

MARCH 1968 / 60c

AIR FORCE

The Magazine of Aeronautics

Association

**INCOMING
DEFENSE
SECRETARY
CLARK
CLIFFORD**

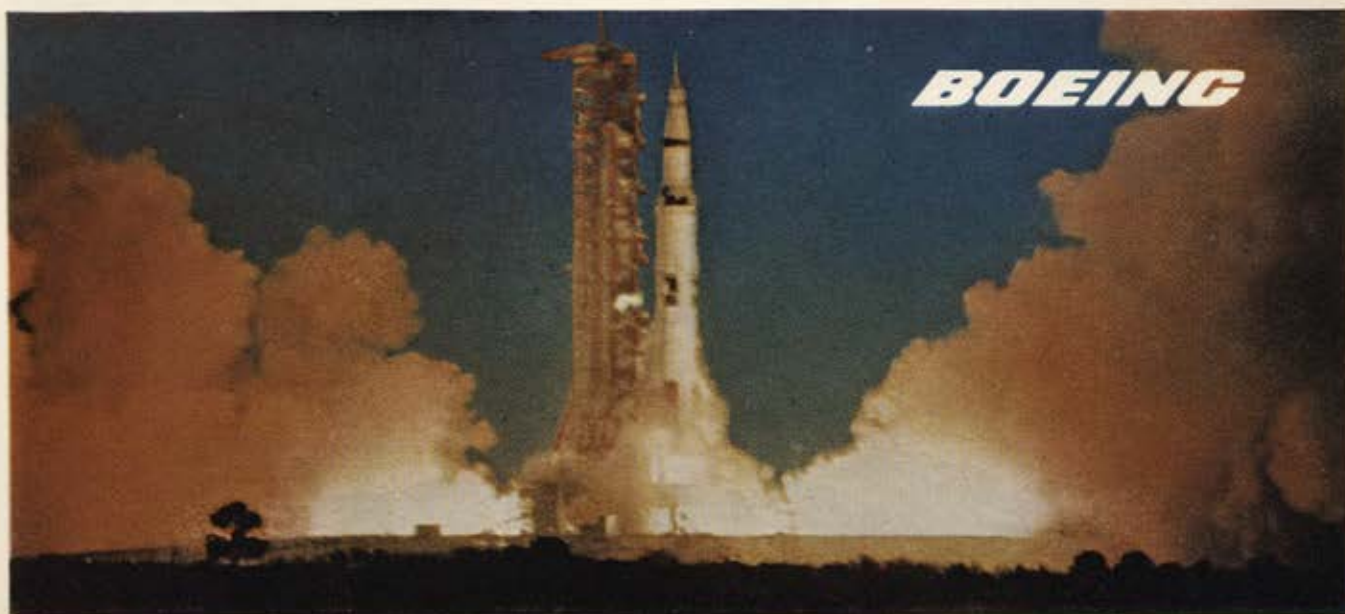
*He knows how
the Pentagon
can and should work*



To the thunder and flame of 160 million horsepower—and tension-releasing “go, go, go” cheers of newsmen and officials—America’s 3,000-ton Apollo/Saturn moon rocket lifted off a Cape Kennedy pad. Its first flight was a spectacularly successful culmination of years of

dedicated effort by thousands of NASA and industry people. Apollo/Saturn’s flight put the heaviest payload yet into orbit, and was a significant step toward the U.S. goal of a manned lunar landing and return by the end of this decade. The program, creating new national techno-

logical capabilities, involves intensive continuing efforts. This year alone, six test flights (four unmanned, two manned) are scheduled. Boeing is a major National Aeronautics & Space Administration contractor, participating in building, integrating and launching Apollo/Saturn moon rockets.





Everything but GCA. The works. Automatic bearing... distance measurement... two-way UHF communications... tactical instrument approach, including glideslope. Self-powered in a rugged, go-anywhere container, the size of a shoe box.

Some shoe box. Now combat units can have a truly portable (not just lugable) locator beacon and communications "hot line" with an all-weather approach system that can be flown like ILS.

Applications: Med-Evac, resupply, close air support, aircraft station keeping and navigation, troop-position location, tactical airstrip letdown—you name it.

Field-evaluated and ready for duty, it sets up in seconds... without a legion of specialists. Requires no optical, magnetic or geographic orientation. Just attach the folding antenna, flip a switch and you're in business.



And here's the best part: as compact as our shoe box is, we found a way to pack in plenty of Sperry. Give us a call.

SPERRY
FLIGHT SYSTEMS DIVISION
PHOENIX, ARIZONA 85002



Sensational Shoe Box



Space base

TRW's Space Park is one of the nation's foremost industrial centers for advanced technology. The 17,000 Systems Group people here and at 25 other locations throughout the world represent every scientific, engineering and administrative discipline needed to design and build space systems and subsystems. Planned in the space age, Space Park now has 15 research, engineering and manufacturing buildings. Its integration and test facilities include high bays to 88 feet, and nine space chambers to 30 feet in diameter, with solar simulation. Additional buildings for 7,000 employees are now under construction.

In less than a decade, this unique combination of modern facilities and talented people has resulted in contracts to design and produce 123 spacecraft ranging from 1½ to 2,000 pounds, plus scores of major subsystems. TRW spacecraft have already logged more than 356,616 operating hours in space.

TRW was the first industrial firm to build and launch a spacecraft—Pioneer I in 1958. The TRW record includes Explorer VI, six more Pioneer spacecraft, six Orbiting Geophysical Observatories, ten Vela nuclear detection satellites, thirty-one Environmental Research Satellites, and many military satellites. The Apollo Lunar Module's Descent Engine and Abort Guidance System are also TRW products.

For more information about TRW capabilities and products, please contact Marketing Services, TRW Systems Group, One Space Park, Redondo Beach, California 90278.

TRW®

TRW Systems Group is one of four major operating units of TRW INC. (Formerly Thompson Ramo Wooldridge Inc.), where 75,000 people at over 200 locations around the world are applying advanced technology to electronics, space, defense, automotive, aircraft and industrial markets.



D. L. Hearn,
Vice President
and Director,
LTV Electro-
systems, Inc.;
General
Manager,
Greenville
Division.

THE
EXCITING
SURGE OF
ELECTROSYSTEMS

no mission impossible

Not too many years back, D. L. Hearn was our only engineer. Now he is general manager of our largest operating unit, directing teams of scientists and engineers—developing and producing the advanced electronic systems required for defense missions today and in the future.

That's how Mr. Hearn's Greenville Division (LTV Electrosystems' nucleus) began in business: by taking on the "impossible" missions, those no one else wanted or had the technical skill to deliver.

Our growth record shows just how well we accomplished our *own* missions. Ten years ago, annual sales were \$12.7 million, we had about 1000 employees, one facility. Last year, sales passed \$180 million, employment is nearing 10,000 and we

operate 12 facilities in five states.

Product capability also branched out. Greenville Division is an industry leader in building systems for surveillance, reconnaissance, command and control, tracking, and tactical warfare. Other divisions and subsidiaries produce guidance, navigation and control systems, communications systems, electronic warfare and space systems, and super-power transmitters.

Whatever the mission, no matter how impossible it may seem, bring us the problem. We have an impressive record of solving the tough ones—quicker, better, at a lower cost.

For more information on our systems capabilities: P. O. Box 1056, Greenville, Texas 75401.

LTV ELECTROSYSTEMS, INC.
A SUBSIDIARY OF LING-TEMCO-VOUGHT, INC.

JAMES H. STRAUBEL
Publisher
JOHN F. LOOSBROCK
Editor and Assistant Publisher

EDITORIAL STAFF
1750 Pennsylvania Ave., N. W.
Washington, D. C. 20006

Richard M. Skinner, Managing Editor; Laurence W. Zoeller, Assistant Managing Editor; Philip E. Kromas, Art Director; Robert L. Fines, Assistant Art Director.

Claude Witze, Senior Editor; William Leavitt, Senior Editor/Science and Education; Allan R. Scholin, Associate Editor; Edgar E. Ulsamer, Associate Editor; J. S. Butz, Jr., Technical Editor; Jackson V. Rambeau, Military Affairs Editor; Don Steele, AFA Affairs.

Editorial Assistants: Peggy M. Crowl, Judith E. Dawson, Maria T. Estevez, Nellie M. Law, Jeanne J. Nance, Linda L. Sours.

Irving Stone West Coast Editor
10000 Santa Monica Blvd.
Los Angeles, Calif. 90067
(213) 878-1530

Stefan Geisenheyner Editor for Europe
6200 Wiesbaden, Germany
Wilhelmstr. 52a Apt. 123

ADVERTISING STAFF

Advertising Headquarters, Suite 400, 1750 Pennsylvania Ave., N. W., Washington, D. C. 20006 (202-298-9123). John W. Robinson, Director of Sales; Carole H. Klemm, Production Manager.

ADVERTISING OFFICES

EASTERN: Charles E. Cruze, Director of International Marketing; Douglas Andrews, Mgr., 880 Third Ave., New York, N. Y. 10022 (212-752-0235). WESTERN: Harold L. Keeler, West Coast Mgr., 10000 Santa Monica Blvd., Los Angeles, Calif. 90067 (213-878-1530). MIDWEST: James G. Kane, Mgr., 3200 Dempster St., Des Plaines, Ill. 60016 (312-296-5571). SAN FRANCISCO: William Coughlin, Mgr., 444 Market St., San Francisco, Calif. 94111 (415-421-0151).

UNITED KINGDOM AND EUROPE

Overseas Publicity and Service Agency Ltd., W. G. Marley; R. A. Ewin; A. M. Coppin; 214 Oxford St., London W.1, England (01-636-8296).

BPA AIR FORCE Magazine and SPACE DIGEST are published monthly by the Air Force Association, 1750 Pennsylvania Ave., N.W., Washington, D. C. 20006 (phone Area Code 202, 298-9123).

PRINTED IN USA, by McCall Corporation, Dayton, Ohio, Second-class postage paid at Dayton, Ohio. Composition by Sterling Graphic Arts, New York, N. Y. Photoengravings by Southern & Lanman, Inc., Washington, D. C.

TRADEMARK registered by the Air Force Association. Copyright 1968 by the Air Force Association. All rights reserved. Pan-American Copyright Convention.

ADVERTISING correspondence, plates, contracts, and related matter should be addressed to AIR FORCE/SPACE DIGEST, Advertising Hq., Suite 400, 1750 Pennsylvania Ave., N.W., Washington, D. C. 20006.

EDITORIAL correspondence and subscriptions should be addressed to Air Force Association, 1750 Pennsylvania Ave. N.W., Washington, D. C. 20006. Publisher assumes no responsibility for unsolicited material.

CHANGE OF ADDRESS: Send old and new addresses (including mailing label from this magazine), with ZIP code number, to Air Force Association, 1750 Pennsylvania Ave., N.W., Washington, D. C. 20006. Allow six weeks for change of address to become effective.

MEMBERSHIP RATE: \$7 per year (includes \$6 for one-year subscription to AIR FORCE/SPACE DIGEST). Subscription rate—\$7 per year, \$8 foreign. Single copy 60¢. Special issues (Spring and Fall Almanac issues), \$1.25 each.

UNDELIVERED COPIES: Send notice on Form 3579 to Air Force Association, 1750 Pennsylvania Ave., N.W., Washington, D. C. 20006.

AIR FORCE Magazine • March 1968

AIR FORCE

and SPACE DIGEST

The Magazine of Aerospace Power
Published by the Air Force Association



VOLUME 51, NUMBER 3

MARCH 1968

Living at the Bottom of the Barrel

AN EDITORIAL BY JOHN F. LOOSBROCK

9

Clark M. Clifford—Neither Hawk nor Dove / BY CLAUDE WITZE

32

A special report on the incoming new Secretary of Defense, who takes over a vastly troubled empire at a time of great stress.

A Look at National Defense as a System

BY DR. ROBERT STRAUSS-HUPE

35

Despite much talk about and use of the "systems" approach to planning and building weapons, the concept has yet to be applied to American national defense as a whole, this authority contends.

"Above and Beyond the Call of Duty" / BY FLINT DU PRE

42

Medals of Honor have been awarded to two Air Force men, one posthumously, for heroic action in the air war in Vietnam.

New Vistas for Reconnaissance from Space / BY J. S. BUTZ, JR.

46

In prospect is a satellite reconnaissance system that holds more real promise for attaining world peace than any development in history.

A Welcome Lift from the Airlines / BY EDGAR E. ULSAMER

57

The US airlines industry, largest and best equipped in the world, represents a vital national resource, which is providing broad augmentation of the military's strategic airlift capability.

"Viggen" Means Thunderbolt / BY STEFAN GEISENHEYNER

63

Sweden's new fighter-interceptor is an exciting design with supersonic as well as low-level and STOL capabilities.

A Military Career—Is That a Job for an American Boy?

BY MURRAY GREEN

68

If we are to maintain our position of world leadership, we must respect our men in uniform and support them wholeheartedly.

The Forgotten War in the Aleutians / BY COL. C. V. GLINES, USAF

75

An account of the Japanese invasion of Kiska and Attu in 1942 and how the American forces countered this threat to the mainland.

SPACE DIGEST

No Time for Business as Usual in Space / BY WILLIAM LEAVITT

87

In the face of mounting fiscal crisis occasioned by the war abroad, there seems little justification for development of both military and civilian orbiting laboratories.

Yankee Enterprise for Ancient Greece / BY HAROLD H. BRAYMAN

92

A US aerospace firm is using modern techniques in pioneering "nation building" in an ancient part of the world.

Texas Training Ground for USAF Leaders

BY COL. DONALD J. FERRIS, USAF

96

How USAF's Officer Training School goes about its job of providing junior officers for the Air Force.

Aeromedical Airlift Joins the Jet Age / BY IRVING STONE

102

MAC's aeromedical transport fleet will soon get a badly needed shot of jet power when the first C-9A enters the inventory.

