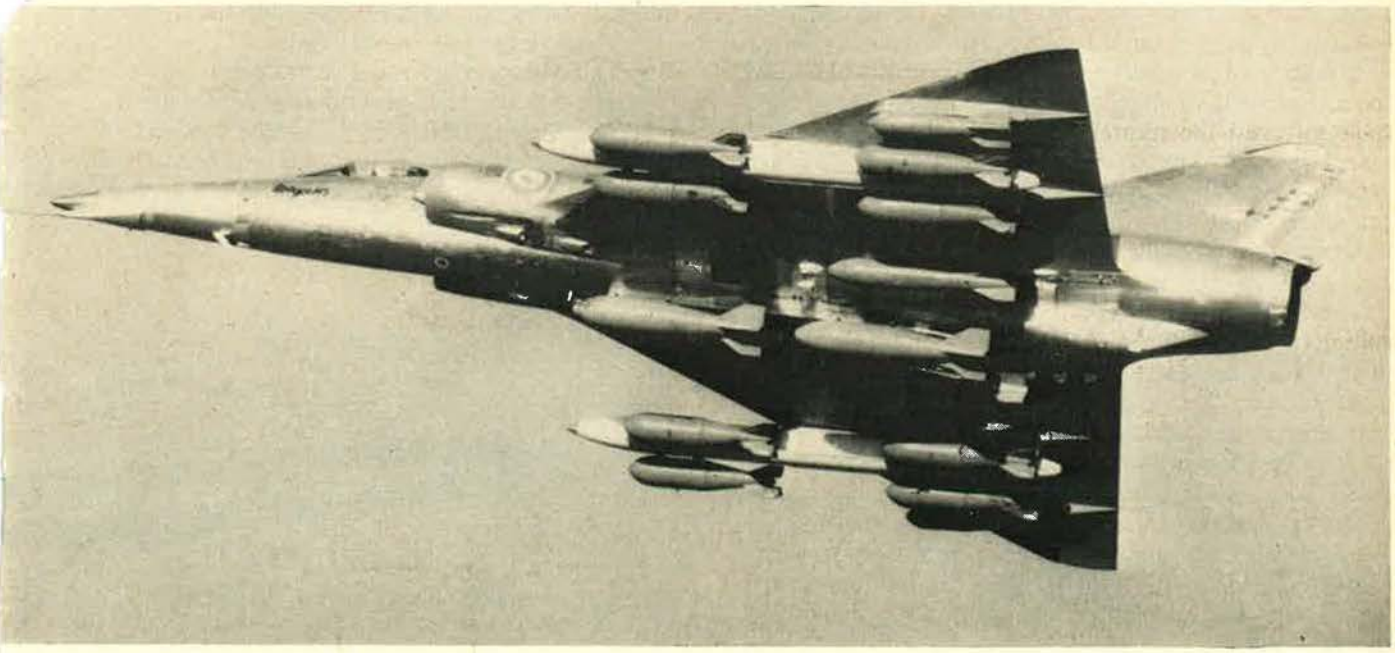
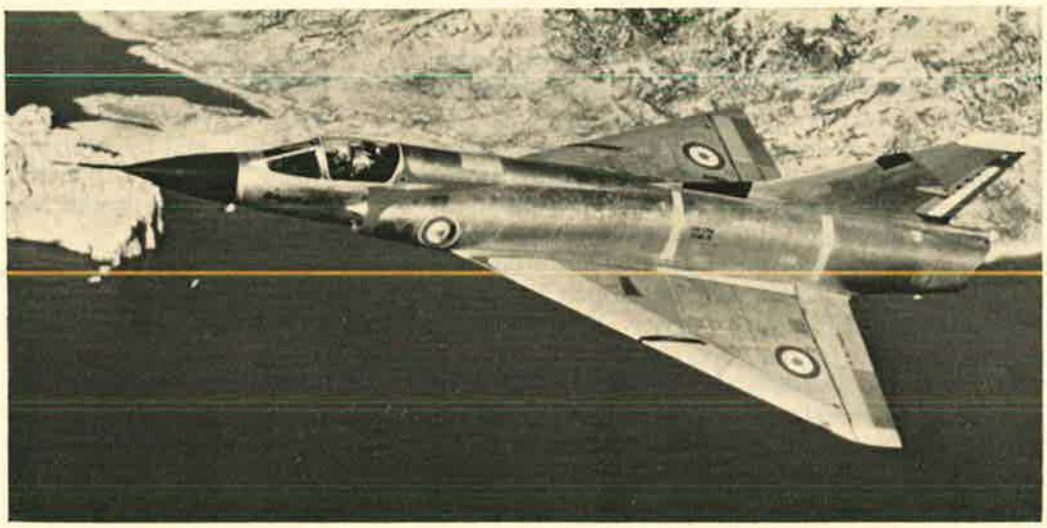


The Mirage 5 was designed by Dassault as a simple, lower-priced fighter aircraft geared for sale to air forces abroad.

In designing such aircraft as the Mystère, the work force of Dassault engineers is kept at a hand-picked minimum—a lean team that avoids the bureaucratic red tape afflicting many US companies.



Originally, the Mirage IIIA was to have a twin-engine configuration, but transformation to single-engine design came during a crash program to produce the aircraft, a standard Dassault approach.

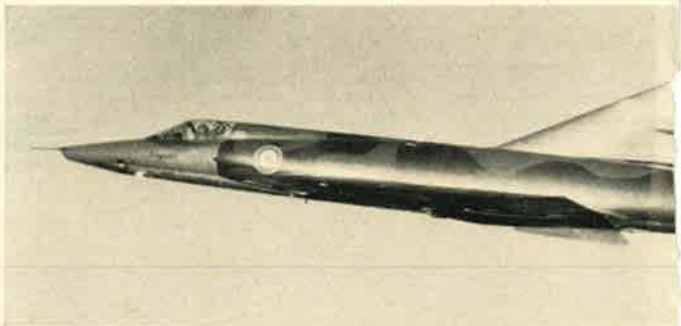
geared to conventional warfare, the accepted NATO doctrine at the time. As the Mirage I was coming along, however, NATO policy changed to one of all-out nuclear strategy. Under such conditions, an aircraft dependent on fixed ground-based radar—presumably the first targets to be destroyed by the enemy—made no sense. Rather than abandon the design completely, Dassault salvaged the aircraft's entire wing structure and mated it to a completely redesigned, larger fuselage capable of accommodating the required airborne radar equipment. In the process, the Mirage was changed from its original twin-engine configuration to a larger single-engine design.

The transformation was ordered in March 1956, resulting in the first flight of the new design in November of that year, and in successful flight at Mach 1.75 four months later. The approach became the hallmark of Dassault management techniques—a closely knit group of roughly 120 engineers and craftsmen working on a crash basis, often around the clock, because crash programs "are good for the morale," in M. Dassault's view. As a consequence, the new aircraft, first known as the Mirage III 001, was ordered into production. Fitted with a new engine, the resulting aircraft was named the Mirage IIIA.

To offset the high unit cost resulting from the small number of aircraft required by the French Air Force (because of the then prevalent massive retaliation concept), Dassault decided to "consolidate" essentially fou. different types on one main assembly line:

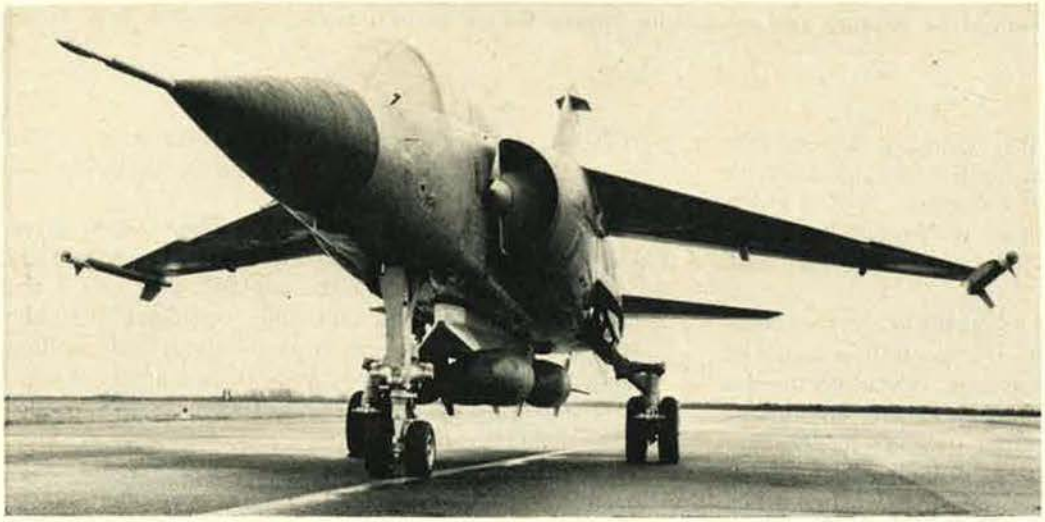
- The Mirage IIIC interceptor;
- The Mirage IIIB two-seat trainer;
- The Mirage IIIE ground-attack aircraft;
- The Mirage IIIR reconnaissance version.

The main production line was arranged to diverge at different stages, terminating in the four individual



One of four designs, the Mirage IIIR fits a recce role.

Equipped with JATO rockets, the twin-engine Mirage IV can take off fully loaded from very short runways. Sixty-six Mirage IVs are serving with France's Air Force strategic command.



An aircraft that survived policy fishtailing by the French government and emerged as a Dassault interceptor is the Mirage F-1, of which the first group of 105 are being produced for the French Air Force.

aircraft types. Later the company added still another Mirage model to its line—the Mirage 5, a simplified, lower-priced design geared to the export market. To date, the total Mirage III and 5 sales score stands at about 1,400 aircraft and involves sixteen foreign countries. (There are significant variations in the export models within the various Mirage categories.)

When the French government decided in 1956 that it needed strategic bombers able to deliver nuclear ordnance, Dassault extended the potential of the Mirage aircraft family further by proposing a scaled-up, twin-engine version to be known as the Mirage IV. It was ordered into production in 1961. The aircraft became operational two years later, with sixty-six Mirage IVs entering the strategic command of the French Air Force.

Another undulation of NATO policy afforded Dassault further opportunity to expand the Mirage line. In response to the French government's requirement for a V/STOL fighter, M. Dassault ordered the original Mirage prototype, the twin-engine 001, out of a shed where it had been gathering dust and equipped it with a new fuselage incorporating eight Rolls-Royce lift engines. The result was the Balzac 001. (The company received a number of letters complimenting it for naming the aircraft after the famous French novelist; in fact, its engineers arrived at the name because of a then popular ad campaign employing the Parisian phone number BALzac 0001.) The aircraft was involved in an accident resulting from a fuel shortage. Its derivative, the Mirage IIIV, was tested at cruise speeds of Mach 2-plus in 1966, after having demonstrated its hover capabilities a year earlier. But because of yet another change in NATO policy and the lack of suitable lift engines, it was not ordered into production.

In 1962, France's license production of the Pratt & Whitney TF30 engine required that a French flying testbed be built. This led to a Mirage III derivative with a larger fuselage. From this prototype Dassault developed a new design, the Mirage F-2, which departed from the previous approach by replacing the familiar deltawing with high sweptback wings and a low tail. Showing substantially improved maneuverability over the earlier Mirages, it proved its capabilities as an excellent low-level penetrator with good range. It fell victim, however, to a subsequent change in French Air Force policy by which the low-level penetration mission was abandoned in favor of interceptors. Dassault adjusted to this change by transforming the F-2 design into a fighter, the F-3. But once more political vagaries intervened in the form of cooling relations with the

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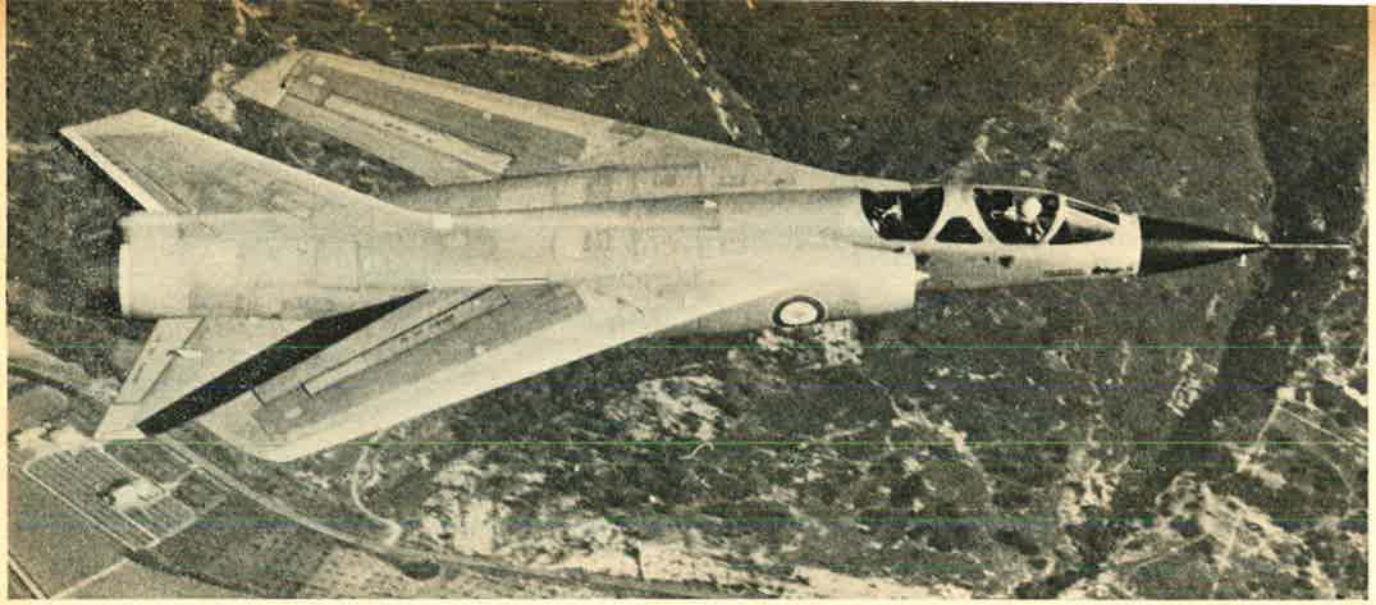


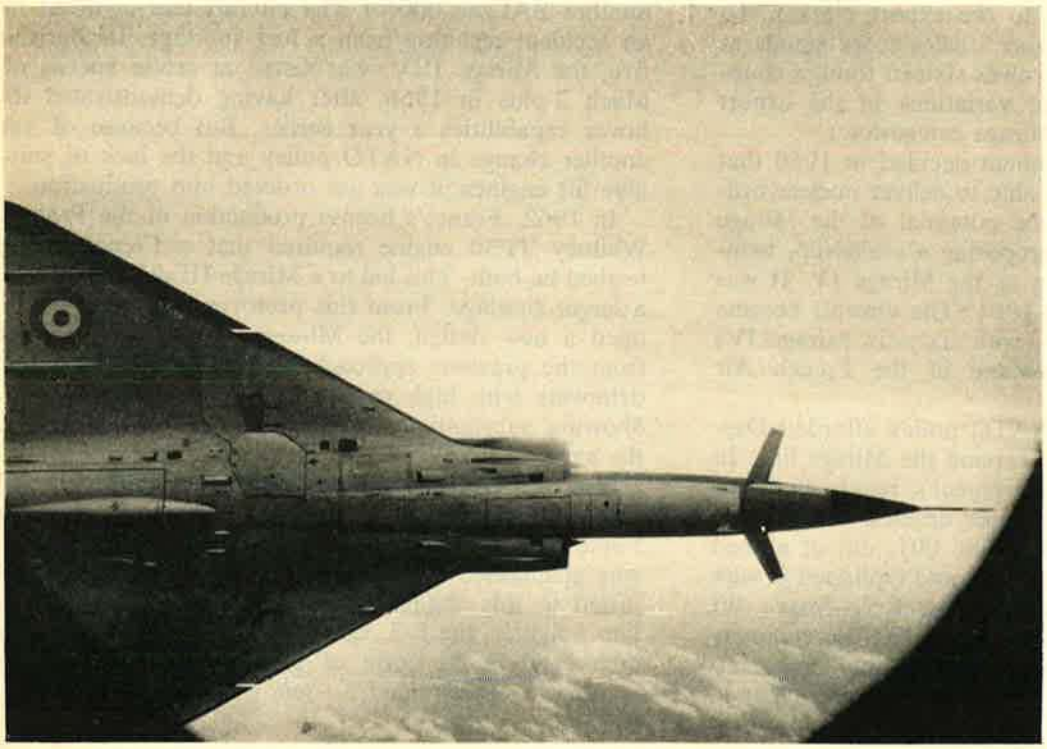
Just sixteen months after go-ahead to produce the sweep-wing Mirage G, the aircraft made a successful first flight.

United States, and the French government decreed that the aircraft be redesigned (as the F-1) to operate with the French SNECMA Atar 9 K engines. A first group of 105 F-1s is being produced for the French Air Force by Dassault. A number of foreign countries may also order this aircraft.

Not given to waste any of its creations, Avions Marcel Dassault decided that the F-2 prototype could be used to prepare the way toward the development of a VSW (variable-sweep wing) aircraft, since its landing gear was already in the required fuselage location, its air-intake performance was established, and its basic controllability by the tail assured. In accord with its policies of evolutionary design approach, the only needed stepup to the company's next aircraft, the VSW Mirage G (*see cover*), was the pivot, to swing the wings.

The go-ahead decision on the Mirage G was given in 1965. Sixteen months later, the aircraft successfully completed its first flight. The rapidity with which the prototype was designed and built, combined with the fact that total costs were held to about 200 million francs (about $35 million), are seen as marvels of cost-effectiveness by US Department of Defense officials and USAF leaders.

The performance of the aircraft, which is rated in the Mach 2.5-plus range at altitude and supersonic at tree-top level, has been described as "brilliant" by pilots



Equipped with a canard for improved low-speed aerodynamic characteristics, the Milan will have excellent STOL capability. The Milan is about to enter intensive flight testing.

who have flown it. The French Air Force's insistence on a twin-engine version of this aircraft employing French Atar engines, in place of the first prototype's TF30 powerplant, resulted in orders for two test models of the Mirage G-4 fighter, which is scheduled to fly for the first time at next year's Paris Air Show.

The most recent attempt to stretch the utility of the Mirage design was catalyzed by the Swiss Air Force's interest in a Mirage 5 with improved STOL capabilities. This was achieved by the addition of a canard, which improves the low-speed aerodynamics of the aircraft, known as the Milan. The Milan's canard is retractable to prevent formation of shockwaves that otherwise would interfere with the engine inlet. Flight testing of this aircraft is about to begin.

How Dassault Management Works

The opportunity to design high-performance aircraft at a high rate and without interruption since the end of World War II—as manifest by the preceding chronology—is obviously a key factor underlying Dassault's successes. But a number of other techniques, in the company's view, are seen as equally important.

First, there is a complete absence of all "horizontal" management structures in the Dassault operation. Individual project teams are formed on an *ad hoc* basis under the leadership of one of the company's senior managers. These teams are kept small, generally involving about twenty-five engineers of "the best quality that we can obtain." Most team leaders have been with the company since about 1930 and generally work closely with young, hand-picked engineers who are carefully recruited from the country's top engineering schools. These men are the designated successors to the present managers, of whom there are about thirty.

The teams have full authority and freedom of action, including wide latitude in terms of funding, "as long as they produce." The R&D team managers participate, however, in a unique bonus plan designed to foster close adherence to cost estimates as well as performance specifications and schedules. Meeting these criteria can mean a bonus double or even triple the manager's base salary. Because of the long association of the team leaders as well as many of the team members with the company, there exists "a degree of confidence that eliminates the need for exchanging memos." M. Dassault's philosophy is that "he wants people thinking and acting, not writing memos."

On the higher echelon, you "don't write, not even to confirm," AF/SD was told. If difficulties crop up, the teams discuss the problems with M. Dassault, either in person or via telephone, "because we are a small enough company to be able to function on a vertical basis at all times."

Because of its size the company can function with only limited administrative forces. In the case of larger companies, in the US and elsewhere, the fastest growth takes place in such peripheral and cost-escalating areas as administration, a pitfall successfully avoided by Dassault. Smallness is a fetish with the company and is partly due to the fact that it engages heavily in subcontracting with France's nationalized aerospace industries. In the case of the Mirage IV production effort, for instance, Dassault farmed out about eighty percent of the program to other French companies, but maintained full control over the manufacturing process by handling all final assembly and tests itself.

Because of its lean payroll, the company can pass through periods of slow business without having to dissolve its invaluable teams of designers and craftsmen. The other advantage of such heavy subcontracting is derived from the fact that government looks with favor on such "work-sharing" with the nationalized industry by the country's only private aerospace industry. Most of the engineers, draftsmen, and craftsmen know each other and have "the fullest confidence in one another." This obviates the need for detailed instruction and briefings, and makes it possible to function with only a small number of expediters, analysts, and planners.

The latter function is reduced further by another peculiarity of the Dassault management approach: The company employs specialists only on lower levels. Senior engineers must be "polyvalent" generalists. The company does employ highly specialized technical personnel on the nonmanagement level, but "any man who wants to move up in the technical hierarchy must become a generalist."

There is another Dassault rule: The company will not employ computer programmers per se. The rationale was described to this reporter by a company executive: "Several years ago, when we first introduced computers into our operation, we decided to avoid what we view as a common mistake—that is to form a corps of computer specialists dedicated to 'make-work' schemes, giving answers to questions nobody would ever ask, and making computations for the sheer pleasure of it. We have a special installation where we maintain our computers, but any engineer can and must be able to formulate and run his own program relevant to the problem he wants to solve, without guidance or instruction by anybody. We view this sort of work as creative. And anything that is creative we consider essential for the professional development of our engineers and designers."

Design engineers who can run their own computer programs, in Dassault's view, "also tend to make more intelligent use of computer equipment than those who have to go through a middleman. If our people ask a stupid question of the computer, they, of course, get a stupid answer, but they feel no compunction or embarrassment about having to go back to rectify their error. By contrast, if the designer who has made such a mistake in basic thinking sees his error 'authenticated' by a programmer of unquestionable competence, he will tend to accept it as gospel. What is actually a case of 'garbage in, garbage out,' has been transformed into a case of 'garbage in, flowers out.' "

The informality of the Dassault approach hinges on the company's willingness to undertake greater technical risks than are commonly accepted by US industry, especially so far as analysis and test are concerned. This willingness to take risks is deliberately encouraged by management which lets its designers know that "you are always covered in case of an honest or even spectacular mistake, as long as you show initiative." The cardinal sin for a Dassault employee is to *not* show ini-

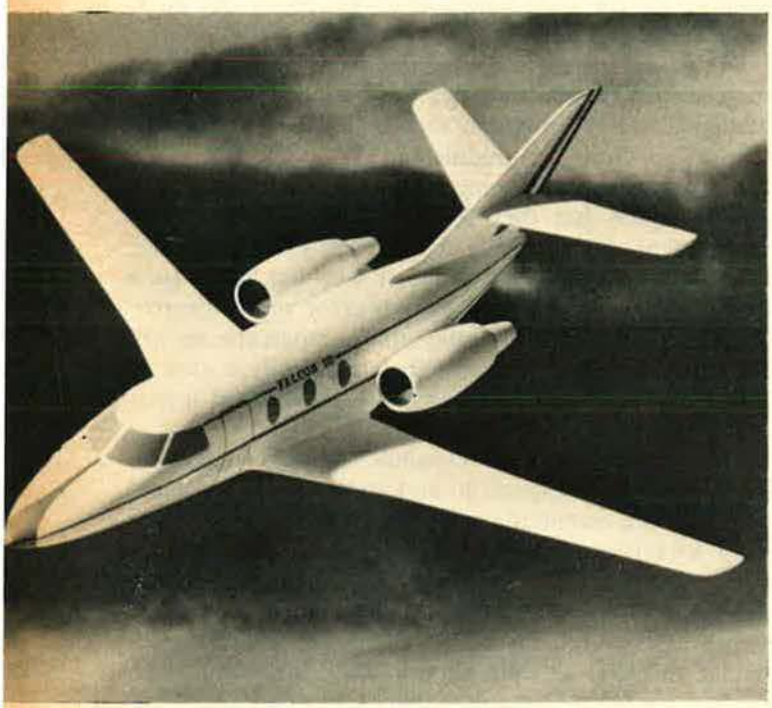
(*Continued on following page*)

Dassault versatility is reflected by such aircraft as the Mystère 20 business jet, known in the US as the Fan Jet Falcon. It was brought from drawing board to first flight in twelve months.

tiative, but even in such rare instances the company's paternalistic policy saves him from getting fired. Instead, he is given a comparatively menial assignment, which often leads to eventual rehabilitation.

The ability to react rapidly to problems is considered vital at Dassault. Test pilots, for example, are encouraged not only to point out shortcomings in performance or other areas but to suggest "quick fixes" immediately after completing a given test flight, without waiting for telemetry data to be processed and evaluated. In such a case, a personal meeting or telephone conference with senior program personnel is arranged almost immediately and details of the fix worked out and specified. Work on the fix frequently will begin within two hours after a test flight.

It is not uncommon that such a fix is completed, and tested the next day in another test flight and by the same pilot who proposed the corrective action. "By teamwork of this sort we build an *esprit de corps* and a level of man-to-man confidence that is the key ingredient of our success," a company executive said.



The Falcon 10 is a smaller derivative of the Mystère 20.

Close Government Cooperation

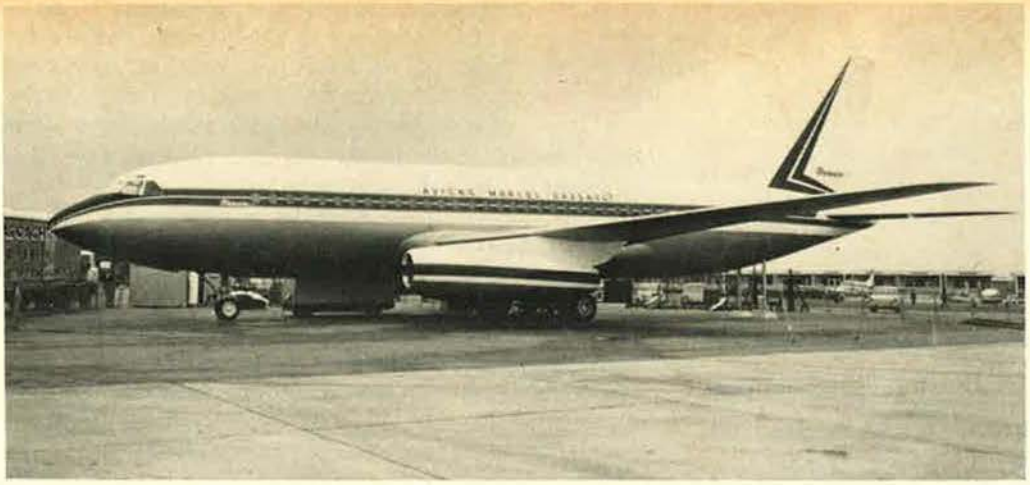
Two intrinsic advantages accrue to the Dassault operation, compared to its foreign competitors, especially so far as US aerospace industry is concerned. The fact that the French Air Force had consistently specified essentially austere designs oriented toward low-cost, modest payloads, and limited range has resulted in combat aircraft often more suitable to the international market than the more sophisticated, larger, and more expensive US aircraft. Many subsystems that are incorporated into US designs are viewed by Dassault and its foreign buyers as "frills." Eliminating them lowers costs and eases maintenance and training requirements for the foreign buyers.

The second factor is the French government's "pragmatic" export policy. This stems from the fact that France ranks third in aerospace and defense exports, behind the US and the Soviet Union, but would like to do better.

Since it is not one of the "Big Two," the French government can be less concerned with political overtones, the prohibition of Mirage sales to Israel being the one notable exception. (The French government's rationale vis-à-vis Israel is based on the assumption that, for every aircraft turned over to Israel, "the Soviets will turn over ten to the Arabs, the end result being that the Mediterranean will fall completely under Soviet control.")

Typical of this pragmatic attitude was French President Georges Pompidou's recent explanation of Dassault's sale of 110 Mirages to Libya. France, like nature, he said, "abhors a vacuum [and] felt it had the duty to fill it." Filling vacuums of this kind has netted France almost half a billion dollars over the past six months.

French government support of aerospace exports is very effective and often includes highly attractive financial terms. Dassault frequently augments this attractiveness by offering liberal licensing agreements. This was recently the case in the sale of thirty Mirages to Spain, which included the provision that half of the aircraft



Currently under development is Dassault's most ambitious commercial undertaking, the Mercure jetliner, with planned passenger seating of 134 and range of about 900 nautical miles.

involved would be built locally, as well as an option for Spain to participate in the manufacturing of Dassault's next commercial aircraft project, the Mercure. So far, there has been no serious adverse public reaction, and no national psychosis has developed about a "military-industrial complex."

In Dassault's view, its own smallness, combined with the fact that all other aerospace companies are nationalized, have instilled in the French public the attitude "that we are the nation's representatives in technology, vital to the national economy, and therefore have never been viewed as either a political or economic factor inimical to the national interest."

Dassault and Civil Aviation

The company, despite its successful military programs, has consistently diversified its business through commercial and general aviation programs, either as prime developer or as subcontractor for other companies.

At the moment, the most successful commercial product of the company is the Mystère 20 executive jet, brought into being on a crash basis (from drawing board to first flight in twelve months) in 1963 at the personal insistence of M. Dassault, for almost all his senior managers felt "it had no market."

Shortly after the aircraft completed its flight testing and certification program, Charles A. Lindbergh, the US aviation pioneer who for many years has been a consultant to Pan American World Airways, happened to see a desk model of the Mystère 20 while in France on a business trip. He evinced interest in seeing and testing the aircraft because Pan Am was attempting to market a business jet in the US at that time. Dassault rushed him to its Bordeaux facility for a demonstration ride.

Upon its completion Lindbergh wired Pan Am's founder and then President, Juan Trippe: HAVE FOUND YOUR BIRD. Shortly thereafter, Pan Am placed firm orders for 190 and options for an additional sixty aircraft, which are being sold in the US as the Fan Jet Falcon. Worldwide, the number of orders for the Falcon stands at about 320.

In 1968 Dassault launched the development of a smaller derivative of the Falcon, initially known as the Mystère 10 but now called the Falcon 10. Pan Am has ordered (firm orders and options) 120 aircraft of this type. Currently under development is the company's most ambitious commercial venture, the Mercure, a 134-passenger, 900-nautical-mile-range jetliner, powered by two Pratt & Whitney JT8D-15 low-noise fanjet engines.

Initially launched under a fifty-six percent French government and forty-four percent Avions Marcel Dassault funding ratio, the company has since managed to attract the financial backing of Belgian, Spanish, and Italian aerospace industries, in exchange for the right to participate in the manufacturing process. The basic design objective behind the Mercure is similar to that underlying the company's military products. It aims at "that specific sector of the market not covered by American products." In case of the Mercure, this means the short-haul market, especially the 500- to 700-mile range, for which the aircraft is optimized.

On a long-term basis, Dassault hopes to produce an enlarged version of this aircraft, the Super Mercure, suitable for service in the denser air transport markets of the 1980s. With its wide range of products, burgeoning sales, and unique management and development techniques, Dassault expects its future to be rosy, especially as the declining aeronautical technology effort of the US (termed the "McNamara legacy" by a senior Dassault official) advances its own competitive position. But there is prevalent, among Dassault's management, a vague feeling that Soviet competition will increase, based on what "our people have seen recently in the Soviet Union, including dozens of new, advanced engines employing all sorts of novel technologies, and the obvious fact that the Russians are working very hard."

It would seem, however, that under the ingenious direction of Marcel Dassault, who started his career by building the propeller for France's World War I Spad fighter in 1915, and who has not stopped making successful aircraft since, the company will manage to continue to hold and expand its share of the military and civilian aviation market.

But Avions Marcel Dassault should be prepared to find more competitors on both sides of the Atlantic who will be imitating its management style and design philosophy.—END

Soviet military initiatives in the Middle East are creating greater risks for the US than any we have faced since the end of World War II. US airpower is not prepared to meet the Soviet challenge in the Mediterranean. So believe the authors, experienced observers who have recently returned from the area. They examine that potentially explosive situation, and offer some policy alternatives in this report on . . .

The USSR in the Middle East

By Robert A. Kilmarx and Alvin J. Cottrell

THE United States again has turned to diplomatic initiatives in the Middle East in the hope of reducing the need for providing more US aircraft to Israel. This may cut the risk of further alienating Arab states, or at least ameliorate the impact of more military assistance to Israel if it is subsequently provided.

Both the necessity and the prospects for US efforts to nurture Middle East stability, however, are largely dependent on developments at other levels, among them: current US perceptions of its national interests in the area, the balance of military airpower there, and Soviet willingness to extend its involvement in Middle East affairs. To discuss these matters usefully, however, they must be addressed in the larger context of the entire Mediterranean region.

The importance of the Mediterranean basin to US security and well-being was clearly recognized more than twenty years ago when Soviet inroads in that area were minimal, and when the concept of the Soviet Union as a global threat was more widely accepted than it is today. Every President since Harry Truman has held the view that Middle East/Mediterranean stability is vital to US interests. In 1951, General Eisenhower remarked that "so far as the sheer value of territory is concerned, there is no more strategically important area in the world . . ." than the Middle East.

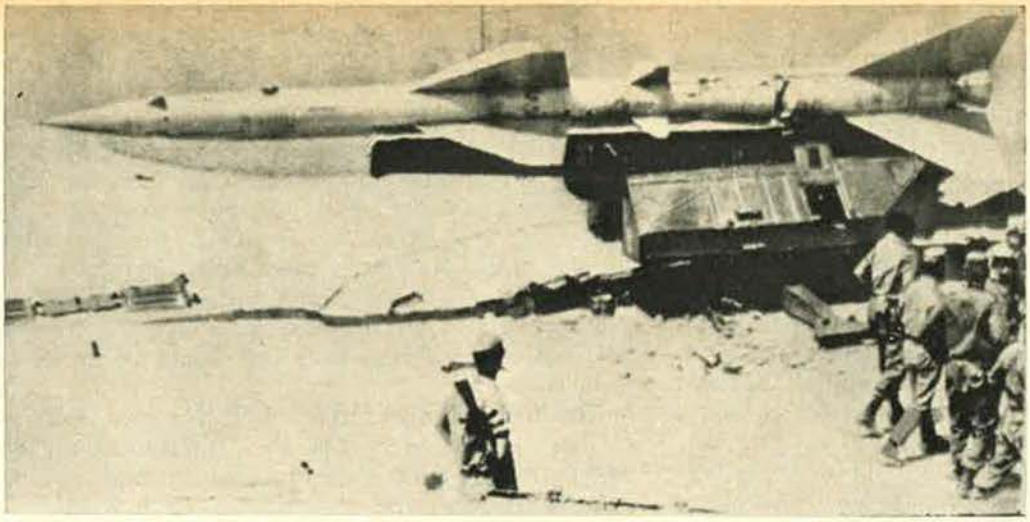
Paradoxically, as Soviet aggressiveness has intensified, a disposition to degrade the degree of "vitalness" of our Mediterranean and Middle East interests has emerged in the United States and elsewhere in the West.