AFA Nominees for 1968-69 / BY DON STEELE

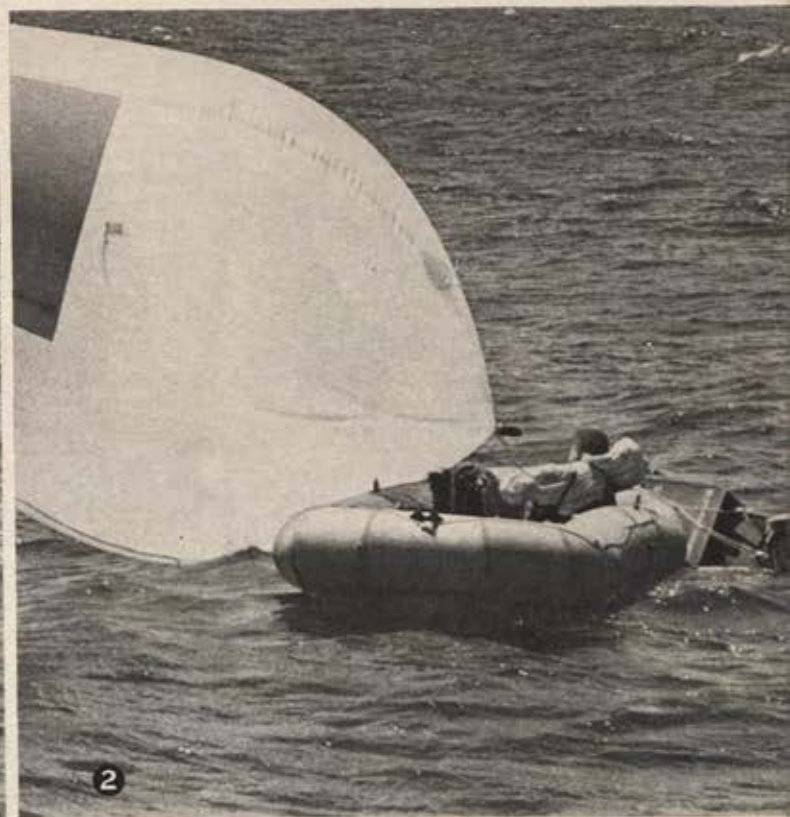
112

Robert W. Smart and Jess Larson head the slate of National Officers to guide the Association during the coming year.

DEPARTMENTS

Airpower in the News.....	10	The Bulletin Board.....	108
Airmail.....	16	Senior Staff Changes.....	110
Aerospace World.....	22	This Is AFA.....	111
New Books in Brief.....	24	AFA News.....	114
Index to Advertisers.....	28	There I Was.....	118

Hitching a ride at 130 knots.



It's the new look in rescue: "fishing" upwards to catch a lift from an Air Force HC-130H Hercules passing nearly 500 feet overhead.

And that airman is safely up and headed home, lifted with less of a jolt than he'd feel in a parachute jump. With this advanced, man-rated surface-to-air technique, Hercules adds one more capability to Lockheed's list of successful responses to Air Force support requirements.

Hercules starts the operation by dropping a kit that can be rigged and readied in minutes. On a return pass, the plane snares the balloon-borne lift line in a nose-mounted yoke. Then, at the aircraft's open aft ramp, crewmen secure the trailing line, and winch it in.

This specialized Hercules is outfitted for making various high-speed pickups...searching for, finding, and retrieving personnel, space capsules

and other objects in support of our worldwide aerospace missions. And doing it fast. It was a major link in the quick-reaction chain of rescue craft on the Mercury and Gemini projects. Today it backs up Apollo and the Manned Orbiting Laboratory programs, ready to haul in astronauts or other earth-aiming "packages." It can even catch on the fly, using highly efficient air-to-air retrieval gear.

The HC-130H, built by Lockheed-



Georgia Company at Marietta, Georgia, carries rescue systems for searching and recovering over water, land, snow and ice—in daylight or darkness. And its more powerful engines—plus the addition of fuselage fuel tanks—give it approximately 12% greater range than other C-130 models, thereby extending the Air Force's worldwide search-and-recovery capabilities.

Hercules serves another way, too. With the addition of an in-flight refuel-

ing system for battle-zone rescue helicopters, it becomes the HC-130P. A number of these are in service today and their support is paying off regularly in Southeast Asia, as rescued Americans can testify.

The ability to understand present mission requirements and anticipate future ones, coupled with technological competence, enables Lockheed to respond dependably to the needs of the Air Force in a divided world.



LOCKHEED
LOCKHEED AIRCRAFT CORPORATION



The Air Force came to us for guidance.

The U.S. Air Force is now flying the world's fastest airplane. Flying it higher than any operational aircraft has flown before. For long distances.

It's called the SR-71 and its mission is strategic reconnaissance. Lockheed built it. We built its navigation and guidance system.

Our system guides the SR-71 automatically along a selected route. It's an astroinertial system which means that it not only keeps track of changes in speed and direction, but also checks its position by the stars. So it knows exactly where it is every moment of its flight, and exactly where it's been when it comes back.

The Air Force came to us because when it comes to

airborne guidance systems we have some exceptional capabilities. We've been building them for 20 years and we've developed many of the techniques that make them work. Such as an instrument that can locate and track stars even in broad daylight.

So now that we've built the guidance system for the world's fastest airplane you'd think we'd be content to rest for awhile.

But we aren't.

Now we're building the navigation system for the Lockheed C5-A, the world's largest airplane.

And that's no small job either.

NORTHROP

Living at the Bottom of the Barrel

By John F. Loosbrock

EDITOR, AIR FORCE/SPACE DIGEST

THE stated annual cost of the war in Vietnam is \$25 billion, and there is good evidence that the true figure is nearer to \$30 billion.

The side effects, of course, are much greater. There have been serious dislocations to the national economy and particularly to the rate of economic growth. This is the first war in modern times involving the United States in which the added costs of the war have not been soaked up by the expansion of the economy. Needed social programs are being cut back with results that are sure to be felt if the forthcoming summer is long and hot. Advanced technological programs such as the SST and the space effort are feeling the cold breath of stretch-out. As Technical Editor Sam Butz points out on page 46 of this issue, the prospect of a satellite reconnaissance system that holds more real promise for attaining a workable world peace than any development in history lies moldering on the shelf.

But nowhere is the drain and strain of our effort in Vietnam felt more keenly than in its impact on the future shape and composition of the US armed forces.

The outstanding case in point is the serious Air Force pilot shortage that is bound to develop under present policies—a shortage which even now is having its own kind of side effects on the career development patterns of the Air Force officer corps and hence upon the Air Force of five, ten, and fifteen years from now.

The key to the pilot problem is the unforeseen length and intensity of the war in Vietnam. The Air Force (and the other services as well) is being subjected to a seemingly endless war of attrition for which it was relatively unprepared in terms of both numbers of aircraft and the skilled men required to operate them. A pilot-training pipeline always pumps out fewer men than are fed into it. Certainly never more. And so, when a business-as-usual war, which calls for understandably short terms of combat duty in the interest of equity of risk, is coupled to an open-end campaign of attrition, the bottom of the pilot barrel is quickly reached. For evidence, one needs only to look at

the average age of our pilots—thirty-seven, worldwide, and a hoary thirty-five and a half for those in Vietnam.

The job is getting done. The oldsters have risen to the occasion in magnificent style. But in the doing, the ranks of Air Force middle management in particular have been stripped of men of talent, education, and experience. The effect on individual career development has no place in this discussion. It is war, after all, and those who can contribute must go. It is part of the profession of arms.

But as one looks down the road it is increasingly difficult to understand the Department of Defense position that no pilot shortage exists or is likely to develop. One must scrape the bottom of the barrel if need be, but one must also look to the refilling of the barrel. This is not being done, in our judgment. There is no plan to increase pilot training to any meaningful extent. We suspect the main reason is because this might involve reopening of bases that already have been declared surplus. The barrel is not being replenished.

Which brings us back to the matter of broad national policy. If the war in Vietnam has a foreseeable ending (whether satisfactory or not is beside this particular point) and if, more importantly, there are to be no more Vietnams, no more large-scale wars of attrition, then the pilot shortage can be looked upon more comfortably—as a transitory phenomenon that can be solved by *ad hoc* improvisation, as we are doing.

But every month the war drags on compounds the current error. And the prospect of other Vietnams in other times and other places requires that the pilot pipeline be expanded now, as the Soviets move rapidly toward a flexible-response capability of their own. We were able to fill the gap in Korea with pilot veterans of World War II. Pilot veterans of both previous wars have plugged the hole thus far in Vietnam. Where will the next crop come from?

Without a stepped-up pilot procurement program, already far too late in beginning, the Air Force will not only be scraping the bottom of the barrel. It will be living there—indefinitely.—END



AIRPOWER in the news



By Claude Witze

SENIOR EDITOR, AIR FORCE/SPACE DIGEST

The High Cost of Restraint

WASHINGTON, D. C., FEBRUARY 12

Herewith, the one hundred and twenty-first report on *Airpower In The News* (initial capital letters) under this editor's byline.

As we mark this tenth anniversary, the national agony of the past couple of weeks is foremost in our mind. With both North Vietnam and North Korea practicing brinkmanship, there is only one inescapable conclusion. It is that there has been too little airpower in the news (lower case) in the past decade.

The most convincing evidence is found in the casualty reports. Few Americans seem to realize, reading the day-by-day statistics from Vietnam, that sometime in 1968 we will reach the point where 50,000 of our men will have been killed in action since the end of World War II. The latest figure, covering both Korea and Vietnam, as of January 20, is 47,069.

The Russians have not lost a single man in combat since 1945.

While reflecting on this, you can read in the newspaper

"WE HAVE TURNED THE CORNER . . ."

—GENERAL WESTMORELAND



—Courtesy the Washington Daily News

that the head of the Soviet Communist Party, Leonid Brezhnev, is conferring in Moscow with a Vietnamese friend, Dang Quang Minh, of the National Liberation Front. He has told his guest that the NLF, or Viet Cong terrorists, can "count on the brotherly aid and support of the Soviet people."

This expression of brotherhood is nothing new. There has been a lot of publicity about the amount of Soviet war materiel that has poured into North Vietnam. There are the SAM missiles confronting our Air Force pilots, and there are MIG fighters. Most recently, the emphasis has shifted to modern assault rifles, PT-76 light tanks, and IL-28 bombers.

It is interesting and pertinent that the latter, obsolete twin-engine jets, have appeared on the runways at Phuc Yen, a base about eighteen miles northwest of Hanoi. This is the field, it will be recalled, that was fingered by USAF's now-retired Maj. Gen. Gilbert L. Meyers in his testimony last summer before the Senate Preparedness Subcommittee.

General Meyers was of the opinion that Phuc Yen, a haven for MIGs when he was Deputy Commander of the Seventh Air Force in Saigon, should have been put out of commission at least two years ago. Strikes on the airfield were recommended by the Seventh Air Force, General Meyers testified, but permission to bomb the base was denied. This restriction, since relaxed to some degree, was cited by the General as "another illustration of how our air resources were not being most effectively utilized to carry the war to the enemy."

It is not unreasonable to raise a question now about how the failure to use these same resources has contributed to the Viet Cong week of terror in Saigon, Hué, and nearly thirty provincial capitals of South Vietnam. There has been no estimate that we can call reliable of the number of Communist troops thrown into this effort—the US command claimed nearly 15,000 were killed in five days of fighting—but it is substantial. At the same time, and continuing as this magazine goes to press, about 40,000 of the enemy have 6,000 US Marines under siege at Khe Sanh.

All of these soldiers, North Vietnamese and Viet Cong, are adequately armed with war materiel that was unloaded and transhipped out of ports and depots long declared off limits to US airpower. The movement of this materiel, from its sources in Russia, China, and other Communist countries all the way to cemetery caches in Saigon, could not be stopped by the kind of air effort we have used.

As the Senate subcommittee said nearly six months ago, after finding that the air campaign had not achieved its objectives:

"It attests . . . to the fragmentation of our air might by overly restrictive controls, limitations, and the doctrine of 'gradualism' placed on our aviation forces which prevented them from waging the air campaign in the manner and according to the timetable which was best calculated to achieve maximum results."

And the subcommittee lamented the sanctuary areas in North Vietnam for good reason:

"These sanctuaries have enabled the North Vietnamese

to concentrate their war-making materiel in these areas, which are safe and secure from bombing, and ready them for the dash southward over vulnerable land, rail, and water routes under cover of darkness and bad weather.

"Whether warranted or not, it is clear that the sanctuaries have reduced and curtailed the effectiveness of our air operations and reduced the impact of the bombing campaign upon the enemy's ability to support the war and infiltrate men and materiel to the South.

"This is one of the reasons why, through January 1967, the application of our airpower was relatively ineffective, and much more ineffective than it should have been."

So far, there is no indication of how the subcommittee feels about this in February of 1968, but the havoc created by the Communist terror raids makes it unnecessary to ask. The men and the guns were allowed to mobilize and go south, resulting in what Sir Robert Thompson, a British expert on guerrilla war, calls "a masterstroke" by Hanoi's General Vo Nguyen Giap.

Sir Robert, it must be added, suspects the long impending battle at Khe Sanh is a Giap diversionary tactic, designed to tie up a substantial force of our Marines while the Communists shoot at more important targets. He also insists that the whole strategy and course of the war have been fully under control of the Hanoi government, which has no valid reason to negotiate.

From the start, the restraints imposed on USAF and Navy airpower have helped the enemy and the Russians, who give generously of their "brotherly aid and support." US military men have pointed out time and again that this failure to use our muscle contributes to the American casualty rate.

Sometime this year, the total of Americans killed in action since 1945 will reach 50,000.

The McNamara Swan Song

Even before Leonid Brezhnev pledged his continued brotherly aid and support to Dang Quang Minh, Defense Secretary Robert S. McNamara was telling Congress about it.

"The past year has seen increased Soviet assistance to North Vietnam, but if it has bought Moscow any significant political leverage, it has not been used to move Hanoi toward a negotiated settlement of the Vietnam conflict," the Secretary reported. "Instead, its support has done much to support Hanoi's aggression."

This evaluation of an obvious situation was offered in Mr. McNamara's annual Posture Statement, the 218-page document he reads each year to the Senate Armed Services Committee as background to his request for authorization to finance the armed services for another year.

There was something almost plaintive in the Secretary's acknowledgment that the Russians rarely agree with him on the uses of power and the cost-effectiveness of some weapon systems.

He lamented the fact that the Soviets not only failed to prevent the Arab-Israeli war last May, but that they "must carry a major share of the responsibility" for starting it in the first place. Also:

"Over the past year, the Soviets have projected an image of increased activity, determination, and new strategic directions, especially toward developing a capability for flexible response. There are some signs that the Soviets are developing the forces required to give them a limited mobile military capability to meet some types of contingencies beyond the land areas of the Communist group of countries."

It is Mr. McNamara's opinion that "a fully flexible response remains outside the realm of immediately foreseeable Soviet capabilities." The only possible way to interpret

this rather tortured phrase is to say that Russia is getting ready to extend its brotherly aid and support to more wars of liberation, wherever they occur. The cost-effectiveness of this effort, in terms of American casualties, looks promising in the Kremlin.

Looking at Russian progress in its missile defense program and the FOBS (fractional orbital bombardment system), Mr. McNamara calls them "evidence of a continuing search for security," a search that he feels will not be fruitful. As for the vastly increased amount of Soviet naval activity in the Mediterranean, a development that has both American and NATO military men alarmed, he views it as a "diplomatic gesture" that shows the Red flag in an area where the Arabs did not do well last year. In this section of his Posture Statement, the Secretary made no mention of the fact that Israel won the war in a hurry, with the liberal and effective application of airpower.

In discussing strategic forces, the Secretary reports a big advance in Russian ICBM capability. In 1966 they had 340 launchers ready to go. In 1967, his count shows 720. He added that "we believe the Soviet ICBM force will continue to grow over the next few years, but at a considerably slower rate..." Offsetting the Soviet increase, the number of our own ICBMs rose from 934 to 1,054.

Here is a tabulation of the opposing strategic forces, taken from Mr. McNamara's figures:

	1966		1967	
	US	USSR	US	USSR
ICBMs	934	340	1,054	720
SLBMs*	512	130	656	30
Bombers	680	150	697	155

(*Submarine-launched ballistic missiles)

The big drop in the Russian submarine-launched threat results from a reevaluation of the Kremlin's targeting program. A year ago, the Pentagon says it thought all 130 submarine missiles were a threat to the United States. Now it has decided that 100 of them are on diesel-powered boats "whose primary targets are believed to be strategic land targets in Eurasia." This intelligence estimate apparently does not consider the possibility that a diesel submarine could be refueled a reasonable distance from our shores. Cuba, it will be recalled, is ninety miles away.

As for the war in Vietnam, Mr. McNamara testified, while the Viet Cong were battering at Saigon and the provincial capitals, that we were making progress, albeit "uneven" progress. "Our forces," he said, "have won every major battle in which they have been engaged."

Other signs of progress:

"... because of our great firepower and mobility, we are able to come to the aid of the South Vietnamese and other friendly forces whenever they encounter sizable enemy concentrations.

"... the free world forces have severely mauled most of the Communist main force units in the coastal areas.

"Many strategic lines of communication have been recovered from enemy control, and allied forces now conduct military operations in sectors of the country which previously had been inviolate Communist sanctuaries for two decades.

"Total Communist battle losses are running much higher than in 1966, the enemy's 'in-country' recruitment appears to be markedly declining, and the population base from which he can draw support is shrinking."

Well, while Mr. McNamara was reading these words there was a substantial amount of fighting going on as a result of Giap's "masterstroke." And these battles, one of them on the first floor of our Saigon embassy, could have been foiled, to a large degree, by a local population that

(Continued on following page)

FINANCIAL PLANS FOR FISCAL 1969

For Fiscal Year 1969, Defense Secretary McNamara has requested a Total Obligational Authority (TOA) of \$82.4 billion. He has submitted, in his Posture Statement, two breakdowns showing how the money would be divided:

(In billions of dollars)

	Fiscal 1968	Fiscal 1969
Strategic Forces	\$ 7.9	\$ 9.6
General Purpose Forces	32.6	35.2
Intelligence and Communications	5.7	6.3
Airlift and Sealift	1.9	1.8
Guard and Reserve Force	2.7	3.0
Research and Development	4.5	5.1
Central Supply and Maintenance	7.1	7.3
Training, Medical, etc.	9.4	9.8
Administration	1.6	1.7
Military Assistance Program	2.1	2.7
Unfunded Retirement Pay (subtract)	—3	—1
Total Obligational Authority	\$75.2	\$82.4

By Department and Agency

Army	\$24.2	\$26.1
Navy	21.1	24.0
Air Force	25.1	27.0
Defense Agencies	3.7	4.2
Defense Family Housing	.6	.5
Military Assistance	.5	.6
Total Obligational Authority	\$75.2	\$82.4

was motivated to foil them. The battles were fought, for the most part with Soviet materiel, at times and places dictated from Hanoi. Indeed, as Mr. McNamara suggests, "the ultimate success of our entire effort in South Vietnam will turn on the ability of the government to reestablish its authority...."

It must be said that Mr. McNamara did not ignore the extent of Soviet brotherly aid and support. He fixed the amount of assistance from Russia and other Communist countries to North Vietnam at \$420 million in 1965, \$730 million in 1966, and \$1 billion in 1967.

From Russia, Hanoi receives SAMs, AAA guns and ammunition, radars, fighter aircraft, trucks, railroad equipment, barges, machinery, petroleum, fertilizer, and food.

The cost of this war to the United States is detailed, almost certainly in figures that are less than completely honest, in the budget proposed for Fiscal 1969. A year ago, the Fiscal 1968 budget predicted Vietnam defense spending at \$21.9 billion. The real cost, still estimated, already is up to \$24.5 billion, which is conservative. For Fiscal 1969, it is set at this early stage at a total of \$26.3 billion.

Here is a revealing table from the new budget. It shows, by fiscal year, what it costs to run the Defense Department, and what has been added to that each year to pay for Vietnam, in billions of dollars:

	Regular Expenses	Vietnam Special
1965	\$46.070	\$.103
1966	48.597	6.094
1967	47.333	20.557
1968	49.163	24.989
1969	50.874	26.264

Unrevealed, in this table, is the amount of neglect of our regular military inventory that can be blamed on the war. An unmeasured amount of the nation's arsenal has

been consumed, without being entered as part of the cost of Vietnam.

For the big picture, there are two tables at the left and below, which show how Mr. McNamara or, more precisely, his successor, Clark M. Clifford, will split up an estimated kitty of \$76.7 billion to be spent in Fiscal 1969. That is the figure for purely military defense, to which is added \$525 million for military assistance and \$2.5 billion for atomic-energy activity, giving a grand total of \$79.8 billion for the Pentagon.

The original requests of the Army, Navy, and Air Force this year are reported to have totaled \$101 billion. It is a figure described by one sharp observer as the largest amount of money ever requested from anybody by anybody in the history of the world. This does not alter the more significant fact that defense spending as a percentage of the nation's total budget will drop from 43.5 percent in Fiscal 1968 to 42.9 percent in Fiscal 1969. And, as a percentage of the Gross National Product, the cost of running the military services will drop from 9.2 percent to 8.9 percent.

How all this money will be used is spelled out in Secretary McNamara's Posture Statement. It reveals that \$1.1 billion will be invested in the "thin" Sentinel ABM system. Procurement of the controversial F-111 aircraft will be continued. The Air Force will get 163 of the F-111A models for \$1.1 billion and seventy-five of the FB-111 bomber versions for another \$550 million. There are thirty F-111Bs scheduled for the Navy at a cost of \$350 million.

The Navy again seeks four fast deployment logistic ships (FDLs) with an initial tag of \$180 million. The funds were denied by Congress in 1967. Also included this year are funds to start work on a third nuclear attack aircraft carrier and two nuclear-powered guided missile destroyers.

Of major interest to the Air Force is an increase in funding for the military space program. The Defense Department seeks an obligational authority of \$1.3 billion in this area, of which USAF would get almost the entire amount. It will provide more money for the Manned Orbiting Laboratory (MOL) project. Mr. McNamara told Congress he planned to spend \$2.2 billion on space in Fiscal 1969, with special attention to MOL.

This could be the best news in this year's study of the military financial outlook.—END

WHAT THE PENTAGON WANTS TO SPEND

	Authorized FY 1968	Requested FY 1969
Aircraft		
Army	\$ 899,200,000	\$ 735,447,000
Navy and Marine Corps	2,363,246,000	2,782,788,000
Air Force	5,270,700,000	5,212,000,000
Missiles		
Army	492,700,000	956,140,000
Navy	582,154,000	879,212,000
Marine Corps	22,500,000	13,500,000
Air Force	1,355,100,000	1,768,000,000
Naval Vessels		
Navy	1,063,800,000	1,712,300,000
Tracked Combat Vehicles		
Army	323,200,000	299,426,000
Marine Corps	3,300,000	10,800,000
GRAND TOTAL	\$12,375,900,000	\$14,369,613,000



Astro-Color is a service mark of American Airlines, Inc.

Astro-Color.
Even if you're in the back of the plane,
you can have a front seat for the movie.

We wouldn't want to see anyone get stuck in the back of a plane when the movie screen is stuck up in front.

So we've put 14 screens on every coast-to-coast nonstop flight. A screen every 3 rows in First Class, and one every 4 or 5 rows in Sky Club. And we've given each screen its own projector.

This makes the picture so clear we don't have to dim the cabin lights. And the color so bright our passengers don't have to close the

window shades. (It's a better movie system, even if they don't watch the movie.)

We call it



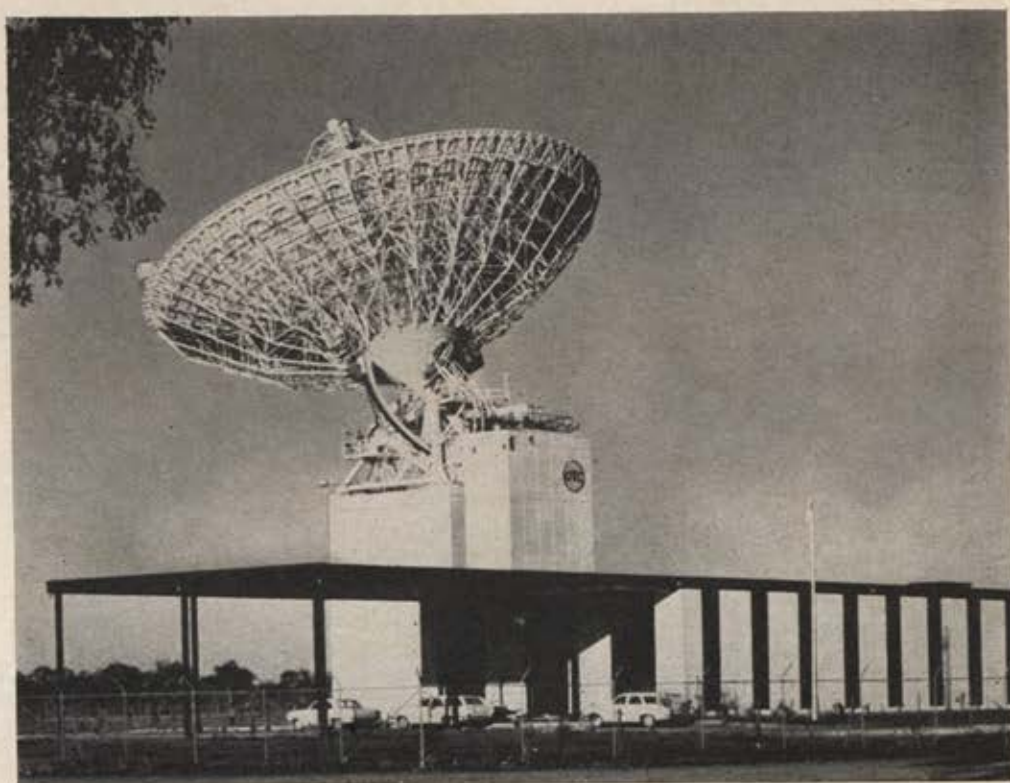
Paramount Pictures presents Hal Wallis' production "Becket."

"Astro-Color." And no one will be admitted once the feature has begun.

American Airlines

The airline built for professional travellers. (You'll love it.)

the big systems by Collins



Australian earth station serves vast area



Australia's new computer-controlled earth station near Moree permits satellite communication with any country from the U. S. to Thailand — or from Alaska to New Zealand.

Procured by the Australian Overseas Telecommunications Commission, the earth station can accommodate 600 telephone calls and one television channel simultaneously, with a capacity for later expansion. The facility employs a 90-foot-diameter antenna with shaped reflector. Design of the pedestal permits pointing of the antenna at satellites in approximately equatorial orbits.

Collins provided transmitting and receiving equipment, the antenna, the building, all associated control and monitoring systems, installation, and testing. The facility is the first fixed ground station designed and built by one manufacturer for satellite communications.

COMMUNICATION / COMPUTATION / CONTROL



Projects 100,000 and Transition

Gentlemen: Congratulations on another first for AIR FORCE/SPACE DIGEST! [William Leavitt's] "Project 100,000" article [January 1968] was the first comprehensive discussion of the initial progress on one of the most significant educational experiments ever undertaken by the military. [The] sympathetic treatment and interesting style resulted in a genuine human story rather than a prosaic compilation of statistical data.

Ever since Secretary of Defense Robert McNamara first announced the proposal, I [have been] intensely interested not only in the social contributions of the New Standards men [program] but in the possibility of innovations in such a massive manpower-utilization program. I fully expect that the vast educational resources of the military focused upon this group will lead to improvements in the instruction and programs in our civilian institutions. I consider the attempt to record their records in both their military and post-service occupations to be very desirable.

I was delighted that the military did not segregate this group during their basic as well as advanced classes. I presume that those at Lackland who may have taken the program there would have been placed in the maximum-length track. The low attrition rate of the New Standards men was a surprise.

I am looking forward to additional progress reports on this great experiment.

CHARLES BOEHM
Superintendent Emeritus
Department of Public Instruction
Commonwealth of Pennsylvania
Morrisville, Pa.

Gentlemen: I found "Project 100,000" in your January issue a highly informative review of the experimental armed forces training project for disadvantaged youth.

As you know, the elimination of disadvantage in this nation demands the interest and cooperation of all public and private agencies that possess resources pertinent to this goal.

Project 100,000 is a fine example of the valuable contributions that can be made by the armed services—in their own interests and those of the nation.

W. WILLARD WIRTZ
Secretary of Labor
US Department of Labor
Washington, D. C.

Gentlemen: . . . Mr. Leavitt has written a thoughtful and balanced description of Project 100,000 and Project Transition. I was pleased that he had the opportunity to visit training bases and discuss the programs with the services. The success of these important undertakings is a tribute to the professional skill and dedication of the officers and noncommissioned officers in the field.

ALFRED B. FITT
Assistant Secretary of Defense,
Manpower and Reserve Affairs
Washington, D. C.

Gentlemen: I have read thoroughly and with great interest the article on Project 100,000. . . . Mr. Leavitt did an excellent job and should be complimented highly.

I certainly hope Project 100,000 will be continued over many years to come, even after the educational inequities of region, race, and educational level cease to be. The armed forces can do what public school systems cannot, since the services completely control the individual and are free from environmental influences presenting today's formidable problems to public school efforts. The program's extension should also yield information better to evaluate our testing standards.

G. L. WASHINGTON
Assistant to the President
Howard University
Washington, D. C.

Gentlemen: I think "Project 100,000" in the January issue is "must" reading for every educator.