This has occurred even while the Soviet Union became deeply entrenched in the Arab world, deployed a permanent naval fleet in the Mediterranean Sea, and accepted ever higher risks of indirect confrontation with the United States. NATO has proved of little help in arresting this trend. On June 17, Secretary of Defense Melvin Laird pointed out that "the United States is without a great deal of support there. . . ." In fact, most European NATO countries believe the eastern Mediterranean is primarily an American concern.

The Soviet scheme of penetration into the Mediterranean has been subtle. They made their inroads by measured steps: by gradually filling political voids, by exploiting opportunities, and by offering only piecemeal and ambiguous challenges. Such an approach reduced the risk of conflict, complicated US decisions to react, and has even helped to change US perceptions of our own national interests in the area.

Deescalation of US national concern about the area has been encouraged by disenchantment with the war in Vietnam, congressional challenges to other commitments abroad, euphoria about the prospects of détente with the Soviet Union, and preoccupation with domestic economic malaise, social unrest, and degraded ecological conditions.

Classical principles of geopolitics and economics once assured high-level US concern about the area. These principles have been compromised by the impact of technological advances—for example, new concepts of strategic mobility. New sources of vital oil supplies outside the area have contributed to dis-



A Soviet SA-2 surface-to-air missile of the type supplied to the UAR and now deployed within fifteen miles of the Suez Canal. Recently the SA-2s have been supplemented by the more advanced Soviet SA-3, apparently manned by Russian crews.

—Wide World Photos

counting the importance of the Middle East. Even the links of culture and religion have been eroded. One of the West's leading political-military pundits, Professor Laurence Martin, has summed up a current, rather narrowly based view of the area: "The Middle East," he says, "is a declining asset to the West in its traditional role of line of communication, for the Europeans have gradually shed their military commitments east of Suez, and are increasingly acquiring economically alternative routes for trade and oil, while the United States has always taken a different way to its heavy responsibilities in Asia."

He is right, as far as he goes. However, the primary importance of the Mediterranean today is that the Soviet Union has chosen to make it the major arena for contemporary political advance against the interests of the West, in order to forge new correlations of power in the world. Only in this area has the Soviet Union shown a willingness to commit its military forces to support its political goals by direct action. There, Soviet materiel, political interests, and prestige are more deeply involved than anywhere else in the Third World, including Vietnam.

Yet there is a clear and present danger that while we are trying to put our own house in order, the international situation in the Mediterranean area will not wait. Today's and tomorrow's decisions may determine the political destiny of the area for ages to come. Historians may point out that the Mediterranean proved to be the primary testing ground, not only of the will and capability of the United States to exercise a global role, but even of President Nixon's more limited concept of "partnership" and "even-handedness." Certainly from an airpower point of view, the US is not presently prepared to meet the Soviet challenge in the Mediterranean.

The Soviet Air Force Arrives

As early as 1954, the Soviet Union elected to give the Arab states the highest priority in its military and economic aid programs. In the last fifteen years, more than forty percent of Soviet foreign aid has gone to the Arabs. The Soviets have extended $5 billion in military assistance to Egypt and Syria alone. The Soviet Navy entered the Mediterranean in strength after the June 1967 Arab-Israeli War. Now the Soviet Air Force has arrived.

The threat thus posed to the security of NATO was made clearly evident to one of the authors of this article (Dr. Kilmarx), who recently served as US representative at a meeting in Naples of the Atlantic Treaty Association. The Association met to discuss Soviet penetration into the Mediterranean. The author subsequently visited US military commands in the eastern Mediterranean, and in Spain and Portugal. Reinforcement of his findings, reported below, came from his coauthor, who has just returned from discussions with military and political officials in the Middle East and the Persian Gulf area.

The continuous, creeping expansion of Soviet air involvement in the Middle East and on the southern shores of the Mediterranean, with the UAR as its strategic pivotal point, can be measured in several ways. One yardstick is the gradual expansion of the number and capabilities of land bases under the control of radical Arab states favorable to the USSR (some 100 bases, with more than forty-five capable of supporting jet aircraft). Many bases were constructed or extended and reequipped with Soviet assistance to support jet operations. In contrast, the last American base in the region (Wheelus Air Base near Tripoli) was turned back to the Libyans in June at their request, following a radical shift in Libyan politics.

On May 11, 1970, Maj. Gen. E. B. LeBailly, Commander of the US Sixteenth Air Force with headquarters in Spain, told Dr. Kilmarx: "Soviet expansion in the Mediterranean and Mideast cannot be accomplished without securing its position through land/air bases. . . . Land-based airpower is the key to controlling the Mediterranean and other water-adjacent areas. The Soviets fully recognize this. Russia now has a nucleus of air bases utilized by Soviet aircraft and ground equipment, and an infrastructure of competent military technicians, maintenance personnel, pilots, etc., to operate this equipment and serve as the basis for a rapid expansion of Soviet military capability in the area should the necessity arise."

Another measure of Soviet penetration is the con-

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struction of hardened aircraft shelters to protect Arab and Soviet aircraft, presently totaling about 1,000. A further gauge is the provision of modern Soviet fighters and bombers (now including more than 500 MIG-21s and SU-7s), and surface-to-air missiles (SAMs) to Arab states. The number of Soviet aircraft thus provided far exceeds our combat aircraft strength in Spain, Turkey, and with the Sixth Fleet. In addition, Soviet Air Force units—fighters (MIG-21s), bombers (TU-16s), and ASW aircraft (BE-12s)—now operate from Egyptian soil. The number of *Soviet-manned* combat aircraft in the UAR soon will exceed that of all US air units in the entire Mediterranean area. A further measure is the thirty-odd low-altitude Soviet SAM sites that shield Alexandria, Cairo, Aswan, and the air bases from which Soviet aircraft operate in Egypt. Now the Soviets have deployed surface-to-air missile defense systems within fifteen miles of the Suez Canal. The loss rate of Israeli aircraft already has increased in that area. Next may come Soviet bombers, ballistic missiles, and more.

As a result, the problem of countering Soviet military initiatives in the Middle East involves higher risks for the United States than at any time or in any place since World War II. Not since the end of World War II has the Soviet Union been engaged militarily on operational missions outside Communist boundaries, as it is in the Middle East today. To be sure, the Russians attempted to deploy missiles in Cuba, but that was not in the midst of a conflict. In Egypt, an actual war situation exists. Soviet intentions are clear. They would not have made such a deep military commitment—now estimated to number up to 14,000 military personnel—without hoping to establish economic, military, and political hegemony over this vital area. They counted on the fear and disinterest of NATO's European members, the preoccupation of the US in Southeast Asia and at home, and the instability and weakness of the region.

A More Neutral Policy

Also, the impact of the Soviet military presence in the area is obvious from the authors' recent visits to the eastern Mediterranean and Iran. The Turks and the Iranians are already reinsuring themselves against the possibility that the Soviets eventually will dominate the area. There is a strong belief that the US no longer is able to formulate and commit itself to a defense policy there. This explains the more neutral policy which Turkey and Iran have adopted vis-à-vis the United States and the West. For example, Dr. Cottrell was told in Iran and Kuwait of the fear that the old Iraqi claim to Kuwait, which was asserted in 1961 and forestalled by British military intervention, would be revived. The number of Soviet advisers in Iraq is increasing, the British are withdrawing, and the US commitment of two ancient destroyers and a converted seaplane tender is inadequate to deter aggression or enhance stability. Indeed, it was said that so small a commitment—given the antimilitary mood in the US—could constitute an unnecessary source of aggravation from revolutionary elements, which are widespread in the Persian Gulf, with little fear of intervention by the United States.

United States concern over Soviet moves in the Mediterranean and Middle East was enunciated in President Nixon's statement to Congress on February 18, 1970, entitled *US Foreign Policy for the 1970s: A New Strategy for Peace*. He said: "The activity of the Soviet Union in the Middle East and the Mediterranean has increased in recent years. This has consequences that reach far beyond the Arab-Israeli question. . . . The United States would view any effort by the Soviet Union to seek predominance in the Middle East as a matter of grave concern." But the President pulled his punches. He sought to give the Soviets another chance at a negotiated balance—and it failed.

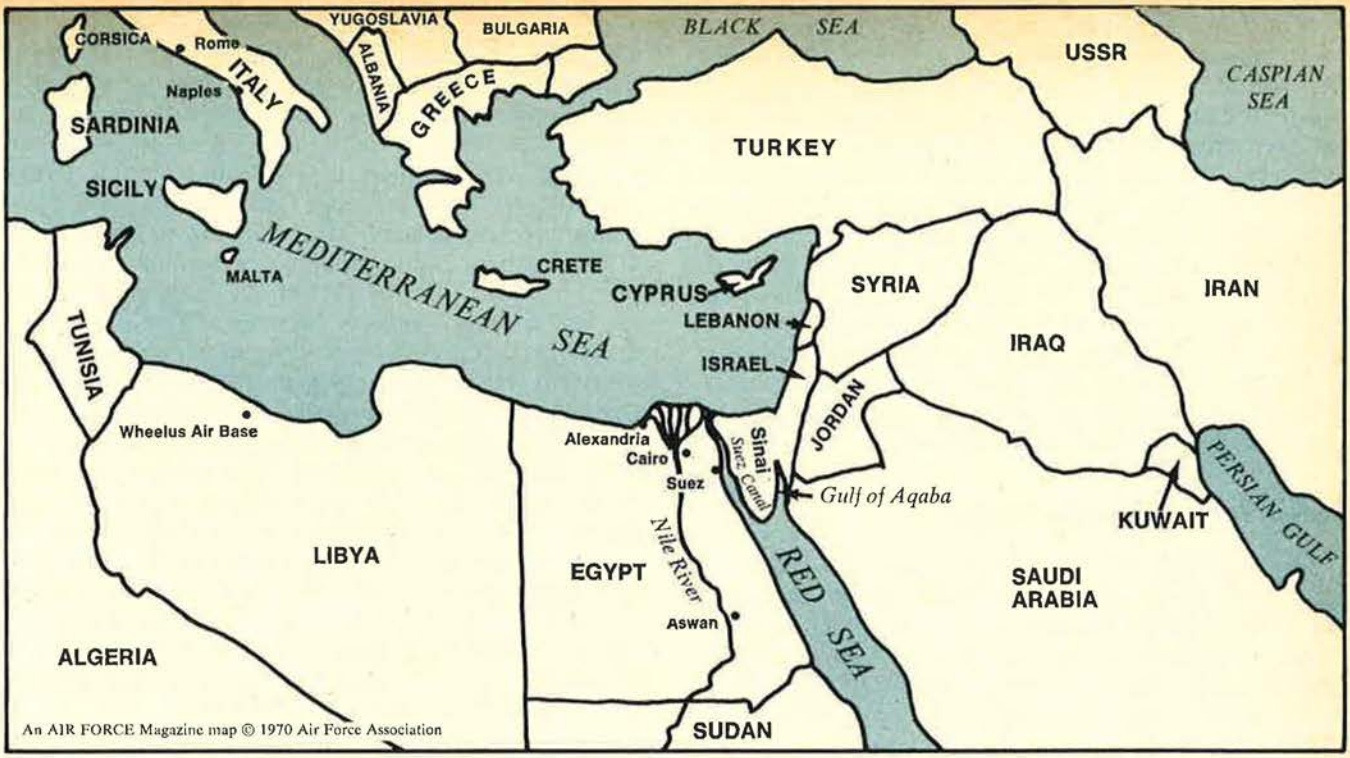
The President went further in his television interview on July 1, when he warned: ". . . the situation in the Middle East is more dangerous [than in Vietnam] because it involves—and this is not the case in Vietnam—a collision of the superpowers."

The delay over providing US aircraft for Israel demonstrates the strength of the Soviet position and the weakness of the US response. In an understandable and laudatory attempt to deescalate the arms race in the Middle East—and presumably to encourage the SALT talks—the United States refused, in March 1970, to grant Israel's request for approximately 100 Skyhawks and twenty-five to thirty-five F-4 Phantoms. The Administration stated that the United States would closely watch the military balance in the Middle East and review its decision should future developments in the military balance of the area warrant. Since the announcement of that US decision—made with much fanfare and in the full glare of all communications media last spring—the Soviet Union has responded by committing military forces (100 to 150 Soviet pilots and seventy-five to 100 new MIG-21J fighter aircraft) to the direct support of Egypt in the Arab-Israeli conflict. This is in addition to Soviet operation of Egyptian air-defense missiles.

It is increasingly recognized that the aircraft balance between Israel and Egypt has been sharply and perhaps irrevocably altered. It cannot even be redressed by a US decision to supply more aircraft to Israel, or simply by replacing lost aircraft. Furthermore, as one of the authors was told by authoritative sources, even the Israelis now recognize this.

It also is no longer possible for the United States to change its much-publicized earlier decision on this issue without even greater political reverberations throughout the Arab world than would have been true initially. At the time of the original Israeli request, the decision would have been primarily one of providing military hardware, rather than a guarantee to defend Israel. However, with the passing of time and the great amount of publicity that has been given to the Soviet military commitment to Egypt, the issue now has become one of a United States guarantee. Without such a US guarantee, the Soviet escalation of its military position in the Arab states cannot be checked. The Soviets can up the ante at will.

In March 1970, US officials in the area told one of the authors that Israel would need twenty-five times the air strength she possessed in June 1967, in order to have the same preemptive capability that was applied so decisively at that time. Now the factor may



The Arab-Israeli conflict has given the USSR a pretext for penetration of the Mediterranean/Middle East area. In this strategically important region, Israel fights for survival, and the US, short of land bases and with little support from NATO allies to the north, faces its most severe diplomatic challenge since the end of World War II.

be over forty. Even the qualitative superiority of Israel, which officials believe more than offset the quantitative superiority of the Arab air forces, is changing. Given time, the Arabs probably will develop into fair, if not good, fighter pilots. The Egyptian Air Force could become a very potent force by 1971, for their MIG-21s are roughly equal to our F-4s. Such changes alone contribute to an imbalance.

The Ultimate Outcome

The better-trained Russian pilots are another problem. One often reads or hears discussions of whether the Israelis could defeat the Russians in air-to-air combat on a man-to-man, plane-for-plane basis. It is quite possible that they could, but it would not greatly affect the ultimate outcome. The Soviets could afford to lose many times more aircraft and pilots than the Israelis, and still eliminate the Israeli Air Force simply by weight of numbers. What in fact has happened is that Soviet missile and interceptor defenses in Egypt have removed the Israeli ability to carry out a preemptive strike. Israel's deterrent posture, based on preemptive air attack, can never be restored simply by selling jet aircraft to Israel. Hence, the present Israeli request for aircraft is not merely a demand for the jets, but rather a request for a statement of US support, which the Israelis hope will deter the Soviets and their Arab clients.

Assessing the relative value of air capabilities is complicated by influential Western observers who consider the Soviet insertion of its airpower in Egypt to be "defensive," as we did, to our regret, during the early development of the Cuban missile crisis of 1962. From the strategic standpoint, the best Israeli defense to offset Arab numerical superiority in aircraft and artillery—particularly along the Suez Canal—has been offensive air strikes. The Israelis are deficient in artillery. Protracted Israeli air attacks on the Egyptian side of the Canal have been designed to deal with Nasser's war of attrition by artillery, which, given Israel's vastly inferior numbers, has resulted in serious losses. Again the term "offensive" and "defensive" are imprecise terms for describing strategies or tactics.

The word that best describes Israeli strategy and outlook is "survival." Israel is a fortress state. The Israelis are convinced that they cannot afford to lose even a single battle, let alone a single war. This helps to explain why—even at great political cost in terms of world opinion and image—the Israelis retaliate swiftly and fully for military attacks upon their positions (*e.g.*, recent attacks on the Palestine guerrillas in southern Lebanon). It points up the danger, in terms of Israeli security, of the present policy of limiting air strikes to border areas lest Soviet fighter pilots be engaged. Recently such strikes have been opposed by modern Soviet surface-to-air missiles. Soon Soviet-manned fighters may be encountered over the Canal.

It seems clear that the Israeli victory in the "Six-Day War"—a war that has, in fact, lasted three years and is still continuing—has been transformed into a subtle, albeit clear, trend in the military balance favoring Egypt and the other Arab states. Over the long run, this reversal will tend inexorably to favor the Arab cause. In May 1970, this view was stated to one of the authors by a highly placed Soviet source.

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Now that the Soviets are in Egypt, they may soon move on to more ambitious purposes. It is conceivable that one of the Soviets' most-cherished objectives, *i.e.*, the reopening of the Suez Canal, eventually could be achieved from their present base of power in Egypt. It is not incredible that the Soviets will expand their operations to the east side of the Canal, and provide the necessary air and military support and protection needed to reopen it. They could, for example, support an Arab "beachhead," of say twenty-five miles deep on the Israeli side of the Canal, thus clearing the way for its reopening under control of the Soviet Union.

The Soviet source cited above emphasized the great political and strategic interests that the Soviet Union has in seeing the Canal reopened soon.

Need for a Broader View

One problem of US foreign policy has been to view crisis areas apart from their regional context. We did it in Southeast Asia and we are doing it again in the Mediterranean. In order to be effective, the US approach must take as broad a "Mediterranean" view as the Soviets take. The realities of potential conflict in all areas of the Mediterranean region and the relationship of opposing military forces must be kept in view. Otherwise, we can misinterpret our weaknesses as well as our strengths, and misread Soviet intentions.

A renowned British Middle East scholar recently told one of the authors: "The Arab-Israeli dispute is not the only one in the area. There are others that may become more important, (*e.g.*, the Persian Gulf area), for what the Soviets do (what they can get away with) guides what they want."

The Soviet Union not only is moving toward predominance in the Middle East and throughout the southern and eastern rimland of the Mediterranean as a salient against NATO and bridge to Africa, but the USSR also is establishing bases for projecting power from there into other regions. The Indian Ocean and South Asia may follow on their agenda. The Mediterranean and the Suez Canal provide the logistical through route and geopolitical base for this step.

The need for a more comprehensive view of the entire Mediterranean was suggested by the NATO South Commander in the Mediterranean, US Admiral Horatio Rivero, Jr. Speaking at a meeting of the Atlantic Treaty Association in Naples in March 1970, which Dr. Kilmarx attended, Admiral Rivero stated that the entire Mediterranean basin needs to be treated as a single strategic area. "We have in essence a theater of war which is quite independent geographically from the other theaters of war, composed of central and northern NATO Europe," the Admiral said. "It is really three subtheaters. The broken front which exists in the southern region reduces our flexibility as it does our ability to shift forces to face changing threats as they develop." Indeed, because of the Arab-Israeli dispute, it is impossible to separate even the area immediately east of Suez, namely the Persian Gulf. The traditionally ruled Arab sheikdoms there provide political support and revenue to the anti-Israeli forces.

Existing alliance structures and military assistance programs do not take these factors adequately into account. NATO's concerns are to the north. A number of its members reject the dispersion of its capabilities and commitments in the defense of what is to them a secondary theater. The needs of Spain and Greece are obstructed by political passions. The support of France and Italy is impeded by competing national aims and economic links, as in Libya.

An Upset Balance

The deployment of US air units to the area is not sufficiently responsive to changes in the threat. While it may be possible for the US to maintain some semblance of an air balance in the Middle East for a brief period by providing fighter aircraft to Israel, the problem of maintaining military balance throughout the Mediterranean is much more complex. Already this overall air balance has been lost, and the naval balance can become much more precarious.

This trend can have increasingly destabilizing effects, since airpower has become a primary indicator of the prospects of deterrence and conflict control in this part of the world. In the Middle East, this has been clearly demonstrated since the June 1967 war. It also is true to varying degrees in other parts of the area. The importance of the overall air balance increases as the USSR catches up with, and ultimately may overtake, the United States in strategic nuclear weapons. Tactical nuclear and conventional arms must carry a larger portion of the deterrent burden in this

The USSR is believed to have provided more than 500 MIG-21s (shown here) and SU-7s to Arab states. The Soviets also have deployed seventy-five to 100 new MIG-21Js, flown by Soviet pilots, to Egypt. US land-based airpower is outnumbered in the Mediterranean.

The Soviet-built SU-7, primarily a ground-attack fighter, flown by Arab pilots, contributes to an air imbalance in the Mediterranean that is favorable to the USSR and its client Arab states.

region. If US ground forces assigned to NATO are significantly reduced in the next few years—as seems likely—the political significance of airpower will be further enhanced.

As presently equipped, the US Sixteenth Air Force cannot provide an adequate counter to the buildup of Soviet air capabilities throughout the Arab world. Modern US Air Force fighter bases in Spain and Turkey are very few. Our inventory of modern jet fighters is only a fraction of that of the UAR. Obsolete F-86s are the mainstay of base defense in Spain. In the central Mediterranean area, there is no regularly deployed US land-based air coverage. The Sixteenth Air Force has only a very limited capability to cover the whole area.

If the land-based air threat grows, our Sixth Fleet in the Mediterranean Sea will be forced to divert aircraft from strike commitments to defense of the fleet, and may not be able to deter continued Soviet incursions.

The military capabilities of our NATO allies in the western Mediterranean—Italy and France—do not change the imbalance. (France, of course, has no forces formally committed to the NATO Command structure). Their contribution—potential or actual—to collective defense is markedly reduced not only by preoccupation with the defense of NATO's Central Front, but also by political weaknesses, budgetary priorities, and the limited capabilities of their military forces.

A persistent problem is the low state of readiness of their operational units—particularly air support elements. Their support units are not ready for conventional warfare on short notice. Air capabilities for sustained conventional military operations are exceedingly low, because of inadequate supply levels and acute equipment shortages. This is compounded by the qualitative superiority of Warsaw Pact aircraft.

In the case of Italy, the Warsaw Pact states also would have a numerical air superiority of three and a half to one or four and a half to one, based on combat forces in being, under present deployment patterns. For the defense of Greek Thrace, a most vulnerable frontier, there is again a substantial superiority in favor of the Warsaw Pact. This is particularly true between Bulgaria and Greece. Bulgaria's air superiority is clear. This one can readily see by visiting AFSOUTH. In combat aircraft, the Pact advantage in this area is three and a half to one, with the Pact again also maintaining qualitative superiority. Soviet air forces that could be brought to bear in the Mediterranean are far superior to local air forces of NATO, even if augmented by other NATO units that might reasonably be expected from other NATO commands or from the US.

While NATO maintains numerical naval superiority in the Mediterranean at the present time, thanks partly to the presence of two US aircraft carriers, the balance could be markedly upset by the deployment to the Mediterranean of Soviet Black Sea units or naval forces from other areas, and by the movement of Soviet air elements to land bases in friendly states bordering the Mediterranean.

Thus, the potential if not actual air imbalance in the Middle East is compounded by a greater imbalance in the relationship of Warsaw Pact vs. NATO airpower in the area as a whole. This limits the muscle the US can bring to bear in pressing for a diplomatic settlement of the conflict.

These force disparities are especially difficult to overcome as long as the US foreign policy approach to the area is piecemeal—and the public is kept in the dark as to our interests and goals. As of this writing, the Administration has not communicated in any detail its views on our present interests in the Mediterranean area, nor has Congress done so. This is admittedly difficult in a climate of constitutional confrontation concerning foreign policy prerogatives, complex base negotiations with Spain, objections to further military aid to Greece, and problems of domestic politics.

Some New Approaches

The President stated in February 1970 that "our interests must shape our commitments, rather than the other way around." This suggests the need for the United States to develop and declare a more comprehensive Mediterranean strategy—not just a Middle East formulation—as an adjunct to the President's "strategy for peace." It should lead to a clear statement of US interests in the area under present conditions, and a definition of US commitments—those already made and those the US would be willing to make. Otherwise, we may be on the threshold of a

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credibility gap of unprecedented dimensions. Our problems in Vietnam stemmed in part from the fact that commitments came first: They were tacked on the ambiguous formulations of our goals that were more suitable for engraving on monuments than for clear policy guidance.

In pursuing an over-arching regional strategy for the area, more emphasis should be placed on new linkages with allies and friendly countries in the region. The utility of supplementary alliance systems should be explored. For example, Spanish officials in Madrid indicated to the authors that Spain was interested in forming a west Mediterranean grouping of nations, indirectly linked to NATO, but yet not a part of that organization. Such an alliance could be primarily political, but could provide for coordinated economic activity and military cooperation to defend portions of the Mediterranean from Soviet encroachments. Such an organization might include Spain, France, Italy, Malta, Morocco, and Tunisia.

Hopefully, Libya could be drawn into its political and economic activities. As a result, Libya might be encouraged to place restraints on the advantage the UAR could obtain in the Arab-Israeli confrontation by acquiring advanced aircraft and bases in that country. Through such intermediary channels, the influences of friendly states could be brought to bear to serve objectives in the area that the United States could not support more directly. This should be a key element of a policy of "partnership."

Sharing the Blame

More emphasis, too, should be placed on coordinated military exercises, joint planning, and upgrading capabilities of those NATO allies in the Mediterranean who are willing to do more to defend the area. In the words of Sir Frank Roberts, former British Ambassador to the Soviet Union, "We should do more in the way of sharing the blame among the western allies."

We also must avoid the entrapment of denying or restricting essential military aid and other aid to friendly states in the area because of the hope they could or would do more to improve their own military stature or democratic institutions if we did less to help them. We cannot depend on our allies and friends to provide more for their own defense if we first subject them to a political litmus test which we know they presently cannot pass.

More subtle techniques than have sometimes been used must be found to provide assistance and to further military collaboration. The pitfall of overpoliticalization of military aid to friends and allies should be avoided in the future. For example, providing aircraft to the Israelis should not be a highly publicized presidential decision each time further assistance is needed to carry out US policy. Rather, it might, for example, be quietly worked out through intercorporate arrangements at the commercial level, and through third countries.

These aspects of the pursuit of "partnership" should be accompanied by a reappraisal of the overall air capabilities of the US vs. the more militant Arab states and Warsaw Pact powers in the region. The present basing and combat aircraft strength of the Sixteenth Air Force, for example, should be augmented, and more facilities provided at other locations throughout the Mediterranean, in response to the continuing development of the rimland air threat from the Soviet Air Force and radical Arab states. Our Sixth Fleet in the Mediterranean Sea should be modernized.

The gravity with which we view Soviet penetration of the Mediterranean and Middle East can be demonstrated to the Soviet decision-makers only by the actions we take to redress imbalances. The upgrading of air capabilities in the area should be accompanied by the clearly expressed intent to defend those interests we still place high on our list of national priorities. The United States government should make it abundantly clear that we are not going to abandon the Mediterranean to the Soviets and their radical, anti-Western proxies.

While SALT talks may hold promise of some agreement on strategic nuclear weapons within the next year or two, the road to regional settlements with the Soviet Union is long and tortuous. But only regional settlements offer hope of limiting the projection of new-found Soviet global power into still more areas of the world, or of reducing the threats those projections would pose to world stability.

A policy of "even-handedness" and "partnership," commendatory as it sounds, should not be permitted to lead to a policy of neglect and self-induced paralysis.

It is clear that the Nixon Administration still believes there is some diplomatic value in continuing to hold off compliance with Israel's request for aircraft. Undoubtedly it is assumed that Israel will agree to return or vacate occupied territory, and the Soviet Union and the UAR will make compensating agreements vis-à-vis Israel.

This is a credible theory, but there is a serious possibility that the USSR and its Arab clients might conclude that the US fears Arab warnings of reprisal against US oil and political interests in the area. Also, US hesitancy may be interpreted as evidence that the US is fearful of a confrontation with the USSR. It is clear that, thus far, US caution has only increased Arab opposition to a settlement and has not prevented greater Soviet military involvement in Egypt. —END

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The action in Vietnam looks a lot different to the infantry commander than it does to the fighter jock who gives him close support. The author, who commanded an infantry battalion in Vietnam, wrote this account of an infantry engagement near Saigon, to help his blue-suit classmates at the Air War College understand the problems of . . .

Campaigning With the Infantry In Vietnam

By Lt. Col. Roy K. Flint, U.S. Army

"FALCON Six, this is Charlie Six. We're in contact."

That matter-of-fact radio transmission from the C Company commander to the battalion commander transformed the relaxed, almost casual, mood of the battalion command post. Once again the years of training and the hard-earned experience of an infantry battalion were to be pitted against an enemy in ground combat.

In one form or another, this scene has been repeated uncounted times throughout the history of warfare. For those who have experienced the surging excitement of battle, the quietly spoken words of the C Company commander hold special meaning. They convey a message of professional competence and mutual confidence that mark the battle-hardened infantry unit.

Those who have not fought on the ground, but who either have supported or will support the infantry, should know what happens when the infantryman engages his enemy. Much of that story is told by the campaign of the 3d Battalion, 22d Infantry, close to the village of Nhi Binh, near Saigon, during February and March 1968.

Air Force people can perhaps best appreciate an infantry campaign in Vietnam when seen through the eyes of a battalion commander. The battalion commander is the highest field commander who normally maneuvers infantry and directs supporting fire. He commands and controls the widest variety of combat support, and, of special interest to Air Force men, the battalion commander is the one with whom the forward air controller (FAC) and the fighter pilots deal when air strikes are used on a target.

Senior commanders indicate to the battalion commander how they want combat operations conducted, by assigning an area of operations (AO) to a battalion. They also state their priorities, personal preferences for operational techniques, and constraints in a written or oral concept of operations. Even though specific missions assigned to infantry battalions may vary in minor details, all ground operations—cordon and search, reconnaissance in force, sweep, and the like—conducted within the AO are designed to expose the enemy so he can be destroyed as an effective force.

The war in Vietnam, because it is a low- to mid-intensity conflict, lends itself to the use of a wide range of tactical techniques that exploit many levels of violence to destroy—or disarm—the enemy. How this is done depends on the skill and imagination of the battalion commander, the weapons that support the battalion, and the determination of the enemy to resist.

A campaign, conducted in a populated area such as AO Nhi Binh, can be divided into four phases. First, the newly assigned area of operations must be occupied. This is normally done by inserting a battalion into the AO by helicopter assault. Once on the ground, there follows a period of reconnaissance and familiarization with the area, which I call the penetration phase. This phase ends when the major enemy force in the area has been found and the enemy's redoubt or base area has been defined. The domination phase follows and is usually highlighted by a violent fight to defeat the enemy's main force. Thereafter, the principal tasks are to exploit the victory won in the domination phase, and to maintain security in the area.

At the time of the action described here, the American battalion would usually move to a new AO, once security had been achieved, and its place would be taken in the area by a Vietnamese Army unit or a Regional/Popular Force unit.

I will use these four phases to describe the action that ultimately led to securing AO Nhi Binh.

The Occupation

Following a bitter fight with an enemy regiment during the first two weeks of the Tet offensive in 1968, the 3/22 Infantry was assigned to the Nhi Binh

(Continued on following page)

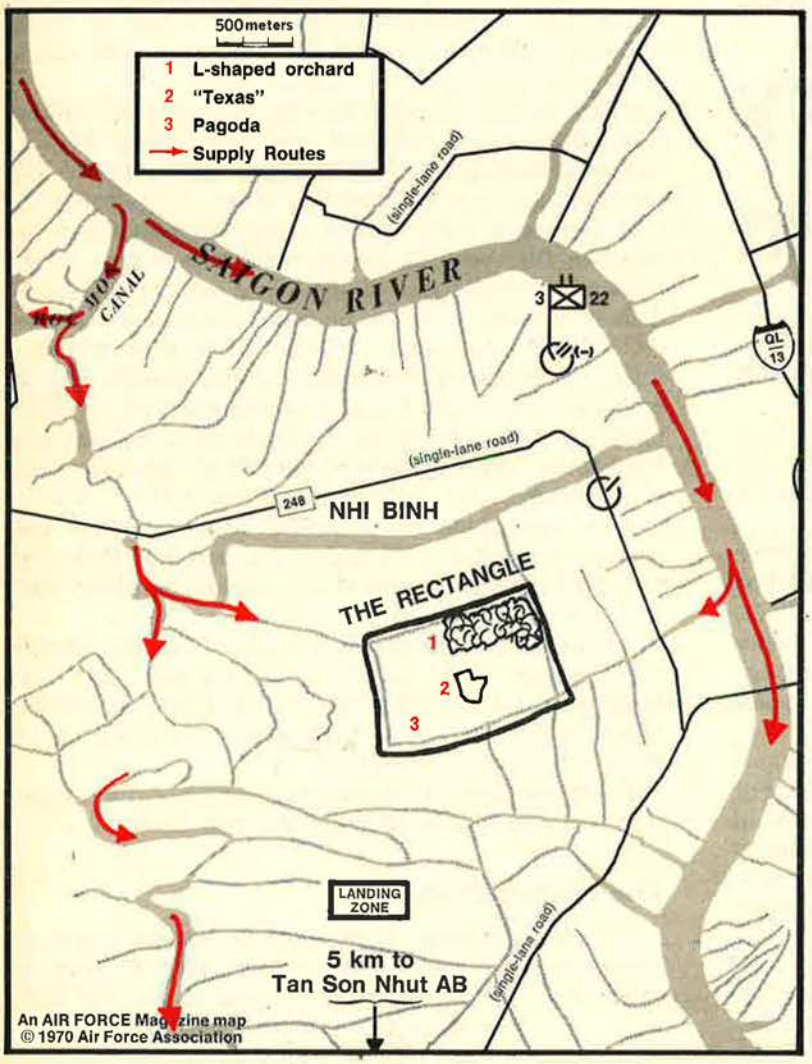
area of operations, located about five kilometers north of Tan Son Nhut Airfield. The battalion, which was under the operational control of Headquarters, 2d Brigade, 25th Infantry Division, was part of a larger force then ringing Saigon and Tan Son Nhut. The mission was to stop 122-mm rocket attacks on the city and the airfield. Although shorthanded because of the high number of casualties suffered earlier, the 3/22 Infantry was a battle-hardened outfit when it air-assaulted into a landing zone (*as shown on the accompanying map*) on the south edge of AO Nhi Binh on the evening of 19 February 1968. The landing was unopposed, and a new infantry campaign was under way.

The Penetration

In less than twenty-four hours, we realized that our maps did not portray AO Nhi Binh accurately. First, with the exception of a few islands of dry land, all else—the open fields, the rice paddies, and the ground beneath the lush tropical fruit orchards—was under water. Secondly, the seemingly minor canals shown on the map turned out to be deep, wide obstacles to rapid movement by infantry. This situation was worsened since the enemy was located to our north, and movement from south to north was across the general flow of the canal-stream system, rather than parallel to it. Minor contact with enemy units manning the canal lines convinced us that moving perpendicular to the canal system would keep us at a disadvantage.

Finally, to the north was the village of Nhi Binh. We believed that working out from a village was more effective than working in toward it. Living in or near a village increased our contact with the people, who invariably became our most prolific intelligence source. Fighting in a direction leading away from a village reduced the chances of accidentally injuring innocent civilians and therefore indirectly aided our intelligence effort. Surprising to some, living in a village lowered the probability of receiving enemy mortar and rocket fire. Apparently the enemy competed with us for the support of the civilians and, at least in this area, normally took great pains to avoid harming the villagers in any way.

The village of Nhi Binh was unlike any other village encountered in the 25th Division AO. Several months before our arrival, the village had been bombed accidentally by a B-52 strike. Damage and casualties were extensive. Little was known of the enemy situation, but probably because they were ardent Roman Catholics, the villagers were believed to be militantly anti-Communist, and, despite the B-52 strike, friendly to Americans. American authorities were anxious to do what they could to set right the grievous bombing error, and US Army engineers were told to repair the damage done to roads and houses in Nhi Binh. Our battalion



Area of operations (AO) of the 3d Battalion, 22d Infantry, near Nhi Binh, South Vietnam, during February and March 1968. AO Nhi Binh, roughly fifteen square kilometers in size, was largely under water and was interlaced by a network of rivers and deep canals. Terrain and enemy dispositions called for a range of tactics including air landing, river patrols, night ambush operations, and frontal assaults supported by artillery, tactical air, and helicopter gunships. The battalion's mission was to stop 122-mm rocket attacks on Tan Son Nhut Airfield and the city of Saigon in the weeks shortly after the 1968 Tet offensive. The author considers this operation quite typical of small-unit ground action in Vietnam; hence, illustrative of some of the problems of air-ground coordination and cooperation that concern both Air Force and Army commanders.

was given the additional mission of securing the engineers with one rifle company—a turn of events that suited our purposes perfectly.

Within two days, the rifle company, sent north to secure the engineers, was followed by the rest of the battalion. We established the two camps shown on the map. From these locations, armed patrols ranged the Saigon River and the major east-west canals in powered engineer boats that gave us high-speed mobility on the waterways. Foot patrols guided by members of the local Popular Force platoon scouted major trails and wooded areas that were of possible use to the enemy. At night, our platoon-size ambush patrols lay in wait on trail junctions and at canal-crossing sites. Within two days we had gained an easy familiarity with much of the terrain and with many of the residents of the area.

Not surprisingly, it was the local populace that proved to be the key to success in Nhi Binh. We quickly made contact with enemy forces. The villagers were particularly impressed by a helicopter assault, rapidly mounted by B Company, that netted seven enemy dead and seven captured weapons. The combat assault had been made in response to information provided by a local farmer. This and other operations soon convinced the villagers that we were a stabilizing and benevolent force in the area, and they freely offered information on enemy forces. The cooperation of the civilians soon brought the penetration phase to a close. We began preparations for a major battle when the battalion reconnaissance platoon confirmed a civilian report of a large concentration of enemy troops in our AO.

The Domination

The battle that was to clear AO Nhi Binh of the enemy was within the rectangle outlined on the map. Key terrain features that became objectives during the battle were the L-shaped orchard (1), another orchard (2) that, because of its shape, we called "Texas," and (3) a pagoda.

The battalion, which was only a fraction of the total combat power available, consisted of four rifle companies of about 100 men each, an extremely effective reconnaissance platoon, a mortar platoon manning four 4.2-inch mortars, and attached engineers. One battery of 105-mm artillery was in direct support of the battalion. The fires of 155-mm and 8-inch artillery were within range and available to reinforce the 105 battery. Smoke helicopters could be employed upon approval of the brigade commander. Air strikes, of which more will be said later, Air Force flare ships, and Air Force gunships were also available.

The battalion staff—consisting of the operations officer, intelligence officer, enlisted assistants, and radio operators—remained in the northernmost defensive position in the Tactical Operations Center. The battalion commander controlled the fight from a small observation helicopter overhead.

The tactical plan for Nhi Binh was prepared in the battalion command post by the battalion commander and the staff well in advance of the attack. It consisted of a maneuver plan and a fire-support plan. D Company was to attack the L-shaped orchard; C Company was to attack "Texas"; and B Company, the reserve company, was given several contingencies for which it must prepare. Finally, A Company secured the engineers and the battalion command post, and kept an eye on the rest of the AO. Artillery formed the backbone of the fire-support plan. The broad concept of fire support was set forth by the battalion commander, and the details were worked out by the artillery liaison officer. For reasons to be discussed, air strikes and helicopter gunships would be used as the developing situation required.

This brief description of friendly forces and the arrangements for command and control serves to highlight one of the most interesting problems encountered by a battalion commander in Vietnam. All professional training received up to this time would lead an officer to believe that, as a battalion commander, he would control his units and a wide variety of combat support while studying a detailed situation map painstakingly updated by a staff of experts. Critical decisions concerning the movement of units and the employment of supporting fires were thought to spring from the calm deliberations of the commander surrounded by his helpful staff. In fact, the battalion commander must "calmly deliberate" while stuffed into the left front seat of a three-seat helicopter, clutching his wind-blown maps and trying to juggle command frequencies on a woefully inadequate radio set. In the front right seat sits his artillery liaison officer who, from his equally cramped vantage point, controls a vast array of artillery and mortar fire. From this excellent observation platform—if inadequate operations center—the battalion commander directs his companies and their fire support. He judges difficult time-distance problems involving resupply, the replacement of committed units by fresh companies, as well as the tactical maneuver of his units.

Because of his physical separation from the staff, the battalion commander is forced to undertake much more of the detailed planning and direction of the battalion than has ever been the case before. The staff, for its part, closely monitors the commander's radio transmissions to keep track of the action, to respond to requests, and, more importantly, to anticipate the wants of the commander and the units in contact. In many ways a good staff is more rare under these conditions than when the commander and his staff share the same situation map.

As the battle opened early in the morning of 24 February, C and D Companies advanced abreast toward their objectives. Their advance was preceded by a heavy artillery preparation, which mixed the fires of 105-mm, 155-mm, and 8-inch artillery, and concentrated on hitting the dike line that formed the eastern boundary of the rectangle, the L-shaped orchard, and "Texas." The 4.2-inch mortars assisted in the preparation, even though they were primarily concerned with supporting A Company as it secured the engineers in Nhi Binh. B Company, in reserve to the east of the L-shaped orchard, was initially responsible to help evacuate casualties and resupply ammunition and water to the assault companies.

The Use of Airpower

I would like to interrupt the narrative at this point

(*Continued on following page*)

to discuss in some detail the use of airpower. Tactical air strikes had been requested for the preparation of the objective area but were disapproved. The restrictions in force at that time permitted the employment of tactical air strikes only *after* making contact with the enemy. The restrictions were imposed in order to limit damage in and near populated areas, but this policy created some practical problems that were extremely aggravating.

We were denied air strikes at a time most conducive to their efficient use—during the preparation of an objective area. When used in that way, friendly troops may be held a safe distance away from the target. Artillery fire is placed on the objective area before and after the strike aircraft hit the target and thus maintain constant pressure on the enemy. Most importantly, the shock effect of the 500- and 750-pound bombs damages the enemy *before* the assaulting infantry reaches the target area.

Instead of this more desirable way to use air, the infantry was forced to advance, take fire from the enemy, and then withdraw a safe distance before tactical air could be used. No infantryman likes to voluntarily give up ground, knowing that he must retake the same ground at a later time. From the commander's standpoint, unnecessarily risking good men just to show that the battalion needs air support is hard to rationalize.

There is a certain perverse benefit to restricting air strikes to contact missions only. As mentioned earlier, air strikes frequently force the infantry to make a substantial, time-consuming withdrawal to a safe distance from the target. Although the enemy can be busied by artillery fire while the withdrawal takes place, the inevitable termination of small-arms fire signals the withdrawal, and the presence of a FAC overhead confirms the imminent employment of an air strike. Frequently the enemy is safely away from the target area by the time the air strikes are delivered. So to minimize loss of time and to stay as close to the enemy as possible, the ground commander uses his direct-fire 90-mm recoilless rifles and light antitank weapons first, and then fires the 105-mm, 155-mm, and 8-inch artillery. If this firepower is insufficient to destroy or suppress the enemy, he then calls the FAC for help.

Two important conclusions follow from this. Air strikes are highly destructive, require a large radius of safety, and are therefore most desirable in the preparation phase of a ground attack or an air assault *before* friendly troops are committed. But when in contact with the enemy, I think air strikes are the least efficient use of combat power and should be avoided until all other weapons have proved ineffective.

Close Air Support

Armed helicopters have purposely not been mentioned so far. They are special weapons that in some ways seem to compete with tactical air and therefore deserve special treatment. Important interservice issues have emerged over the differences between close air support provided by the Air Force and direct fire support delivered by Army helicopters. Close air support projects airpower onto the land; helicopter gunships extend land power into the air. The difference between the two statements is meaningful and underlies an organizational conflict of interest between the Army and the Air Force. Whether armed helicopters can survive in other than Vietnam-type environments is for others to debate.

From the perspective of a battalion commander *in Vietnam,* the issue is seen solely as a question of the relative effectiveness of these two methods of fire support. Strikes by tactical fighters are favored for heavy preparatory fires, and, as a rule, the closer a target is to friendly troops, the less efficient is the use of air strikes. The converse applies to helicopters as they are currently configured. Gunships are lightly armed and are therefore relatively inefficient when used in preparatory fires. On the other hand, the lighter fire delivered from the stable—even stationary—gun platform provided by the helicopter permits its use in a variety of situations requiring continuous and highly discriminate fire.

Up to the time the helicopter gunship was introduced, machine guns and recoilless rifles of heavy caliber provided the observed fire used in direct and continuous support of infantry. Their fires were limited in both trajectory and observation by terrain obstacles. The maneuverability of gunships has largely overcome these limitations on ground fire and literally has added a new dimension to the direct fire support traditionally provided from the ground. The concept of close and continuous fire support delivered from a hovering, highly maneuverable air vehicle was never conceived before the advent of the helicopter and was certainly not included in Air Force close air support doctrine.

In spite of interservice rhetoric to the contrary, there is no conflict of interest between close and direct air support on the battlefield. At the present time, their respective capabilities clearly mark helicopters and fighter-bombers for mutually exclusive missions. Tactical air strikes are best used against heavy fortifications; gunships can "shadow" personnel in the open. Air strikes are effective against fixed positions; helicopter gunships—which can linger on station—are irreplaceable in the attack of fleeting targets of opportunity. And so it goes; the battalion commander needs and wants both capabilities.

The Battle Heats Up

Meanwhile, back on the ground in AO Nhi Binh, the battle quickly heated up. Leading riflemen eased slowly into the objective area. One of D Company's lead platoons received automatic-weapons fire from the L-shaped orchard soon after struggling across the canal on the eastern edge of the rectangle. The platoon returned the fire and covered the rest of the company as it crossed the canal. C Company advanced more rapidly on the south flank of D Company toward "Texas," until it too came under heavy AK-47 and RPG rocket fire from both the L-shaped orchard and "Texas."

As frequently happens at the point of contact, C Company lost two men in the initial burst of fire. It was not known if they were dead or alive. Now the whole question of delivering heavy suppressing fire was in abeyance while C Company's lead platoon agonized over the extraction of the two casualties from their exposed position. Once again a hero surfaced and proved equal to the task. A young private crawled

forward and, moving to each man, determined that both casualties were dead. Had they been wounded, no supporting fire could have been delivered until the men were recovered.

With this information, however, the C Company commander withdrew his lead elements a safe distance in order to employ supporting artillery fire. After a heavy concentration of artillery on both the L-shaped orchard and "Texas," D and C Companies again crawled forward. Once more they received heavy fire from the bunkered area, and once more they bombarded their objectives.

Fighting bogged down for the remainder of the day. The enemy lost thirty-two casualties while effectively resisting our continued advance. Even air strikes delivered at midday and during the late afternoon failed to break his resistance. We were obviously up against a well-disciplined enemy, in strong positions, and defending something of great value. Since we saw little chance of breaking through the enemy position before dark, B Company and A Company were ordered forward to hold our ground for the night. The two companies moved to the immediate rear of D and C Companies and established night defensive positions from which they could maintain contact with the enemy and resume the attack in the morning. At dusk, C and D Companies withdrew through A and B to rest and resupply. This rotation process was repeated nightly until the enemy was defeated.

For two more days and nights, the 3/22 Infantry hammered the enemy before finally breaking through the L-shaped orchard and "Texas" and reaching the pagoda. The prize was worth the effort, for the battalion uncovered a 122-mm rocket unit complete with rocket launcher, sixteen rockets, and the fire-direction center. The heavy resistance had been provided by an infantry unit whose sole purpose had been to secure the rockets and the launcher crew.

Exploitation and Security

As soon as the main battle for Nhi Binh ended, the battalion shifted its operational pattern from day to night operations and to the interdiction of enemy supply and replacement activities. Continued ambushing of the rectangular objective area following the battle produced several more enemy casualties as bypassed survivors attempted to escape the area. However, the destruction of the main enemy force and the domination of the area permitted the battalion to conduct operations characteristic of the exploitation and security phase.

During the penetration and domination of Nhi Binh, the battalion staff had given a great deal of thought to the total nature of enemy military operations in the area. We knew that one rocket artillery unit had been using the area to fire on Saigon and Tan Son Nhut. What else was the area used for? Where did the rockets come from? Was there a connection between AO Nhi Binh and other potential 122-mm rocket-launching sites?

Analysis of the terrain indicated that the Saigon River, the Hoc Mon Canal, and the waterways along the western edge of the AO (*see map*) were the most practical routes of movement for items as heavy as 122-mm rockets. Furthermore, these waterways led from northern base areas and connected with areas further to the south and west. We concluded that the Saigon River and the Hoc Mon Canal were probably major supply routes. The decision was made to exploit our own waterborne mobility against the enemy's water lines of communications by patrolling the rivers and canals during daylight and ambushing them at night. Daylight security operations on land were largely entrusted to the local Popular Force platoon—a unit that improved daily as we supplied it with ammunition, encouragement, and the promise that we would come to its aid if needed.

The first priority for the 3/22 Infantry was night ambushing. Normally two rifle companies ambushed nightly while two companies secured the night defensive positions and dried out. The committed companies hid in or near their ambush sites for twenty-four to thirty-six hours. They were relieved when the other two companies were committed. By rotating companies, we could sustain our operations for a long period of time. Company commanders were assigned an area of operations for the ambush, and within the AO, specific targets—such as canal crossings or junctions—were earmarked for ambush. While there were few spectacular actions, the battalion closed the enemy supply lines and killed more than 100 enemy soldiers, all at a cost of two wounded Americans.

Conclusion

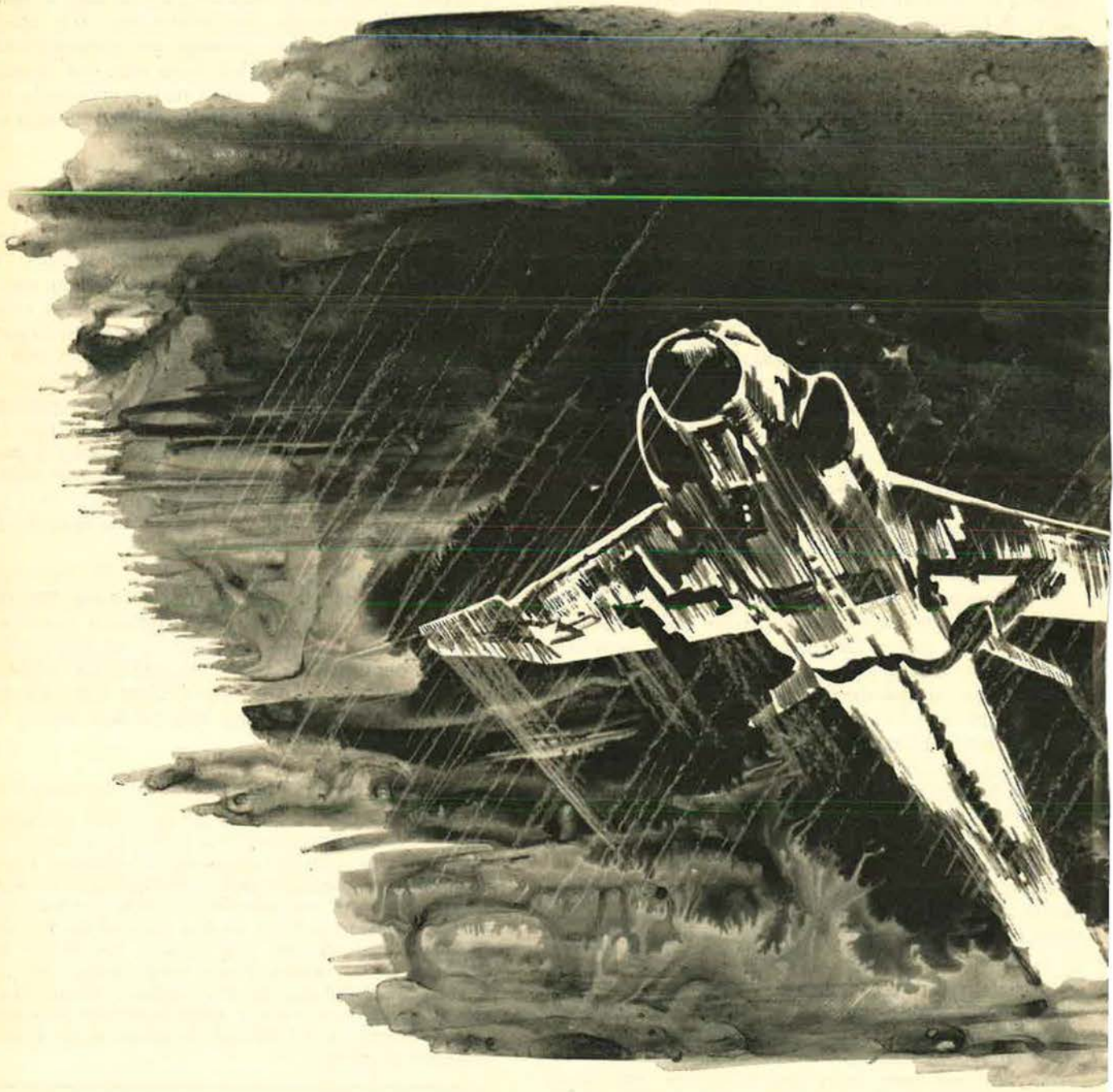
The battalion was relieved of AO Nhi Binh by a Vietnamese airborne battalion on 11 March. We learned some important lessons from our long stay in Nhi Binh. Good relations with civilians were clearly the key to good intelligence. We learned to organize ourselves for sustained operations. Nhi Binh was the first area in which we concentrated on night operations to such a great extent, and the success of our ambushes influenced the battalion thereafter. It was clear that American soldiers were superior to the enemy at night. It only took a successful experience like Nhi Binh to prove to our men that they, and not the Viet Cong, owned the night. We became enthusiastic and effective "bushwhackers."

The story of Nhi Binh and the 3/22 Infantry is typical of the infantry war all over Vietnam. Nhi Binh was a hot, wet, sleepless, and frequently sanguinary experience. But in spite of remorse for our fallen friends and our physical discomfort, we, like other battalions in other places, believed that we had won this little piece of the war. Only time will tell how lasting was our victory.—END

Lt. Col. Roy K. Flint, US Army, is a 1950 graduate of the University of Michigan, and holder of a master's degree in history from the University of Alabama. Colonel Flint has had command and staff experience in Korea, Hawaii, Germany, and Vietnam, where he commanded an infantry battalion in 1968. He has attended the US Army Command and General Staff College, the British Staff College, the US Armed Forces Staff College, and is a recent graduate of the Air War College. Colonel Flint is now doing graduate work at Duke University preparatory to returning to the US Military Academy as an Associate Professor of History.

It's hairy work, flying night interdiction in an F-4 Phantom—a job for real pros. The weather, the built-in hazards of night refueling, target identification, and the mountains hiding in the dark are all enemies—and, of course, there's the enemy, too. These pilots have a saying, "And if the big guns don't get you, the black karst will." But then, back on top in the moonlight, a man finds brief moments to think his own thoughts before cracking a low ceiling back at home base. It's all part of a . . .

Night Mission on



By Maj. Mark E. Berent, USAF

ILLUSTRATION BY CLIFF PRINE

the Ho Chi Minh Trail

IT'S COOL this evening, thank God. The night is beautiful, moody, an easy rain falling. Thunder rumbles comfortably in the distance. Just the right texture to erase the oppressive heat memories of a few hours ago. Strange how the Thai monsoon heat sucks the energy from your mind and body by day, only to restore it by the cool night rain.

I am pleased by the tranquil sights and sounds outside my BOQ room door. Distant ramp lights, glare softened by the rain, glisten the leaves and flowers. The straight-down, light rain splashes gently, nicely on the walkways, on the roads, the roofs. Inside the room I put some slow California swing on the recorder *(You gotta go where you wanta go . . .)* and warm some soup on the hot plate. Warm music, warm smell . . . I am in a different world. *(Do what you wanta, wanta do. . . .)* I've left the door open—I like the sound of the rain out there.

A few hours later, slightly after midnight, I am sitting in the cockpit of my airplane. It is a jet fighter, a Phantom, and it's a good airplane. We don't actually get into the thing—we put it on. I am attached to my craft by two hoses, three wires, lap belt, shoulder harness, and two calf garters to keep my legs from flailing about in a high-speed bailout. The gear I wear —gun, G-suit, survival vest, parachute harness—is bulky, uncomfortable, and means life or death.

I start the engines, check the myriad of systems—electronic, radar, engine, fire control, navigation—all systems; receive certain information from the control tower, and am ready to taxi. With hand signals we are cleared out of the revetment and down the ramp to the arming area.

I have closed the canopy to keep the rain out, and switch the heavy windscreen blower on and off to hold visibility. I can only keep its hot air on for seconds at a time while on the ground, to prevent cracking the heavy screen. The arming crew, wearing bright colors to indicate their duties, swarm under the plane: electrical continuity—checked; weapons—armed; pins—pulled. Last all-around look-see by the chief—a salute, a thumbs up, we are cleared. God, the rapport between pilot and ground crew—their last sign, thumbs up—they are with me. You see them quivering, straining, bodies poised forward as they watch *their* airplane take off and leave them.

(Continued on following page)

And we are ready, my craft and I. Throttles forward and outboard, gauges OK, afterburners ignite, nose wheel steering, rudder effective, line speed, rotation speed—we are off, leaving behind only a ripping, tearing, gut noise as we split into the low black overcast, afterburner glow not even visible anymore.

Steadily we climb, turning a few degrees, easing stick forward some, trimming, climbing, climbing, then suddenly—on top! On top where the moonlight is so damn marvelously bright and the undercast appears a gently rolling snow-covered field. It's just so clear and good up here, I could fly forever. This is part of what flying is all about. I surge and strain against my harness, taking a few seconds to stretch and enjoy this privileged sight.

I've already set course to rendezvous with a tanker, to take on more fuel for my work tonight. We meet after a long cut-off turn, and I nestle under him as he flies his long, delicate boom toward my innards. A slight thump/bump, and I'm receiving. No words—all light signals. Can't even thank the boomer. We cruise silently together for several minutes. Suddenly he snatches it back, a clean break, and I'm cleared, off and away.

Now I turn east and very soon cross the fence far below. Those tanker guys will take you to hell and then come in and pull you right out again with their flying fuel trucks. Hairy work. They're grand guys.

Soon I make radio contact with another craft, a big one, a gunship, painted black and flying very low. Like the proverbial specter, he wheels and turns just above the guns, the limestone outcropping, called karst, and the mountains—probing, searching with infrared eyes for supply trucks headed south. He has many engines and more guns. His scanner gets something in his scope, and the pilot goes into a steep bank—right over the target. His guns flick and flash, scream and moan, long amber tongues lick the ground, the trail, the trucks. I am there to keep enemy guns off him and to help him kill trucks. Funny—he can see the trucks but not the guns 'til they're on him. I cannot see the trucks but pick the guns up as soon as the first rounds flash out of the muzzles.

Inside my cockpit all the lights are off or down to a dim glow, showing just the instruments I need. The headset in my helmet tells me in a crackling, sometimes joking voice the information I must have; how high and how close the nearest karst, target elevation, altimeter setting, safe bailout area, guns, what the other pilot sees on the trails, where he will be when I roll in.

Then, in the blackest of black, he lets out an air-burning flare to float down and illuminate the sharp rising ground. At least then I can mentally photograph the target area. Or he might throw out a big log, a flare marker, that will fall to the ground and give off a steady glow. From that point he will tell me where to strike: fifty meters east, or 100 meters south, or, if there are two logs, hit between the two.

I push the power up now, recheck the weapons settings, gun switches, gunsight setting, airspeed, altitude—roll in! Peering, straining, leaning way forward in harness, trying so hard to pick up the area where I know the target to be—it's so dark down there.

Sometimes when I drop, pass after pass, great fire balls will roll and boil upward and a large, rather rectangular fire will let us know we've hit another supply truck. Then we will probe with firepower all around that truck to find if there are more. Often we will touch off several, their fires outlining the trail or truck park. There are no villages or hooches for miles around; the locals have been gone for years. They silently stole away the first day those big trucks started plunging down the trails from up north. But there are gun pits down there—pits, holes, reveted sites, guns in caves, guns on the karst, guns on the hills, in the jungles, big ones, little ones.

Many times garden-hose streams of cherry balls will arc and curve up, seeming to float so slowly toward me. Those from the smaller-caliber, rapid-fire quads; and then the big stuff opens up, clip after clip of 37-mm and 57-mm follow the garden hose, which is trying to pinpoint me like a search light. Good fire discipline—no one shoots except on command.

But my lights are out, and I'm moving, jinking. The master fire controller down there tries to find me by sound. His rising shells burst harmlessly around me. The heavier stuff in clips of five and seven rounds goes off way behind.

Tonight we are lucky—no "golden BB." The golden BB is that one stray shell that gets you. Not always so lucky. One night we had four down in Death Valley—that's just south of Mu Gia Pass. Only got two people out the next day, and that cost a Sandy (A-1) pilot. "And if the big guns don't get you, the black karst will," goes the song. It is black, karsty country down there.

Soon I have no more ammunition. We, the gunship and I, gravely thank each other, and I pull up to thirty or so thousand feet, turn my navigation lights back on, and start across the Lao border to my home base. In spite of an air-conditioning system working hard enough to cool a five-room house, I'm sweating. I'm tired. My neck is sore. In fact, I'm sore all over. All those roll-ins and diving pullouts, jinking, craning your head, looking, always looking around, in the cockpit, outside, behind, left, right, up, down. But I am headed home, my aircraft is light and more responsive.

Too quickly I am in the thick, puffy thunder clouds and rain of the southwest monsoon. Wild, the psychedelic green, wiry, and twisty St. Elmo's fire flows liquid and surrealistic on the canopy a few inches away. I am used to it—fascinating. It's comforting, actually, sitting snugged up in the cockpit, harness and lap belt tight, seat lowered, facing a panel of red-glowing instruments, plane buffeting slightly from the storm. Moving without conscious thought, I place the stick and rudder pedals and throttles in this or that position—not so much mechanically moving things, rather just willing the craft to do what I see should be done by what the instruments tell me.

I'm used to flying night missions now. We "night owls" do feel rather elite, I suppose. We speak of the day pilots in somewhat condescending tones. We have a black pilot who says, "Well, day pilots are OK, I guess, but I wouldn't want my daughter to *marry* one." We have all kinds; quiet guys, jokey guys (the Jewish pilot with the fierce black bristly mustache who asks, "What is a nice Jewish boy like me doing over here, killing Buddhists to make the world safe for

Christianity?"), noisy guys, scared guys, whatever. But all of them do their job. I mean night after night they go out and get hammered and hosed, and yet keep right at it. And all that effort, sacrifice, blood going down the tubes. Well, these thoughts aren't going to get me home. This is no time to be thinking about anything but what I'm doing right now.

I call up some people on the ground who are sitting in darkened, blacked-out rooms, staring at phosphorescent screens that are their eyes to the night sky. Radar energy reflecting from me shows them where I am. I flick a switch at their command and trigger an extra burst of energy at them so they have positive identification. By radio they direct me, crisply, clearly, to a point in space and time that another man in another darkened room by a runway watches anxiously. His eyes follow a little electronic bug crawling down a radar screen between two converging lines. His voice tells me how the bug is doing, or how it should be doing. In a flat, precise voice the radar controller keeps up a constant patter—"Turn left two degrees . . . approaching glide path . . . prepare to start descent in four miles."

Inside the cockpit I move a few levers and feel the heavy landing gear thud into place and then counteract the nose rise as the flaps grind down. I try to follow his machine-like instructions quite accurately, as I am very near the ground now. More voice, more commands, then a glimmer of approach lights, and suddenly the wet runway is beneath me. I slip over the end, engines whistling a down note as I retard the throttles, and I'm on the ground at last.

If the runway is heavy with rain, I lower a hook to snatch a cable laid across the runway that connects to a friction device on each side. The deceleration throws me violently into my harness as I stop in less than 900 feet from nearly 175 miles per hour. And this is a gut-good feeling.

Then the slow taxi back, the easing of tension, the good feeling. Crew chiefs with lighted wands in their hands direct me where to park; they chock the wheels and signal me with a throat-cutting motion to shut down the engines. Six or seven people gather around the airplane as the engines coast off, and I unstrap and climb down, soaking wet with sweat.

"You OK? How did it go? See anything, get anything?" They want to know these things and they have a right to know. Then they ask, "How's the airplane?" That concern always last. We confer briefly on this or that device or instrument that needs looking after. And then I tell them what I saw, what I did. They nod, grouped around, swear softly, spit once or twice. They are tough, and it pleases them to hear results.

The crew van arrives, I enter and ride through the rain—smoking a cigarette and becoming thoughtful. It's dark in there, and I need this silent time to myself before going back to the world. We arrive and, with my equipment jangling and thumping about me, I enter the squadron locker room, where there is always easy joking among those who have just come down.

Those that are suiting up are quiet, serious, going over the mission brief in their minds, for once on a night strike they cannot look at maps or notes or weapon settings.

They glance at me and ask how the weather is at The Pass. Did I see any thunderstorms over the Dog's Head? They want to ask about the guns up tonight, but know I'll say how it was without their questioning. Saw some light ZPU (automatic weapons fire) at The Pass, saw someone getting hosed at Ban Karai, nothing from across the border. Nobody down, quiet night. Now all they have to worry about is thrashing through a couple hundred miles of lousy weather, letting down on instruments and radar into the black karst country and finding their targets. Each pilot has his own thoughts on that.

Me, I'll start warming up once the lethargy of finally being back from a mission drains from me. Funny how the mind/body combination works. You are all hypoed just after you land, then comes a slump, then you're back up again but not as high as you were when you first landed. By now I'm ready for some hot coffee or a drink (sometimes too many), or maybe just letter writing. A lot of what you want to do depends on how the mission went.

I debrief and prepare to leave the squadron. But before I do, I look at the next day's schedule. Is it an escort? Am I leading? Where are we going? What are we carrying? My mind unrolls pictures of mosaics and gun-camera film of the area. Already I'm mechanically preparing for the next mission.

And so it goes—for a year. And I like it. But every so often, especially during your first few months, a little wisp of thought floats up from way deep in your mind when you see the schedule. "Ah no, not tonight," you say to yourself. "Tonight I'm sick—or could be sick. Just really not up to par, you know. Maybe, maybe I shouldn't go." There's a feeling—the premonition that tonight is the night I don't come back. But you go anyhow and pretty soon you don't think about it much anymore. You just don't give a fat damn. After a while, when you've been there and see what you see, you just want to go fight! To strike back, destroy. And then sometimes you're pensive—every sense savoring each and every sight and sound and smell. Enjoying the camaraderie, the feeling of doing something. Have to watch that camaraderie thing though—don't get too close. You might lose somebody one night and that can mess up your mind. It happens, and when it does, you get all black and karsty inside your head.

I leave the squadron and walk back through the ever-present rain that's running in little rivulets down and off my poncho. The rain glistens off trees and grass and bushes, and a ripping, tearing sound upsets the balance as another black Phantom rises up to pierce the clouds.—END

Maj. Mark E. Berent is a veteran of two tours in Southeast Asia and is the holder of the Silver Star, two DFCs, the Bronze Star, numerous Air Medals, and the Vietnamese Cross of Gallantry. In his first tour, he flew F-100s with the 531st TFS, based at Bien Hoa Air Base, South Vietnam. Two years later, he returned to the theater as an F-4 pilot, assigned to the only all-night-flying outfit in SEA, the 497th TFS at Ubon AB, Thailand. While there, he also commanded the Wolf Forward Air Control unit operating out of Ubon. Major Berent now is assigned to AFSC's Space and Missile Systems Organization (SAMSO) as a staff development engineer.

'I Felt the No. 3 Pod Separate'

On March 17, 1969, a B-52 commanded by Maj. Robert M. Winn took off from Wurtsmith AFB, Mich., on what was expected to be a routine mission. Within minutes, the crew was confronted by a series of interrelated crises, later labeled by SAC B-52 experts as "totally unprecedented." At any time during the next five hours, the aircraft could have crashed. Here is Major Winn's own account of how he and his crew, working with specialists in the SAC command post and from Boeing, saved both a valuable bomber and perhaps many lives in this . . .

Incident at Wurtsmith

By Maj. Robert M. Winn, USAF

EVERYTHING was normal through the preflight check and until approximately two minutes after the B-52 lifted off the runway of Wurtsmith AFB. My copilot, Capt. Bruce E. Pederson, was setting climb power to 280 knots when I noticed the No. 5 engine registering a high, fluctuating rpm rate. The copilot pulled back the throttle, but the rpm kept increasing.

Just then all of us heard a distinct explosion. The aircraft reacted like someone had just thumped it a good one, and it began a slow roll into a slight left bank. The shock was so intense that I can't describe precisely how the aircraft felt, but it was very much as if I had hit something. Immediately, the No. 5 fire-warning light came on, followed in seconds by the No. 7 warning light. Captain Pederson reported that the No. 3 engine pod, holding engines 5 and 6, was on fire. The fire was so intense that he could not see the engines.

A check of the instrument panel showed no sign of power on any of the four engines on the right wing. All of the gauges indicated that the engines had flamed out. With the fire lights illuminated, I started engine-shutdown procedures—cut off the throttles on engines 5 and 7 and pulled the firewall shutoff switches.

The aircraft was at 2,500 feet, and another B-52 behind us reported that he could see fire on the right side. At this time, we shut down the No. 6 engine, and pulled its firewall shutoff switch. The other B-52 then said we were shedding debris from the right side. I felt the No. 3 pod separate and, while I held the left wing low, the copilot confirmed that the pod had separated.

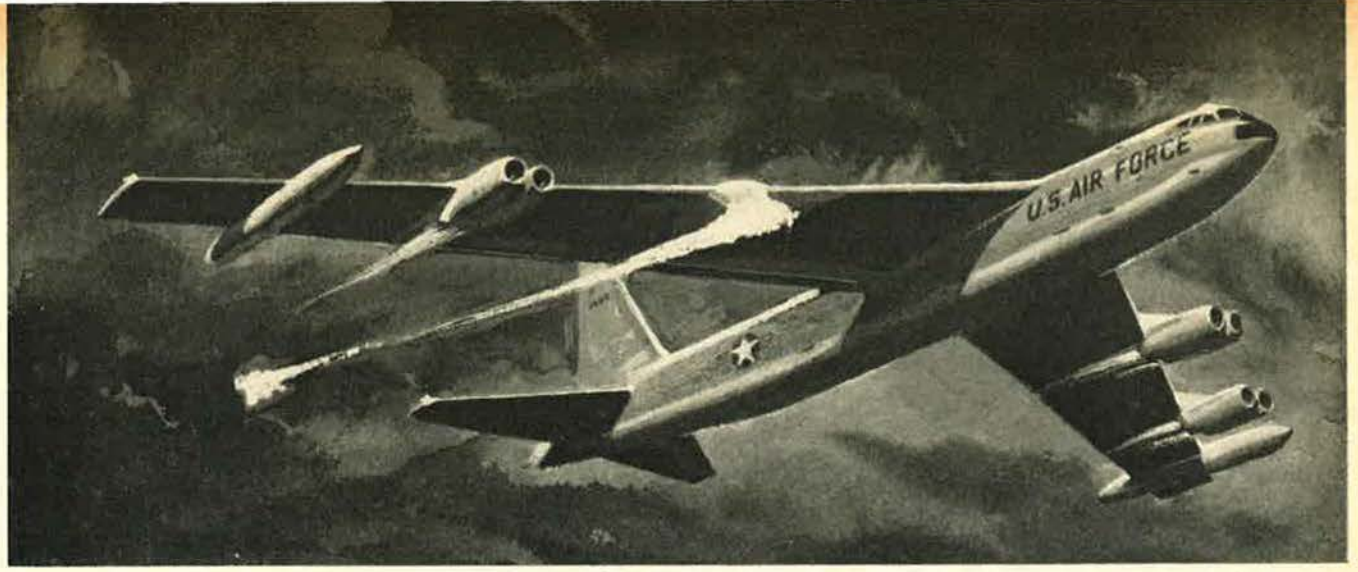
Actually, I felt no abnormal control sensation as the pod tore off. It felt like dropping a bomb load. I alerted the crew for bailout, and the seven crew members, including my instructor radar navigator, made ready. My major concern now was to maintain control of the aircraft.