My own studies over the years have convinced me that American education as it is conducted in our schools is basically a reject system symbolized

by a normal curve of probability. This reject system takes the form of a process in which the grades in school are made to function as gigantic sieves selecting out the so-called "superior" children. The passivity of some of the operators (sometimes called educators), or worse, their lack of real effect upon the raw material, is both striking and disturbing.

Young people demonstrate the effects of this reject system by: (a) leaving school as soon as they are legally able to do so; (b) truancy; (c) refusing to perform any but the most rudimentary classroom assignment; (d) acting in such a manner as to disrupt school activities; (e) rejecting the basic process needed in a free society; i.e., reasoning as a way of solving problems; (f) failing military standards.

We need a Zero-Reject Tradition in education. Under this tradition, each teacher would feel a responsibility to see that each child had mastered the tools and the strategies of learning. Through careful analysis by educators, Project 100,000 and Project Transition can help us acquire such a tradition. . . .

LEON M. LESSINGER
Superintendent
San Mateo Union High School
District
San Mateo, Calif.

Gentlemen: . . . We have had some effective discussions with Defense Department representatives on ways in which the Office of Education can coordinate in this valuable enterprise. Should something develop out of these discussions, I will be happy to keep you informed.

DAVID S. BUSHNELL, Director
Division of Comprehensive and
Vocational Education Research
Department of Health, Education
and Welfare
Washington, D. C.

Gentlemen: Thank you very much for the article on Project Transition. . . . As the Director of the Project, I am most appreciative of the article which Mr. Leavitt has written.

(Continued on page 18)

SCIENCE/SCOPE

The seventh Surveyor, sent to explore the unknown rock-strewn ridges of the moon's south polar region, landed only $1\frac{1}{2}$ miles from its bullseye near the crater Tycho. Its TV camera shortly revealed the boulders it had barely missed. Later, laser beams aimed at the moon from stations in California and Arizona were recorded by Surveyor 7 and transmitted back to earth. One of the lasers was built by Hughes Research Laboratories.

So complete had four earlier Surveyors tested and photographed all proposed landing areas for the first manned moon mission that Surveyor 7 could be freed for this important scientific mission. NASA scientists hoped to learn more about the character of the moon, which could lend clues to its origin and that of the universe, by landing near the fallout from this large new crater.

Surveyor 7's only glitch -- its temporary inability to lower the tiny box containing its alpha backscattering instrument all the way to the surface -- was turned into a brilliant demonstration of the commandable-spacecraft concept by a 40-man team of JPL and Hughes scientists. After an all-night session of delicate maneuvering, they successfully used the surface scoop to free the box and guide it to the soil.

The West German Ministry of Defense has awarded Hughes a contract for two prototype computer-controlled flight-line testers for their F-104G Starfighter's inertial navigation system. The tester, using pre-programmed test sequences, enables relatively unskilled operators to make fast, accurate tests. It uses a Hughes H3118M computer, and can be adapted for testing other avionics.

The nonstop flight of 10 F-106 interceptors from Tacoma, Wash., to Panama City, Fla., during which they were refueled in flight and knocked down a jet drone with a missile over the Gulf of Mexico, has demonstrated the Aerospace Defense Command's ability to deploy anywhere on the globe. The F-106, with its Hughes airborne missile control system and Falcon missile, is the fastest, highest-flying, most advanced all-weather interceptor now operational with the Air Force.

It's the TV camera in Walleye's nose that gives this U.S. Navy and U.S. Air Force air-to-surface weapon its phenomenal accuracy. After launch, its electro-optical guidance system keeps it on course as it glides to its target. Walleye is now being manufactured at the Hughes Tucson, Arizona, plant under a second-source contract.

First working laser, developed in 1960 at Hughes Research Laboratories, was the ruby laser. Last November, Hughes was awarded a U.S. patent covering all ruby laser systems until 1984. Although many patents have been granted on other lasers since 1960, the ruby laser is one of the most important for practical applications.

Creating a new world with electronics

HUGHES

HUGHES AIRCRAFT COMPANY

As you know, Project Transition is a new project which only goes operational this month at all major military installations. In view of the excellent job which Mr. Leavitt has done on Project Transition and Project 100,000, I am happy to invite you to do a later article on Project Transition, which would be as complete and comprehensive as that done on Project 100,000.

I congratulate you and Mr. Leavitt on the excellent reportage that is so evident in both of these articles. I do hope that Project Transition can later, perhaps within the next ten months, be the subject of a feature story.

FRANK M. MCKERNAN
Director
Project Transition
Washington, D. C.

Gentlemen: . . . There is no doubt that the reader will have a comprehensive grasp of the objectives of the program and a feeling of satisfaction that some very real and beneficial results are being developed. More than anything else, I think it shows what can be done with ingenuity, patience, and perseverance.

It is a fine article. . . .

EMILIO Q. DADDARIO
Member of Congress
Washington, D. C.

New Problems in the Making

Gentlemen: . . . I have read Mrs. Anne M. Jonas' article, "New Dimensions in Soviet Strategy" [January issue].

. . . Mrs. Jonas is a very astute reporter who appears to have read the signs with exceptional clarity. While she may not be fully informed on certain sensitive matters of high classification, she has, nevertheless, done a very scholarly job of researching her subject. Indeed, in her words, "the challenge is clear and the issues are complex."

LT. GEN. A. W. BETTS
Chief of Research and Development
Department of the Army
Washington, D. C.

Progress Report?

Gentlemen: I could not help but cringe when reading Dr. Alain Enthoven's discussion on "Systems Analysis—Ground Rules for Constructive Debate" [January issue]. All my experiences in World War II and Korea . . . and indeed pre-McNamara, flashed before my eyes, and I am now appalled that I risked my life under such a sloppy, slipshod, immature, unreasonable, mismanaged, stupid, politically oriented, parochial, misguided, and economically unsound system, run by nincompoops who obviously hadn't

gotten the word on "military requirements" within the framework of the national budget.

"With all my heart, and all my soul, and a condescending air, 'I praise my predecessors (with reservations here and there). 'How could we let the country go, so far along the road 'Lacking fundamental goals in economic code?"

I cringed worse when I read the record of accomplishments. The B-52? The B-58? The Atlas, Titan, Minuteman? The Century Series and the F-4? The Sparrow, Sidewinder, and Falcon? The B-70? The Skybolt? The TFX? Ahh, now *that's* a real record of progress.

FRANK WALKER
Clinton, Md.

Alternatives No. 1 and No. 2

Gentlemen: In the course of the December article, "The Search for Nuclear Flexibility" [by J. S. Butz, Jr.], he commented:

"Two hopes exist for avoiding this specter of a multinational, mutual deterrence circle. One is to attempt to negotiate realistic and enforceable agreements on the reduction and eventual elimination of armaments. The other is to attempt to devise a close-to-perfect defense and . . . offensive weapons . . . that no other nation could hope to match or to stop. The stakes are so high that we should pursue both of these courses even though success cannot be guaranteed in either of them."

The same belief was expressed in [Mr. Butz's] November article, "The Case for the Defense."

The stating of these alternatives is not new. In January 1957 [AIR FORCE] Dr. Edward Teller wrote:

"In the long run I believe preparedness is not sufficient to avoid a war. Something else is needed, and this something else is international law and order." Dr. Teller has reiterated this belief in a number of articles.

Again, in 1946, General of the Air Force "Hap" Arnold wrote (in a personal letter to the undersigned): "Air-power now is power for an interim peace. . . . Permanent peace can only be the result of effective international organization."

These ideas must be felt and believed deeply or they would not appear (even parenthetically) in writings such as Mr. Butz's and Dr. Teller's and Hap Arnold's. My question then—is our responsibility to the survival of human values, of humanity itself, fully discharged by the mere mention of these requirements? Is not pursuit

of them as essential as the pursuit of a superior military posture?

Disarmament (Alternative No. 1) cannot take place in a vacuum. Effective international organization must be developed, even as effective local organization is necessary to prevent armed conflict between individuals. This means some kind of authority, representative of the people, not necessarily for the purpose of bringing the nations together, but rather of keeping them apart, keeping them from "colliding," even as Air Traffic Control keeps the aircraft of different nations from colliding. Such an authority should have no power to interfere with the internal affairs of any nation, even as the air traffic controller has no concern over the nationality or ideology of any individual pilot.

There must be a case for the argument that it is the task of the Air Force Association and other veterans' groups to concentrate on Alternative No. 2, and leave No. 1 to others. I disagree, because I believe that both are the responsibility of all citizens. But even if the argument were granted, there can be no justification for the veterans' groups ignoring, sometimes even disavowing, Alternative No. 1. Far less is there excuse for the attitude, which has been expressed now and again through the years, that those individuals, groups, and organizations who have been and are doing what they can to promote effective international organization are thereby, at best, naïve and misguided—at worst disloyal, even traitorous.

Irresponsible demonstrators for peace do not contribute to Alternative No. 1. But let not their presence detract from the efforts of sober, responsible citizens who believe that peace is not merely the absence of armed conflict, but the presence of law and order and justice, and are willing to pursue that goal, regardless how distant.

COL. RONALD C. McLAUGHLIN,
AFRes
Seattle, Wash.

Educational Innovations

Gentlemen: I [recently] read [William Leavitt's] article, "Education for the 1970s," in the November '67 issue. As a high school instructor in social studies, in one of our so-called "quality" school districts, I find myself in complete agreement with the tone of [Mr. Leavitt's] article. It is indeed interesting, and somewhat disquieting, to reflect upon the statement of Dr. B. F. Skinner the fact that educational technology is and has been used by the military and industry but is only now beginning to be felt in public school systems.

Mr. Robert Morgan's statement concerning the fact that innovation in American education is almost non-existent is, I am sorry to say, very true. How often have I known a school administrator to introduce an innovation—by which he means we are getting a different textbook! The word itself has been overused, misused, and badly abused.

My only regret, after reading the article, is that I was not acquainted with the activities of the Aerospace Education Foundation, and that I missed the Seminar last September. I would certainly like to get more information on the whereabouts of AEF seminars and materials. Therefore, I would appreciate it if you would forward this letter to the Foundation.

CAPT. JACK E. FORD, AFRES
Grosse Pointe High School
Grosse Pointe, Mich.

• We're happy to pass along Captain Ford's letter to the Aerospace Education Foundation.—THE EDITORS

UNIT REUNION

1st Air Commando Squadron

The 1st Air Commando Squadron will hold its reunion at Las Vegas, Nev., on March 8 and 9, 1968. For reservations contact

Col. Eugene P. Deatrick, Jr.
Aerospace Research Pilot School
Edwards AFB, Calif. 93523
Phone: (805) 277-2803

57th Bomb Wing Reunion Postponed

The 57th Bomb Wing reunion, originally planned for April in Miami, has been postponed. The reunion has been rescheduled for June 2, 3, and 4, 1969, at Denver, Colo. Members of the 57th Bomb Wing and Components, including the 310th, 321st, and 340th Bomb Groups, and the 313th Signal Corps are invited to attend. Contact

John W. Dillin
18 North Market St.
Lake Wales, Fla. 33853

American Fighter Pilots Association

AFPA, formerly the Night Fighters Association, will hold its reunion and first Annual Awards Banquet (in conjunction with the annual Air Force Association National Convention) on Wednesday, April 3, 1968, at Regency Hyatt House, Atlanta, Ga. For further details or reservations contact

Convention Chairman
American Fighter Pilots
Association
P.O. Box 90363, Airport Station
Los Angeles, Calif. 90009

Pioneers' Day

The second annual reunion of members of Missile, Space and Range Pioneers, Inc. (a non-profit organization designed to offer the men and women who created the US space program a chance to get together each year), will be held in the Cape Kennedy area on March 14. Maj. Gen. Harry "Bud" Sands will emcee the banquet. For further details contact

Sanders LaMont
Gannett Florida Newspapers
Box 1330
Cocoa, Fla. 32922
Phone: (305) 636-2641

collage 30

Gap-Filling with a 500 lb. Lightweight



All right, students, what is it that plugs the communications gap between the 0 to 40 mile range of line-of-sight microwave radio and the over-150 mile range of HF radio? Give up? Then go stand in the corner because we've been telling you about this wondrous gap-plugger for well over a year now. It's the AN TRC-105 lightweight (500 lbs) troposcatter radio set. One of the beauties of this little (more or less) system is that it virtually eliminates the usual effects of troposcatter fading by using an extremely high (16th) order of diversity . . . without power splitting at the transmitter, or multiple antennas, or multiple receivers. And, AN TRC-105 uses but one-fifth the power input of what (to our people) are laughingly called current "tactical" tropo equipment. The system comes in five handy pieces: a power amplifier; a receiver-exciter; a power distribution unit and controller; a multiplex unit; and the everpresent antenna. A compelling 6-page brochure, replete with dramatic illustrations and turgid words is available from our Chicago Center.



The Black Box of Another Color

To the uninitiated our new Airborne Digital Decoder (fondly called ADD) may be just another black box. But it is replete with such esoteric specs that it has been known to reduce even the most

world-weary and jaded engineers to a state of blubbery frenzy. For example, ADD accepts and processes detected PSK audio signals or a decoded FSK NRZ binary data stream at either a 2.4 KHz or 12 KHz data rate! And, upon closer inspection, you'll see that the little black box is machined from actual aluminum, so it needn't be a black box at all, unless, for tradition's sake you prefer it that way. ADD can be used as part of a flight guidance and control system, and is put together of I/C "flat-packs," and discrete components in sandwich type, modular construction. Those of you who wish to guide and control flying things should write to the Command Systems Section of our Aerospace Center. They'll send you a data sheet that will tell you more than most people will ever want to know about ADD.

HOMING IN ON THE RANGE



If you'd like your video return produced with greatly improved resolution you've come to the right place. We have this thing called a Range Gated Processor that is the latest and greatest in our series of video processors for airborne side-looking radar systems. Among other things, the new unit sequentially divides incoming video into 660 elements, each of which is 0.2 microseconds long. These elements are stored, processed to reduce off boresight returns, and serially recombined to produce, as we said, a video return with greatly improved azimuthal resolution. If you are resolute about improving your resolution, write our Aerospace Center's Radar Systems Lab.