When I realized that I could maintain flight, we leveled off at 8,000 feet, but then discovered that we could not turn right even with the control wheel all the way over. After leveling, I placed the No. 8 engine throttle in cutoff, ending all power on the right side.

By this time the command post was entering the picture, with the Chief of Standardization and Evaluations in charge. He suggested that the No. 7 standby hydraulic pump be turned on to obtain outboard spoiler effectiveness, thus enabling me to turn more easily. This was successful, and controllability improved.

The aircraft was now flyable, and I ordered a damage assessment. The other B-52 moved up for a look-see. At the same time, I noted that we were losing fuel from the No. 4 main fuel tank. The second B-52 reported exhaust coming from the No. 4 pod on the right wing. I paralleled power on the four outboard engines and discovered that Nos. 7 and 8 were operating at extremely high power. Even with the throttles in cutoff and the No. 7 firewall shutoff switch pulled, both engines were running, but with no indications on the engine instruments. By this time, airspeed had increased to 320 knots.

Boeing engineers were now in contact with the local command post and were concerned about the possibility of the No. 7 and 8 engines blowing up or disintegrating. In addition, a landing was out of the question with 7 and 8 at an uncontrollable, high power setting and with no shutdown capability on those engines.



A coordinated decision was then made to fuel-starve 7 and 8 by emptying the No. 4 main fuel tank. I really didn't know about shutting down those engines. I was happy to have them running at the time, but this decision was made and fuel was transferred from the No. 4 main tank, and 7 and 8 engines flamed out.

Now, with only four engines operating, we were able to maintain straight and level flight with fifteen degrees of left bank, four degrees of left rudder trim, and five to seven degrees of lateral trim. At no time did I completely trim out the rudder forces since we wanted to maintain a positive feel for the required pressures.

Our flight continued while fuel was burned to obtain the gross landing weight advised by Boeing. Maintaining a safe center of gravity was a problem in fuel management. A mockup fuel panel was used in the command post to monitor our fuel status. In addition, windmill hydraulic pressure from the No. 7 pump was obtained. This was accomplished by pulling the firewall fuel shutoff valve circuit breaker and pushing the fire switch in.

To improve go-around capability and reduce the power required for the approach, we decided to attempt the four-engine landing with no flaps. When asked by the command post if I had ever made a no-flap landing in any model B-52, I replied, "Not yet!"

After the fuel had been reduced to the desired level, we lowered the landing gear. Emergency extension of the right forward gear was necessary since the normal right-body hydraulic system was not working. We made a controllability check at the recommended approach speed of 160 knots, with airbrakes at a normal setting of four on the outboard spoilers and the inboard circuit breaker pulled. This check revealed no unacceptable control problems, and my crew prepared for landing.

We made a straight-in visual approach, monitored by Ground Control Approach, at the two-and-one-half-degree glide angle recommended by the Boeing people. Final approach airspeed initially was held at 170 knots, because I found that it was difficult to regain any airspeed due to physical control efforts, but airspeed could be easily reduced. Engines 3 and 4 were used for the approach, with 1 and 2 pulled back. Trim was adjusted throughout the approach until passing the overrun.

At my command, Captain Pederson and our instructor radar navigator handled the trim and rolled it out completely just prior to touchdown. The nose of the aircraft seemed abnormally high during the approach, and I had to raise my seat several inches to see. We reduced airspeed to 160 knots for the last third of the approach.

When nearing the runway with no flaps down, I could definitely feel the ground effect on the aircraft. The ground effect assisted in establishing the landing flare, and touchdown was made first by the rear main gear, with power still on the engines. There were no control problems, and the aircraft settled to the runway with the left wing slightly low. The forward main gear settled with ample control, and the landing felt better than a normal full-flap landing. In fact, it was one of my best landings.

As for my personal feelings during the incident, my first thought at the onset of our troubles was whether or not I would be able to pin on my Command Pilot wings the following week, as scheduled. Once the aircraft was under control, I had no doubt that I could bring it in for a safe landing.

My crew worked like a well-oiled, precision machine and backed me up in every way possible. Later they told me they had seen me more excited over a routine practice bombing mission than I was that day.

That night, however, all attempts to relax failed. I made at least a thousand approaches to land that crippled B-52 while lying in bed trying to get to sleep!—END

The author, Maj. Robert M. Winn, is a command pilot with fifteen years of crew duty in SAC. He was a member of the B-47 crew that won the Fairchild Trophy and SAC's 1958 Bomb and Navigation Competition. After graduating from AC/SC in 1965, Major Winn transitioned to the B-52. He has flown sixty-three B-52 combat missions in SEA, and is now a controller in the SAC command post at Wurtsmith AFB, Mich.

Since the space age was literally thrust upon the world with the launch of the first Sputnik, Britain has labored to create a firm foundation for its own ventures into space. Within the confines of limited budgets and other formidable hurdles, her scientists have achieved some notable successes, detailed here by a long-time observer of British aerospace efforts. Just what the new government's policies will be toward money for the space program and Britain's troubled relations with space-minded European neighbors remain to be seen . . .

Britain's Space Program — A Respectable Past and A Future Yet Uncharted

By John Marriott

IT IS now some twelve years since the first man-made satellite was placed in earth orbit. Since those faltering steps, space technology has expanded and achieved results undreamed of only a decade ago. Men have landed on the moon, vast new satellite communications systems have sprung up, ships and aircraft can navigate by satellite, scientists can probe the upper atmosphere, meteorological satellites are daily improving our weather forecasting, and military reconnaissance can be accomplished by satellite as well as by aircraft.

In all this, Britain has watched the US with growing envy. British scientists, realizing that they were fast falling behind their American cousins in technique, did all they could to persuade their government to spend more money on space, with little result. Britain's finances, never strong, have been at low ebb for some time, and the Labor-controlled government of Harold Wilson, replaced by the Conservatives in the June election, had been more interested in expending money on social services than on technology. Thus Britain's space effort has had to be limited to one major single-stage rocket (Blue Streak), a number of smaller scientific rockets, ground stations for satellite communications, and acting as subcontractor to some of the vast US aerospace companies.

However, what equipment has been built has been extremely reliable and, within her small space budget, Britain has achieved first-class results.

Scientific Satellites

Britain first turned her attention to scientific experiments in space. Two satellites filled with British experiments, UK1 and UK2, were produced and launched in the US. These were followed by UK3, an entirely British-built satellite launched in May 1967 from the Western Test Range in California by a Scout rocket (once airborne, its name was changed to Ariel 3). It proved 100 percent successful and is still in orbit. It is to be followed by UK4, scheduled for launch in April or May 1971, to be followed in turn by UK5.

These satellites had to be launched by US boosters because neither Britain nor Europe has managed to produce a sufficiently powerful launcher. Britain, unable to go it alone on powerful two- or three-stage launchers because of their enormous cost, decided to throw in her lot with a European venture, which has run into trouble (discussed below).

Scientific space experiments in Britain are controlled by the Science Research Council (SRC), the UK's approximation of a true space agency such as the US's National Aeronautics and Space Administration.

British universities and government laboratories are circularized by NASA periodically and informed that a launch will take place on a specific date, to investigate some particular aspect of space science, and that so much room has been allocated for British experiments.

The laboratories then inform SRC of their desire to participate, and the latter submits the proposed experiments to NASA, which may or may not accept them, depending on whether other countries have suggested similar experiments.

In addition, SRC coordinates all experiments aboard purely British satellites, such as UK3, and arranges launching with NASA.

Technicians work on a full-scale thermal model of the world's largest communications satellite—Intelsat-4—two of which are to be assembled by the British Aircraft Corp.

Thus far, NASA has been extremely generous in providing room in US satellites and in launching British ones—all free of charge. But with ever-increasing costs, and NASA's expenditures being carefully controlled by the Nixon Administration, British scientists wonder how long this happy state of affairs will last. They are looking anxiously for alternative means of launch, which probably will mean reliance on a European launcher.

Applications Satellites

So far, British industry has participated in applications satellites only as subcontractors to US firms. However, portions of Intelsat-2 and Intelsat-3 projects were manufactured in Britain, and the British Aircraft Corp. has been entrusted with assembly, integration, and test of two of the four spacecraft for the Intelsat-4 program.

Skylark

As mentioned above, Britain has developed a number of rockets capable of carrying scientific payloads, the most powerful of which is BAC's Skylark. It is a fin-stabilized vehicle, powered by a solid-fuel Raven motor. Two versions of the motor are available, both the same size, but one having a heavier propellant weight. There is also a Cuckoo boost motor, which can be fitted below the Raven to increase the vehicle's performance.

A typical Skylark without additional boost can lift a seventy-five-pound head to an altitude of eighty miles. Similarly, a 120-pound head also could be lifted to 135 miles using the heavier Raven motor plus the boost.

The scientific experiments are contained in the head, which is designed on a modular basis using a number of cylindrical sections with a nose cone clamped on top to form the head structure. The head also contains the telemetry sender, an attitude-stabilization system, and a parachute. The head is ejected from the main body of the vehicle at a suitable height and continues its trajectory, with its parachute opening shortly before it returns to earth some 100 to 150 miles downrange.

Typical experiments that can be accommodated include measurements of temperature, wind, pressure, air density, and electron and ion density. The vehicle also is used for radio-propagation experiments, observations of transient auroral disturbances, and investigations of the earth's magnetic field. Cameras can be carried to photograph solar flares and other phenomena.

Ground-launch equipment consists of a triangular section boom nearly 100 feet long, supporting the rails by which the rocket is guided during liftoff. The boom is trainable to allow firing in any required direction. Launch sites are at Kiruna (Sweden) inside the Arctic Circle, Salto da Quirra (Sardinia), and Woomera (Australia).

Petrel and Skua

Two inexpensive rockets, which have proved invaluable to research scientists, are Petrel and Skua. Designed and manufactured by the Bristol Aerojet Co., the two rockets are very similar, but Petrel is the larger and more powerful of the two. They both use the same launcher—a tube about twenty inches in diameter and thirty feet long. It can be mounted on either a truck or a turntable.

The ten-foot-long Petrel is capable of carrying at least a thirty-eight-pound payload to an altitude of ninety-three miles. Skua is just under eight feet long and can carry a twelve-pound payload to an altitude of sixty miles.

A feature of these rockets is that, when launched, a booster separates from the main body at fifty feet and returns to the ground by parachute. After recovery,

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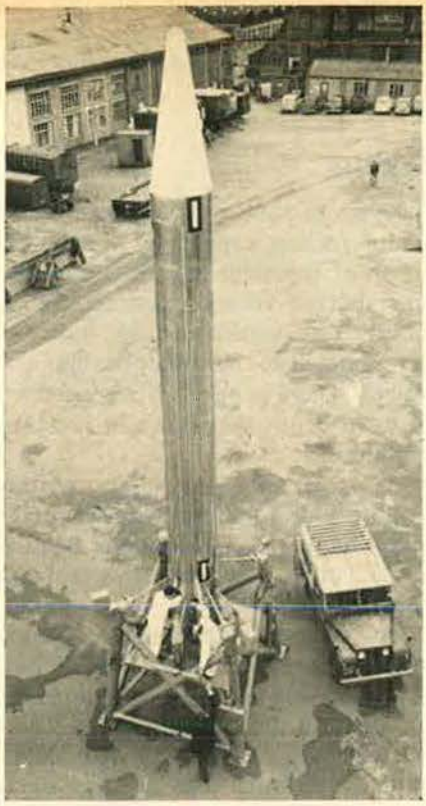


Scientists prepare Black Knight ballistic test vehicle for a launch from the Australian range at Woomera. The vehicle, on which is based Britain's development of the medium-powered launcher, Black Arrow, was Britain's first ballistic reentry vehicle and achieved notable success in test firings.

—British Crown Copyright

Two highly valued, and inexpensive, research rockets are Petrel and Skua, designed and built by the Bristol Aerojet Co. The two are very similar, with Petrel being larger and more powerful. Their launcher is a tube about thirty feet long mounted on a truck or turntable.

the boost carriage can be fitted with a refilled motor and be reused.

Skua was specially designed for meteorological work and is normally fired with a ten-pound payload that includes a radiosonde and parachute. It has a high launch velocity, enabling launch even in strong winds.

Both rockets have complete telemetry units, operating in the 432- to 450-megahertz (MHz) band. Twenty-three data channels are available, and mobile telemetry receivers and acquisition systems are provided.

Most of the rockets are launched from South Uist in the Hebrides, but Arctic launches are made from the Swedish site at Kiruna.

Black Arrow

Apart from rockets, Britain is developing Black Arrow, a medium-powered launcher. Designed by the Royal Aircraft Establishment at Farnborough and currently being developed by the Westland Aircraft Co., this vehicle is capable of putting small payloads of up to 200 pounds into near-earth orbit. Such payloads also consist of scientific experiments, but could include meteorological, reconnaissance, or navigational satellites.

At present, two test payloads, X1 and X2, are being developed with a limited technological content. The first in the series proper, X3, is also under development, and launch by Black Arrow is hoped for in 1971. This will be followed by X4, an experimental meteorological satellite. If successful, it is hoped that further meteorological satellites will follow as part of the World Meteorological Organization's activities.

Black Arrow is based on the previous, very successful, Black Knight ballistic test vehicle and consists of three stages: the first and second using liquid-propellant hydrogen peroxide and kerosene, and the third using a spin-stabilized, solid-propellant motor. The satellite is carried atop this third stage and separates from it after injection into orbit. Liftoff weight is 40,000 pounds.

The first-stage propulsion system consists of two engines, identical to those used on Black Knight, and eight combustion chambers, mounted in groups of two. Each pair is gimbaled to swing about a radial axis to control pitch, yaw, and roll.

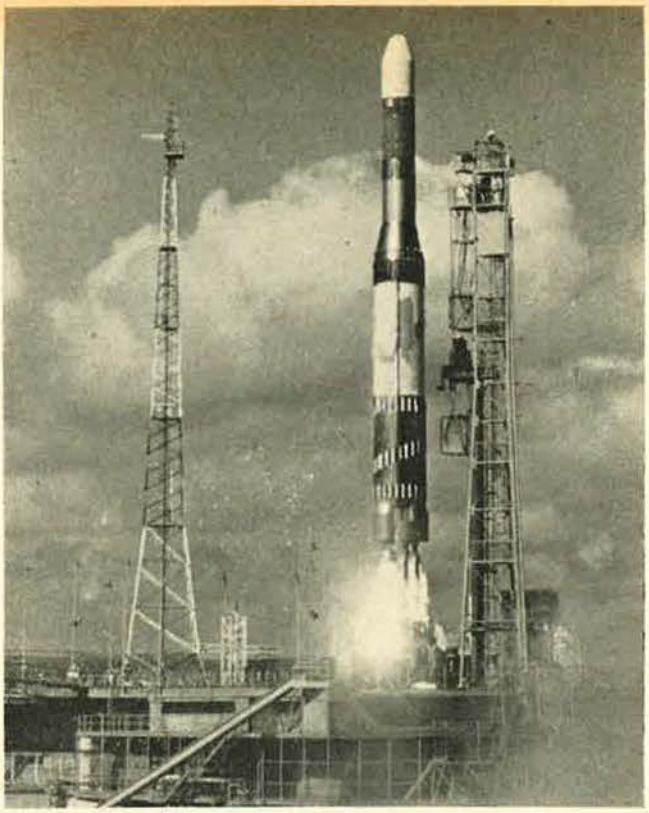
The second stage has one engine with two combustion chambers and carries the telemetry-tracking beacons, command-destruct receivers, power supplies, and an attitude-reference system, which, together with a program unit, enables orbital injection to be managed without the need of an external guidance system.

The third stage consists of an apogee motor, which fires when orbital height has been reached, to kick itself into orbit as it separates from the second stage. Finally, the payload separates. With a payload of 190 pounds, an orbit of about 300 miles at perigee and 1,000 miles at apogee is expected.

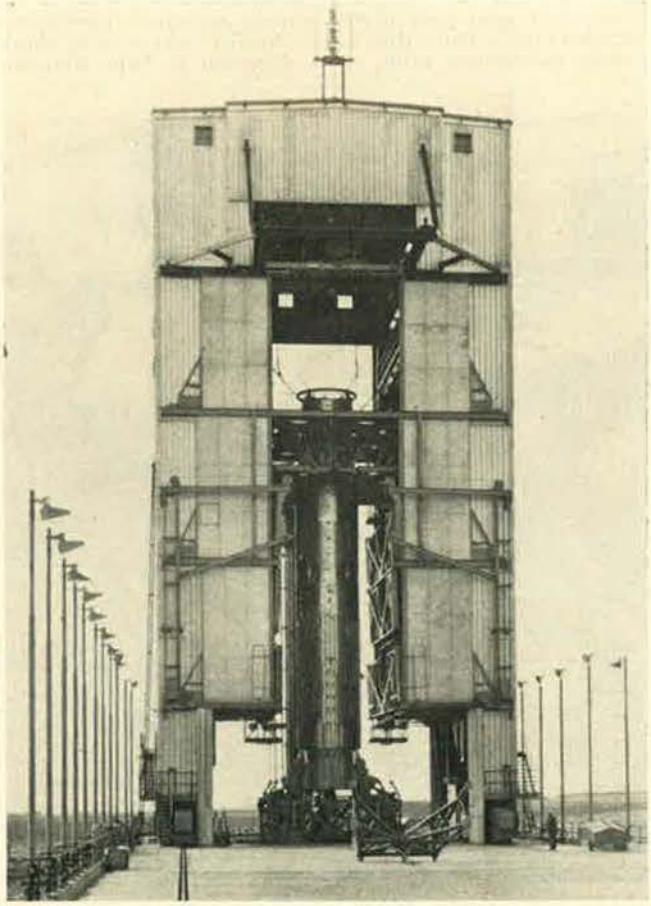
Black Arrow has had two test firings from Woomera. Unfortunately, the first was a failure and the vehicle had to be destroyed one minute after liftoff. The second firing took place on March 4 of this year and was completely successful.

Europa 1

For launches of heavier satellites, Britain is hoping that the European Launcher Development Organization (ELDO) will eventually manage to produce its series of powerful launch vehicles. The first of these, Europa 1, was to have been a three-stage vehicle using Britain's Hawker Siddeley Blue Streak as the first



Europa 1 first and second stages undergo launch from Australia's Woomera range during a test series there.



One of the largest test stands in Britain accommodates complete Blue Streak missiles and checks out all systems.

stage, France's Nord Aviation Coralie as the second stage, and Germany's Bölkow rocket as the third stage.

Europa 1 would not have been very powerful, but could launch 1,600 to 2,000 pounds into low circular orbit. A recent trial of the first and second stages with a dummy third stage was not a success, owing to a failure of the French second stage.

Europa 1 is to be succeeded by Europa 2. This much more powerful vehicle will be similar to Europa 1, but will have the addition of solid-fuel perigee and apogee stages. It will be capable of putting a 350-pound payload in geostationary orbit at 22,300 miles and, with certain variations now under study, up to two tons in low orbit.

Plans also exist for a third European launcher that will be even more powerful, and capable of putting a 1,000-pound payload into geostationary orbit. Finally, a Europa 4 is envisaged, which will be powerful enough to launch manned spaceflights.

Blue Streak

The first stage of all these vehicles was to have been Blue Streak, but recently ELDO, piqued by Britain's noncooperative attitude, announced that it no longer had the intention of using it. Just what is to replace it is by no means clear, so once again the whole of Europe's launching program is in doubt.

However, with the change of government in Britain, more money for European space projects may be made available, thereby reprieving Blue Streak. It was first developed as an intermediate-range ballistic missile and was first fired in 1960, to be almost immediately canceled by a change in government policy. However, shortly afterward, ELDO was formed, and Blue Streak was adopted as the first stage of the newly planned European launchers.

Some sixty feet high and weighing more than nine tons at liftoff, this most successful vehicle is powered by two Rolls-Royce RZ2 rocket engines, each capable of producing 150,000 pounds of thrust. The engine was developed from an original license agreement between Rolls-Royce and the Rocketdyne Division of North American Aviation, so that Blue Streak engines share a common ancestry with the US's Thor, Jupiter, Atlas, and Saturn engines. The propellants are liquid oxygen (lox) and kerosene, a relatively cheap mixture of quite high performance.

Blue Streak has been fired nine times without failure.

Space Communications

Although British companies are participating in the Intelsat programs as subcontractors to US companies, their major successes have been in the provision of earth stations. Six major earth stations have been supplied, and a further dozen or so are playing their part in military comsat systems.

The Intelsat agreement is being renegotiated this year, and Britain is anxiously watching the negotiations. It is felt that satellite communication systems naturally divide into three separate divisions: global, regional, and national. Global would imply trans-oceanic and intercontinental systems. Regional would

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cover an area or a group of nations whose frontiers adjoin, *e.g.*, Europe; and national would cover one country only. There is a fear that the new Intelsat agreement may not make provision for a regional system and that the provisions of such systems might be open to international bidding, which would give the US a great advantage.

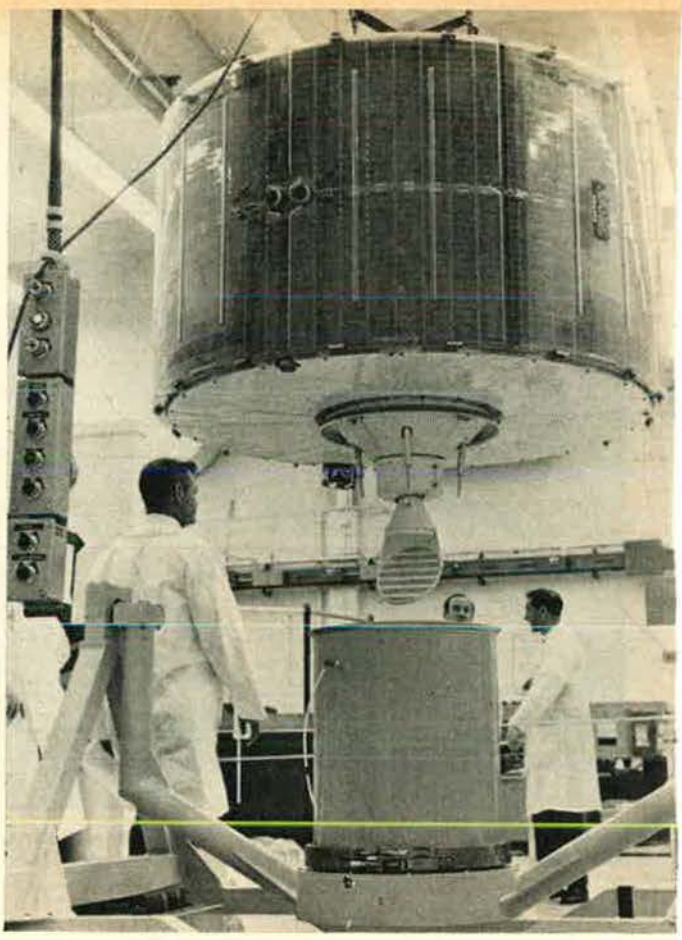
National systems would, of course, be provided by national resources, if available, or by purchase from other countries. Here Britain would like to be able to provide systems for such Commonwealth associates as India and Australia. Thus, there is a strong body of opinion, in both Britain and Europe as a whole, against Intelsat's being allowed any jurisdiction over regional systems.

Skynet

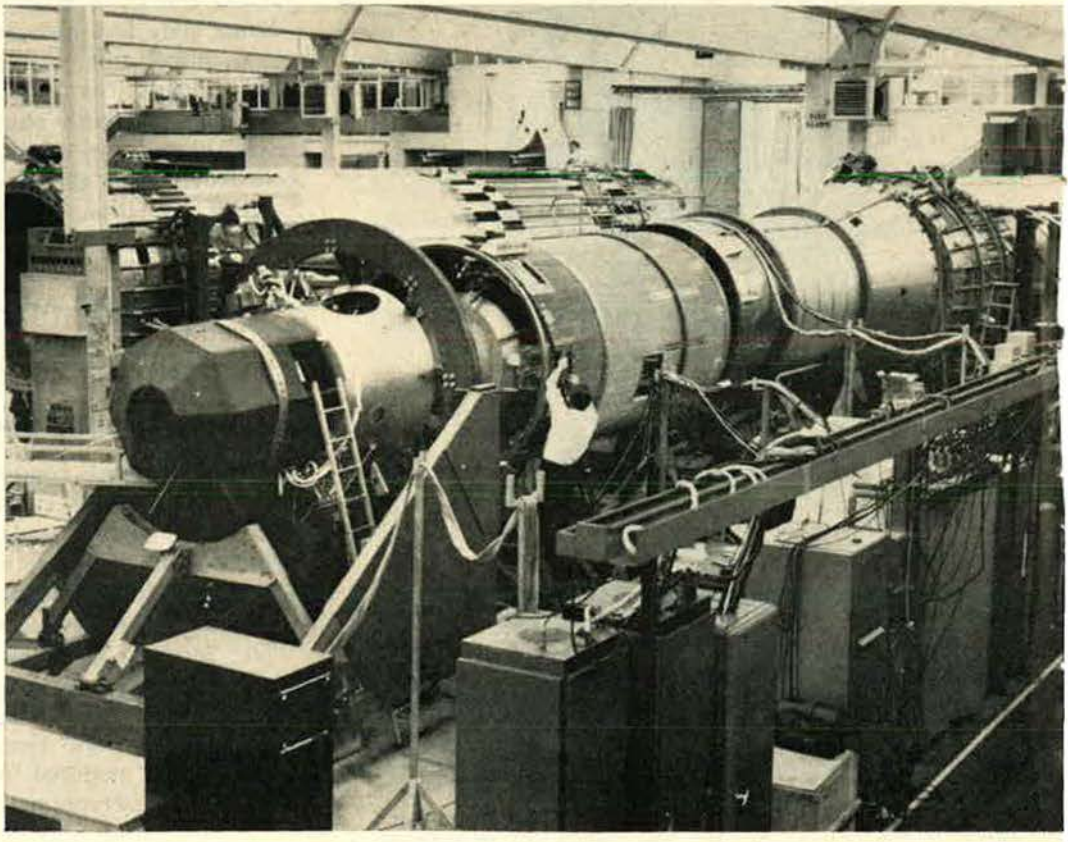
However, Britain has one space-communication system of her own—Skynet—a military system for communication between the UK and places and ships east of Suez. Skynet is a British-designed, but US-built, synchronous satellite launched last November from Cape Kennedy and now in geostationary orbit over the Indian Ocean. All the ground stations that go with it are British designed and built, but the control station was constructed by the US firm of Radiation Inc.

A number of different types of ground stations have been provided. The largest, by the Marconi Instruments Division of English Electric, have forty-three-foot antenna dishes and are situated in semipermanent positions in the UK and in Cyprus and Singapore.

Smaller transportable stations (GEC/AEI) with twenty-one-foot dishes will be sited at Bahrein in the



A British Skynet defense communications satellite is covered with protective plastic during prelaunch handling at Philco-Ford's Palo Alto, Calif., facility, where final checks were undertaken prior to its shipment to Cape Kennedy.



Blue Streak is being assembled to serve as the first stage of a Europa 1 launcher. This powerful vehicle, developed as an intermediate-range ballistic missile and first fired in 1961, has an impressive record, having experienced no failures during its history of firings. Its propellants are liquid oxygen (lox) and kerosene, a high-performance fuel mixture.

Persian Gulf and on the island of Gan in the Indian Ocean. Similar size stations will also be kept in reserve in the UK, ready to accompany any mobile force sent to quell a "brush fire."

Two naval ships are to be fitted initially with a six-foot dish station designed by the Plessey Airborne Co. Finally, there is to be a yet smaller naval station with a three-foot dish, capable of one radio-teletype and one voice channel, which will be fitted in selected flagships and other important vessels. It is to be built by the GEC/AEI group.

At present, only one satellite has been launched, but another is planned to be launched in mid-1970 and will act as a standby.

Both satellites will have a life of from three to five years, and consideration is already being given to their replacement. British firms are anxious that the new satellites be entirely designed and manufactured in Britain, but so far the government has neither agreed nor disagreed with this point of view. However, there is an unpleasant feeling among British industry that it might be cheaper if they were made in the US, as are the existing ones, and, if this is the case, it is feared the government will undoubtedly go for the cheapest solution and once again British technology will not be given the chance it so badly needs.

ESRO and ELDO

No review of Britain's space effort would be complete without mention of the closely linked European organizations.

There are two: European Space Research Organization (ESRO) and the previously mentioned European Launcher Development Organization (ELDO). Both exist on subscriptions from member countries.

ESRO so far has only developed satellites into which scientific experiments can be put, but it is felt that the work should be extended to applications satellites. To date, ESRO satellites can be launched only by US (or Russian) launchers; thus ELDO was formed to develop Europe's own launchers and the European launcher program started. Unfortunately, no one thought of insisting that, when the launchers were available, ESRO should be forced to use them.

Europa 1 was originally planned for communications satellites because at the time it was thought that a comsat system would be made up of a number of low-orbit satellites. It has now been generally agreed that the best comsat is a synchronous one at high altitude, which negates Europa 1. Similarly, experimental satellites have grown larger and larger and are required to go to higher and higher altitudes. Thus, Europa 1 is falling behind in mission capability, and it is possible that ESRO will find little use for it. This has led to a certain amount of dissension in Europe, and there is a body of opinion that it is not really necessary to develop any European launchers at all.

The prime disclaimer came from Britain, who in 1968 announced that to develop a purely European launcher was "nonviable" and that Europe should depend upon US launchers; Britain, therefore, intended to withdraw from ELDO on conclusion of the present program (about the end of 1971). However, Britain would continue to contribute financially until then, but not contribute to any costs exceeding the budget agreed to in 1966.

The other nations, although shaken, agreed to this and stated that they would keep to the original budget of $626 million by canceling certain planned launches and development of a synchronous test satellite.

Only a month later Britain infuriated the others by announcing that, since a synchronous satellite was not now going to be orbited, the program had changed and was in fact different from that to which the UK had agreed. Britain, therefore, claimed no obligation to contribute funds beyond the end of 1968. However, as a gesture, Britain would contribute $25 million of the $41 million previously committed. In other words, Britain had agreed to support ELDO until the end of 1971 by $41 million, but cut this by $16 million.

Amidst cries of "perfidious Albion," the remaining members have been forced to make up the difference themselves, but the irony of the whole situation was that Britain was offering Blue Streak as the first stage for all ELDO launchers and charging a considerable amount for it.

Red-faced British scientists, talking across the table with their opposite numbers in Europe, found it difficult to explain a purely political decision with which they did not agree. It is therefore hardly surprising that the other members of ELDO have finally decided to cut Britain out of the program.

At the same time, however, it must be noted that Britain (even after the recent cut) will still have been by far the largest financial contributor. None of Blue Streak's development cost was charged to Britain's European partners and, from 1961 to 1966, Britain contributed nearly forty percent of ELDO's funds and, from '67 to '69, twenty-seven percent.

Britain has not withdrawn from ESRO, which continues apace, but ESRO has no monopoly of satellites in Europe. The French and the Germans went off at a tangent and currently are jointly developing their own comsat—Symphonie—and another is planned by C.E.T.S. (Conférence Européenne pour Télécommunications par Satellite) as a European television relay. Both could be launched by Europa 2.

There are undoubtedly too many fingers in the European pie, and an urgent need exists for rationalization. With this generally understood, discussions have been proceeding toward combining ESRO and ELDO into a single agency—the European Space Organization (ESO)—the NASA of Europe. At the same time, European space firms are trying to create a consortium—Eurosat—which would be the exact counterpart of the US-dominated Communications Satellite Corp. (Comsat).

It is fairly certain that both these reorganizations will come about. It would seem to be Europe's only hope to ever compete with the US. Despite British politicians' assertions that Europe does not need its own launcher, most British experts believe the opposite and are hoping that, when ESO is formed, Britain will play her full part.

In the meantime, British scientists are struggling to keep pace with the ever-expanding technology and are not finding it easy.—END

The many critics who take an "either-or" view of aerospace with respect to national priorities tend to overlook the economic contributions of technology and the potential of the systems approach in the analysis of problems, no matter how complex . . .

What Aerospace Has Done and Can Do to Solve Social Problems

BY WILLIAM LEAVITT
Senior Editor/Science and Education

NO REASONABLE observer will deny that we have neglected many serious social problems in this country—education, housing, health, and the like. Many concerned critics have lately fallen into the habit of blaming this neglect on a national preoccupation with high technology, particularly aerospace.

Without getting into a circular argument over whether the country would have done more on the social-problem side had there been no space program, as some people charge, it is worth considering what aerospace technology, if properly harnessed, can contribute to the solution of social problems, since aerospace technology is here and, despite its current doldrums, is obviously not about to be abolished.

Robert L. Marquardt, Group Vice President for Economic Development Operations at the Thiokol Chemical Corp., has some thoughts on the subject. He put them down recently in a publication of the New York State Department of Social Science, called *Social Service Outlook* (June 1970 issue).

"I cannot accept," Mr. Marquardt wrote, "the increasingly widespread belief that progress in aerospace is necessarily in conflict with progress in the war on poverty or in solving other social ills. We are told more and more often that our industry (by 'our' industry I mean aerospace) is distorting national priorities. The accusation has an appealing sound, but I am not sure it is much more than that.

"For one thing, it is based on the notion that all the money that we spend on defense and space must be subtracted from what we can spend on other needed projects . . . and vice versa.

"These alternatives, however, do not accurately picture the real situation. The main weakness of the argument, in my view, is that it overlooks the creative role that expenditures on both space and social pro-

The technological management skills that sent Apollo-11 to the moon represented not only a conquest of space but also of time. Properly harnessed, they can help solve non-aerospace problems. To ensure that this prospect comes about, research and development support must not flag.

grams play in generating more resources than they consume."

He went on to quote a mutual-fund manager who had forecast—in this dim economic period—full employment in the 1970s, largely because of a conviction that our economy will be able to exploit aerospace technological achievements and research and development.

In this vein, Mr. Marquardt pointed out that, "while aerospace technology will be creating much of the wealth we need to attack social ills, it does not follow that social programs will simply consume that wealth."

Then, citing some examples in his own company of the interplay between technology and social improvement, he listed Thiokol-operated socially oriented programs, including an Urban Job Corps Center, a Paraprofessional Institute, an Employment Training Center for American Indian families, start-up of plants in urban ghettos and rural areas for hiring hard-core unemployed, work in the field of new low-cost building materials, and management of an Indian Police Academy, among others.

"The role of these projects—to different degrees—is to help men and women who have suffered social, economic, or educational deprivation," he wrote. "We do this by assisting them in making social and personal adjustments, filling in educational and health gaps, providing vocational training, and helping in other ways to equip them for more fruitful and productive lives.

"In less than three years," he wrote, "Thiokol's learning centers alone have placed more than 6,000 'hard-core unemployables' in pretty good jobs. We have reason to believe that most of them . . . will acquire the habit of working and that this will replace the previous habit of not working.

"The alternative," said Mr. Marquardt, would have been "welfare payments of $60,000 to $100,000 per person to age sixty-five. For these 6,000 people, that would add up to $420 million of welfare."

Mr. Marquardt went on to talk about another aspect of aerospace research and development and its relationship to social problems—the business of the systems approach.

Acknowledging that "we have made mistakes" and that "our critics never fail to remind us that we have been wrong in some of our forecasts, timetables, budgets, and technical developments" and further that "we will make more mistakes in the future," he asserted that, nevertheless, aerospace has "given the world a new systems approach that allows meaningful decisions to be made not just for today, nor even for tomorrow, but [also] for ten years or more in the future.

"I think it is fair to say that our technologists have been spectacularly—even unbelievably—right more often than they have been wrong. . . . Our industry has helped to redeem a number of . . . impossible promises [such as the moon landing]. . . . The significance of such tightly scheduled accomplishments has been completely overlooked by our critics and even by some of our friends. I think it may yet turn out that the greatest achievement of aerospace lies *not* in the *conquest of space* but in the *conquest of time.*

"This important aspect of aerospace, the ability to analyze complex missions, line up problems to be solved years in advance, and then to program the solutions, is almost as important as the solutions themselves," he said.

He cited the many efforts in public-problem areas that aerospace companies have undertaken, several of which have been described on these pages in past issues of AF/SD, and urged that we not shortchange the future by failing to make adequate investments in research and development now.

"Unfortunately," he wrote, "the idea seems to be . . . that expenditures for R&D are just sly ways of dipping into the porkbarrel. It is not always easy to disprove this notion, especially when we are working on problems that may not even become visible for five or ten years. . . . The urban and environmental problems that now face us are greater than any we have encountered in the past in aerospace. Yet in many areas R&D funding is actually diminishing instead of expanding to the new needs and opportunities. . . . It seems to me that lowered levels of R&D funding could turn into very expensive savings. . . . On-going programs for discovering opportunities, as well as for solving problems, will become increasingly essential to our

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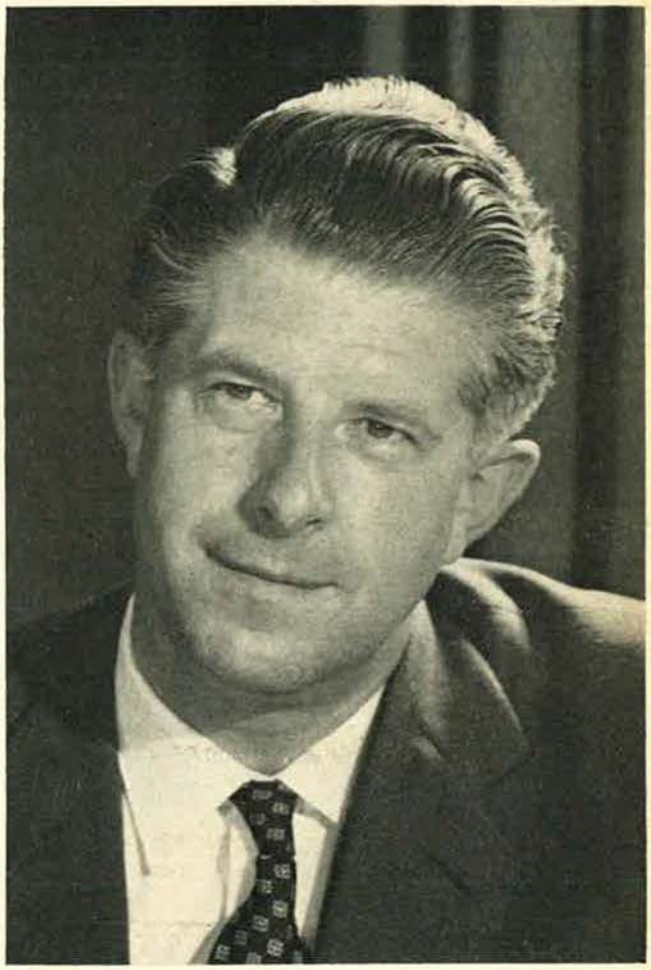


British Aircraft Corp.'s R. F. Creasey, himself long interested in space-shuttle concepts, believes that important technical decisions on the project still need to be made, and that Europe's skills could enhance shuttle development. He hopes Britain will play a part in the project.

physical well-being as well as to our survival and freedom. And on the record of history, R&D spending is the best investment America can make."

The Space Shuttle: A British View

Although we can be proud of the enormous achievements of the US in space technology, America does not hold a Western monopoly on technical expertise. Europe, with a lot less money to spend, has been building for the past several years its own capabilities. Individual countries, well-known firms, and such international organizations as the European Space Research Organization (ESRO), the European Launcher Development Organization (ELDO), and Eurospace, a band of space-oriented companies and financial institutions, have all been taking part in the space revolution.

The European effort has been mounted in the face of frequent controversies reflecting the residual nationalism of Europe. But there has been progress, and the Europe of 1970 seems far more prepared than it was a few years ago for important participation in space technological efforts in the years ahead.

NASA Administrator Dr. Thomas O. Paine has, with a space-agency team, already briefed Europeans on US space-station plans and, at this writing, was planning another European trip to talk about the US space-shuttle project. If discussions jell into action and Europe joins the US in the project, a new era in space development could open in the '70s.

This is an artist's conception of a BAC approach, developed in the 1960s, to the recoverable space shuttle. It was called MUSTARD (multiunit space transport and recovery device). It was a three-unit vehicle that would have consisted of two manned units serving as first-stage boosters, and a third manned unit that would have been the orbited spacecraft. The three units were to have been practically identical and stacked vertically in parallel for launching.

Britain, particularly, has quietly, and in an austere financial climate, built up its space capabilities (*see page 58*). And if recent comments by a top British Aircraft Corp. official, Raymond F. Creasey, are any indication, the United Kingdom would like very much to take part in developing the US space-shuttle program *(see "Speaking of Space," July '70 AF/SD)*.

Mr. Creasey is director of advanced systems and technology for BAC and for several years has been analyzing the shuttle concept. He has some strong technical views on the shuttle and believes that NASA might benefit from his firm's extensive experience in international collaboration as part of a cooperative US-European shuttle program.

Mr. Creasey cites BAC's collaboration in such international efforts as the B-57 Canberra with Martin Co.; its work, with ten other countries, in the Intelsat communications-satellite consortium; its part in the Anglo-French Concorde supersonic-transport program and the Jaguar aircraft program as well as the company's collaboration, with a number of other European countries, on the multirole combat aircraft (MRCA).

Mr. Creasey declared during a recent visit to this country that America and Europe need a "genuine get-together to have a proper exchange" on the best ways Europe might contribute not only to the shuttle effort but also to the US space-station project, expected to develop into a major effort after the Skylab demonstration project in 1972.

NASA does seem interested these days in some degree of partnership with Europe in space development. This could be a function of fiscal belt-tightening here. The space agency's chief, Dr. Thomas O. Paine, has already been to Europe to brief European government and industry specialists on US space-station plans. He was planning, at this writing, to do the same thing with respect to the shuttle. Such meetings, in Mr. Creasey's view, should have been held long ago.

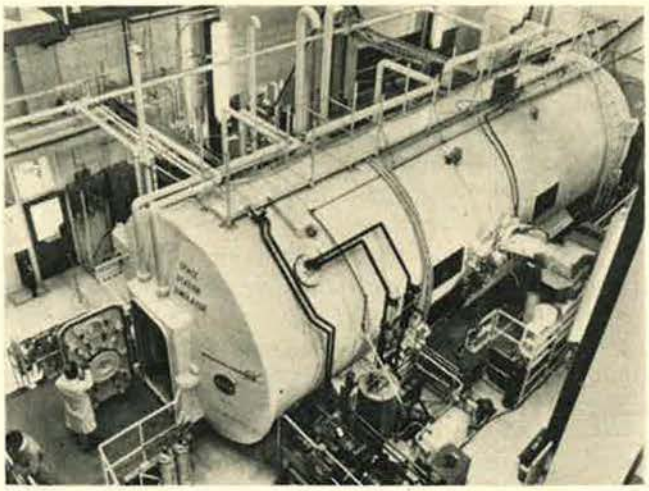
Mr. Creasey says that the comparatively small amount of interchange thus far between NASA and European space specialists on the subject of collaboration on major projects may well have been "Europe's own fault"—because Europe did not know the technical areas where it is strong. But Mr. Creasey seems hopeful as to the future of US-European major space-project collaboration. "If we make it work, it will really revolutionize the economics of space," he says, adding that before the shuttle can get going in earnest, NASA and the US Air Force need to work out their differences as to the capabilities of the craft. To meet more complicated potential military requirements *(see "Speaking of Space," July '70 AF/SD)*, the Air Force would like much greater landing flexibility, among other characteristics.

On the technical side, Mr. Creasey has told American colleagues that there needs to be much more work on the optimum sizing of the space shuttle. Mr. Creasey worked as far back as the late 1950s on recoverable-shuttle concepts and tried to interest the US in BAC's ideas on recoverable boosters and orbiters. Recounting that experience, he dwelled, in a recent speech to the American Astronautical Society, on the differences between what he called the maxi-shuttle and the mini-shuttle.

The first would have a large cargo space able to carry 50,000 pounds of payload and the second, mini-version, a payload capability of less than 10,000 pounds. The latter sort of payload was about what the European Space Transporter, proposed by European enthusiasts a few years back, would have been able to carry.

In view of the billions of dollars involved, Mr. Creasey told the AAS that, if two systems could not be developed in parallel, there might well have to be a compromise between long-term economic objectives and the risk of not getting a shuttle program going at all. He suggested that probably not very much work had really been done on the size question either here or in Europe and that everyone interested in the shuttle would do well to get cracking on some hard analysis of these problems.

It seems clear that, under Mr. Creasey's leadership, BAC intends to do a lot more than dust off its old studies and will very closely examine shuttle questions in the context of 1970, so that if there's any chance of European participation in the shuttle program, BAC will be in a good position to make its bid.



The biomedical problems associated with extended manned spaceflight continue to raise questions. Among current studies is this McDonnell Douglas test program in which four "crewmen" will spend ninety days in a space simulator at the firm's Huntington Beach, Calif., facility. The NASA-sponsored project will test the ability of a regenerative life-support system to convert crew sweat and urine into potable water and crew's exhaled carbon dioxide into breathable, clean oxygen. The simulator is forty feet long and contains 4,100 cubic feet. Testees are CalTech and UCLA students.

Soviet Space "Sickness"

Although much was made of it in some press coverage, there shouldn't be any real surprise that the two Soviet cosmonauts, who in June broke the manned-space-orbital record (*see "Aerospace World," page 26*), suffered a certain amount of physical degeneration during their flight.

Mineral content loss in the bones, effects on the cardiovascular system, and difficulty in readjusting to normal gravity are all standard hazards of extended exposure to weightlessness. To some degree, the same effects have been observed among US astronauts. And from all indications, the symptoms fade and there is a return to normality after a few days back on earth.

But at the same time there's no reason to be complacent about these hazards, in view of the probability that American and Soviet crews will, in the relatively near future, be manning space stations for periods as long as several months.

A number of the biomedical experiments planned for the crews of the US Skylab space station expected to be orbited in 1972 *(see "Speaking of Space," July '70 AF/SD)* will be designed to measure physical effects of extended exposure to zero-gravity during the twenty-eight- and fifty-six-day missions planned.

In any case, the experience of US and Soviet crews thus far may well indicate that if man is really going to operate in space for long periods of time—weeks, months, years (a manned Mars expedition would take many months each way)—he may have to have as close to a natural gravitational environment as possible. That would mean artificial-gravity effects of some sort (arranged perhaps by careful rotation). Doing that could complicate the spacecraft design, but sooner or later the artificial-gravity question will have to be faced squarely.—END

A Former POW Revisits the Scene

American airman imprisoned in Romania during World War II enjoyed a uniquely friendly relationship with their captors, who, by comparison with the Nazi overlords, were lighthearted and cooperative. But twenty-five years of Communist control of the country have made a world of difference, as quickly becomes apparent when . . .

An Airman

By Kenneth D. Barney

WHEN my feet touched Allied soil again, I supposed it was the end of the story. It was August 31, 1944, and I was one of the American airmen just liberated from a Romanian prisoner of war camp. Lt. Gen. Nathan F. Twining, then Fifteenth Air Force's Commanding General and Commander of the Mediterranean Allied Strategic Air Forces, was there to welcome us back. So was Lt. Col. James A. Gunn—an ex-prisoner himself who had been flown back to Bari, Italy, by Romania's top fighter ace to arrange our evacuation. The Luftwaffe had been taking its revenge on Bucharest after Romania's armistice, and we had been caught in the middle of incessant bombing. But that was behind us now. We were once again under Fifteenth Air Force control, and in a few weeks would be heading home.

I never dreamed there would be an emotional sequel to the story twenty-five years later. In honor of my tenth anniversary as pastor, my church surprised my wife and me last year with a trip to Israel. Having heard me often speak affectionately of the Romanian people, they included a six-day stop in that country as part of the package.

A distorted mass of thoughts almost numbed my brain as I stepped off the Tarom airliner at Bucharest Airport after our trip to the Holy Land. It was in late October—a couple of months beyond the actual anniversary date of my liberation. It seemed like a dream, especially the fact that this time my wife was by my side. Now she could share some of the atmosphere of that long-ago summer. Her part then was to be on the receiving end of a chilling telegram that I was missing in action.

Many of the prison-camp experiences of World War II were too unpleasant to evoke any sentiment. I am sure most ex-POWs would have no desire to revisit those places. There are no words to express the anguish I feel now over the plight of our men held captive in North Vietnam. I can only explain that Romania was a different experience; in fact, unique. We were the first large group of prisoners liberated in the war, though a small number compared to other areas. Fighting was still raging elsewhere, and our rescue did not receive a great deal of publicity. It was, however, a thriller from beginning to end, certainly one that the participants will never forget.

By no means were those days a picnic, and there were plenty of moments no one would want to relive. But the prevailing atmosphere in Romania was totally different from that in Germany or Japan. Romania was a German ally, yes. We were bombing their oil fields, and they were shooting down as many of us as they could. But it did not take long to realize that they considered Russia their real enemy. With a few exceptions, the Romanians acted as though we were friends from whom they were temporarily estranged by circumstances beyond their control.

Actually, some of the Romanians who conversed with me during the war acted as though their feelings were hurt to find their country an enemy of the United States. They could not quite comprehend why we were bombing them. "We have not done anything to you; why are you fighting us?" was a frequent question. Naturally some of them were angry—a few even violently so—over the death of loved ones in our air raids. An old man holding a scythe slapped my upraised hand when I was first captured—although he was quickly rebuked by one of the soldiers. Later in the day, when my captors and I were traveling up the road in a one-horse cart, an enraged citizen grabbed the guard's rifle with the apparent intent of shooting me. I quickly seized it from him, and the incident was

(*Continued on page 72*)

WW II's Kenneth Barney

The author, Kenneth D. Barney, now is pastor of the Heights Assembly of God Church in Houston, Tex. During World War II he served as a B-24 bombardier with the 450th Bomb Group, based in Italy. His plane was shot down near Ploesti, on his second mission, and what happened during his imprisonment is told in this article. After his discharge from the AAF in May 1945, Mr. Barney completed his ministerial studies at Central Bible College, Springfield, Mo. He had served congregations in Levelland and Lubbock, Tex., prior to accepting his present pastorate.

Pastor Barney today

Returns to Romania

over except for his shouting. But most of the people simply seemed sad that history had taken such a strange turn of events. The friendliness and, in fact, affection of most of them amazed me.

Many of the people made no attempt to hide their contempt for the Nazis. I must say, however, that on my visit last fall, no one was brave enough to voice such dislike of the Communist regime. One Western business representative told me about a Romanian woman who had been demoted in her job and denied the privilege of receiving foreign mail, as punishment for too much friendly association with an American and a critical remark on her tapped telephone.

My first three days in Romania, after being shot down over Ploesti on May 31, 1944, were spent in the small county seat of Costesti, about eighty miles from Bucharest. I was alone when captured in a plowed field, and had no chance to escape. Later that day my pilot, Lt. James Lombardi; the copilot, Lt. James Althouse; and our nose gunner, Sgt. John Diviney, were brought in by train. Diviney had torn his chute, and suffered a broken back in landing. We left him in the hospital, where he stayed until he was able to be brought to Bucharest.

Our guards were peasants who had been drafted into the army. At first they seemed fearful, but, when they got over their nervousness, they were like old friends. I assume that the place where we were kept was the police station. It had only two beds, and the guards gave them to the three of us while they slept on the floor. A couple of Gestapo-type characters in civilian clothes came around to harangue us loudly, but the only words we understood were "Heil Hitler!" When they closed the door, the guards made elaborate gestures to show their extreme dislike of the intruders.

Our ball-turret gunner, Sgt. Raymond Sinclair, had gone down with the plane, and his remains were brought to Costesti for burial. The only minister in town was an Orthodox priest, and the service, which we were allowed to attend, was held in the small chapel in the village cemetery. I never saw people so sincere. The kneeling peasant women kept dabbing tears from their eyes, and everyone seemed genuinely sorrowful.

At Costesti we met the one Romanian I will always remember most. She was a young lady, about eighteen, and spoke excellent English. Her name was Lucia Dimitru, and she told us to call her "Lucy." She was extremely helpful, especially as an interpreter. One of her acts of kindness was to take us to the hospital to see Diviney. While we were there, I explained to her, with some embarrassment, that I was suffering from diarrhea, and in no time at all she had secured medication that quickly brought the situation under control. Lucy's ambition was to be a doctor. She and her family had come to Costesti temporarily to escape the bombing elsewhere, and my friendship with her was to be renewed in a strange way after the war.

Our next stop was the larger city of Pitesti, whose railroad yards were sometimes a secondary bombing target for American planes. We spent our first night in some sort of police building, and then were taken to a two-story building whose lower floor was occupied by a few German soldiers. They seemed to be engaged

in salvaging parts from crashed planes, and always greeted us in friendly fashion when we met outside the only toilet, which was on the first floor.

Before leaving the police headquarters, we were visited by a handsome young Romanian who told us to call him "Johnny" ("Ion" in Romanian). His pro-American, anti-Nazi feelings were intense. At one point, he left for a little while and came back bringing us sweet rolls he had purchased at a bakery. But the thing for which I shall always remember Johnny was more personal. He explained that his aunt was a Red Cross censor in Bucharest, and that if we would give him our names and the names and addresses of our next of kin, he would try to get messages to them through Switzerland. When I got home, I learned that he had succeeded. The message to my wife, sent from Bucharest, had gone to Geneva by mail and then to America, finally reaching my wife about three months later. In Romanian handwriting, it read, "I am perfectly well. Love, Lt. Kenneth Barney." We still have that little scrap of paper stored away with other cherished mementos of an unforgettable episode in our lives.

Then came the trip to Bucharest—by train, and at night. A Romanian military garrison was our temporary home, and a number of us were kept in a single room until we had been interrogated. The questioning was done by a German lieutenant, who was polite and did not seem to have his heart in his work. He only spent a few minutes with me, and most of it seemed meaningless.

At the garrison we had our first experience with what was actually the most unpleasant part of our captivity—bombing by our own Air Force. It was against the rules of the Geneva Convention for a POW camp to be in such a place, but there was nothing we could do about it. Along with several hundred others, I spent many an anxious moment cowering while the building shook from the concussion of the bombs striking the railroad marshaling yards.

The food at the garrison was to be standard for most of the time. For breakfast there was whole-wheat bread and jam, with ersatz coffee. At noon it was bread and soup, and for supper more whole-wheat bread and cheese. We had all the bread we wanted, and it was very good—*whole* wheat in every sense of the word. I lost only five pounds in the three months I was in Romania.

The rank-conscious Romanians separated the American officers from the enlisted men, housing our noncoms in a hospital close to the marshaling yards. The bombing was even more of a problem to them. The officers were kept in a massive stone schoolhouse not far from the main part of Bucharest. We had a view of the eagle atop the Parliament building, which sits on a hill. The barbed wire on top of the board fence surrounding the building was in contrast to the good-natured peasant guards.

Someone had put up basketball goals in the school yard, and soon we had a league, with regular games, and eventually a tournament. A fairly good supply of books was on hand, including Bibles supplied by the Canadian Red Cross. A Baptist minister, Lt. Bill Rittenhouse, conducted Protestant services for us, and a Romanian priest came each Sunday for Roman Catholic services. Some of the Catholic boys had their own services in a hall during the week, and several of the guards always joined them.

There were a number of Russian prisoners at the schoolhouse, who had been captured on the Eastern front. They had separate quarters, and worked in the kitchen and did other jobs around the premises. They were likable characters, and had a singing group we nicknamed "The Don Cossack Chorus."

The Romanian commandant was a pear-shaped lieutenant colonel. They must have scraped the bottom of the barrel to find him. He was continually bellowing, and, although he never laid a hand on the Americans, he slapped his own soldiers around unmercifully. At times he also abused the Russians, and they were often heard to say they were going to get him when they were free. Whether they did or not, I have never heard.

Again it was the bombings that made life miserable at times. One night the RAF dropped three parachute flares right over our building, and when these burned

(Continued on following page)

out, they dropped more in the same spot. Their bombs rained all around us and broke out windows in the building while we huddled under tables in the basement. It was an overcast night, and a Canadian flyer shot down on the raid told us they had been mixed up on their target.

On the night of August 23, 1944, I was in the bathroom about 11:00 p.m., just before going to bed. There was an apartment building almost within arm's reach of the schoolhouse, and a window suddenly went up. I heard the word "peace" several times in a loud whisper. Then another window was raised, and a woman's voice shouted, "Yes, peace in Romania." The next instant I heard yelling down the hall as some of the others had just learned the news over the radio that had been smuggled in several months before.

The scene that followed was like something out of a movie. The wild, delirious celebrating, however, was tempered by our anxiety about the Germans still stationed in and around Bucharest. About 1:00 a.m., a Romanian colonel from the War Ministry came to the school to make a short speech. Through an interpreter he said, "We now salute you as our friends and allies! Romania is on the right side!" The applause and cheering were thunderous.

Naturally there was no sleep the rest of the night. About 7:00 o'clock the next morning we gathered in the school yard for the most unforgettable part of the whole drama. Three weeks before this, we had received a clothing shipment through the Red Cross, and at the bottom of one of the boxes was an American flag. Now we were free to bring it out and fly it. With the Romanian flag on top, Old Glory next, and a small Russian flag on the bottom, we raised the banners to the top of the flagpole and stood at attention. First the Romanians sang their national anthem. Then it was our turn to square our shoulders and sing, "Oh say, can you see, by the dawn's early light." The only way I know to describe the sensation was that it was like a thousand volts of electricity chasing up and down my backbone. I only wish every American could have a similar experience with his flag. The sight of those Stars and Stripes filled me with such a wild storm of emotion that I thought my heart would burst.

A little later a crowd of Romanians swarmed around our building, bringing us watermelons and pastry, and trying in every conceivable way to show us how they felt. Romanians by nature are gay, high-spirited people, and now they were pulling out all the stops. A few could speak a little English, and one said, "Thanks to you, we are free" before walking on. Several asked anxiously, "Will the Americans come?" Some told us, "If the Americans or British landed on our soil, we would welcome them with open arms, but we don't want those Russians!"

Our celebrating did not last long. The German revenge bombing started soon, and lasted day and night. Most of the time, I was against a wall in the schoolhouse basement, and that wall kept moving back and forth with the concussion of the exploding bombs. It was a nerve-racking ordeal, and we began to wonder, "After being so close to freedom, are we going to die this way?"

Colonel Gunn had been shot down only a few days before, but by virtue of rank became our senior officer. He was a Godsend to us. After many frustrating efforts to get us out of the country, he finally struck pay dirt. Romania's top ace, Prince Constantino Cantacuzino, a captain with sixty victories to his credit, agreed to take the radio equipment out of his ME-109, squeeze Colonel Gunn into the plane, and fly him back to Italy. Of course, Colonel Gunn was ready, and the rest is as inspiring a chapter as was ever written in Air Force history. The quick flight brought the Fifteenth Air Force into action. American B-17s, with swarms of fighter escorts, started landing at Bucharest and taking us out. It happened with such dramatic suddenness that it was hard to believe.

Long after returning home and reentering civilian life, I cherished my memories of the Romanian people. I watched the newspapers for items from over there, but such reports were almost nonexistent. Then one day in 1947 I saw an Associated Press dispatch from Bucharest. I wrote the reporter, Leonard Kirschen, describing my experience in Romania and my sentiment for the people. I never heard from him, but soon began receiving letters from Romanians, a number of them written in English. Mr. Kirschen had given my letter to a Romanian newspaper, which had printed it in full, right on the front page. I had mentioned "Lucy," and one of the letters was from her. She sent me a picture of herself so I could know the correspondence was genuine. She was in Bucharest, and I asked her for a photograph of the schoolhouse, which she quickly sent. It was the only one I had until my recent trip, and I had a good many prints made in case I lost the original.

One of the letters was from a woman who lived in an apartment close to our schoolhouse. She told how she and her friends used to talk about "our Americans." Another was from a man who said he used to walk by the school and wave at us. One lady mentioned King Michael, saying, "To us he is less than God, but he is all we have." It was all so heartwarming—in a sad sort of way.

Then Ana Pauker came to power, ousted the King, and proclaimed "the People's Republic." The letters from Romania suddenly stopped. The Iron Curtain had fallen with a crash.

Through the years I had entertained a vague dream of going back to Bucharest. When the present regime opened the borders to tourists, the dream became a little larger, but still seemed unlikely. Then came the big surprise from my congregation, and it was all coming true. As I said, imprisonment in Romania was unique. All through our days in Israel, I looked forward to our arrival in Romania.

I must confess I was a bit naïve on this, my first visit behind the Iron Curtain. President Nixon had been warmly received, and there has been much comment in the news about Ceausescu's growing independence of Russian domination. I soon became aware, however, that all of this does not translate into much extra freedom for the individual Romanian.

I was completely unprepared for what I saw and felt. Long-cherished memories were soon crushed. The people's drab clothing seemed to symbolize life itself in that country today. I looked in vain for the gay, laughing people I had known twenty-five years ago. Those I saw now looked weary, and seemed lacking in

incentive. There was a pathetic sameness about the faces we saw in the streets. I almost wished I hadn't come. I do not know the reaction of Americans visiting that land today for their first time. But I doubt that anyone who did not know something of the old Romania—before communism—could understand my heartsick feelings.

There were a number of things, of course, to lift our spirits. The good bed at the Athenee Palace Hotel was a far cry from the lumpy burlap mattress I had endured through those prison days. Most of the food was acceptable, and there was fine maid service. Our maid, incidentally, headquartered in a room next to ours, seldom failed to pop out as automatically as a jack-in-the-box each time we opened the door.

On our first afternoon, we bumped around the city in a small sightseeing bus. At one point the lady guide mentioned their national celebration on August 23. This is the date of the 1944 armistice with the Allies and is the Romanian equivalent of our Fourth of July. "I know all about the twenty-third of August," I said. "I was here!" I told this to several Romanians, and the reaction was always about the same—a quizzical smile and a puzzled look at this American who seemed so strangely interested in their country.

We rented a car with a driver and an English-speaking guide for the trip to Costesti. The weather was beautiful, but the cemetery was hardly an inspirational place. In fact, it seemed more eerie than before, with its weather-beaten, hand-carved markers. The little chapel was still there, but showed the wear of the years. I was glad our gunner's body had been removed to a military cemetery shortly after the war.

I learned that the four of us from our crew were the only American prisoners who had been brought to Costesti, and all of the old-timers seemed to recall it. One was an elderly man, who had been the mayor in 1944. A school teacher, who was eleven years old in 1944, related so many small details that I knew she had to have been there. She said she attended the gunner's funeral, and, in fact, saw our plane crash as she and her father worked in the field. Her father, she said, had even taken a small piece of our plane as a souvenir. Her face fairly beamed as she told me, with the guide interpreting, "It is an honor to see you again."

Regrettably, no one in Costesti could give me any information about Lucy, and one of the real disappointments of my trip was not being able to contact her.

We made the trip to the schoolhouse by taxi, and found the building practically the same as in 1944, except the barbed wire was now gone. The building now serves as a theological seminary for the Orthodox Church. Several priests and students were standing around the halls, seemingly oblivious of our presence.

My emotions at the school were overwhelming. For a few brief moments, I relived those dramatic hours surrounding the sudden armistice, the flag-raising, the outpouring of the people's affection, and the other events, large and small, that are forever etched in my memory. Only this time my wife was at my side, as stunned as I that this was really happening!

The Communist mind apparently has little understanding of such a thing as sentiment, and my interest in revisiting these wartime scenes must have aroused suspicion. A few hours after our trip to the schoolhouse, we returned to our room to find evidence that someone had been there. When we came back that night from a concert by the Bucharest Symphony, our visitor had quite obviously been on the premises again. On our last night in Bucharest, a security man met us going into the dining room and turned around to follow us back in, conveniently finding a table next to ours. On reaching home, I learned that my church had sent me a cable at the hotel a day before we arrived. We were there six days, but never received it. Maybe the Romanian government is still trying to break the "code"!

I have a Romanian friend whose mother I intended to visit in Bucharest. When I felt my shoulder being looked over, I asked an English-speaking university student about this. "No," he said, "it would not be good for you to go to a Romanian's home alone." Before our trip, I had paid a hospital visit to a Romanian lawyer from Constanta who came to Houston for heart surgery. In Bucharest I attempted to telephone his wife, who had not been allowed to leave the country with him. The desk clerk placed the call, but it was never completed, and there was no explanation. I was beginning to understand that the hand beckoning to tourists was not an invitation to fraternize with the populace. Based on our limited personal contacts, I would describe most of the people as "reserved," and not anxious to warm up. I do not blame them. Now I understand.

Long before we boarded Tarom again for Brussels and home, reality slapped me squarely in the face. The Romania I knew no longer exists. A land has disappeared; a people has faded into the shadows. I should have known, but we Americans are so naïve. During those six days I felt almost as much like a prisoner as before. To me the atmosphere was stifling —like being shut up in a room with no windows. I had just been through a cram course in the preciousness of freedom, and the lesson will stay with me forever.

And, believe me, when I sing "The Star-Spangled Banner" now—it will be loud!—END

Air Force Academy's Outstanding Squadron

For the last eleven years, one of the highlights of the June Week graduation festivities at the Air Force Academy has been the Outstanding Squadron Dinner, sponsored jointly by the Air Force Association and its Colorado Springs Airpower Council. At this spring's banquet, top honors went to the 19th Squadron . . .

AFA's Salute to the Best of the Best

By James A. McDonnell, Jr.

GENTLEMEN—from the United States Air Force Academy—The Outstanding Squadron of 1970."

These words, almost drowned in applause, brought the audience of over 500 to its feet. On the stage of the International Center, at the Broadmoor Hotel in Colorado Springs, the curtain rose majestically to reveal the eighty-five cadets of the 19th Squadron. They were the members of this year's Outstanding Squadron and this gathering was the 11th Annual Outstanding Squadron Dinner, sponsored each year by the Air Force Association and its Colorado Springs Airpower Council.

This year, K. G. Freyschlag, Vice Chairman of the Airpower Council, serving as Chairman, uttered the words that opened the evening's festivities. As the cadets were introduced individually, leaving the stage in single file to take seats at their tables, they could see at the head table with Mr. Freyschlag an impressive array of guests. George Hardy, AFA President, and Jess Larson, AFA's Chairman of the Board, were there, along with Gen. John C. Meyer, Air Force Vice Chief of Staff. Also, Gen. Seth McKee, Commander in Chief, NORAD/CONAD; Gen. J. P. McConnell, former Chief of Staff; Lt. Gen. Thomas K. McGehee, Commander, ADC; Lt. Gen. Thomas S. Moorman, Jr., Academy Superintendent; and Brig. Gen. Daniel "Chappie" James, Jr., OSD, Deputy Assistant Secretary (Public Affairs). A proud participant was Maj. Robert D. Beckel, from Nellis AFB, Nev., the Academy's first Cadet Wing Commander, the outstanding graduate of his class of 1959, and a much-decorated SEA pilot.

Taking their place at the head table were the Cadet Commanders of the 19th Squadron for the fall and spring semesters, Cadets Michael H. Rosenblatt and Dennis R. Young, respectively. In place with them was the Air Officer Commanding of the 19th, Vietnam veteran Maj. Thayer W. Allison. Serving as Toastmaster was the "Toastmaster General of the Air Force," a long-time dedicated AFAer, Joe Higgins, the "Safety Sheriff" of television commercial fame.

After dinner, Mr. Freyschlag introduced Joe, who saluted the men of the 19th Squadron. Higgins then introduced General James, who spoke of his pride in being an American and an Air Force officer. He charged the cadets to seize every opportunity to show, by example, that constructive youth could make a difference in today's divided world.

In the audience were many, famous in their own right, who were there to honor 1970's Outstanding Squadron: the Academy's Director of Athletics, Col. F. E. Merritt; Brig. Gen. Robin Olds, a combat hero of the Vietnam War and now Commandant of Cadets; the Dean of Faculty of the Air Force Academy, Brig. Gen. William T. Woodyard, a command pilot with outstanding credentials as both a scientist and educator; a Colorado Springs delegation of business and civic leaders, all loyal backers of the Academy; and members of the city's Airpower Council of AFA, represented by the President of the Colorado Springs Chamber of Commerce, Eugene Graham; Lt. Gen. James E. "Buster" Briggs, USAF (Ret.), a former Superintendent of the Air Force Academy; Col. Francis S. Gabreski, the nation's top living fighter ace whose son was in this year's Academy graduating class; and representatives of the Utah AFA.

The Utah Chapter, the day before, had turned over to the Air Force Academy a restored F-4, a venerable, battle-damaged veteran of the air war in Vietnam, wrecked in an emergency landing. It had been restored by members of the Utah AFA, under the supervision of A. B. Draper, a veteran aircraft-repair foreman.

The aerospace industry was ably represented. Introduced on behalf of the many industry executives present was Sanford N. McDonnell, President of the McDonnell Aircraft Co. and a corporate Vice President of the McDonnell Douglas Corp. Several fathers

The Air Force Academy's eighty-five-man 19th Squadron was greeted with a standing ovation at the 11th Annual Outstanding Squadron Dinner, in Colorado Springs, Colo.

AFA President Hardy, right, presented an AFA Citation of Honor to General Moorman, and the Outstanding Squadron Trophy to Commanders Mike Rosenblatt and Dennis Young.

of the Outstanding Squadron Cadets were present and were recognized. Finally, came a special introduction —Maj. Gerald O. Young, an Air Force officer who wears the highest award this nation can bestow. As a representative of all Air Force heroes who have been awarded the Medal of Honor, Major Young was honored with a standing ovation.

General Moorman then welcomed the guests and spoke of his tremendous pride in the Academy and its graduates.