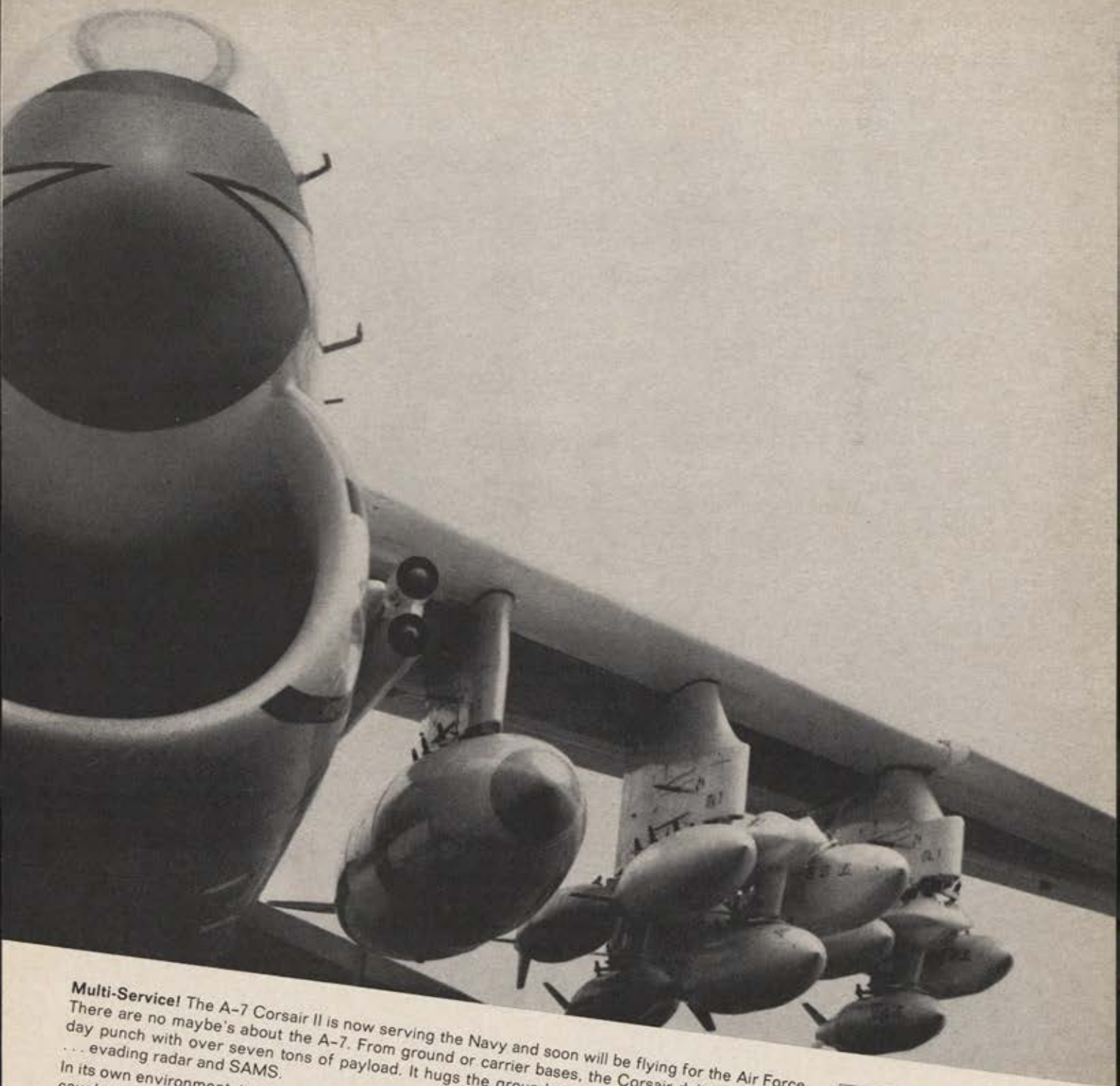
Aerospace Center Dept. 2008
8201 E. McDowell Rd., Scottsdale
Arizona 85252, Phone (602) 947-8011
Chicago Center Dept. 985
1450 N. Cicero Ave., Chicago,
Illinois 60651, Phone (312) 379-6700



MOTOROLA
Government Electronics Division



Corsair II
Corsair II
Corsair II



Multi-Service! The A-7 Corsair II is now serving the Navy and soon will be flying for the Air Force. There are no maybe's about the A-7. From ground or carrier bases, the Corsair delivers a seven-day punch with over seven tons of payload. It hugs the ground at speeds near 600 miles an hour ... evading radar and SAMS.

In its own environment, it can out-fight and out-maneuver any existing jet light attack aircraft. When caught in a scrap, the Corsair can more than take care of itself. Its air-to-air sting is unequalled. The A-7 covers troops for hours, ready to roar in with support. Its armor and design features provide maximum pilot protection and a high degree of aircraft invulnerability. The A-7 Corsair II is a tough, rugged and versatile aircraft that adapts readily to multi-service needs ... designed and produced by the Vought Aeronautics Division.

MISSILES AND SPACE DIVISION • VOUCHT AERONAUTICS DIVISION • KENTRON HAWAII, LTD. • RANGE SYSTEMS DIVISION

LTV AEROSPACE CORPORATION
A SUBSIDIARY OF LING-TENCO-VOUGHT, INC. DALLAS



AEROSPACE WORLD

By Judith Dawson

EDITORIAL ASSISTANT, AIR FORCE/SPACE DIGEST

WASHINGTON, D. C., FEB. 13
US military might was not able to save the American intelligence ship, USS *Pueblo*, hijacked January 23 by North Korean PT-boat crews. On the high seas off the Korean coast, the Communists, using century-old tactics in the nuclear age, boarded and captured the US Navy vessel without a fight, the first such incident since the seizure of the Union gunboat *Harriet Lane* during the Civil War.

The US Air Force, with its worldwide air superiority and heavy deployment in the Far East, is far more than a match for North Korea's fleet of fewer than 500 combat aircraft. North Korea's air strike force consists of an estimated 20,000 men and 400 MIG-15 and -17 jet fighter-bombers, twenty-five MIG-21 jet interceptors, and forty IL-28 light jet bombers.

The US had aircraft in Japan, fif-

teen or twenty minutes away, and at half a dozen bases in both Japan and South Korea. But the apparent sad fact is that whatever planes were available either were equipped with nuclear rather than conventional weapons or were out of range for any rescue mission. At the same time, there were no naval aircraft available to help the *Pueblo* until the US Navy's 85,000-ton *Enterprise*, the world's only nuclear-powered aircraft carrier, headed into the Sea of Japan after the fact, detoured from her appointed cruise to the Gulf of Tonkin.

Outgoing Secretary of Defense Robert S. McNamara has given several reasons why the US could not prevent the hijacking and why we did not retaliate. The *Pueblo* cruised unprotected off North Korea. "To have protected it," Mr. McNamara asserted, "would have been a provoca-

tive act. . . . It would have compromised the mission. This ship went undetected by North Koreans for ten to twelve days. . . . The protection itself always runs the risk of leading to military escalation." Neither US intelligence ships nor aircraft are protected during missions.

After the ship had been hijacked, Mr. McNamara said, "No reaction force could have saved those men." North Korea, with her fighter aircraft ready to take off from several bases, would have ensured a bloody battle. And, in fact, two MIG jets were circling off the *Pueblo's* starboard bow during the hijacking. A nuclear response was out of the question.

With American lives at stake, the US immediately opened a diplomatic campaign to free the *Pueblo's* crew. At the same time, the Administration emphasized its determination to re-



USS *Pueblo*, tagged "environmental research ship," is one of eighty US ELINT (electronic intelligence) ships countering Russia's sixty ELINTs. While US fleet watches China, North Korea, and USSR, Russian ships prowl both US coasts, Guam, Tonkin Gulf, and the Mediterranean.



World's only nuclear-powered aircraft carrier, USS *Enterprise*, rushed toward Korea after *Pueblo* hijacking, carries 100 planes, including F-8 Crusaders, F-4 Phantoms, A-5 Vigilantes, A-4 Skyhawks, A-1 Skyraiders, Sea Sprite jet helicopters, as well as reconnaissance and early-warning craft.



Protection for this C-130 Hercules preparing to depart from Marine base at Khe Sanh, South Vietnam, is provided by USAF and Navy jets. Air support was called in after enemy forces were spotted near the base. Their plan to destroy the C-130 and its cargo of ammunition was foiled.



Putting a bridge out of commission is one thing; keeping it that way another. Composite photo shows destruction of eastern portion of bridge near Hanoi by USAF F-105s in December (top). Western section of same bridge, damaged last October, has been almost completely rebuilt (bottom).

cover its men and property with a show of military force. The President activated 14,787 Air Reservists, and the *Enterprise* was deployed to the Sea of Japan. Soon afterward, two other aircraft carriers joined the *Enterprise*, plus "substantial reinforcements in our airpower," according to Mr. McNamara, the latter out of active forces without detracting from US strength in Vietnam or Europe.

The substantial reinforcement initially included a composite squadron of F-102 fighter-interceptors, F-105 fighter-bombers, and F-4 Phantoms sent into Osan AB, South Korea. Air Force also brought in RF-4C photo-reconnaissance planes. More aircraft were expected to be deployed to both Osan and the base at Kunsan.

Then, as talks continued, the *Enterprise* was ordered to withdraw several hundred miles, an apparent attempt to encourage North Korea to release the *Pueblo* and her eighty-two men. The carrier's escorts, however, remained in the area, and her F-4 Phantoms were still within range of North Korea.

But as this was written, the small Communist country continued to hold most of the high cards. The *Pueblo's* men were still prisoners. And the Administration was still hoping North Korea, having humiliated us, would relent and release.



The crash January 21 near Thule, Greenland, of a USAF B-52 carrying four hydrogen bombs has created wide-ranging controversy over the merits of SAC's airborne alert system.

The B-52 on airborne alert was forced to attempt an emergency land-

ing 7.5 miles southwest of Thule AB because of a fire in the navigator's compartment that spread intensive smoke throughout the aircraft. Six crewmen survived the crash; one, Capt. Leonard Svitenko, copilot, of West Springfield, Mass., was killed.

This was the fifth known accident involving B-52s on airborne alert since 1958. In January 1966 a midair collision between a B-52 and a KC-135 jet tanker scattered four bombs over both land and sea near Palomares, Spain, and released some radioactivity in a populated area. The recovery operation took eighty-two days and cost \$50 million.

The Thule crash littered a wide area with parts of the four hydrogen bombs, all of which broke open on impact. Most of the fragments are radioactive, contaminated by the plutonium metal, which oxidized when

the TNT wrappers around the nuclear material detonated. Plutonium forms the fusion core of the 1.1-megaton bombs. The radioactivity is not considered a health hazard to the 650 Eskimos and Danish residents and walruses, seals, and polar bears who inhabit the area. Whatever plutonium remains after clean-up will be diluted once the ice melts in July.

To pick up the debris, 450 Air Force and Atomic Energy Commission nuclear specialists and assorted technicians, plus US Navy recovery teams, were called to the frigid, rugged Arctic site for "Operation Crested Ice." This costly and time-consuming effort involves recovery of countless bits of radioactive particles and decontamination of the surrounding snow and ice to the satisfaction of Denmark, which owns Greenland.

The controversy stemming from the Thule and Palomares accidents has raised questions about the need for the airborne alert. SAC's airborne alert concept was initiated in late 1958 in response to increased Soviet threats. Some SAC aircraft were to be in the air twenty-four hours a day, loaded with bombs, on station, ready to deliver a retaliatory blow in the event of a surprise nuclear attack.

Critics of this policy claim that since the seas are swarming with nuclear-armed submarines which cannot yet be destroyed in a surprise attack, and since DoD has stated that our missile bases are now so thoroughly hardened that enough would survive a first strike to deliver a crushing retaliatory blow, loaded bombers are not needed. And, in fact, the alerts have been cut back to two or three

(Continued on following page)

Associate Editor Allan R. Scholin, who normally conducts this column, is on assignment for AF/SD, covering events in the Far East. He was in Thailand on February 8. . . . Other news of members of the Air Force Association headquarters staff: Confirmed for promotion to brigadier general in the Air Force Reserve is John Gray, AFA's Assistant Executive Director, who is beginning his eleventh year with AFA (see also p. 110). . . . New Assistant Art Director of AF/SD is Robert Fines, who studied commercial art at the Famous Artist School and was formerly Assistant Art Director of *Aerospace Technology*.

flights at a time in recent years and are simply called "training flights" by USAF.

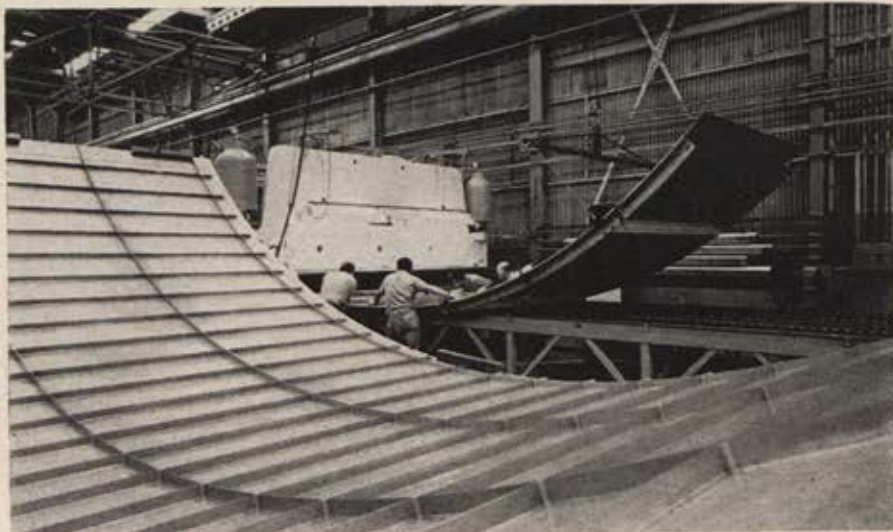
Critics also charge that the policy of sending loaded bombers over or near friendly territory only estranges US allies and foments misinterpretation of US intentions. Denmark, even before the Thule crash, informed the US that it wants no such weapons flying over its soil. Now the critics are calling for an extensive and critical review of American deterrence policies.

In his Posture Statement on the 1969-1973 defense program and 1969 defense budget before the Senate Armed Services Committee, Defense Secretary McNamara indicated that much of the existing US surveillance, warning, and control network can be phased out when new warning systems and radars become available. He reported that because of the B-52 modification program (to carry SRAM missiles) and our other missile forces, it may be possible to "reduce somewhat the proportion of the bomber force on the alert."



Ten years ago, barely three months after the USSR startled the free world with its Sputnik I, the US launched its first satellite into space, and there it remains—the oldest man-made object circling the earth.

Explorer I, launched January 31, 1958, has outlived its competitors, Sputnik I and II, by nine years. It is expected to remain in earth orbit for about two more years.



Second stage of Saturn-5 lunar launch vehicle begins life here at the Structural Machining Center at North American Rockwell Corporation's Los Angeles Division. The large machine shapes quarter panels for the Saturn. The \$30 million center was developed in response to the growing aerospace need for production of massive-sized structures and equipment to very close tolerances.