Then, after a moving ceremony, in which the playing of Taps reminded all present of those fifty-seven Academy graduates killed in SEA, Major Beckel, as one who had traveled the road on which they were beginning, told the cadets of the duties and rewards of an Air Force career.

General Meyer next took the podium to speak to the cadets about the opportunities awaiting them in the Air Force. Highlighting the fact that the next ten years will see a large number of today's field-grade leaders and generals move into retirement, General Meyer reminded the cadets that the opportunity indeed is there for those who have the initiative to pursue it.

Closing out the evening, Mr. Hardy first presented an Air Force Association Citation of Honor to General Moorman, in recognition of his years of enlightened leadership, superior administration, and dedication in his challenging post as Superintendent. Mr. Hardy then discussed the threat facing America today, both from within and without. He ended by exhorting the cadets to put their talents and energies to work in combating the real dangers confronting the nation today.

The evening's salute ended with a presentation by Mr. Hardy to the Squadron's Cadet Commanders, of the Air Force Association's Outstanding Squadron Trophy for 1970, which will be placed on permanent display in Arnold Hall at the Academy.

The cadet squadron honored this year had compiled an enviable record. Members of the 19th have appeared on the Dean's List 137 times, on the Commandant's List 113 times, on the Superintendent's List fifty-six times. Fourteen members of the Squadron have completed T-41 training and five hold FAA pilot ratings. Fifteen others are rated parachutists, and nine Squadron

Reviewing the evening's events are, left to right, Brig. Gen. Daniel "Chappie" James, Jr., Lt. Gen. Thomas K. McGehee, Gen. John C. Meyer, and Mr. K. G. Freyschlag.

members belong to intramural championship teams. The record of the Squadron members in terms of pre-Academy performance is equally impressive.

Of the Squadron's seventeen graduating members, nine will enter pilot training. Others will begin Air Force careers in intelligence, management engineering, and civil engineering. One will go on to law school and another to medical school.

This is the first time the 19th Squadron has won the Outstanding Squadron Trophy. At the midrating period this year they stood seventeenth. Their performance in the stretch, which brought them to first place, is indicative of the striving for excellence which is a tradition at the Academy.

Another Academy tradition is this annual Air Force Association salute to the best of the best—the men of the Air Force Academy's Outstanding Squadron.

General Moorman summed up the event: "The Outstanding Squadron Banquet is a great feature of our June Week festivities and something that the cadets always enjoy and appreciate. The Air Force Association does so many good things for the Air Force and its people."—END

AIRMAN'S BOOKSHELF

Never Before—Never Again

The Mighty Eighth: A History of the U.S. Eighth Air Force, by Roger A. Freeman. Doubleday & Company, New York, 1970. 311 pages with appendices and index. $14.95.

The only true strategic air campaign in history was fought in Europe and the Pacific during World War II. Nothing even remotely resembling the massive, sustained strategic operations against Fortress Europe will ever happen again. It was unique in human experience. The central figure in that greatest of all military dramas was the Eighth Air Force, which eventually ranged over all of Western and Central Europe from its bases in the United Kingdom.

In the folio-size pages of this carefully researched and beautifully designed book, Roger Freeman has set down the complete World War II history of the Eighth, from its inception in January 1942 to V-E Day.

This is not just a story of heroics, though there is plenty of heroism and plenty of combat narrative in the book. It is also a careful examination of early mistakes and failures that almost halted the strategic campaign before the Eighth acquired long-range fighters that made daylight bombing operationally feasible. The evolution of strategy and tactics is described in detail, from the first small mission to the 1,000-plane raids that climaxed the war. Particularly exciting is the chronicle of Eighth fighter and bomber operations against the Luftwaffe's jets in the closing weeks of hostilities. But the book is essentially a narrative of men—the commanders, the aircrews, the support people, and the planners—whose individual triumphs are set against the backdrop of the most tragic of modern wars.

In addition to the 236 pages of narrative history, illustrated with more than 400 photographs, Mr. Freeman has compiled some sixty pages of appendices covering a brief history of each bombardment and fighter group, and each reconnaissance, ECM, leaflet, and rescue unit. Other appendices include pictures and biographical data on all Eighth AF Medal of Honor recipients; the fighter aces and their records; airfields from which the Eighth operated; color plates and descriptions of unit aircraft markings; a listing of units attached to the Eighth; individual aircraft names; and considerable supplementary data pertinent to combat and support operations.

This is a book for those who were there, for airpower enthusiasts, and for serious historians. It is the kind of book to which the owner will return many times—a book that will grow in value through the years.

—Reviewed by John L. Frisbee. Mr. Frisbee is AF/SD's Senior Editor for Plans and Policy.

Better Tools for Problem-Solving

Serious Games, by Clark C. Abt. Viking Press, New York, 1970. 131 pages plus appendices. $5.95.

For anyone in or out of uniform involved in education, training, or planning, this is a gem of a book by a one-time systems engineer and military analyst who has turned to the social sciences and has pioneered in the development of games and simulation techniques for problem-solving in a wide range of fields. Dr. Abt's prime interest these days is educational reform. And he believes that a vital tool of such reform is the use of well-thought-out "serious games," which even very young children can use to learn about the real world, while at the same time sharpening their basic academic skills. And if children can use them, why not adults? Indeed, much of the book provides a highly useful reference for military people, on how games can be used to teach everything from strategy to occupational skills.

Dr. Abt, whose Massachusetts-based firm, Abt Associates, develops such "serious games" for schools, industry, and government, argues persuasively that traditional instructional techniques are rapidly losing their utility and relevance. He suggests that the standard lecture technique, while needed to impart very basic information, is increasingly lacking in interest, excitement, and, above all, challenge for students of all ages.

Games, on the other hand, he urges in this delightfully dejargonized book, provide the opportunity for participants to role-play (kids love to act out), to use relevant data in a dramatic way, to empathize with other participants, and, in the case of history games, to understand the motivations of historical characters and the interplay of forces and events.

There seems no end to the kind of games that can be devised for education, training, and specific problem-solving. Games have been used for years, of course, for military planning. But they can also be used to teach math and science, or to help students plan their careers, or even by community groups to plan facilities and services. Conflict and resolution games, Dr. Abt suggests, can even help solve police-community problems, with traditional antagonists playing real-life but reversed roles—the

angry citizen playing the role of the cop and vice versa.

Dr. Abt describes the heartening success of educational gaming among so-called disadvantaged students. Kids thought to be "slow" and even kids short on reading and math have come alive when given the chance to express themselves intellectually through games that range from simulation of present-day police-racketeer conflicts to the re-creation of the historical forces that led to the Industrial Revolution.

The appendices describe, in detail, samples of elementary math games designed to replace traditional arithmetic drill, games devised to help public officials plan total educational systems, and games simulating major historical events.

—Reviewed by William Leavitt. Mr. Leavitt is AF/SD's Senior Editor for Science and Education.

Pearl Harbor Minus One and Counting

Roosevelt and Pearl Harbor: A Great President in a Time of Crisis, by Leonard Baker. Macmillan, New York, 1970. 356 pages. $8.95.

Leonard Baker has written a very engaging, blow-by-blow account of events in the US during the twelve months preceding the Japanese attack on Pearl Harbor in December 1941. His obvious admiration for Franklin D. Roosevelt does not diminish the interesting profile he has drawn of the controversial President during the first year of Mr. Roosevelt's third term in office. Mr. Baker has used primary sources to intersperse his narration with numerous direct quotations of the personalities involved in the momentous actions preceding the crisis that forced the US to become a belligerent in WW II.

Essentially, the author maintains that Mr. Roosevelt's greatest achievement during this period was to perceive the inevitability of the US joining the defense of freedom against the Axis, and to prepare the country in slow but steady steps for the assumption of its international responsibilities. In order to do this, Mr. Roosevelt had to overcome the strong opposition of isolationists (like the America First organization); the military establishment (including General Patton), which believed that World War I preparedness and tactics would be sufficient in the event of another war; the industrial machine, which anticipated smaller profits if it turned to producing military equipment for the government; labor leaders who feared for the social gains the New Deal had made since the Depression; and a general public attitude of reluctance to rearm.

In successive months, Mr. Roosevelt overcame each of these oppositionist groups, especially those in the Congress, where he was successful in having legislation passed for lend-lease to Britain and Russia, and to extend the draft.

Although Mr. Baker recognizes President Roosevelt's belief in the inevitability of US participation in the war, and the difficulty the President knew he would have in getting Congress to declare war, the author does not subscribe to the theory that Mr. Roosevelt allowed Pearl Harbor to happen in order to galvanize the country's will to enter the war. Mr. Roosevelt may have known that an attack on the US would come, but he did not know when or where. On the contrary, he had urged repeatedly that the defenses at Pearl Harbor be increased, but the Army—and even more, the Navy—was complacent about the possibility of an attack there. In sum, Mr. Baker maintains, quite convincingly, that Mr. Roosevelt was a clairvoyant President in a time of crisis, and that he prepared a reluctant America for war—militarily, emotionally, politically—better than it had ever been for any of its prior conflicts.

—Reviewed by Joseph W. Annunziata. Dr. Annunziata is a research analyst in the Office of the Secretary of the Air Force.

NEW BOOKS IN BRIEF

Before the Eagle Landed, by the Editors of *Air Force Times*. The challenge of aviation throughout its history, as told in the words of the men and women who made that history, should thrill both armchair and veteran aviators. Beginning with Signal Corps Flight No. 13 by Lt. Thomas E. Selfridge and Orville Wright, on September 17, 1908, which ended in a crash that injured both men, Selfridge fatally, the saga of flight unfolds in stories ranging from Charles Lindbergh's nonstop transatlantic crossing to Paris and the Berlin Airlift, to the "Hindenburg" and "Blossberg Crash" air tragedies, and closes with Neil Armstrong's Apollo-11 landing on the moon. Robert B. Luce, Inc., Washington, D.C. 224 pages. $6.95.

Military Law, A Handbook for the Navy and Marine Corps, by Lt. Cmdr. Edward M. Byrne, JAGC, USN. Presently a Naval Academy instructor in military law and leadership, Commander Byrne has a strong background in his subject. The jacket claims "the military member is intimately involved with the body of law which governs him" and, presumably, this book is designed to make that intimacy more readily available, although still complex. The format includes discussions and self-quizzes at the end of each chapter, with the answers in the back of the book, along with twenty-two helpful appendices, a glossary, bibliography, and index. Published by United States Naval Institute, Annapolis. 396 pages. $7.50.

Mustang—The Story of the P-51 Fighter, by Robert W. Gruenhagen. This splendid book by a new author was researched and written over a six-year period. The Mustang, last piston-engine air-superiority fighter to be used operationally by the USAF, is accepted by its fans as the best airplane to come out of World War II. The detailed material concerning the design, construction, and operation of the P-51 is supplemented by numerous black-and-white photographs. Arco Publishing Co., N.Y. 240 pages. $15.95.

See Them Flying, by Houston Peterson. A reproduction of the two voluminous scrapbooks kept in 1909–10 by Peterson, as an eleven-year-old boy, who later became a professor of philosophy at Columbia and Rutgers Universities. It contains hundreds of irreplaceable clippings from newspapers and magazines of the day: interviews with aviation pioneers here and abroad, priceless pictures of planes and pilots, eyewitness accounts of early triumphs and tragedies, prophesies both remarkably accurate and incredibly naïve. Richard W. Baron, N.Y. 261 pages. $19.95.

The Solar System and Back, by Isaac Asimov. This collection of essays by one of the most prolific and widely read popular-science writers is far ranging in space, time, and subject matter. Beginning with an examination of our solar system's symmetries and irregularities, he returns to earth to discuss physical and chemical properties in nature and science fiction, and goes back in time (and out in space!) to speculate on the causes of the extinction of the dinosaurs. A chapter on chromosome aberration includes a warning against LSD usage. Women's Lib people will like the chapter on the future role of women in our society. Asimov predicts—and supports—that "In the twenty-first century . . . women will be completely free for the first time in the history of the species." Doubleday & Co., N.Y. 246 pages. $5.95. —KAY COLPITTS

LETTER FROM LOS ANGELES

By Irving Stone
AIR FORCE MAGAZINE WEST COAST EDITOR

USAF and the Shuttle

To some observers, the Air Force's participation in the space-shuttle program appears to be not much more than mere formality. To be sure, there's a liaison group—an eight-member review committee, with four members each from the National Aeronautics and Space Administration and the Air Force—to plan and review the shuttle's development phase, but the show is NASA's, and essentially it is NASA that is calling the shots. The shuttle is a NASA program, the management responsibility is NASA's, and NASA's money is paying the bills.

Important as the shuttle program may be to the Air Force, the military is not in a position to carry any of the financial load. There is only a low-key, in-house space-transportation-system study effort being conducted by USAF's Space and Missile Systems Organization (SAMSO).

In addition to its small and nonpublicized space efforts and its Minuteman program, there are aircraft programs of critical importance in the Air Force hopper—the C-5A transport, F-15 air-superiority fighter, B-1 advanced strategic bomber, airborne warning and control system (AWACS), and the aircraft-carried short-range attack missile (SRAM). These critical programs alone will require huge funding to carry them through to operational status.

Projected NASA and military missions create differing shuttle design requirements. The most critical difference relates to cross-range capability—the landing footprint. NASA favors a 200-nautical-mile cross-range target, while the Air Force would prefer the more flexible allowance of 1,500 nautical miles, affording a landing footprint that would permit blanketing almost all of the continental United States and hence a fast emergency return from space.

The cross-range difference isn't a black-and-white question. There are various considerations that color the situation. The 1,500-mile capability would introduce design complexity, additional cost, and an extended program timetable. These factors, though not completely controlling, are important. The design complexity isn't insurmountable. But there is feeling in NASA that the 200-nautical-mile cross range probably could satisfy the bulk of military mission requirements. This viewpoint may be further strengthened if the total number of missions per year contemplated by the Air Force for initial utility of the shuttle is relatively low. Planning at NASA contemplates twenty-five to seventy-five space-shuttle launches per year. Some industry observers feel that the program may be hard pressed to support the lower limit of twenty-five launches per year. If so, this would increase the cost per pound of payload.

The factor of additional cost involved in designing a shuttle to achieve a 1,500-mile cross-range capability may be a large consideration in NASA's favoring a 200-mile cross-range limit. For one thing, the shuttle program doesn't have the glamorous cast of the Apollo lunar mission. To incorporate the sophistication of a 1,500-mile cross-range capability in the shuttle could introduce enough additional expense to cause congressional apprehension over the cost.

An extended program would seem to offer the most feasible approach to incorporate the Air Force cross-range requirement. And at the same time, it would increase NASA's operational capability. The overall space station/base/shuttle is a large project and will involve many technical hurdles, despite the fact that it is considered a reasonable jump in the state of the art. Hence, it may be wiser to proceed a little more slowly and develop the wider-latitude cross-range configuration. This approach also could stretch the yearly funding requirement.

What would be the practical effect of this delay in the space-station/shuttle timetable? Suppose that the operational date were delayed one, two, or three years? Would this in any way diminish our world reputation for technological capability, even if the Soviets first achieved a space-station/shuttle combination?

With the exception of the manned orbiting laboratory (MOL) program, which, after reduced financial support and stretchouts, died in a wave of funding austerity, the Air Force has had no role in manned spaceflight. At the same time, the Soviet space effort has been largely military-oriented. It's reasonable to expect that, until all international points of difference can be resolved by talk and reason, near- and far-space will offer some distinct opportunities for military utilization sometime in the future. The years ahead are so uncertain with respect to technological development that could be applicable to space weaponry that it seems shortsighted for the Air Force to be relegated to its relatively insignificant space role.

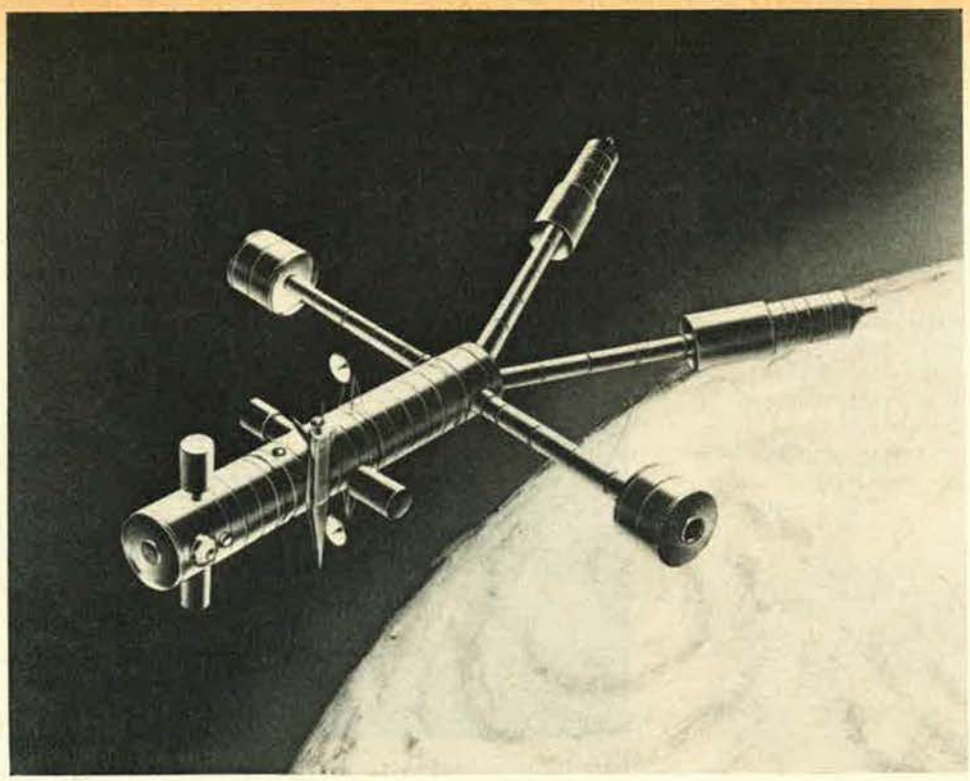
Look-Ahead for EVA

Parallel studies to identify advanced extravehicular protective system (AEPS) concepts for use in the late 1970s and 1980s are being supported by NASA's Ames Research Center, Moffett Field, Calif. LTV Aerospace Corp.'s Missile and Space Div. and United Aircraft Corp.'s Hamilton Standard Div. will generate, in eleven-month efforts, concepts utilizing technologies that could be developed through two or three years of research.

The US manned space effort planned for the 1970s and 1980s includes long-duration missions with orbiting space stations, possibly lunar bases, and eventually Mars landings. Extravehicular activity (EVA) is likely to take on an increasingly important role in the completion of these future missions.

The Apollo portable life-support system (PLSS) used for EVA requires expendables for carbon dioxide removal, heat rejection, trace contaminant control, and power. This involves approximately two and a half pounds of consumables used per hour of EVA, NASA reveals. The use of such expendables in a portable life-support system may be prohibitively burdensome. For future EVAs to be effective, the portable life-support systems may need to have regenerating capability, NASA believes.

The study requirements are viewed as the beginning of a planned program to investigate the practicality and development of an advanced extravehicular protective system that has a regenerating or partially regenerating ca-



On the drawing boards are manned bases for use in earth orbit, like this artist's rendering of a design under concept determination by McDonnell Douglas Astronautics for NASA. This space base is being designed to support fifty men. It would be assembled in the late 1970s and early 1980s, from specialized modules placed in low earth orbit. First up would be a twelve-man station.

pability. Also, NASA is considering future testing of a functional mockup of a complete AEPS, and flight qualifications for a final AEPS prototype.

The concepts generated under the AEPS study will identify technology required for future construction of an advanced system. In addition to the usual portable backpack concept, the study will consider:

- Total or partial subsystem integration into the protective suit.
- Placing of the life-support subsystems on a cart or vehicle with umbilicals to the suit.
- Integration of the life-support system into a pack or suit with subsystem modules removable for regeneration on a cart or vehicle.

The degree of regenerability is an important consideration of the study. A completely regenerating life-support system as envisioned in the study is essentially a closed arrangement. It removes exhaled carbon dioxide for reclamation of the oxygen, and it captures water lost from the astronaut, for purification. Also, no water or other material is evaporated or sublimated to space as a mechanism of heat removal. There is no loss of mass from the system except possibly for trace-contaminant disposal, or a small amount of leakage of fluids from the life-support system and suit. All systems are reusable.

A partially regenerating life-support system has one or more, but not all, subsystems dependent on expendables. For example, a portable life-support system may use a space radiator to reject heat rather than to evaporate water, but it may still use lithium hydroxide (LiOH) to remove carbon dioxide, charcoal for absorption of trace contaminants, etc.

While there is no requirement that recharging or regeneration of the regenerating portions of the system occur within the AEPS, if reclamation and recharge are to occur in the parent vehicle, the necessary vehicle equipment will have to be considered as part of the AEPS design and the associated costs evaluated.

The AEPS concept may take a different form in the case of earth-orbital missions, as contrasted to lunar-surface missions. And some concepts may be applicable only to orbital missions while others may be applicable only to lunar-surface missions. Lunar-surface and earth-orbital operations will be considered separately. In the selection of the most promising systems, analysts will consider separately the questions of reliability, operational simplicity, mobility, stowage, and total mission weight and volume as a function of EVA time.

One performance requirement for the advanced system is that EVA duration, at average metabolic rate, would be in excess of eight hours. Mission frequency would be one per day. Suit gas composition would be five to seven and one-half pounds per square inch absolute (psia) of pure oxygen. Center of gravity of the EVA suit and life-support elements attached to or integrated with it should not shift more than plus or minus three inches from the center of gravity of the crewman.

More Space-Shuttle Tasks

The design of a laser communication system for the space shuttle will be supported by NASA's Marshall Space Flight Center under a twelve-month effort to be funded at approximately $245,000. The design will have to be sufficiently flexible for eventual adaptation, with a minimum of redesign of additional effort, to the space-shuttle design selected for production. This will require liaison with the space-shuttle prime contractors (the North American Rockwell/General Dynamics team and McDonnell Douglas) and NASA to determine the laser communication system requirements.

Among the communication modes that will require study are: shuttle booster to ground, booster to shuttle orbiter, orbiter to ground, orbiter to booster, orbiter to data-relay satellite, and orbiter to space station. State-of-the-art components and techniques will be used in the laser system design.

Approximately thirty-five percent of the effort will be applied to study and sixty-five percent applied to the breadboarding of critical components in the system. These breadboard components will be designed in such a man-

(Continued on following page)

ner that they may be converted at a later date into a prototype system. The components will be packaged to demonstrate the advantage of optical techniques.

Two design review meetings are to be held at MSFC at sixty and 120 days after the start of the contract. The final decision on what components will be breadboarded will be made during the second design review meeting. A final design review meeting will be held nine months after start of contract.

Another space-shuttle effort under the direction of NASA's Marshall Space Flight Center will be the development of shuttle-crew workload criteria for system monitoring. Shuttle in-flight tasks will be a combination of high-performance aircraft and spacecraft operations. Also, all system tests, checkout, and monitoring activities will be performed on board the shuttle. This combination of

This artist's concept depicts how an Air Cushion Landing System being developed by Textron's Bell Aerospace Corp. may be applied to the booster vehicle of NASA's space shuttle, now under development. Bell is also studying the possible application of an air cushion to the orbiter stage.

control and monitoring functions will place heavy workloads on the shuttle crew, particularly under contingency conditions. If workloads become too great, crew performance will be degraded, response times will increase, and error rates will increase. Shuttle-system designers will have to provide for limits as to the amount of work to be performed by crew members.

The study contractor will have to apply systems engineering and man/system integration techniques to identify shuttle-crew system-monitoring workload levels that can be maintained without reducing crew performance effectiveness. The crew workload levels for the booster and orbiter operations will be determined for the entire mission—launch, booster/orbiter separation, booster landing, and orbiter docking, reentry, and landing. System monitoring under nominal and off-nominal conditions will be

Industry team leaders discuss NASA's planned space shuttle. Donald Dooley, right, of General Dynamics' Convair Division, holds a model of the booster vehicle. At his side is Bastian "Buz" Hello of North American Rockwell's Space Division, the integrater of the joint booster/orbiter effort.

analyzed. The assumption is that, to some degree, system monitoring tasks will be performed concurrently with all shuttle-control tasks. And workload analyses will have general application to space-shuttle configurations under study now. One- and two-man crews will be assumed for both the booster and the orbiter.

Results to be achieved in the analysis will include identification of all combinations of crew functions that will constitute definite overload conditions and a listing of all combinations of crew functions that are potential overload conditions. Simulations, or tests, to evaluate combinations leading to potential overload conditions also will be identified. Each suggested simulation will require a detailed study design plus a description of hardware and software requirements.

To identify crew operational requirements for system monitoring, the study contractor will prepare typical flight functional sequences, determine system performance requirements, and identify manual, semiautomatic, and automatic functions for one- and two-man crews. Determination of possible overload conditions will involve estimates of workload duration and magnitude per function, estimates of total workload per mission phase, identification of all instances where work cannot be reliably performed in the time available, development of suggested system design guidelines prohibiting unreliable combinations of functions, and pinpointing those function combinations where workload data are not sufficient to determine crew performance levels.

For those combinations of crew functions where workload data are not sufficient to estimate crew performance, the study contractor will develop complete man-in-the-loop simulation plans. These will involve identification of mathematical models for simulation, specification of system and crew performance measures to be used, simulator hardware specifications, data collection and analysis procedures, and procedures for conducting the simulation.—END

By Jackson V. Rambeau

AFA DIRECTOR OF MILITARY RELATIONS

Dental, Improved Medical Care Recommended

A government-sponsored dental-care program and an improved medical-care program for families of military personnel were called for in a report issued by the Supplemental Service Benefits Subcommittee of the House Armed Services Committee.

The report followed an extensive review of military health-benefit programs, including the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), which provides care for military families, from civilian sources.

The subcommittee said that the CHAMPUS program has fallen short of planned goals for military families because of serious administrative shortcomings. The most serious problem was the lack of a program to fully inform military families of benefits available. The subcommittee said that up to forty percent of enlisted personnel were unaware of available government-sponsored care.

The subcommittee recommended establishment of a vigorous and continuing information program using all available media, with an official at its head with the authority to conduct such a program.

The most severe problem now facing military medical departments is the retention of career medical officers. As a long-term solution, the subcommittee recommended enactment of H.R. 1 (sponsored by Rep. F. Edward Hébert, D-La.), which would establish a Uniformed Services Health Sciences Academy. On a short-term basis, the subcommittee recommended that DoD draft legislation to increase medical officers' earnings, and called on DoD to take a variety of administrative actions to improve medical-officer retention.

Maj. Gen. Roy T. Sessums is congratulated by Air Force Vice Chief of Staff Gen. John C. Meyer after receiving the Distinguished Service Medal during ceremonies held in Washington. General Sessums, who retired last February, received the award for service with the Air Force Reserve.

AFA President George D. Hardy looks on as 2d Lt. Robert C. Roberts receives his gold bars from girl friend Carolyn Timmons at University of Maryland commissioning ceremonies. Mr. Hardy was guest speaker at the function, which saw nine officers commissioned through the ROTC program.

The subcommittee labeled the lack of adequate dental care for dependents of military personnel the remaining big gap in the medical-care program. The group called DoD's position on dental care untenable and criticized it for ignoring the advice of its health-care professionals.

The American Dental Association, earlier neutral, has now adopted a policy of support for a dependents' dental-care program.

The subcommittee recommended in "the strongest possible terms" that dental-care legislation be considered by the parent committee at "the earliest practicable time."

In other recommendations, the group:

- Recommended that the Office of the Civilian Health and Medical Program of the Uniformed Services (OCHAMPUS) be made a DoD agency and be relocated in the Washington, D.C., area. It is presently under the Department of the Army and located in Denver.
- Called for a simplified claims form for military dependents who get care from civilian hospitals and doctors. Calling the present claims form "that bureaucratic revenge," the subcommittee found that twenty-two percent of all forms must be returned to beneficiaries for more information.
- Said the quality of care provided in military hospitals and medical facilities is excellent, but warned that crowding due to the ever-increasing dependent and retired population could adversely affect care in the future.
- Reported that all evidence indicates the quality of care given military families by civilian hospitals and doctors is excellent.

(*Continued on following page*)

• Recommended consideration of special pay for optometrists and inclusion of eye examinations under CHAMPUS.

• Praised the Air Force physical-fitness program.

"What 'Buddy' System?"

With the kind permission of the Editor of the largest newspaper devoted to reporting on matters of interest to Civil Service employees, we reprint the lead editorial of the July 8, 1970, issue of *Federal Times:*

"For years we have heard protests about Defense Department offices hiring former military types for the best jobs. If the protests were accepted at face value, it would be easy to conclude that it is not what you know but who you know that counts.

"However, some figures we obtained from the Air Force make it appear the problem is not as serious as some would have us believe—at least not in the Air Force.

"Since 1965, the Air Force says, military retirees have averaged only 3.59 percent of the total hires made. During this five-year period, a total of 13,540 military retirees were hired.

"Of these, 1,235 were appointed to 'hard to fill' occupations of which there is a nationwide shortage, such as engineering, computer programming, electronic installation, and repair.

"There were 623 appointments made from June 1 through November 30 of 1969. Only thirty-nine of these appointments required prior approval under the provisions of the Dual Compensation Act of 1964.

"The figures make it clear that the three or four percent of total accessions has not represented a major source of intake into civilian positions in the Air Force over the five-year period.

"There undoubtedly are exceptions—cases in which the rules, if not broken, were bent a little. But, there seem to be few such instances documented.

"There are many areas in which hiring and promotion policies are deserving of legitimate criticism. But the charge that the 'Buddy' system runs rampant in the military seems without foundation."

Air Force Village Foundation

Following the annual meeting of Air Force Village Foundation, Inc., held recently at Bolling AFB, D.C., the Board of Trustees met in executive session and elected the following officers:

President, Gen. Frederic H. Smith, USAF (Ret.); 1st Vice President, Edward W. Virgin; 2d Vice President, Mrs. John D. Ryan; 3d Vice President, Mrs. John P. McConnell; Secretary, Col. Jackson V. Rambeau, USAF (Ret.); Treasurer, Maj. Gen. Robert E. L. Eaton, USAF (Ret.).

Other members of the Board of Trustees include: Maj. Gen. Jess Larson, USAFR (Ret.); Mrs. Mary Cain; Gen. Charles P. Cabell, USAF (Ret.); Col. Claude W. Campbell, USAF; Lt. Gen. Laurence C. Craigie, USAF (Ret.); Maj. Gen. John H. Foster, USAF (Ret.); Maj. Gen. Richard A. Grussendorf, USAF; Maj Gen. Reginald C. Harmon, USAF (Ret.); Pat Legan; Mrs. Curtis E. LeMay; Maj. Gen. Morris R. Nelson, USAF (Ret.); Maj. Gen. William H. Powell, Jr., USAF (Ret.); Col. Paul K. Walker, USAF (Ret.); Brig. Gen. Robert F. McDermott, USAF (Ret.); Brig. Gen. John P. Hollers, USAF (Ret.); and Brig. Gen. Edgar H. Underwood, USAF.

Construction of Air Force Village is well along, and the facility should open as scheduled on November 1. It is designed as a residence for widows and female dependents of USAF officers, some retired officers, and widows of officers of other services on a space-available basis.

Col. Jacqueline Cochran, the famed aviatrix who headed the wartime Women's Air Service Pilots (WASP), here receives, from AF Secretary Robert Seamans, her certificate of retirement from the Air Force Reserve, in which she had served since 1948. Secretary Seamans also awarded her the Legion of Merit for exceptional service while at Hq. USAF.

Retired Raise Due in August

About 800,000 military retirees will receive a 5.6 percent pay raise effective August 1, the largest pay hike for retirees since 1958 when the boost was six percent. The raise also increases the amount of pay retired officers working for Uncle Sam can keep under the dual-compensation laws.

Federal civilian retired employees also will receive a 5.6 percent raise effective one month later, on September 1.

The retired raises are based on the May consumer price index which stood at 134.6, or 4.6 percent above the base for determining increases. An extra one percent, required by law, will be added.

The total 5.6 percent raise will apply to service people on the retired rolls before April 15, date of enactment of the last active-duty pay raise. Service members retired on or after April 15 will receive another pay boost next spring.

Retired Regular officers employed by the government will now keep $2,492.02 plus fifty percent of their remaining retired pay annually. This is an increase from $2,359.80.

Civil servants who retired by July 31 also will receive the 5.6 percent boost. Authorities hope that this "lure" may persuade numerous older civil servants to leave government service promptly and thus help ease the RIFs that are slated to occur soon.

The earlier cutoff date for military people to share in the upcoming 5.6 percent raise stems from differences in applicable laws.

This past spring, Air Force relaxed service commitments and invoked other policy changes which were designed, at least in part, to encourage more military retirements. Insufficient time has transpired to determine whether that action will in fact spur retirements. Less than 1,500 AF members retired in May.

Parting Shots

• There is a shortage of field-grade and senior company-grade officers in open-mess management. To alleviate this problem, the Air Force is soliciting voluntary retraining of lieutenant colonels, majors, and captains (including captain selectees). Wouldn't this be a perfect place to improve food service by a strong recruitment program among female officers?

• The Air Force has announced that selected Reserve units will be authorized the same equipment priorities as active units having the same mobilization missions or deployment requirements. Within priority categories, active units may be equipped first, but Reserve units of a specific readiness requirement will be equipped before active units with a lower readiness requirement.

• The Air Force has stated that it has an urgent requirement for forty undergraduate navigator trainees to enter two upcoming classes, and will grant administrative waivers for minor medical defects. Why not recruit WAF officers for navigators? After all, a woman with a sextant is just as good as a man.

• A bill recently signed into law by the President automatically increased life-insurance coverage from $10,000 to $15,000 for more than 3,500,000 active-duty servicemen, the VA has reported.

The new law also covers about 1,000,000 Reservists, National Guardsmen, and ROTC. However, these groups are protected only during certain training activities, and while they are traveling to and from training areas.

• The Chief of the Air Force Nurse Corps, Col. Ethel A. Hoefly, recently completed an intensive tour of Air Guard medical facilities, as the guest of Maj. Gen. I. G. Brown, Director, Air National Guard. She visited the permanent Field Training Site at Alpena, Mich.; 122d TAC Hospital, Fort Wayne, Ind.; 118th Aeromedical Evacuation Squadron, Nashville, Tenn.; 197th Aeromedical Evacuation Flight, Phoenix, Ariz.; and 153d Aeromedical Airlift Group, Cheyenne, Wyo. She toured all medical facilities, a C-121 aeromedical evacuation aircraft, and was on board a C-97 aeromedical evacuation training flight in Phoenix, Ariz.

This is the first time in Air Guard history that the AF Chief Nurse visited Air Guard units, and she was favorably impressed with the Guardsmen's "devotion to duty and outstanding ingenuity."

Helping Hand

A copy of the following letter was sent to AFA President George D. Hardy:

June 10, 1970

General Bruce K. Holloway
Commander in Chief
Strategic Air Command
Offutt AFB, Nebraska

Dear Sir:

On June 5, 1970, my crew and I were operating United Air Lines Flight 664, San Francisco, California, to Spokane, Washington, in Boeing 737 equipment.

On final approach to Spokane International, we experienced a partial failure of the wing flap mechanism, leaving us with unequal and limited wing flap extension.

Because of the increased approach speed and subsequently greater runway length required, we elected to land at Fairchild Air Force Base.

Although Air Force personnel had only a few moments' notice, their performance during the landing and securing of the aircraft indicated a readiness capability of high order.