Launched by the US Army with the assistance of the Jet Propulsion Laboratory of the California Institute of Technology, Explorer was boosted aloft by a four-stage Jupiter C rocket, whose main stage was the 78,000-pound-thrust Redstone ballistic missile, modified for space-boosting use.

The nation's first satellite transmitted signals back to earth for four months and discovered the existence of the radiation band around earth, which became known as the Van Allen Belt, named for Dr. James A. Van Allen of the State University of Iowa. It was physicist Van Allen's

experiment package which rode into space aboard Explorer I.

Dr. William Pickering of the Jet Propulsion Laboratory, in an address in Washington, D. C., early in February, observed man's first decade in space by presenting an impressive list of space accomplishments since Sputnik and Explorer: 500 US satellites placed in earth orbit compared with 250 for the Soviets; thirteen successful lunar missions to eight for the Soviets, 2,000 hours of manned flight to 530 for the Soviets.

But even as he reeled off this success story, he despaired at the alarming

NEW BOOKS IN BRIEF

Aircraft Down, by R. J. Mokler. Stories of RCAF rescue squadron search operations, including one dramatic incident that received international coverage, are retold by a retired flying officer who has served as an assistant searchmaster. Exposition Press, N. Y. 110 pages. \$5.

Behind Japan's Surrender: Seven Days to Cataclysm, by Lester J. Brooks. A look at the internal squabbles of Japan preceding the decision to surrender—and at the cultural values that demanded death before such a dishonor. No over-all national picture is presented, however. Consequently, the decision is not satisfactorily explained through this one aspect. McGraw-Hill, N. Y. \$6.95.

The Insecurity of Nations, by Charles Yost. Are national ideals obsolete? A former ambassador to the UN claims that international relations, essentially unchanged from ancient times, must be replaced by a universal, supranational system of cooperation. Along with the creation of new global institutions, arms control should be achieved if "mankind is to prosper, perhaps even to survive to the end of the century." Praeger, N. Y. \$6.50.

The Last Hero: Charles A. Lindbergh, by Walter S. Ross. A non-sensational, empathetic, and detailed description of Lindbergh's achievements and resolute personal character.

The author constructed this biography without his subject's approval or cooperation because he feels that, as a public hero, Lindbergh "owes a debt to history" above his preference for privacy. Harper & Row, N. Y. 402 pages. \$7.95.

UFOs—Identified, by Philip J. Klass. With extensive documentation, Mr. Klass offers an explanation of UFO sightings in terms of freak atmospheric phenomena. Detailed coverage and a critical analysis will appear in the April issue of this magazine. Random House, N. Y. \$6.95.

The Vaagso Raid, by Joseph H. Devins, Jr. Britain's first offensive raid of World War II, on Norway's fortified Vaagso Island, caused Hitler to reshape his strategy, altering the course of the war. To the British, the victory also meant a valuable lesson in interservice cooperation. Chilton, Philadelphia, Pa. 222 pages. \$4.50.

The Wars of America, by Robert Leckie. Cramming ten major wars into a single volume comes dangerously close to pseudo-history when the author devotes just as much space to quips, quotes, and colorful forgotten incidents. But this book would be an interesting companion to other in-depth studies. Harper & Row, N. Y. 1,052 pages. \$12.50.

—MARIA T. ESTEVEZ

drop in public interest in the national space effort despite the glowing record above. "Must we return to the public apathy that prevailed before Explorer I? Must we lose our technological momentum and the continuity of research effort that we have achieved at considerable cost during what is probably the most scientifically productive decade in the history of our culture?" the space scientist asked.

Seemingly unalarmed by the public's indifference, Dr. Van Allen, at a symposium later that week at the California Institute of Technology, declared, "My main aim in life now is to get a mission to Jupiter."



One of the most advanced interceptor aircraft ever developed for the US, the YF-12A, has been shelved in favor of the Convair F-106 Delta Dart, equipped with new engines and improved avionics.

Lockheed built only three YF-12 prototypes. The project was born in secrecy, and development of the plane as the A-11 was announced with much fanfare by President Johnson in February 1964. The YF-12 claimed nine world records, including an absolute speed record of 2,062 mph, speed over closed-circuit courses with varying payloads, and horizontal flight at 80,000 feet.

The F-106 first flew in 1956, currently employs a Pratt & Whitney J75 turbojet powerplant rated at 24,500 pounds of thrust. If the power could be boosted to the 30,000-pound range as in the J58, two of which are used in the YF-12A, the Dart could reach Mach 2.5 or better, DoD says.

The decision to cancel the YF-12 was part of a planned \$12 billion overhaul of present US air defenses. While the YF-12 bears a \$5 million price tag, DoD reasons, the F-106 could be given an extensive facelifting for a fraction of that price, particularly since there are plenty of Darts on hand.

USAF has already fitted the F-106s with in-flight refueling to overcome any range problems. While the YF-12 contains its own long-range radar to seek out enemy bombers, the F-106, equipped with new electronic systems, would work with AWACS (Airborne Warning and Control System) aircraft, one of the "new warning systems and radars" to which Secretary McNamara referred in his Posture Statement. The AWACS aircraft would spot incoming aircraft and vector the F-106s, armed with nuclear-tipped missiles, to blast them from the sky.

(Continued on page 28)

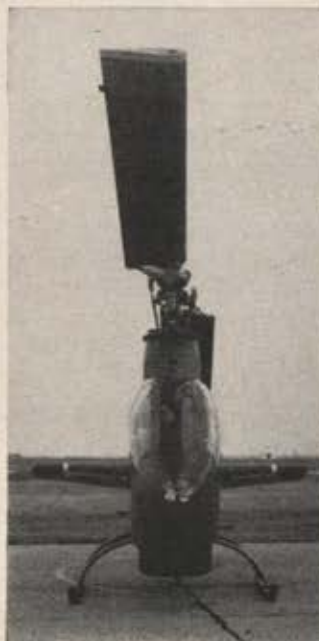
Flying their lonely vigil at sunset off the North American coast, these F-106 Delta Darts of the Aerospace Defense Command will carry their interceptor capabilities into the 1970s with new engines and radars. Already ten years old, F-106 was favored by DoD over YF-12A.



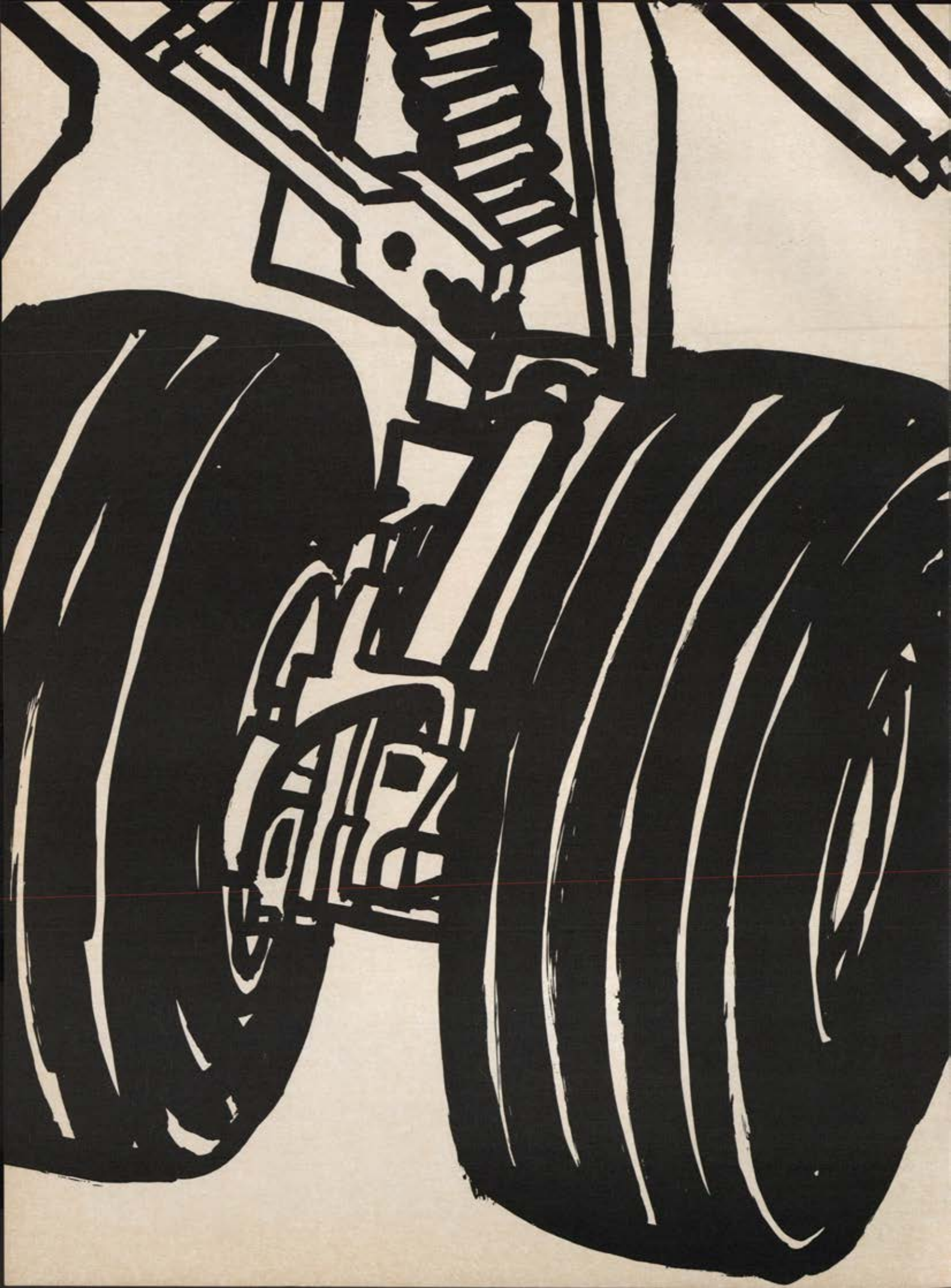
Observing the action in South Vietnam is US Army's OH-6A light observation helicopter (LOH) which, at 120 mph, can fly faster than present observation cop- ters and carries a Minigun on the left side.

Another new Army helicopter in Vietnam, the Bell AH-1G HueyCobra, looks more like a fighter than a helicopter; its fuselage is only thirty-six inches wide.

Replacing the old Huey, the new ship can dive at a sixty-degree angle, cruise at 106 mph, carries rockets, machine guns, Minigun.



HH-43 Huskie, first turbine-powered helicopter in USAF inventory, is affectionately called "Pedro" in Vietnam where it flies rescue and evac missions.



More like too smart is the answer. But maybe not. Read and judge for yourself.

You see, we make the world's best and most accepted skid control braking system. Hytrol. We do not make wheels, tires or brakes for aircraft. For five good reasons: Bendix, B.F. Goodrich, Goodyear, General Tire and Dunlop.

We developed our Hytrol concept so that the skid control systems will work with anybody's wheels, tires and brakes. Or any combination of anybody's. That way, you, the aircraft manufacturer, and you, the airline specifier, are free to choose the best product at the best price in each category.

But now, one major brake, wheel and tire manufacturer has this new idea called "total braking system responsibility." It means that you give this company one order for their wheels, tires, brakes—and their skid control system. You save several

sheets of paper on purchase orders, a lot of phone calls and meetings, and a lot of hard thinking about competitive products.

Two words bother us in this concept. One is the word "system"; the other is the word "responsibility."

The trouble with the word "system" is that the marketing people are taking it away from the engineers. Engineers use this word to define and call attention to an area of component interaction with a single function. Unfortunately, marketing people are beginning to use the same term as a selling device. They'd like to sell as many of their products as possible for use on your airplane.

When it comes to "responsibility," we may be old fashioned. We've always felt that it would be presumptuous to take this responsibility away from our customers. We build skid control braking systems. They are really responsible for stopping the airplane.

We try to help in every possible way, of course. With the manufacturer as well as with the airline user. We run computer and dynamometer studies. We are present when aircraft are flight tested. We have service personnel all over the world.

And when it comes to skid control, we have something that nobody else has: the practical experience from millions of landings with over 13,000 operating aircraft. Since 1948. From the B-47 to the DC-9. From the Jetstar to the C5A and the 747. With every commercial U.S. built jet transport now in service.

We frequently work with the major manufacturers of brakes, wheels and tires. Sometimes at our initiative. Sometimes at the request of our customers. And we can point to the fact that our research in skid control systems has lead to several improvements in brake technology as well as in improvements of other components.

Now, if somebody does want us to take on "total braking system responsibility," we're willing. And since we don't make our own wheels, brakes or tires, we can offer you this responsibility with an important "Plus": complete freedom of component choice.

You say you already have that? So you do.

We don't really think you're about to give it up. So we'll continue to save time by letting you worry about total braking system responsibility. And we'll continue to invest the time we save in developing the very best skid control braking systems. Incidentally, while you were reading this message, fifteen more jet transports landed safely—with excellent directional control regardless of weather or runway conditions. With Hytrol.

If your responsibility for stopping an airplane requires information about skid control, please let us hear from you.

Just call, write or wire to Chicken, c/o Hydro-Aire Division of Crane Co., Burbank, California.

Is Hydro-Aire too chicken to accept "total braking system responsibility"?





South of Da Nang, Vietnam, this Marine corporal fires at the Viet Cong with controversial M-16 rifle, a revolutionary and efficient weapon when it's functioning properly. After men in the field reported jamming of the rifle, DoD investigated and found that ammo propellant may be at fault.



Sandpiper, USAF's new supersonic target missile, is powered by hybrid rocket, using both solid- and liquid-fuel technology. In recent firing from 49,000 feet from F-4C Phantom II, Sandpiper approached Mach 2, remained in level flight for five minutes, unusually long for any rocket.

The US Department of Defense early in February announced cancellation of the three-year-old joint US-German project to develop an advanced tactical V/STOL fighter-bomber.

Cancellation was "due to the lack of a firm operational requirement at this time," DoD said.

Managing the venture was EWR/Fairchild International, an organization formed from Germany's Entwicklungsring Sud and the US's Fairchild Hiller Republic Aviation Division. The resulting aircraft (see "US/FRG V/STOL Fighter Design," December '67 AF/SD, p. 91) was to fulfill multinational requirements for a high-performance, vertical/short takeoff and landing tactical fighter during the 1970s. Its V/STOL capability would

have been well suited to the European defense requirement, making the aircraft less vulnerable to attack than those concentrated at large military airfields.

DoD officials said the US had spent \$7.5 million on the project.



Malfunction of the Army's new weapon, the Colt M-16 rifle, used extensively in Vietnam, may be due to the type of propellant used in the ammunition, according to the results of recent tests conducted in Panama by the Defense Department.