In addition, their public relations efforts were so well carried out that our 71 passengers left the base in high spirits and, I am sure, with a new respect for the United States Air Force.

I would like to extend my compliments to Colonel Hedlund, Deputy Commander Maintenance, Colonel Forman, Deputy Base Commander, and to Colonel White, Base Commander, upon whose command the aforementioned actions reflect.

I trust that our intrusion has not interfered too much with your operations.

Sincerely,

Captain H. D. Bryan
United Air Lines

SENIOR STAFF CHANGES

B/G Louis O. Alder, from Asst. DCS/Procurement and Production, to DCS/Comptroller, Hq. AFSC, Andrews AFB, Md., replacing M/G Harold C. Teubner . . . **M/G Fred J. Ascani,** from DCS/P&O, Hq. AFLC, Wright-Patterson AFB, Ohio, to Sr. AF Member, Mil. Studies & Liaison Div., Weapons Systems Evaluation Group, OSD (R&E), Hq. USAF . . . **M/G Paul N. Bacalis,** from Asst. DCS/Plans, to DCS/Plans, Hq. SAC, Offutt AFB, Neb., replacing M/G Sherman F. Martin . . . **Mr. Paul E. Beck,** from Supervisory General Engineer (AGE), GS-15, to Technical Director, GS-16, Directorate of Crew & AGE Subsystems Engineering, Aeronautical Systems Division, AFSC, Wright-Patterson AFB, Ohio . . . **B/G John S. Chandler,** from Asst. DCS/Systems, Hq. AFSC, Andrews AFB, Md., to Cmdr., Def. Contract Admin. Svcs. Region, DSA, Los Angeles, Calif., replacing B/G Theodore S. Coberly.

B/G Theodore S. Coberly, from Cmdr., Def. Contract Admin. Svcs. Region, DSA, Los Angeles, Calif., to Dir. Reconnaissance and Electronic Warfare, DCS/R&D, Hq. USAF . . . **B/G Martin G. Colladay,** from Vice Cmdr., 21st AF, MAC, McGuire AFB, N.J., to Cmdr., 436th Mil. Airlift Wg., MAC, Dover AFB, Del. . . . **M/G Paul T. Cooper,** from C/S, to Dir., Laboratories, Hq. AFSC, Andrews AFB, Md., replacing retiring B/G Raymond A. Gilbert . . . **B/G John A. DesPortes,** from C/S, US Taiwan Def. Cmd., Taipei, Taiwan, to Cmdr., 12th Strat. Aerospace Div., SAC, Davis-Monthan AFB, Ariz. . . . **Col. (B/G Selectee) Clarence J. Douglas, Jr.,** from Asst., Program Mgmt., Def. Communications Planning Group, Hq. USAF, to C/S, US Taiwan Def. Cmd., Taipei, Taiwan, replacing B/G John A. DesPortes . . . **B/G Robert A. Duffy,** from Dep., Reentry Systems, SAMSO, Norton AFB, Calif., to Vice Cmdr., SAMSO, AFSC, Los Angeles, Calif.

B/G John J. Gorman, from DCS/Intelligence, PACAF, Hickam AFB, Hawaii, to DCS/Intelligence, PACOM, Hawaii, replacing M/G George J. Keegan, Jr. . . . **Mr. Thomas W. Gorman,** from Asst., Comptroller, GS-17, to Asst., DCS/Materiel Management, GS-17, Hq. AFLC, Wright-Patterson AFB, Ohio . . . **M/G Ernest C. Hardin, Jr.,** from DCS/Ops, to Vice Cmdr., 7th AF, Tan Son Nhut Airfield, Vietnam, replacing M/G (L/G Selectee) Robert J. Dixon . . . **B/G John W. Hoff,** from Cmdr., 512th Mil. Airlift Wg., SAC, Carswell AFB, Tex., to Cmdr., Central AF Reserve Region, Ellington AFB, Tex. . . . **M/G John B. Hudson,** from DCS/Ops, Hq. AFSC, Andrews AFB, Md., to Vice Cmdr., ASD, Wright-

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Patterson AFB, Ohio (previously reported as being assigned Vice Cmdr., SAMSO, AFSC, Los Angeles AFS, Calif.) . . . **B/G Clare T. Ireland, Jr.,** from Cmdr., 437th Mil. Airlift Wg., MAC, Charleston AFB, S.C., to Vice Cmdr., 21st AF, MAC, McGuire AFB, N.J., replacing B/G Martin G. Colladay.

M/G George J. Keegan, Jr., DCS/Intelligence, PACOM, Hawaii, to DCS/P&O, Hq. AFLC, Wright-Patterson AFB, Ohio, replacing M/G Fred J. Ascani . . . **B/G James D. Kemp,** from Asst. C/S, J-3 UN Cmd./US Forces, Korea, Seoul, to Cmdr., Def. Gen. Supply Ctr., DSA, Richmond, Va. . . . **B/G Thomas B. Kennedy,** from Dep., Special Asst., Strat. Mobility, OJCS, Hq. USAF, to Cmdr., 437th Mil. Airlift Wg., MAC, Charleston AFB, S.C., replacing B/G Clare T. Ireland, Jr. . . . **M/G John B. Kidd,** from Dep. Dir., to Dir., Personnel Planning, DCS/P, Hq. USAF, replacing M/G Edward A. McGough, III . . . **Mr. William W. Klare,** from Asst., Dir. of Ops, GS-17, to Asst., DCS/P&O, GS-17, Hq. AFLC, Wright-Patterson AFB, Ohio . . . **Mr. Edward G. Koepnick,** from Supervisory Aerospace Engineer, GS-15, to Technical Director, GS-16, Directorate of Propulsion & Power Subsystems Engineering, Deputy for Engineering, Aeronautical Systems Division, AFSC, Wright-Patterson AFB, Ohio.

M/G (L/G Selectee) Eugene B. LeBailly, from Cmdr., 16th AF, USAFE, Torrejon AB, Spain, to Chairman, Inter-American Def. Board, Washington, D.C. . . . **M/G David I. Liebman,** from Dep. Dir., Jt. Staff, OJCS, Hq. USAF, to Vice Cmdr., 12th AF, TAC, Bergstrom AFB, Tex. . . . **B/G Robert P. Lukeman,** from Chief, Strat. Plans & Policy Div., J-5, Jt. Staff, JCS, Hq. USAF, to Asst. DCS/Plans, Hq. SAC, Offutt AFB, Neb., replacing M/G Paul N. Bacalis . . . **Col. (B/G Selectee) Abner B. Martin,** from Cmdr., AF Armament Laboratory, AFSC, Eglin AFB, Fla., to Dep., Reentry Systems, SAMSO, AFSC, Norton AFB, Calif., replacing B/G Robert A. Duffy . . . **Mr. John T. McConathy,** from Director of Personnel Systems, GS-15, Air Force Data Systems Design Center, Washington, D.C., to Chief, Classification & Regulations Division, GS-16, Directorate of Civilian Personnel, Hq. USAF . . . **M/G Edward A. McGough, III,** from Dir., Personnel Planning, DCS/P, Hq. USAF, to Cmdr., 16th AF, USAFE, Torrejon AB, Spain, replacing M/G (L/G Selectee) Eugene B. LeBailly . . . **L/G John B. McPherson,** from Asst. to the Chairman, JCS, to Commandant, National War College, Washington, D.C.

Col. (B/G Selectee) William T. Meredith, from DCS/Civil Engineering, TAC, Langley AFB, Va., to Dir., Real Property Maintenance Office, Asst. Secy. of Def. (I&L), Hq. USAF . . . **B/G Warner E. Newby,** from Cmdr., AF Contract Management Div., AFSC, Los Angeles, Calif., to Systems Program Director, C-5A, ASD, AFSC, Wright-Patterson AFB, Ohio . . . **M/G Edmund F. O'Connor,** from Vice Cmdr., Aeronautical Systems Div., AFSC, Wright-Patterson AFB, Ohio, to DCS/Procurement & Production, Hq. AFSC, Andrews AFB, Md. . . . **Col. (B/G Selectee) James E. Paschall,** from Cmdr., AF Special Weapons Ctr., AFSC, Kirtland AFB, N.M., to Dep. Cmdr., 22d NORAD/CONAD Region, North Bay, Ontario, Canada . . . **Mr. William T. Riordan,** from Physical Science Administrator, Directorate of Operations, GS-15, to Chief, Production & Distribution Plant, GS-16, Aeronautical Chart & Information Center, St. Louis, Mo.

Mr. Franklin J. Ross, from P.L. 313 position of Dir., Advisory Group for Aerospace Research & Development, NATO, Paris, France, to P.L. 313 position of Deputy for Requirements, Office, Asst. Secy. of the Air Force (R&D), Washington, D.C. . . . **B/G Alton D. Slay,** from Cmdr., AFFTC, AFSC, Edwards AFB, Calif., to DCS/Ops, Hq. AFSC, Andrews AFB, Md. . . . **Mr. Gordon W. Summers,** from Technical Director, GS-16, to Asst., Cmdr., GS-16, DCS/Ops, Hq. USAF Security Service, San Antonio, Tex. . . . **Mr. Reuben E. Stanley,** from Asst., Management, GS-16, Office of the Commander, ASD, AFSC, to Asst., DCS/Procurement, GS-17, Hq. AFLC, Wright-Patterson AFB, Ohio.

M/G Harold C. Teubner, from DCS/Comptroller, Hq. AFSC, Andrews AFB, Md., to Auditor General, USAF, Norton AFB, Calif. . . . **Col. (B/G Selectee) Robert M. White,** from Dep. Sys. Program Dir., F-15, ASD, AFSC, Wright-Patterson AFB, Ohio, to Cmdr., AFFTC, AFSC, Edwards AFB, Calif., replacing B/G Alton D. Slay.

PROMOTIONS: To be **Lieutenant General:** Eugene B. **LeBailly;** James T. **Stewart.**

AIR NATIONAL GUARD: Nominated to **Major General:** David **Wade** (Ret); Edwin **Warfield,** III. Nominated to **Brigadier General:** Clinton M. **Miller.**

RETIREMENTS: B/G Russell A. **Berg;** B/G Jack **Bollerud;** M/G Robert W. **Burns;** B/G Roy N. **Casbeer;** M/G Edwin R. **Chess;** B/G McLean W. **Elliott;** B/G Raymond A. **Gilbert;** M/G George B. **Greene,** Jr.; B/G John W. **Harrell,** Jr.; M/G Fred J. **Higgins;** B/G Harold R. **Johnson;** M/G Lee M. **Lightner;** L/G Sam **Maddux,** Jr.; B/G Augustus A. **Riemondy;** B/G Ralph D. **Steakley.**—END

Dr. Louis M. Rousselot, previously Deputy Secretary of Defense (Manpower and Reserve Affairs) for Health Affairs, has been named to head the Office of Assistant Secretary of Defense for Health and Environment, newly established by Defense Secretary Melvin Laird. Dr. Rousselot was nominated for the position by President Richard M. Nixon.

Each year two exceptionally qualified USAF Flight nurses enter the special Aerospace Nursing course at the School of Aerospace Medicine, Brooks AFB, Tex. A recent graduate of that course, which has been expanded to cover the entire Air Force aerospace environment, is Capt. Barbara L. Farrell, now stationed at Vandenberg AFB, Calif.

Capt. Karen A. Meier also completed the broadened aerospace nurse course. Training took the two nurses to such places as the Arctic and Tropic Survival Schools, USAF's Western Test Range, and the Flight Test Center at Edwards AFB, Calif. Captain Meier has been assigned to the 57th Aeromedical Evacuation Squadron, Clark AFB, Philippines.

AFA NOMINEES—1970-1971

MEETING in Colorado Springs, Colo., on May 30, in conjunction with a meeting of the Air Force Association's Board of Directors, the AFA Nominating Committee, made up of the Board of Directors and the State Presidents, selected a slate of three National Officers and twenty-two Directors (including a nominee for Chairman of the Board). This slate will be presented to the Delegates at the 1970 AFA National Convention to be held in Washington, D. C., September 21–24.

Incumbent AFA President GEORGE D. HARDY, Hyattsville, Md., was nominated unanimously for a second term. Mr. Hardy is President of the Harry B. Cook Co., a food brokerage firm with offices in Washington, D.C.; Baltimore, Md.; and Richmond and Norfolk, Va.

During World War II, Mr. Hardy served in a medium bomb group of the Twelfth Air Force in the Mediterranean theater. A dedicated AFAer, Mr. Hardy also serves as a permanent National Director, as chairman of the Executive Committee, as a member of the Finance Committee, and as a member of the Board of Trustees of the Aerospace Education Foundation. A charter member of the Air Force Association, Mr. Hardy has performed devoted service to AFA for more than twenty years. He has served as an AFA Wing Commander (two terms), Regional Vice President (five terms), an elected National Director (four terms), National Secretary (six terms), Chairman of the Board of Directors (one term), and as a National Committee member for many years.

In 1957, Mr. Hardy received the President's Trophy as "AFA Man of the Year" after his highly successful chairmanship of that year's "Golden Anniversary" Convention in Washington, D.C. He has received AFA's Gold Life Membership Card and a Special Citation.

JESS LARSON, AFA's incumbent Chairman of the Board of Directors, was nominated unanimously for an unprecedented fourth term.

Mr. Larson is a member of the Executive and Finance Committees, and the Board of Trustees of the Aerospace Education Foundation. A former Chairman of AFA's Reserve Council, Mr. Larson served for thirty months as AFA's National President. At the 1968 National Convention in Atlanta, Ga., Mr. Larson received the AFA Gold Life Membership Card.

A World War II field artillery officer, he later joined the Air Force Reserve, from which he retired in 1966 with the rank of major general. In civilian life, Mr. Larson has served as Administrator, War Assets Administration; Administrator, General Services Administration; and, along with the latter post, served also as Administrator of the Defense Materiel Procurement Agency. Mr. Larson is a partner in the Washington law firm of Alvord & Alvord.

NATHAN H. MAZER, Roy, Utah, was nominated for the office of National Secretary.

Mr. Mazer, a retired colonel of the United States Air Force, is Executive Director of the Weber County Industrial Development Bureau. He is currently serving as an AFA National Director, a member of the Military Manpower Council, and a member of the Board of Trustees of the Aerospace Education Foundation. He is a former Regional Vice President and Chairman of the Organizational Advisory Council.

JACK B. GROSS, incumbent National Treasurer, was nominated unanimously for an unprecedented ninth term.

Mr. Gross, a prominent Harrisburg, Pa., civic leader and businessman, is a charter member of AFA, a permanent AFA National Director, Chairman of the Finance Committee, a member of the Executive Committee, and a member of the Board of Trustees of the Aerospace Education Foundation. He is a former AFA Squadron and Wing Commander, and Chairman of AFA's Board of Directors. In 1958, he received the President's Trophy as "AFA Man of the Year," and has received AFA's Gold Life Membership Card. Mr. Gross recently retired from the Air Force Reserve, with the rank of colonel.

The following are permanent members of the AFA Board of Directors, under the provisions of Article X of AFA's National Constitution:

JOHN R. ALISON, EDWARD P. CURTIS, JAMES H. DOOLITTLE, JOE FOSS, GEORGE D. HARDY, JOHN P. HENEBRY, ROBERT S. JOHNSON, ARTHUR F. KELLY, GEORGE C. KENNEY, THOMAS G. LANPHIER, JR., JESS LARSON, CURTIS E. LEMAY, CARL J. LONG, HOWARD T. MARKEY, J. P. MCCONNELL, J. B. MONTGOMERY, JULIAN B. ROSENTHAL, PETER J. SCHENK, ROBERT W. SMART, C. R. SMITH, CARL A. SPAATZ, WILLIAM W. SPRUANCE, THOS. F. STACK, ARTHUR C. STORZ, HAROLD C. STUART, JAMES M. TRAIL, and NATHAN F. TWINING.

The twenty-one individuals listed below and shown in the accompanying photos are nominees for elected membership on the AFA Board of Directors for the coming year. *(Names marked with an asterisk are incumbent National Directors.)*

*JOSEPH E. ASSAF, Hyde Park, Mass.—chemical engineering technologist. Former Squadron, Wing Commander; Regional Vice President; National Committee member. Current member, Board of Trustees, Aerospace Education Foundation.

(Continued on following page)

Hardy

Larson

Mazer

Gross

Assaf Berkeley Caniff Cordell Deming Gaillard Gilstrap

Harris Hodges Hunt Kriendler Lawson Lingle Murphy

Ostrow Palen Shosid Vaughan Withers Wright Zuckert

*WILLIAM R. BERKELEY, Redlands, Calif.—AF civilian information officer. Former Squadron Commander; Regional Vice President; National Committee member.

*MILTON CANIFF, New York, N.Y.—syndicated cartoonist. Former Chapter President; National Committee member. Current member, Board of Trustees, Aerospace Education Foundation. Arts and Letters Trophy (1953); AFA Citation of Honor (1961); "AFA Man of the Year" (1965).

*M. LEE CORDELL, Berwyn, Ill.—electrical engineer. Former Squadron, Wing Commander.

*S. PARKS DEMING, Colorado Springs, Colo.—communications engineer. Former Chapter, State President.

*PAUL W. GAILLARD, Omaha, Neb.—telephone company executive. Former Regional Vice President; National Committee member. Current Chapter President.

JACK T. GILSTRAP, Huntsville, Ala.—aerospace program analyst. Former Chapter President; State officer; National Committee member. Current Regional Vice President.

*MARTIN H. HARRIS, Winter Park, Fla.—research engineer. Former State President; Regional Vice President; National Committee member. Current Chapter President; member, Board of Trustees, Aerospace Education Foundation.

*JOSEPH L. HODGES, South Boston, Va.—retail executive. Former National Secretary; Regional Vice President. Current National Committee member; member, Board of Trustees, Aerospace Education Foundation.

MARJORIE O. HUNT, Mount Clemens, Mich.—Chamber of Commerce manager. Former Chapter President. Current State President. "AFA Woman of the Year" (1968).

*MAXWELL A. KRIENDLER, New York, N.Y.—food importer. Former Squadron Commander. Current member, Board of Trustees, Aerospace Education Foundation; National Committee member. "AFA Man of the Year" (1964).

ROBERT S. LAWSON, Los Angeles, Calif.—sales manager. Former Chapter, State President.

*JOSEPH J. LINGLE, Milwaukee, Wis.—Air Reserve technician. Former State President. Current National Committee member.

*WARREN B. MURPHY, Boise, Idaho—insurance and investment executive. Former Squadron, Wing Commander; Regional Vice President. Current National Committee member.

*MARTIN M. OSTROW, Beverly Hills, Calif.—attorney. Former Squadron, Wing Commander; Regional Vice President; National Committee Chairman. Current National Committee member.

DICK PALEN, Edina, Minn.—commercial photographer. Former Chapter, State President; National Committee member. Current Regional Vice President.

*JOE L. SHOSID, Fort Worth, Tex.—advertising executive. Former Regional Vice President; National Committee Chairman. Current National Committee member; member, Board of Trustees, Aerospace Education Foundation. "AFA Man of the Year" (1963).

*ROBERT C. VAUGHAN, San Carlos, Calif.—sales engineer. Former Squadron, Wing Commander. Current member, Board of Trustees, Aerospace Education Foundation.

*JACK WITHERS, Kettering, Ohio—aerospace industry consultant. Former Chapter, State President.

JAMES W. WRIGHT, Williamsville, N.Y.—chemical engineer. Former Chapter, State President; Regional Vice President; National Committee member.

EUGENE M. ZUCKERT, Washington, D.C.—attorney. Former Secretary of the Air Force. AFA Citations of Honor (1952 and 1965). —DON STEELE

UNITS OF THE MONTH

THE TENNESSEE VALLEY AND SATURN, ALA., CHAPTERS . . .

cited for their effective support of the AFA mission through their outstanding support of the AFJROTC program.

More than 150 AFJROTC cadets from S. R. Butler High School and other Madison County, Ala., high schools, as well as some sixty AFAers and guests, attended the First Annual Aerospace Education Symposium co-sponsored by AFA's **Tennessee Valley** and **Saturn Chapters** in cooperation with Huntsville, Ala., based aerospace industries, local merchants, and the news media.

The day-long symposium featured a morning session on aeronautics and an afternoon session on space. Tennessee Valley Chapter President **Moses H. K. Choo** delivered opening remarks for the aeronautical sessions, and **Lt. Col. Clifford M. Winter, Jr.,** USAF (Ret.), Assistant Aerospace Education Instructor at S. R. Butler High School, was moderator. The space session opened with remarks from Saturn Chapter President **W. Scott Fellows,** and **Lt. Col. Jack S. Lacy,** USAF, was moderator.

Aeronautical session panelists and their subjects were: **John T. Campbell,** Associate Chief, Flight Mechanics and Technology Division, NASA Langley Research Center, Va., **"V/STOL"; O. E. Trotter,** Lockheed Aircraft Corp., **"C-5A"; Heber J. Badger,** Boeing Co., **"SST"**; and **Col. J. W. Wood,** Director, Test and Deployment Directorate, F-15 System Program Office, Wright-Patterson AFB, Ohio, **"F-15."**

Space session panelists and their subjects: **Brig. Gen. Jessup D. Lowe,** Commander, Arnold Engineering Development Center, Arnold Air Station, Tenn., **"Arnold in the Years Ahead"; Richard E. Brackeen,** Martin Marietta, **"Lifting Body"; R. W. Bohlen,** North American Rockwell, **"Space Shuttle";** and **George Von Tiesenhausen,** Chief, Orbital Mission Group, Advanced Systems Office, George C. Marshall Space Flight Center, **"Next Twenty Years in the Space Program."**

Brig. Gen. Benjamin B. Cassiday, Jr., Commandant, AFROTC, was guest speaker at the awards luncheon. During the program, AFA South Central Regional Vice President **Jack T. Gilstrap** presented the Tennessee Valley Chapter's $150 scholarship to AFJROTC **Cadet Maj. William Murry Burns.**

An evening awards banquet featured an address by **Maj. Gen. John P. Gifford,** Chief of Staff, Tennessee ANG. During the program, Huntsville Mayor **Joe W. Davis** presented General Gifford a certificate designating him an honorary citizen of Huntsville. **Dr. Boyd E. Macrory,** President, Alabama AFA, presented AFA's AFJROTC bronze medal to **Cadet Earl Mathis.**

Following the banquet, a Military Ball highlighted the program. Reigning were AFJROTC Sweetheart **Miss Mamie Hall** and her two princesses, **Miss Robyn Delaney** and **Miss Mary Lou Kennedy.**

Visiting AFA leaders included **Cecil G. Brendle,** Alabama AFA Secretary; Montgomery Chapter President **Frank Sego;** and **Charlie Powell,** representing the Mobile Chapter.

Members of the Symposium Committee were: Tennessee Valley Chapter President **Moses H. K. Choo;** Saturn Chapter President **W. Scott Fellows; Don Diehl; John E. Hall;** Regional Vice President **Jack T. Gilstrap; William H. Jaeger; Jack H. Haire; William J. Brown;** and AFJROTC **Cadets T. X. Battles, D. A. Masson,** and **D. C. Rogers.**

The entire symposium received excellent coverage in the local newspapers, and the luncheon and banquet programs were videotaped by station **WHNT-TV** (CBS) and were aired over the entire North Alabama area.

(Continued on following page)

AFJROTC cadets from the S. R. Butler High School, Huntsville, Ala., applaud a presentation during the day-long Aerospace Education Symposium recently sponsored for them by AFA's Tennessee Valley and Saturn Chapters of Huntsville. A morning session dealt with aeronautics and an afternoon one with space (see accompanying story).

The ceremony depicted here is representative of similar events at more than 100 universities and colleges at which AFA's Silver Medal was presented to the outstanding AFROTC cadet. At Louisiana State University, Lt. Col. Lee Lockwood, USAF (Ret.), right, Baton Rouge Chapter President, presents the medal to Cadet David K. Jones.

Head-table guests at the Santa Monica, Calif., Chapter's Eleventh Annual Awards Banquet included, from left, Joe Higgins, a past president of the Los Angeles Chapter; Robert Lawson, chairman, California AFA Executive Committee; Maj. Gen. William C. Garland, Commander, First Strategic Aerospace Division, guest speaker and the Chapter's "Military Man of the Year"; Mrs. Garland; Chapter President Milton Feir; Lt. Col. Arthur Ragen, the event's Master of Ceremonies; and Vera B. Wright, past president of the Santa Monica Chapter.

In recognition of the joint efforts of the Tennessee Valley and Saturn Chapters in sponsoring a program which very effectively accomplished its objective of bringing aerospace education to the youth of their area, we are happy to name the **Tennessee Valley Chapter** and the **Saturn Chapter** "AFA Units of the Month," and to congratulate the officers and members of both Chapters on their outstanding contribution to AFA's mission.

* * *

The **Santa Monica, Calif., Chapter's** Eleventh Annual Awards Banquet, the highlight of the Chapter's annual series of programs, was held recently in the Aviation Room of the Miramar Hotel.

Maj. Gen. William C. Garland, Commander, First Strategic Aerospace Division (SAC), Vandenberg AFB, was guest speaker, and was honored as the Chapter's "Military Man of the Year."

Lt. Col. Arthur S. Ragen, USAF Office of Information in Los Angeles, was Master of Ceremonies, and awards were presented by **James H. Doolittle,** Lt. Gen., USAF (Ret.), AFA's first national president; **Robert Lawson,** Chairman, California AFA Executive Committee; Col. **Beirne Lay, Jr.,** USAF (Ret.), co-author of the book and TV series "Twelve O'Clock High" and a recipient of AFA's Arts and Letters Trophy (1956); **Colonel Ragen; Vera B. Wright,** Chairman, Santa Monica Chapter Board; Chapter President **Milton Feir;** and **Joe Higgins,** a past president of AFA's Los Angeles Chapter, the "Toastmaster General of the USAF," and better known to TV viewers throughout the country as the "Dodge Safety Sheriff."

In addition to General Garland, awards were presented to **Aubrey E. Austin, Jr.,** President, Santa Monica Bank, "Community Service Award"; **Col. Richard H. Denison,** Executive Officer, 146th Tactical Airlift Wing, California ANG, "Brig. Gen. Raymond J. Kopecki Memorial Award"; **Lt. Col. William A. Ward,** USAFRes, "USAF Reserve Award"; **Mrs. Mary Wilson Mitchell,** a former secretary of the Chapter, "Youth Activities Award"; **Maj. Gen. and Mrs. Wesley Schott,** USAF (Ret.), and **Col. and Mrs. Beirne Lay, Jr.,** USAF (Ret.), "Appreciation Award"; **Lt. Col. Dean E. Gausche,** Professor of Aerospace Studies, UCLA, "Education Award"; AFROTC **Cadet Maj. William R. Zomar,** Commander, Capt. Don Brown Squadron (AAS), UCLA, "General James H. Doolittle Award"; and **Angel Susan Gurak,** UCLA, "Angel Flight Award."

Guests included **Gen. Samuel E. Anderson,** USAF (Ret.); **Brig. Gen. William Pendleton,** Commander, 146th Tactical Airlift Wing, California ANG; **Col. G. Theedes,** Commander, 9343d Air Reserve Squadron; **Floyd Damman** and **Barbara Rowland,** California AFA Vice President and Secretary, respectively; **Tillie Henion,** Vice President and Secretary, San Bernardino Chapter; and **John Mitchell,** the first president of AFA's Baltimore No. 1 Chapter, the first chapter organized and chartered in AFA.

Several weeks prior to its Awards Banquet, the Chapter and the **Los Angeles Chapter** cosponsored **AFA Day** in the Los Angeles USO.

More than 400 men from all branches of the military service and a large contingent of Canadian servicemen were served free refreshments during the day. Entertainment was provided by **Gary Grayson,** an accomplished magician and a member of the Santa Monica Chapter.

Chairman for the event was **Dorothy Feir** of the Santa Monica Chapter. Los Angeles Chapter President **James Sorrentino,** Santa Monica Chapter President **Milton Feir,** and members from both Chapters, as well as Angels from the UCLA Angel Flight, assisted in making the event a big hit with the servicemen.

* * *

AFA President **George D. Hardy** was guest speaker at the **Chicopee, Mass., Chapter's** recent Awards Banquet. In his remarks, Mr. Hardy said, ". . . we [AFA leaders] can't see any compelling reasons why the silent majority should remain silent any longer. We have at least as much right to speak out and be heard as the Viet Cong flag bearer.

"Not only that, but I sincerely believe that the story we can tell is a great deal better and more valid than theirs.

"I intend, therefore, for AFA to be heard on the issues which determine the future of the country and the free world. . . ."

Emphasizing the importance of maintaining a strong national defense, he said. "They [our candle-bearing peace marchers] completely fail to grasp the very meaning of the word

(Continued on page 92)

At a recent dinner meeting of the Grand Strand Chapter of Myrtle Beach, S.C., Maj. Gen. James Hackler, USAF (Ret.), presents plaques to AFROTC graduates, from left, Wallace M. Watson, U. of S.C.; William A. Lindstrom, Clemson; and George A. Martin, The Citadel.

1970 ANNUAL NATIONAL CONVENTION AND AEROSPACE BRIEFINGS AND DISPLAYS

Washington, D.C.— September 21-22-23-24

AFA's 1970 National Convention, now combined with its Annual Fall Meeting and Aerospace Development Briefings and Displays, will be held in Washington, D.C., September 21-24. All major Convention activities will be conducted at the Sheraton-Park, Shoreham, and Washington Hilton Hotels. Additional housing also will be reserved at the Windsor Park Hotel. Reservation requests should be addressed to the AFA Housing Office, 1129 20th St., N.W., Washington, D.C. 20036. All reservation requests for rooms and suites must be mailed (no phone calls, please) to the AFA Housing Office. Do not make any reservation requests directly with the hotels.

AFA's 1970 National Convention activities will include a luncheon for the Air Force Chief of Staff, a luncheon for the Air Force Secretary, a reception in honor of the Secretary and Chief, and the Annual Air Force Anniversary Reception and Dinner-Dance. The National Convention also will feature AFA's Business Sessions, Seminars, and several other activities, including a reception in honor of AFA Chapter Officers, the Annual Outstanding Airmen Dinner, and the Chief Executives Buffet Reception.

The Advance Registration fee for AFA's 1970 Annual Convention is $50.00, which includes credentials and tickets to all major Convention functions (except as referred to below), including the Secretary's Luncheon, the Chief's Luncheon, and the Reception honoring the Secretary and the Chief. After September 7, the Current Registration fee is $60.00, which includes the above credentials and activities. The Air Force Anniversary Reception and Dinner-Dance is not included in Advance or Current Registration fees. Individual reservations are $30.00 (includes both Reception and Dinner-Dance). All seating at Dinner-Dance is reserved and tables of 10 are available at $300.00. Dress is black tie. All Convention registrants are cordially invited to attend the Aerospace Briefings and Displays each afternoon, as our guests and to join us for a complimentary reception Wednesday and Thursday afternoons at 4:00 PM.

SCHEDULE OF EVENTS

Sunday, September 20

12:00 NN Registration Desk Open
3:00 PM AFA Board of Directors Meeting

Monday, September 21

8:00 AM Registration Desk Open
9:30 AM Opening Ceremony & Awards
2:30 PM 1st AFA Business Session
7:00 PM AFA President's Reception For Chapter Officers and Convention Delegates

Tuesday, September 22

8:00 AM Registration Desk Open
8:30 AM 2nd AFA Business Session
9:00 AM Briefings & Displays Open
11:45 AM AF Chief of Staff Reception
12:00 NN Briefing Participants Buffet Luncheon
12:30 PM AF Chief of Staff Luncheon
2:30 PM AF Reserve Seminar
6:00 PM AF Secretary & Chief's Annual Reception

Wednesday, September 23

8:00 AM Registration Desk Open
9:00 AM Briefings & Displays Open
9:00 AM Air Force Symposium
11:45 AM AF Secretary's Reception
12:00 NN Briefing Participants Buffet Luncheon
12:30 PM AF Secretary's Luncheon
4:00 PM Briefing Participants Reception
7:00 PM AF Anniversary Reception
8:00 PM AF Anniversary Dinner-Dance

Thursday, September 24

9:00 AM Briefings & Displays Open
12:00 NN Briefing Participants Buffet Luncheon
4:00 PM Briefings Participants Reception

ADVANCE REGISTRATION FORM

24th ANNUAL AIR FORCE ASSOCIATION CONVENTION & AEROSPACE BRIEFINGS & DISPLAYS

SEPTEMBER 21-24, 1970 SHERATON-PARK HOTEL WASHINGTON, D. C.

Type or print

NAME _____

TITLE _____

AFFILIATION _____

ADDRESS _____

CITY & STATE _____

*Current Registration fee (after Sept. 7): $60.00

Reserve the following for me:

☐ Advance registrations @$50.00 per person ..... $_____

☐ Current Registrations* @$60.00 per person ..... $_____

☐ AF Anniversary Reception & Dinner-Dance Tickets @$30.00 per person ..... $_____

Amount enclosed ..... $_____

Make checks payable to AFA and mail to 1750 Pennsylvania Ave., N.W., Washington, D.C. 20006

'deterrence' and choose to ignore the historic fact that most international confrontations are resolved without war. The side that is militarily inferior can lose on a vital issue without fighting."

During the awards portion of the program, **Capt. Robert C. Ritter, Jr.,** 99th Air Refueling Squadron, was named "Junior Officer of the Year"; **SMSgt. Albert C. Aniello,** 905th Support Squadron, was named "Airman of the Year" for his unit; and **TSgt. Matthew A. Jenson,** USAF Regional Hospital, was named "Westover AFB Airman of the Year."

Chapter President **Andrew Trushaw** gave the welcoming remarks and presented the awards. The Right Reverend **Monsignor R. L. U. Montcalm,** Massachusetts AFA Chaplain, delivered the invocation, and New England Regional Vice President **Edward T. Nedder** was Master of Ceremonies.

Guests included **Col. William Wolfendon,** Commander, 99th Bomb Wing Rear Echelon; **Col. Robert Bauman, Jr.,** Commander, Eastern Communications Region; **Col. Howard Dye, Jr.,** Commander, 905th Military Airlift Group, USAFR; **Col. (Dr.) James Stuteville,** Commander, USAF Regional Hospital; and AFA National Director **Joseph E. Assaf.**

* * *

More than 100 AFAers representing twenty-two of the **California AFA's** twenty-five chapters attended a two-day Spring Conference at Edwards AFB recently.

First-day arrivals were invited to play golf on the Edwards AFB course, then enjoyed an informal social during the evening at the Officers' Club.

The next morning, after briefings on the Air Force Flight Test Center mission and the Aerospace Research Pilot School, delegates were given a close-up look and briefings by project pilots on the C-5A, YF-12, F-111, and A-7 aircraft currently undergoing testing at the Flight Test Center.

After a dutch-treat lunch, **Robert S. Lawson,** Chairman of the California AFA's Executive Committee, convened the business session and introduced Far West Regional Vice President **Will Bergstrom,** AFA National Director **William Berkeley,** and California AFA President **L. Eugene DeVisscher.**

Two resolutions were adopted, one supporting the Governor of Ohio and the Ohio National Guard for actions taken in quelling student disturbances, the other supporting President Nixon's Cambodia policy.

Mrs. Mitch Jones, wife of a POW, addressed delegates and acknowledged the support AFA has given to POWs and their families. She then introduced **Mrs. Janice Lyons,** a POW wife, and **Capt. Wes Rumble,** a former POW. **Don Steele,** AFA's Director of Field Organization, spoke to the session on National AFA programs, and answered questions from state officers and chapter representatives.