The Secretary of Defense directed the Army late in January to suspend until further notice the distribution in Vietnam and the manufacture of 5.56-mm ammunition loaded with IMR

(Improved Military Rifle) propellant.

Preliminary investigation of data from new tests of the M-16 rifle, fired with two kinds of ammunition available in Vietnam, IMR and ball propellant, indicates a substantial difference in the malfunction rates of the two types of propellant. DoD's tentative conclusion was that the ball propellant is significantly better.

An adequate level of several months' supply of ammunition loaded with ball propellant is now on hand in South Vietnam. IMR propellant constitutes about twenty to twenty-five percent of the total stock of 5.56-mm ammunition. No shortages are anticipated by DoD from the order suspending production with IMR. Existing IMR stocks will continue to be used in training.—END

INDEX TO ADVERTISERS

American Airlines, Inc.	13	LTV Electrosystems, Inc.	4
Bell Aerosystems Co.	41	McDonnell Douglas Corp.	Cover 4
Boeing Co., The	Cover 2	Motorola, Inc., Government Electronics Div.	19 and Cover 3
Collins Radio Co., Inc.	14 and 15	Northrop Corp.	8
Electro-Optical Systems, Inc.	82	Ryan Aeronautical Co.	52
Fairchild Hiller Corp.	29	Sikorsky Aircraft Div., United Aircraft Corp.	30 and 31
Honeywell, Inc., Aerospace & Defense Group	78 and 79	Sperry Rand Corp., Sperry Flight Systems Div.	1
Hughes Aircraft Co.	17	Sperry Microwave Electronics Div.	101
Hycon	45	Sylvania Electric Products, Inc., Electronic Systems Div.	81
Hydro-Aire Div., Crane Co.	26 and 27	Trans World Airlines, Inc.	74
Interstate Electronics Corp., Systems Div.	73	TRW Systems	2 and 3
Jet Avion Corp.	117	Univac Div., Sperry Rand Corp.	49
Lockheed Aircraft Corp.	6 and 7	Vitro Corp. of America	86
LTV Aerospace Corp.	20 and 21		

Space Life Support Systems



Advanced Fighter Designs



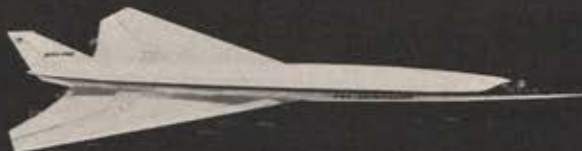
F-4 Tail Assemblies



747 Wing Control Surfaces



SST Body Structures



F-105 Systems



Safety Car Designs



Republic Aviation

Advanced Capabilities in Aerospace Technology

Republic, builders of the famed Thunderbolt, Thunderjet and Thunderchief fighter aircraft, continues to develop advanced aircraft and systems. Current programs include new tactical fighters for the '70s, major structures for the McDonnell Douglas F-4 and the Boeing supersonic transport (SST), wing control surfaces for the Boeing 747, plus systems and support for many other aircraft including the Thunderchief.

And the next vital step in aviation, the hypersonic transport, is already under intensive study at Republic. Republic is also involved in such diversified tech-

nological program areas as space life support . . . V/STOL research . . . information retrieval systems . . . thermionic energy conversion . . . biomedical engineering . . . automotive safety programs (safety car designs) . . . plasma propulsion . . . and new methods of fabricating tomorrow's metals.

Aerospace technology for the future? The capability is here and now, at Republic Aviation.



FAIRCHILD HILLER
REPUBLIC AVIATION DIVISION

**The free world's
only crane helicopter
flew 12 months
after go-ahead...**





This one lifts almost twice as much. It can fly in 16 months.

Guaranteed: First flight in 16 months or less. Production in 24 months or less. All we need is the go-ahead.

We can do it because the S-64B Super-Skycrane will combine many of the best features of two highly success-

ful heavy-lift helicopters: the CH-54A Skycrane and CH-53A transport.

Most of the needed dynamic components are available now.

In short, Sikorsky offers the best combination of lift capability, devel-

opment time and development cost to meet multiservice requirements.

And no one knows more about flying cranes.

Sikorsky Aircraft
STRATFORD, CONNECTICUT

DIVISION OF UNITED AIRCRAFT CORPORATION

U
A

Architect of the Defense Department, long an adviser to Presidents, and a successful corporation lawyer, the newest member of the Cabinet has already started to improve relations between the Pentagon and Capitol Hill. Inheriting a vastly troubled empire in a time of great stress is . . .

Clark M. Clifford— Neither Hawk nor Dove

By Claude Witze

SENIOR EDITOR, AIR FORCE/SPACE DIGEST

FOR THE first time since the beginning of John F. Kennedy's Administration seven years ago, we have a new Secretary of Defense. President Johnson's selection of Clark M. Clifford to replace Robert S. McNamara is heavy with political and military significance, much of which will surface before the end of this year.

It is true that Mr. Clifford, a prominent Washington attorney, has had little experience as an administrator. On the other hand—and this is less widely known—he has been called the architect of the Defense Department, and it would be hard to find a man who knows more about how the Pentagon can and should work.

As Special Counsel to President Harry S. Truman, Mr. Clifford helped create the Defense Department when he played a major role in the drafting of the National Security Act of 1947, and he wrote the 1949 amendments that made it an executive department with a strong Secretary.

The Senate Armed Services Committee, which went through the ritual of examining Mr. Clifford's credentials at a public hearing on January 25, knows of this background and clearly respects Mr. Clifford for it. At one point, Chairman Richard B. Russell asked the nominee if he had any doubt about the authority of the Defense Secretary to control his department.

The answer was no. Mr. Clifford also pointed out that the seven-year tenure of Mr. McNamara illustrates "the ability of the Secretary to utilize the powers that presently exist. . . ."

At this point, the germane fact is that it was Mr. McNamara's utilization of power that led, in many in-

stances, to his clashes with both Congress and the military Chiefs of Staff. Mr. Russell then pursued the subject by asking Mr. Clifford to define the obligations that a Defense Secretary has to the committees on Capitol Hill.

This time the reply was that Mr. Clifford expects to maintain "the closest type of cooperation with the appropriate committees of the Congress." Mr. Clifford added that "at this particular time in our country's history, that close association and coordination is, perhaps, more necessary than ever before."

Speaking only a couple of days after the seizure of the USS *Pueblo* by North Korea, and on the eve of violent new turmoil in South Vietnam, Mr. Clifford continued:

"Some of you have been here longer than I, and I might say only I do not recall perhaps a more perilous time confronting this nation than that which confronts it today."

Politically, it is this approach to Congress that President Johnson knew would make Mr. Clifford an asset in his most burdensome cabinet position. There is no doubt that Mr. McNamara had developed into a liability because of the abrasive effect he had in most of his contacts with Congress. Mr. Johnson, approaching a presidential election contest, has many problems with the Senate and House of Representatives; one of the few he could do anything about was his Secretary of Defense.

Mr. McNamara was removed graciously, by being appointed to the presidency of the World Bank. At his new desk, he will have no direct obligations to Congress but will be able to exercise his competent ad-

ministrative muscle in an area that interests him. Not long ago, in a speech at Montreal, Mr. McNamara held forth on poverty as a cause of war. As President of the World Bank he will be in a position to do something about it in his work with the have-not nations.

As for Mr. Clifford, he already has begun to charm Congress. In his first appearance before the Senate committee, there was not a harsh word or a hostile question. Reported the *New York Times*: "It is apparent that Mr. Clifford can be expected to bring an end to the growing tension, sometimes bordering on hostility, that had been developing between the congressional armed services committees and the Defense Department under Mr. McNamara."

It was out of the Senate hearing that the public got first evidence of the degree to which Mr. Clifford can be expected to differ from his predecessor on matters of basic policy.

A key item is the whole subject of US strategic nuclear power as opposed to that of Russia. Mr. McNamara has been under deep suspicion, particularly among congressmen, as an advocate of parity. This, in short, means that his administration is the one that fathered the thought that one means to ensure peace is to ensure a stalemate. Then the opposing strategic nuclear forces would supposedly cancel each other out.

In his appearance before the Senate, Mr. Clifford made it clear he does not see safety in parity. He came out clearly and emphatically for the maintenance of a clear-cut "nuclear supremacy."

It is interesting that this approval can be traced back, in Mr. Clifford's recorded history, to a paper he

prepared for President Truman in 1946. In that memorandum he said the possibility of a third World War could depend on the relations of the US with Russia. He accused Russia of aggrandizement and said it is dangerous to put our hope for peace into any possible understanding with the Soviet Union. Then he wrote:

"The language of military power is the only language which disciples of power politics understand. The United States must use that language in order that Soviet leaders will realize that our government is determined to uphold the interests of its citizens and the rights of small nations. Compromises and concessions are considered by the Soviets to be evidence of weakness."

This approach by the new Defense Secretary, an approach that is now more than twenty years old, still holds. Mr. Clifford told the Senate he "intuitively" supports a follow-on bomber for the US Air Force B-52. The airplane project has been opposed by Mr. McNamara. Mr. Clifford said that the bombing of North Vietnam has served "extremely useful purposes" because it impedes the movement of supplies and men into South Vietnam. Mr. McNamara had previously told Congress he questioned the military effectiveness of the bombing.

The movement of Mr. Clifford to the Pentagon does not mean that this is the first time his opinions have had an influence on US policy. The fact is he has been at President Johnson's elbow in the White House for many months past and has a reputation as an intimate of Presidents.

(Continued on following page)



No stranger to the White House, new Defense Secretary Clifford here confers with Mr. Johnson, the third President he has served. Appointment won swift approval from chairmen of both armed services committees on Capitol Hill. Mr. Clifford also is a golfing companion of Senator J. William Fulbright, Foreign Relations Committee chairman and Pentagon critic.



—United Press International Photo

Mr. Clifford appeared before Senate committee in midst of excitement over capture of USS *Pueblo*. By this time privy to all secrets, he refused comment on affair to the press.

Clark M. Clifford is a sixty-one-year-old lawyer and is reputed to be the best-paid attorney in Washington, with an income that has exceeded \$1 million a year. At the same time, he has a reputation as a liberal, and in the Truman Administration, when he was a special counsel for the President, was considered a "mainstay" of the Fair Deal.

Mr. Clifford's experience in government goes back to World War II, when he served in the US Navy and was assigned as a military aide to Mr. Truman. He has been in the shadow of the White House ever since, serving both John F. Kennedy and Lyndon B. Johnson in a wide variety of tasks. He is more than six feet tall, handsome, urbane.

President Truman was so impressed with his competence that he retained Mr. Clifford on the White House staff after his release from the Navy in 1946, with the rank of captain. In 1948, Mr. Truman faced a tough election in his contest with Republican Thomas Dewey. It is Mr. Clifford who is credited with charting the strategy that brought victory to the President.

This record as a quiet adviser to Presidents, an "insider's insider," was continued in the Kennedy and Johnson Administrations. Mr. Clifford has handled politically sensitive assignments for both men, and the living room of his farm home just outside the District of Columbia has been the scene of many important, but necessarily clandestine, meetings.

As both a member and chairman of the Foreign Intelligence Advisory Board, Mr. Clifford has for many years been close to the inner workings of the nation's intelligence community. It is a job he was persuaded to take by President Kennedy after the Bay of Pigs fiasco. As Mr. McNamara now has admitted, the bad advice in that case came from men in the President's official family, including Mr. McNamara. Mr. Clifford

was outside the group until after the Cuban exercise embarrassed the White House.

Equally as important as Mr. Clifford's relations with key men in Congress will be his harmony with the military chiefs. He has told the Senate he will make sure that the uniformed men have every opportunity to express their opinions. And that he will confer with them before he makes decisions. Further, if the Chiefs of Staff disagree with a Clifford decision, he feels they are free to go to the White House with their plea.

In the Pentagon many men of the Army, Navy, and Air Force look forward to the new Secretary with the hope that some military dignity, which they feel has been tarnished in the past few years, will be restored. One officer, long chafing under the McNamara approach, was cheered by the fact that Mr. Clifford is an experienced and competent corporation lawyer.

"The Whiz Kids," he said, "will have to take a short course in the rules of evidence."

Of paramount importance in this change of command at the Pentagon is the fact that Mr. Clifford is a confidant of President Johnson. He has been influencing military decisions for many months. For this reason, there has been a tendency to interpret his selection as a victory for the "hawks" over the "doves" in the continuing American debate over the conduct of the war in Vietnam.

The new Secretary himself says he is "not conscious of falling under any of those ornithological divisions." The fact remains that he has closer rapport with the Commander in Chief than did his predecessor.—END



First official Defense Department photo of the new boss shows him in conference with his predecessor (left), who turned over seat of power at time of new security crisis.

Despite much talk and use of the "systems" approach to planning and building weapons, the concept has yet to be applied to American national defense as a whole, contends the author, who is a highly respected authority on US defense matters. Such an approach is needed—an approach that will take in all factors of strategic defense, including technological innovations which have increased the accuracy and cost-effectiveness of missiles and are daily making antiballistic-missile systems for ourselves and our allies increasingly practical . . .

A Look at National Defense as a System

By Dr. Robert Strausz-Hupe

The author, Dr. Robert Strausz-Hupé, has been Director of the Foreign Policy Research Institute, University of Pennsylvania, for many years. He is also editor of the Institute's quarterly publication, ORBIS. Author of numerous books, he has contributed to such magazines as The Saturday Evening Post, US News & World Report, Fortune, and The Reporter, as well as AIR FORCE/SPACE DIGEST.

ALTHOUGH "systems theory" has swept American government, industry, and academia, the study of American national defense as a whole seems remarkably insensitive to the concept of "system"—i.e., a whole of geopolitical and technological relationships. The drift into sectarian squabbles, which increasingly confounds the consensus of the *cognoscenti* on most any national issue, and the long-standing tendency of our civilization toward the propagandistic oversimplification and, hence, the distortion of all issues, may well account for this particular confusion about the whole and its parts.

Be that as it may, the number of our long-range systems and their payload; systems designed to penetrate enemy defenses against ballistic missiles; defenses deployed against enemy missile attack; the configuration of our conventional forces; the nuclear and conventional capabilities of our allies; the state of command, control, and communication systems; the restrictions imposed by arms-control agreements; the cohesiveness of NATO and the Warsaw Pact; and, last but not least, the perceptions of threat by the actors in the grand strategic confrontation—each one of these is part of one package, of one "system." Any one factor in this formidable equation cannot be discussed meaningfully without discussing its relationship to all the others.