At the evening banquet, hosted by the **Antelope Valley Chapter, Brig. Gen. Alton D. Slay,** Commander, Air Force Flight Test Center, welcomed the delegates and guests. Then, **Brig. Gen. William W. Spruance,** Assistant for Air, Delaware Air National Guard and an AFA National Director, gave an outstanding presentation on "Safety." General Spruance has given this presentation to many thousands of US and free-world airmen; and many airmen throughout the world who have lived through aircraft accidents attribute their lives to having heard General Spruance's presentation. Chapter President **A. Hays Blessing** was Master of Ceremonies.

The **Edwards AFB Exhibition Drill Team,** under the command of **TSgt. Russell G. Lyda,** received a standing ovation for their demonstration of precision drills and unique showmanship. Dancing capped the evening's festivities.

Guests included **Col. William A. Nugen,** incoming Base Commander; **Lt. Col. Louis W. Smith,** retiring Base Commander; and **Lt. Col. William J. Trigg,** AF Rocket Propulsion Laboratory and the Antelope Valley Chapter's "Man of the Year."

The outstanding success of the Conference was due largely to the work of California AFA Secretary **Barbara Rowland,** and to the support and hospitality extended by **General Slay.**

* * *

In conjunction with its Fifteenth Annual Logistics Educational Symposium, the **Utah AFA** and **Air Force Academy** liaison officers for Utah cosponsored their annual **Air Force Academy Day** at Hill AFB.

More than 200, including nominees, prospective candidates, college, high school, and junior college students interested in attending the Air Force Academy in Colorado Springs were briefed on qualifications for the Academy, how to apply, obligations, cadet life and activities, and other facets of life at the Air Force school.

Medal of Honor recipient **Lt. Col. Bernard F. Fisher** gave the keynote address. Panelists included **Col. Lee C. Black,** Commander, Air Force Academy Preparatory School; **Lt. Col. Robert J. Peary,** Director, Candidate Advisory Service, USAFA; **Maj. Robert C. Oaks,** Executive for Honor & Ethics, USAFA; and USAFA **Cadets John B. Gannon** and **John A. Thurman.**

Col. Paul A. Simmons, AFRes, was Program Chairman, and **Col. Hugh C. Garner,** AFRes, was the Panel Moderator. **Lt. Col. Hilliard Levy,** Deputy Commander, Hill AFB, gave remarks of welcome.

The Logistics Educational Symposium, cosponsored by the Utah AFA, Weber State College, and the Utah Chapter of the Society of Logistics Engineers, was held at Weber State College in Ogden.

The two-day Symposium, "Logistics of Economic Development," contained presentations on tax structure, human resources, transportation, education, and industry.

Featured speakers included **Dr. William P. Miller,** President, Weber State College; **James H. Straubel,** Executive Director, Air Force Association and the Aerospace Education Foundation; **Millard K. Neptune,** Director, Southwest Region, Economic Development Administration; **Paul A. Simmons,** Chief, Logistics Research & Systems Div., Ogden Air Materiel Area; **Robert Fox,** Research Analyst, Utah Industrial Promotion Division; and **Dr. Helmut Hofmann,** Academic Vice President, Weber State College.

Also, **Ronald Reifler,** Senior Vice President, the Fantus Co.; **James Hannan,** Vice President, Freeport Center, Inc.; **Richard L. Stine,** Vice President, Redevelopment Agency of Ogden City; **E. LaMar Buckner,** Utah State Senator; and **B. V. Walker,** Director, Utah State Division of Aeronautics.

Nathan Mazer, Executive Director of the Weber County Industrial Development Bureau and an AFA National Director, was the Moderator.

Henry Bostwick, Jr., President, American Industrial Development Council, was the featured speaker at the evening banquet.

Utah AFA President **Harry L. Cleveland,** General Chairman of the Symposium, attributed the success of this Symposium, as well as the success of all Utah AFA programs, to the dedication and cooperation of all AFAers in Utah, and to the cooperation received from the military and civilian communities.

* * *

The first luncheon meeting of the year sponsored by the **Nation's Capi-**

tal Chapter of Washington, D.C., featured presentations on **"Air Systems Requirements in the Seventies,"** given by top officers of each of the four military services.

Chapter President **R. J. Schissell** presided, and panelists were: **Vice Adm. Thomas F. Connolly,** USN, Deputy Chief of Operations (Air); **Lt. Gen. Otto J. Glasser,** USAF, Deputy Chief of Staff (Research and Development); **Maj. Gen. Allen M. Burdett, Jr.,** USA, Director of Army Aviation; and **Brig. Gen. Homer S. Hill,** USMC, Deputy Chief of Staff (Air).

More than 150 attended this program, including **Madame Claire Chennault; Lt. Gen. James Doolittle,** USAF (Ret.), AFA's first National President; **Sens. Howard Cannon** (D-Nev.) and **Barry Goldwater** (R-Ariz.); **Jess Larson,** Chairman of AFA's Board of Directors; **Russ Blandford,** Chief Counsel, House Armed Services Committee; **Maj. Gen. H. L. Hogan, III,** Director, USAF Office of Information; and AFA's Central East Regional Vice President **A. Paul Fonda.**

The Chapter's second luncheon meeting featured a panel presentation on **"Space Systems of the Future."**

Maj. Gen. John D. Stevenson, USAF (Ret.), Director of Mission Operations, Office of Manned Space Flight, NASA, was Moderator. Panelists, all from NASA, were: **William C. Schneider,** Director, Skylab Program; **Douglas R. Lord,** Deputy Director, Space Station Task Force; **Clarence C. Gay,** Systems Engineering Director, Space Shuttle Task Force; and **Phillip E. Culbertson,** Director, Advanced Manned Missions.

AFROTC Cadet Col. Stanley A. Sieg, left, and Angel Flight 1st Lt. Elisa Hurtado, both of the University of New Mexico, join Albuquerque Chapter President W. A. Gardner, right center, and Lt. Col. A. D. Norton, Professor of Aerospace Studies for a pre-luncheon photo.

Attendance of almost 200 included a large congressional delegation headed by **Rep. George Miller** (D-Calif.). Russ Blandford. Jess Larson, A. Paul Fonda, and Virginia AFA President **Richard Emrich** were present.

* * *

At a recent luncheon meeting sponsored by the **Albuquerque Chapter,** AFROTC cadets from the University of New Mexico were the honored guests.

Held in the main lounge of the Kirtland AFB Officers' Club, the program featured remarks by **Maj. Gen. F. W. Nye,** USAF, Commander, Field Command, Defense Atomic Support Agency, and **Col. (B/G Selectee) J. E. Paschall,** Commander, Air Force Special Weapons Center. In their remarks, both gentlemen saluted the AFROTC and the Angel Flight for their loyalty and determination in these troubled times.

Chapter President **William A. Gardner** presented an AFA plaque to **Cadet Col. Stanley A. Sieg,** the outstanding AFROTC cadet at the University, and a bouquet of flowers to Angel Flight **1st Lt. Elisa Hurtado,** Area I's "Little Colonel."

The program received excellent TV and newspaper coverage, quite an accomplishment at a time when campus revolts, sit-ins, peace marchers, and other dissidents receive top priority in the news media.

* * *

Sen. Barry Goldwater (R-Ariz.) spoke to more than 450 persons at a dinner meeting cosponsored by AFA's **Faith Chapter** and the **Wichita Falls, Tex., Chamber of Commerce.**

In his remarks, Senator Goldwater stated, "If we follow the advice of the doves and abandon all of Asia, we are going to let China build its own sphere of influence into all of Southeast Asia and possibly Burma, India, and Pakistan."

In commenting on the youth of today, the Senator stated, ". . . that the difference is not a generation gap, it's a value gap. The young people of today do not value time, work, or money. They have a great deal of free time, plenty of money, and a

(Continued on following page)

AFA's AFJROTC Bronze Medal, a fairly new award for a fairly new organization, was awarded to the outstanding cadet at more than fifty high schools. At Rutherford High, Panama City, Fla., Col. Thomas DeJarnette, USAF (Ret.), right, representing AFA's Panama City Chapter, presents the AFA medal to AFJROTC Cadet Maj. Van R. Walker, Jr.

Maj. Gen. Jerry D. Page, left, Commander, Sheppard Technical Training Center, chats with Sen. Barry Goldwater (R-Ariz.) preceding a dinner cosponsored by AFA's Faith Chapter and the Wichita Falls, Tex., Chamber of Commerce. Senator Goldwater was principal speaker at the dinner, which initiated the Armed Forces Week events.

Principals at the H. H. Arnold, N.Y., Chapter's Awards Dinner conducted recently were, from left to right, H. Goldback and F. Missina, award recipients; Chapter President John F. Dolan; Rep. Lester L. Wolff (D-N.Y.) the affair's guest of honor and the Chapter's "Man of the Year"; and Frank X. Battersby, immediate past president. Congressman Wolff was cited for outstanding service in aerospace.

Tom Ireland, left, President of the AFA's Lubbock, Tex., Chapter, presents a Plaque of Appreciation to Dr. O. W. English, chairman, Reese Relations Subcommittee of the Armed Services Committee, Lubbock Chamber of Commerce. The plaque was presented in recognition of the valuable help rendered by Dr. English to Reese AFB, USAF, and AFA; it was awarded at a luncheon at Reese AFB.

view of work as a means, not a desirable end in itself."

The dinner, at which Chapter President **Harold Bristol** presided, was held in the Sheppard AFB Officers' Open Mess and initiated **Armed Forces Week** activities in the Sheppard AFB-Wichita Falls area.

* * *

AFA's **H. H. Arnold Chapter** of Bethpage, N.Y., honored one of its own members, **Rep. Lester L. Wolff** (D-N.Y.), as its "Man of the Year" at the Chapter's Annual Awards Dinner.

In making the award, Chapter President **John F. Dolan** cited Congressman Wolff, who is a colonel in the Civil Air Patrol and Commander of the Congressional Squadron (CAP), for his "outstanding service to the Country and Chapter in the field of aviation and for supporting activities to strengthen America's aerospace potential."

A "Service Award" was presented to **H. Goldback,** and **F. Missina** accepted a "Special Award" to the Grumman Aerospace Corp.

* * *

In his luncheon address at a recent **Northeast Regional Meeting,** AFA President George D. Hardy warned ". . . that the United States, by the middle of this decade, may slip to the position of a second-rate power. The reasons, of course, are the aggressive development and deployment of new strategic weapons by the Soviets while the US is frozen in a posture of stagnation and decline."

In conjunction with the day-long meeting, Presidents of the three AFA state organizations in the Northeast Region—**William Rapp,** New York; **James Grazioso,** New Jersey; and **Gilbert Petrina,** Pennsylvania—conducted state executive committee meetings during the morning session. Northeast Regional Vice President **John Brosky** conducted a regional meeting during the afternoon session.

With more than sixty delegates attending, this was the most effective and successful meeting of this type sponsored by the region in a number of years.

* * *

AFA extends its deepest sympathy to the family of **Raymond Manning,** of Houston, Tex., Secretary-Treasurer of AFA's **Houston Chapter.** Mr. Manning died on June 15, 1970.

* * *

CROSS COUNTRY . . . More than 350 students of the 550-student **Brewer High School** of Fort Worth, Tex., recently signed a resolution asking that firm guidelines be established to permit law enforcement officers to "uphold the laws without fear of reproach or prosecution." In recognition of their action, **Sam E. Keith, Jr.,** Chairman of AFA's **Fort Worth Airpower Council,** presented American flag pins to each student in the school. The pins were presented on behalf of the Fort Worth Airpower Council . . . During a visit to Fairchild AFB, Wash., to play for a drill-team competition, the **15th AF Band** honored a request from AFA's **Spokane Chapter** to play at the Lakeland Village Auditorium for some 700 mentally retarded "shut-ins." The audience appreciation was most gratifying, and we join the Spokane Chapter, and Washington AFA President **Clyde Stricker** in commending members of the Band for volunteering their personal time to entertain the handicapped . . . **Dr. Theodore C. Marrs,** Deputy Assistant Secretary of Defense (Reserve Affairs), was guest speaker at a recent dinner meeting of the **Northern Virginia Chapter.** The dinner was held in the Bolling AFB Officers' Club with more than fifty AFAers and guests attending. Special guests included Central East Regional Vice President **A. Paul Fonda** and Virginia AFA President **Richard Emrich.** Chapter President **William McCall** presided.

COMING EVENTS . . . **Massachusetts AFA Convention,** Hanscom Field, September 11-12 . . . **AFA National Convention and Aerospace Development Briefings and Displays,** Washington, D.C., September 21-24 . . . **Pennsylvania AFA Convention,** Erie, October 9-10 . . . **Michigan AFA Convention,** Detroit, October 16-18 . . . **New Jersey AFA Convention,** Teterboro Airport, October 16-18 . . . **Alabama AFA Convention,** Montgomery, October 16-18 . . . **Washington AFA Convention,** Spokane, October 16-17 . . . **Florida AFA Convention,** Orlando, November 6-8 . . . **Virginia AFA Convention,** Langley AFB, November 21.

—DON STEELE

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 for 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 (nonvoting, nonofficeholding); US citizens on extended active duty with any branch of the United States armed forces—$7 per year.

Cadet Members (nonvoting, nonofficeholding): 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 (nonvoting, nonofficeholding); 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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GEORGE D. HARDY, President, Hyattsville, Md.; **GLENN D. MISHLER,** Secretary, Akron, Ohio; **JACK B. GROSS,** Treasurer, Harrisburg, Pa.; **JESS LARSON,** Chairman of the Board, Washington, D.C.

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State Contacts

Following each state name, in parentheses, are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

ALABAMA (Auburn, Birmingham, Huntsville, Mobile, Montgomery, Selma): **Dr. Boyd E. Macroy,** 3721 Princeton Rd., Montgomery, Ala. 36111 (phone 293-6871).

ALASKA (Anchorage, Fairbanks, Kenai, Nome): **Gordon Wear,** Box 777, Fairbanks, Alaska 99701 (phone 452-4411).

ARIZONA (Phoenix, Tucson): **Hugh P. Stewart,** 709 Valley Bldg., Tucson, Ariz. 85705 (phone 622-3357).

ARKANSAS (Fort Smith, Little Rock): **Alex E. Harris,** 3700 Cantrell Rd., Apt. 612, Little Rock, Ark. 72202 (phone 664-1915).

CALIFORNIA (Antelope Valley, Burbank, Chico, El Segundo, Fairfield, Fresno, Harbor City, Long Beach, Los Angeles, Monterey, Newport Beach, Norwalk, Novato, Pasadena, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, Santa Barbara, Santa Clara County, Santa Monica, Tahoe City, Vandenberg AFB, Van Nuys, Ventura): **Gene DeVisscher,** 2775 Cottage Way, Sacramento, Calif. 95825 (phone 487-7818).

COLORADO (Boulder, Colorado Springs, Denver, Pueblo): **R. E. Stanley,** 7644 Heath Dr., Colorado Springs, Colo. 80907 (phone 473-3154).

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DELAWARE (Wilmington): **Vito A. Panzarino,** Greater Wilmington Airport, Bldg. 1504, Wilmington, Del. 19720 (phone 328-1208).

DISTRICT OF COLUMBIA (Washington, D. C.): **Robert J. Schissell,** 1700 Pennsylvania Ave., N. W., Washington, D. C. 20006 (phone 223-4430).

FLORIDA (Bartow, Daytona Beach, Fort Lauderdale, Eglin AFB, Gainesville, Homestead, Jacksonville, Miami, Orlando, Panama City, Patrick AFB, Redington Beach, Tampa): **Taylor Drysdale,** 5526 Parkdale Dr., Orlando, Fla. 32809 (phone 855-3632).

GEORGIA (Savannah, St. Simons Island, Valdosta, Warner Robins): **William H. Kelly,** 241 Kensington Dr., Savannah, Ga. 31402 (phone 964-1941).

HAWAII (Honolulu): **John H. Felix,** Suite 2012, 1441 Kapiolani Blvd., Honolulu, Hawaii 96813 (phone 946-8080).

IDAHO (Boise, Burley, Pocatello, Rupert, Twin Falls): **Donald M. Riley,** 6925 Copper Dr., Boise, Idaho 83704 (phone 375-2948).

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IOWA (Cedar Rapids, Des Moines): **Ric Jorgensen,** 4005 Kingsmen, Des Moines, Iowa 50311 (phone 255-7656).

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MASSACHUSETTS (Boston, Florence, Lexington, Northampton, Plymouth, Randolph, Saugus, Taunton, Worcester): **Andrew W. Trushaw, Jr.,** 204 N. Maple St., Florence, Mass. 01060 (phone 584-5327).

MICHIGAN (Battle Creek, Dearborn, Detroit, Kalamazoo, Lansing, Mount Clemens): **Marjorie O. Hunt,** P. O. Box 822, Mount Clemens, Mich. 48043 (phone 463-1528).

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NEW MEXICO (Alamogordo, Albuquerque, Roswell): **Pat Sheehan,** P. O. Box 271, Albuquerque, N. M. 87103 (phone 255-7629).

NEW YORK (Binghamton, Buffalo, Elmira, Forest Hills, Freeport, Ithaca, Kew Gardens, Lakewood, Newburgh, New York City, Patchoque, Plattsburgh, Rochester, Rome, Staten Island, Sunnyside, Syracuse, White Plains): **William C. Rapp,** Suite 1400, 1 M&T Plaza, Buffalo, N. Y. 14203 (phone 857-6871).

NORTH CAROLINA (Fayetteville, Raleigh): **Edwin A. Capps,** 4913 Yadkin Dr., Raleigh, N. C. 27609 (phone 829-7196).

OHIO (Akron, Canton, Cincinnati, Cleveland, Columbus, Dayton, Youngstown): **Bernard D. Osborne,** 3046 Tralee Trail, Dayton, Ohio 45430 (phone 255-2581).

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OREGON (Corvallis, Portland): **Robert Ringo,** 605 S. W. Jefferson St., Corvallis, Ore. 97330 (phone 753-4482).

PENNSYLVANIA (Allentown, Ambridge, Erie, Harrisburg, Lewistown, Philadelphia, Pittsburgh, Wayne): **Gilbert E. Petrina,** Box 113, RD #1 Hershey, Pa. 17033 (phone 367-3368).

RHODE ISLAND (Warwick): **Matthew Puchalski,** c/o 143 SOG RIANT, T. F. Green Airport, Warwick, R. I. 02886 (phone 737-2100, ext. 27).

SOUTH CAROLINA (Charleston, Columbia, Myrtle Beach): **James F. Hackler, Jr.,** Box 2065, Myrtle Beach, S. C. 29577 (phone 449-3331).

SOUTH DAKOTA (Sioux Falls): **Don Hedlund,** 2701 W. 24th St., Sioux Falls, S. D. 57105.

TENNESSEE (Memphis, Nashville): **Enoch B. Stephenson,** 4318 Esteswood Dr., Nashville, Tenn. 37215 (phone 244-6400).

TEXAS (Abilene, Amarillo, Austin, Big Spring, Corpus Christi, Dallas, Del Rio, El Paso, Fort Worth, Houston, Lubbock, San Angelo, San Antonio, Sherman, Waco, Wichita Falls): **B. L. Cockrell,** CMR Box 41594, Kelly AFB, Tex. 78241 (phone 925-4408).

UTAH (Bountiful, Brigham City, Clearfield, Hill AFB, Ogden, Salt Lake City, Springville): **Harry L. Cleveland,** 224 N. Jackson Ave., Ogden, Utah 84404 (phone 777-3466).

VERMONT (Burlington): **R. F. Wissinger,** 158th CAM SD. Burlington International Airport, Vt. 05401 (phone 863-4494).

VIRGINIA (Arlington, Danville, Hampton, Lynchburg, Norfolk, Richmond, Roanoke, Staunton): **Richard C. Emrich,** 6416 Noble Dr., McLean, Va. 22201 (phone 962-0710).

WASHINGTON (Bellevue, Port Angeles, Seattle, Spokane, Tacoma): **Clyde Stricker,** P. O. Box 88850, Seattle, Wash. 98188 (phone 534-2396 or 244-8650).

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WYOMING (Cheyenne): **Conley B. Stroud, Jr.,** 6421 Evers Blvd., Cheyenne, Wyo. 82001 (phone 638-9517).

AFA'S BOLDEST, NEWE

EXTRA INCOME

THREE PLANS TO CHOOSE FROM

☐ MEMBER ☐ MEMBER & SPOUSE ☐ ENTIRE FAMILY

WHAT IS AFA EXTRA INCOME HOSPITAL INSURANCE?

For every day you (or members of your family, if you have elected family coverage) are hospitalized AFA sends you money for up to 365 days . . . money you can use as you wish, without restrictions of any kind.

WHO IS ELIGIBLE?

Any United States citizen under the age of 60 who is or becomes a member of the Air Force Association is eligible to apply for AFA Extra Income Hospital Insurance for himself, his spouse, and unmarried children more than 14 days and less than 21 years of age.

HOW ARE BENEFITS PAID?

Once AFA receives verification that hospitalization has taken place, you will receive a benefit check within seven days with additional checks thereafter on a weekly basis upon AFA receiving certification of your continued hospitalization.

FIRST TIME OFFERED TO ACTIVE DUTY MILITARY PERSONNEL

HOW MUCH EXTRA INCOME DO YOU NEED? CHOOSE THE BENEFIT AMOUNT YOU REQUIRE FROM THIS FLEXIBLE GROUP PLAN!

1. You are the key to family finances. How much extra money would your family need if you were hospitalized? Check Plans A-1 and AA-1.

2. Does part of the family income depend on a working spouse? Would a cook, or maid or housekeeper be needed during a wife's hospitalization? How much would this, and other expenses cost? Check Plans A-2 and AA-2.

3. If you have a family, you should consider providing extra income for children's hospitalization. Accidents involving whole families *do* happen, especially with military families living around the world. Check Plans A-3 and AA-3.

And remember: Benefits are paid up to 365 days of hospital confinement for *each* accident or sickness for *each* insured person while the patient is under the care of a legally qualified Doctor of Medicine.

BENEFIT SCHEDULE

PLAN	INDIVIDUAL PLAN MEMBER	LIMITED FAMILY PLAN AND SPOUSE	FULL FAMILY PLAN AND CHILDREN
A	$20/DAY	$15/DAY	$10/DAY
AA	$40/DAY	$30/DAY	$20/DAY

COST SCHEDULE

INDIVIDUAL PLAN — PLAN A-1 — *Member: $20 per day*

Member's Age	Annual	Semi-Annual
Under 40	$ 29.00	$15.50
40-49	$ 37.00	$19.50
50-59	$ 53.00	$27.50
60-64	$ 76.00	$39.00

LIMITED FAMILY PLAN — PLAN A-2 — *Member: $20 per day; Spouse: $15 per day*

Annual	Semi-Annual
$ 59.00	$ 30.50
$ 72.00	$ 37.00
$103.00	$ 52.50
$147.00	$ 74.50

FULL FAMILY PLAN — PLAN A-3 — *Member: $20 per day; Spouse: $15 per day; Children: $10 per day*

Annual	Semi-Annual
$ 74.00	$ 38.00
$ 86.00	$ 44.00
$118.00	$ 60.00
$162.00	$ 82.00

INDIVIDUAL PLAN — PLAN AA-1 — *Member: $40 per day*

Member's Age	Annual	Semi-Annual
Under 40	$ 54.00	$28.00
40-49	$ 68.00	$35.00
50-59	$100.00	$51.00
60-64	$147.00	$74.50

LIMITED FAMILY PLAN — PLAN AA-2 — *Member: $40 per day; Spouse: $30 per day*

Annual	Semi-Annual
$107.00	$ 54.50
$132.00	$ 67.00
$195.00	$ 98.50
$284.00	$143.00

FULL FAMILY PLAN — PLAN AA-3 — *Member: $40 per day; Spouse: $30 per day; Children: $20 per day*

Annual	Semi-Annual
$134.00	$ 68.00
$159.00	$ 80.50
$222.00	$112.00
$312.00	$157.00

WHY DO YOU NEED EXTRA INCOME HOSPITAL INSURANCE?

Hospital costs for Non Military Families are climbing out of sight!

In 1966, according to the American Hospital Association, average *total cost* per hospital admission was $380.39 — *up 412%* in just 20 years.

Average 1966 cost per hospital day, over an average hospitalization of 7.9 days, was $48.15 — a figure which includes only basic costs.

And costs are going higher. Other authorities estimate that average cost per hospital day may reach $100 by 1980.

Would your present hospital benefits begin to cover this cost? Do they even cover today's costs?

Military Families Can Have Severe Money Losses Caused By Hospitalization

Military families as well as civilian families can be financially hurt by the indirect expenses of hospitalization and serious illness.

Even if every cent of direct hospital cost is covered by government benefits (or hospital insurance) there may be hundreds or thousands of dollars in indirect losses. For example:

Loss of income, especially when more than one member of the family works

Extra travel expense (sometimes for long distances) for other family members

Cost of housekeeper or "sitters"

Special diets, sometimes for long periods

Expense of special home care.

AFA EXTRA INCOME HOSPITAL INSURANCE PROVIDES THIS MONEY. BENEFITS ARE PAID DIRECTLY TO YOU — AND YOU USE THIS MONEY TO BEST SUIT YOUR NEEDS.

ISURANCE PROGRAM

HOSPITAL INSURANCE

Pays CASH benefits up to $40 per hospital day for each insured person!

All AFA members — military and civilian— and their families are eligible.

OTHER BENEFITS

Protected AFA members may continue their coverage at the low, group rate to Age 65, or until they become eligible for Medicare, whichever is earlier. Hospitalization for **all** sicknesses and accidents is covered, except for a few standard exceptions listed under "Exclusions."

LIMITATIONS

Hospital confinements separated by less than three months for the same or related conditions will be considered continuations of the same confinement.

Coverage will continue through the life of the master policy unless terminated for whichever of the following reasons occurs first for the protected person: (a) attains age 65; or (b) becomes eligible for Medicare; or (c) AFA membership dues are due and unpaid; or (d) a premium payment is due and unpaid. For dependents, coverage will continue through the life of the master policy unless terminated for whichever of the following reasons occurs first: (a) such dependent ceases to be an eligible dependent; or (b) the protected person's insurance terminates hereunder; or (c) the dependent spouse either attains age 65 or becomes eligible for Medicare; or (d) any required dependent premium payment is due and unpaid.

EXCLUSIONS

The plan does not cover losses resulting from (1) declared or undeclared war or act of war; (2) service in the armed forces of a country *other than the United States;* (3) acts of intentional self destruction or attempted suicide while sane or insane; (4) pregnancy (including childbirth or resulting complications); (5) confinement in any institution primarily operated as a home for the aged or engaged in the care of drug addicts or alcoholics; (6) illnesses for which the insured has received medical treatment or advice or has taken prescribed drugs or medicines within 12 months prior to the effective date of his insurance. Coverage for such pre-existing illnesses will begin after 12 consecutive months during which he is covered under the policy and receives no such medical treatment or advice and takes no such prescribed drugs or medicine; (7) hospital confinement commencing prior to the date the protected person or eligible dependent becomes insured under this policy.

HOW TO APPLY

Fill out the attached application and mail it to AFA with your first premium payment. You may elect to pay premiums either annually or semi-annually.

APPLICATION

AFA EXTRA INCOME HOSPITAL INSURANCE

Underwritten by ***Mutual of Omaha Insurance Co.*** *Omaha, Nebraska*

NAME

ADDRESS

CITY STATE ZIP

DATE OF BIRTH CURRENT AGE HEIGHT WEIGHT SEX

PLAN OF INSURANCE

MEMBER ONLY	MEMBER & SPOUSE	MEMBER SPOUSE & CHILDREN
☐PLAN A-1	☐PLAN A-2	☐PLAN A-3
☐PLAN AA-1	☐PLAN AA-2	☐PLAN AA-3

METHOD OF PAYMENT ☐Annual ☐Semi-Annual

This insurance coverage may only be issued to AFA members. Please check the appropriate box:

☐I am currently an AFA member.

☐I enclose $7 for annual AFA dues (includes subscription ($6) to to AIR FORCE/SPACE DIGEST).

I enclose my initial premium in the amount of $_____ (Refer to premium table to determine correct premium amount.)

Please complete this section only if you are requesting coverage for dependents (Limited Family or Family Plan) and list only those persons for whom you are requesting coverage.

FULL NAME	RELATIONSHIP TO AFA MEMBER	SEX	DATE OF BIRTH
	WIFE (HUSBAND)		
	child		
	child		
	child		
	child		
	child		
	child		

In applying for this insurance coverage, I understand and agree that:

1. coverage shall become effective on the last day of the calendar month during which my application together with the proper premium amount is mailed to AFA.
2. only hospital confinements commencing after the effective date of insurance are covered, and
3. any condition for which I or any of my eligible dependents received medical treatment or advice or have taken prescribed drugs or medicine within twelve months prior to effective date of the insurance coverage will not be covered until the expiration of twelve consecutive months of insurance coverage without medical treatment or advice or having taken prescribed drugs or medicine for such condition.

DATE SIGNATURE

Application must be accompanied by check or money order. Send remittance to:

INSURANCE DIVISION, AFA, 1750 PENNSYLVANIA AVE., N.W., WASHINGTON, D.C. 20006

Form 2332MGC App. 8-70

Bob Stevens'

"There I was..."

Back in the days when not all airmen were all-airman, riding shotgun in a C-45 could be a good way to catch up on your sleep. But sometimes it called for ambassadorial self-control . . .

Univac brings Now to a worldwide command and control system.

Our success in bringing Now to several current applications is being expanded by Univac systems engineers to include the current concept and approach of a worldwide military command and control system.

For example, UNIVAC® computers give 140 Air Force bases here and abroad the equivalent of a "push-button" supply system that operates in the Now with centralized software and documentation and standardized hardware and procedures.

Air Force meteorologists predict in the Now on the basis of information gathered from around the world and processed immediately by high-speed UNIVAC digital computers.

Apollo space missions are conducted in the Now by means of the world's most reliable and flexible real-time system for processing and communicating information. Data messages processed through UNIVAC computers take only six seconds to arrive at the space center in Houston from the lunar surface.

These advanced applications are some of the reasons why Univac can propose a new approach to our worldwide military command and control system.

Because it's UNIVAC, it would operate in the Now—the immediate present—and would constantly gather, process, update and communicate information to all who need it.

Decision-makers will have new flexibility based on continuously available updated data. Changes can be made even during the operational phases of an action.

What's more, Univac is prepared to provide this capability now with proven off-the-shelf techniques and hardware. The necessary techniques have already been proved in working UNIVAC systems at significant cost advantages.

If you or your agency would like to hear more about the Univac systems approach for a new worldwide military command and control system, please call or write Univac, Command & Control Systems Directorate, 2121 Wisconsin Avenue, N. W., Washington, D. C. 20007.

UNIVAC

First in real-time computer systems.

SPERRY RAND

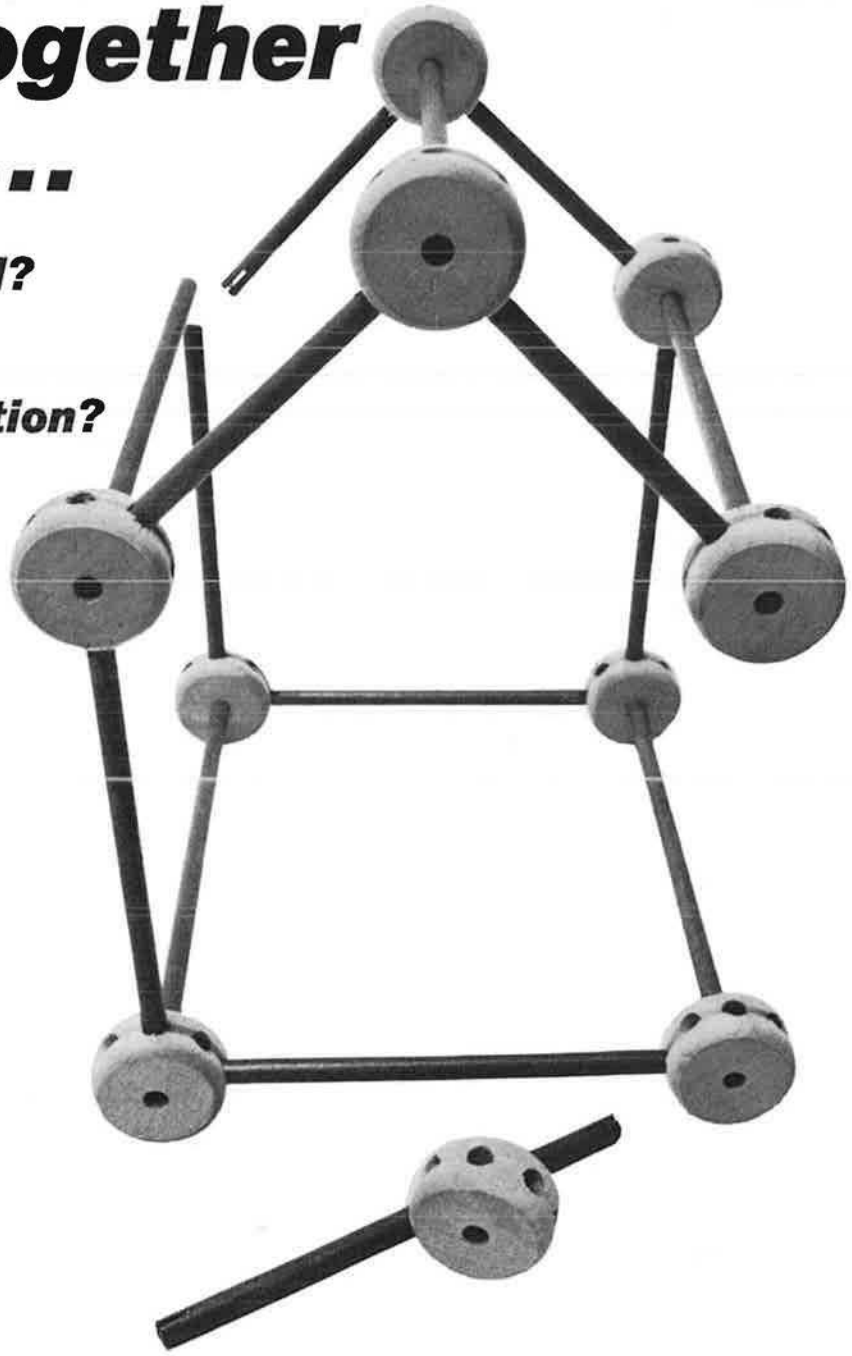
Putting together a system...

Command and Control?

Weapon System?

Management Information?

Logistics System?



Simulation tells if the pieces fit.

A digital simulation is always the first—and cheapest—system that can be built. It relates and exercises all the pieces. It gives quantitative results.

Today, any new system needs more and more justification. Simulation can help answer questions about: Risk of design approach. Computer choice. Effect of new procedures. System software.

TRW has made an advance in the methodology of handling both top level system logic and the detail of data file structure. TRW is under contract to develop a hierarchy of simulations for Advanced Ballistic Missile Defense Systems.

For more information about TRW's software capabilities contact Marketing Services, Software and Information Systems Division, TRW Systems Group, One Space Park, Redondo Beach, California 90278.

The Systems Group is a major operating unit of TRW Inc., where more than 85,000 people at over 300 locations around the world are applying advanced technology to products, systems and services for commercial, industrial and government markets.

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