Of late, for example, the pros and cons of the deployment of a US antiballistic missile (ABM) defense have been debated as if they could be determined without the consideration of these complex relationships—or as if one or two related parts could be abstracted from the whole without reducing the "system" to a skeleton of the living thing.

The observations just made have been emphatically

denied. In fact, Charles Hitch, who was responsible for developing the Defense Department system for planning, programming, and budgeting, stated:

... we have provided for the Secretary of Defense and his principal military and civilian advisers a system which brings together at one place and at one time all of the relevant information that they need to make sound decisions on the forward program and to control the execution of that program. And we have provided the necessary flexibility in the form of a program control system.

He further asserted:

Budgets are in balance with programs, programs with force requirements, force requirements with military missions, and military missions with national security objectives. And the total budget dollars required by the plan for future years do not exceed the Secretary's responsible opinion of what is necessary and feasible.*

Obviously, it would be desirable if our security programs could be determined with such precision. Yet, in a period of dynamically shifting technological innovation, Mr. Hitch's claims seem excessive. Presumably, the practitioner of a systems approach would have to look at the world as a whole and assess the implications of the interaction between competitive

(Continued on following page)

*Planning-Programming-Budgeting, Initial Memorandum, prepared by the Senate Subcommittee on National Security and International Operations (US Government Printing Office, Washington: 1967).

A LOOK AT NATIONAL DEFENSE AS A SYSTEM

powers pursuing distinctly different strategic doctrines. For a number of years, the former Secretary of Defense, Mr. McNamara, attempted to educate the Soviet leadership on the proper design of Soviet strategic forces. If Mr. McNamara had had his way, the Soviet forces would have been constructed along the same lines as our own.

A considerable portion of Mr. McNamara's San Francisco speech, in which he announced the decision to deploy a "thin" US ABM system oriented against the emerging Chinese threat, was addressed to the Soviet leadership. In particular, he reiterated his request that the Soviets desist from the further development of their ABM system. Recently, some US officials have stated that they would be willing to take an uninspected pledge from the Soviets that they were doing so as *quid pro quo* for a US decision to forego its deployment of an ABM system.

The Soviets have shown almost no inclination to abide by Mr. McNamara's stated strategic insights. If



Under this Minuteman combat crew commander's surveillance are ten intercontinental silo-stored strategic missiles. They represent the basis of US strategic defense. But, the author contends, their lack of mobility, in light of increasing ICBM accuracy, jeopardizes their deterrent value.

we have reached the "plateau" of military-technological inventiveness, the Soviets do not seem to understand that they, too, are standing on it. Unpersuaded by the argument of "overkill," they are probing for strategic technological breakthroughs. In fact, they appear to be accelerating production of accurate intercontinental ballistic missiles with several times the payload of the American Minuteman and Polaris missiles and, should the United States elect to deploy an ABM system oriented against the Soviet threat, with the capacity for heavy shielding and penetration aids.

It is becoming increasingly evident that the systems analysts at the Pentagon have been reluctant to take into consideration rapidly changing ratios of cost-effectiveness between defensive systems and those built for offensive missions. Ten years ago the possibility that a defensive missile could be designed and devel-



A second-strike capability as embodied in this Minuteman missile being fired from a hardened silo, is the best defense, according to current US defense policy. But ABM systems are becoming more cost-effective, and planners may soon be able to choose between ICBMs and ABM missiles.

oped to intercept an ICBM was regarded as a futuristic dream. In a few short years the dream became reality. Then, the defense planners calculated that it would be possible to design a defense system that could intercept missiles, but that its cost would be considerably higher than the cost of the offensive missiles arrayed against it. Yet, thanks to some amazing technological developments in recent years, the cost of defense in comparison to offense has been dropping rapidly.

Donald J. Brennan, a leading US defense scientist and arms-control expert associated with the Hudson Institute, Harmon-on-Hudson, N. Y., suggests that "while there is no single number that will stand as the cost-exchange ratio under all circumstances, it is clear that an appropriate value to think of as an average value, and moreover one which is probably close to a 'correct' value for a significant range of circumstances, is 1/1, i.e., unity."* What this implies is that a defense planner can now, or will soon be able to, choose whether he wishes to allocate resources to missiles that will increase damage inflicted upon his opponent or to invest the same resources in reducing damage to his own population. This development has fundamentally altered the nature of the game and has called into question the American reliance on offensive systems as the primary way of maintaining the current (deterrent) balance.

Also, US defense planning over the past five years has increasingly tended to exclude NATO Europe as a factor in arriving at decisions made to provide for the security of the United States. The decoupling of

*"New Thoughts on Missile Defense," *Bulletin of the Atomic Scientists*, June 1967, p. 11.

transatlantic security arrangements is reflected in the unilateral US decision to emphasize conventional over nuclear weapons. The abrupt cancellation of the Skybolt missile, the hot pursuit of the nuclear antiproliferation treaty, and finally, the US decision to deploy a "thin" ABM system might well have been prompted by cogent technical considerations as well as a proper concern with the maintenance of a stable international environment. Yet neither of these crucial initiatives was launched from the base of alliance consensus.

The European members of NATO may have been advised in advance as to the content of Secretary McNamara's September 18 San Francisco speech, but there is no evidence in the public realm that they were consulted about the decision or about the effect it might have upon the defense of "the Atlantic security system." Even a casual examination of Mr. McNamara's San Francisco speech makes it evident that it was primarily an argument against the deployment of an ABM system. As the *New York Times* noted, "... the President made the decision to build the thin system for domestic, political reasons, and Mr. McNamara changed the final portion of his speech to conform."

The above examples should suffice to illustrate that Department of Defense systems planning has been conducted with so narrow a focus that critical factors affecting the validity of any particular decisions were frequently excluded from the analysis.

The Emerging US Strategy

The current US strategic posture has been shaped by decisions made in 1961-62. These decisions resulted in the buildup of both land-based and sea-based ballistic missiles. These, according to Secretary McNamara speaking at San Francisco, are in excess of those which the United States currently needs. Nonetheless, in response to Soviet deployment of an antiballistic missile system, in 1966 Secretary McNamara ordered the acceleration of the Poseidon missile, whose payload is twice that of the existing Polaris system. This additional payload presumably will enable the Poseidon to carry more effective penetration aids and thus strike targets defended by the Soviet ABM system.

At the same time, statements made by Defense Department officials indicate that, despite the rapid buildup of powerful and accurate Soviet ICBMs, the United States is no longer committed to a course of maintaining superiority over the Soviet Union in numbers of offensive missiles. In short, the United States is moving toward a condition of numerical parity with the Soviet Union. Yet, at the same time, the United States has initiated development of a "thin" ABM system oriented against Communist China. This system, as well as the more powerful Poseidon missiles, will probably not become operational until 1971-72.

The United States adheres to a second-strike policy, which the author fully supports. Unfortunately, there is no such thing as a second-strike force which, in numbers of missiles, is inferior to or equal to the opponent's first-strike force and which is also capable of



According to Secretary McNamara, the number of land-based and sea-based missiles we now have is already in excess of what is needed to carry out our strategy. Yet he ordered the acceleration of the Poseidon missile, which will replace the Polaris shown being fired at left. Poseidon will have a payload twice that of the most advanced Polaris.

surviving. The accuracy of offensive missiles has improved so that it will require only one missile to destroy a missile at-the-ready in a silo. Therefore, a second-strike strategy, if it is to have any meaning at all, requires numerical superiority.

The United States, however, is moving toward a strategy of parity because it has accepted two unprovable propositions. The first is that the offense, no matter what happens, will reign superior over the defense. The second is that Soviet strategic planners want exactly the same things we want—namely, an assured destruction capability, which will render unlikely any US nuclear strike upon the Soviet Union.

The evidence, however, seems to indicate that the Soviets, in addition to seeking parity with the United States, might well be committed to the pursuit of a strategic superiority, which could conceivably be exploited politically. The United States strategic planners do not believe that the Soviets are interested in strategic superiority, or, if they are, that they can be persuaded from seeking so unattainable a goal. Because of the lead-time problem, the forward surge of the Soviet strategic curve might soon intersect the more or less static US strategic projection. The strategic balance thus could shift from one of certain and recognized US strategic superiority to an equation whose outcome will be highly indeterminate.

The Soviet Surge

It seems evident that the Soviets are making a sustained effort to increase their nuclear strike force. Their presently deployed ICBMs, which are as accurate as those produced by the United States, carry payloads

(Continued on following page)

approximately six times greater. The Soviets have been producing these missiles at a rapidly accelerating rate. Some are protected in hidden silos, some "can now be launched from mobile complexes which can be moved quickly, making them immune to any reconnaissance satellites and making them impossible to hit with American missiles," the quotation being from remarks by General Tolubko, Deputy Commander of the Soviet Strategic Rocket Forces.

While there is dispute about the full extent of the Soviet ABM deployment, there is no question that they have made a considerable investment in this system, or that the United States cannot assess conclusively its effectiveness. While stepping up their capabilities for intercontinental warfare, the Soviets have continued to maintain some 750 intermediate-range missiles posed against targets in Western Europe, intending, so it seems, to keep America's European allies in hostage to our own good behavior. At the same time, the Soviets have not abandoned their interest in long-range military aircraft and are in the process of developing a supersonic delta-wing bomber. The Soviets are also building up their naval power, both undersea and surface.

The US government has hailed the space treaty as "a milestone in the extension of international law." Space was to have been reserved for peaceful uses. Yet, escalating the military uses of space, the Soviets are making an expensive effort—which, incidentally, is not matched by any US competition—to develop a Fractional Orbital Bombardment System, a system described as "just within the letter of the law."

There are no known reliable means for probing the Soviet leaders' minds to ascertain why they have chosen to commit their national resources to a systematic and sustained military buildup. Are they increasing already considerable allocations as part of a strategy designed to convince the United States that they want to strengthen the "détente"? Is it possible that they may wish to create a force that could enable them to exploit opportunities as, for example, those that might arise in the future from a new Middle East crisis or a resumption of pressures against West Berlin?

Imponderables and Uncertainties

The realm of strategic interaction is exotic and complex. Thus, for example, no one can tell accurately how the matter of lead time will affect the future strategic postures of the United States and the Soviet Union. Short of war, we will never know how effective the Soviet ABM system might be, or how high our penetration aids will score against the acquisition and command radar which the Soviet Union now has or is likely to have in the future.

Much ado has been made about the MIRV (Multiple Independent Reentry Vehicle) as the ultimate offensive answer to the challenge of defense. The principal characteristic of a MIRV is a nose cone carrying more than one nuclear warhead which could be independently and precisely aimed against a given target. Yet, the dialectic of measures and countermeasures

does not falter before the potential challenge of the MIRV. The United States itself is currently investigating the possibility of developing a third stage for the Spartan antiballistic missile, which would give the missile a "loitering" capability, particularly against Soviet multiple warheads.

The American public has recently been alerted to the development of a Spectrum warhead which, presumably, could be used to destroy incoming missiles in outer space. These missiles would emit X-rays of sufficient power to neutralize, above the atmosphere, either the guidance or trigger systems of incoming offensive missiles. The force of the X-rays would decrease according to the distance traveled. Even so, they could prove lethal to missiles within a huge extent of space.

The development of the Spectrum may be handicapped by the test-ban treaty, which prohibits testing in the atmosphere or in space. US development of such a weapon would have to take place underground. There is a possibility that the Soviets are also seeking such a warhead and that their search may have benefited from the detonation of both offensive and defensive missiles several hundred miles above the earth in the 1961-62 test series.

How Soviets 'Read' the US Decision

We have no way of learning how the Soviets read Secretary McNamara's decision to deploy a US "thin" ABM defense. Do they take him at his word, and note with satisfaction that we are not deploying this system against the Soviet Union, but only against Communist China—particularly when most of the deployment will provide protection for US Minutemen located in silos in the Rocky Mountain region? Then again, we do not know how the Soviets calculate levels of losses they would be willing to accept if and when they were to threaten, or actually launch, a nuclear war.

Whatever may be their calculations, the Soviets are making greater efforts to protect their population than is the United States. We do not know how willing the US would be to risk a significant portion of its population in a nuclear war in order to defend even so vital a stake as the continental United States. The longstanding reluctance of successive administrations to commit national resources to blast and fallout shelters and, in general, defensive rather than offensive nuclear weapon systems makes it virtually impossible to infer any US calculus of acceptable human losses in a nuclear war.

The political exploitation, in 1960, of the so-called missile gap has made it less likely than ever that Americans will be able to deal unemotionally with the military-technological problem characteristic of the nuclear age. The fact is that we may well be approaching a more serious strategic gap by the 1970s. For all we know, we may already be teetering on the brink of a defense gap. President Johnson's decision to order the deployment of the "thin" ABM system tacitly

(Continued on page 40)

Soviets Show Off Missile Mobility

Providing mobility for large missiles is a major objective of the Soviet military establishment. Red officials have recently spoken of ICBMs mounted on land vehicles, which will supplement the long-range missile force in silos. According to some sources, the missiles shown on this page are such mobile ICBMs. However, most US observers believe that these forty- to fifty-foot-long, liquid-fuel rockets have a range of less than 2,500 miles and are in the Scud-class of Russian rockets. To have global range they would need to be thirty to forty feet longer, or have three to four feet more diameter, using currently available storable propellants.

A major cross-country mobility trend—the use of wheels rather than tracks—apparently has developed in the USSR as well as the United States. The US Army today usually favors wheeled vehicles for systems that must have good on-road and off-road performance.

Judging from the vehicles shown here and the others seen in Moscow parades, the Red Army has reached the same conclusion.

Missiles of this type pose one of the most formidable problems in nuclear war planning in Europe. Their mobility makes them very difficult to locate and destroy. Large numbers of fighters and excellent reconnaissance would be needed to neutralize a force of several hundred of these weapons.

Operating in small firing convoys, with two or three auxiliary vehicles accompanying each missile carrier, these forces have the potential to remain effective during a prolonged period of combat. Mobile ICBMs have the same potential for sustained action, and such weapons could change the entire complexion of the nuclear-war thinking associated with fixed-base, long-range missile forces.

—J. S. BUTZ, JR.



Crew of a Soviet Army mobile missile launcher stands at attention during a pause in their exercise. It is believed that this missile burns storable propellants, which are carried in an accompanying tanker-pumper truck.



The wheeled carriers above are typical of the Red Army's new rolling stock. They have good speed on road and off. The carriers apparently serve several functions so a missile battery convoy can be kept rather small.

Novosti Press Agency photos



As the missile is raised to firing position the structure is revealed to be quite conventional and conservative. The Russians are believed to have concentrated to a large degree on storable-fuel missiles for field use.

acknowledges a chink of sorts, if not a gaping hole, in our armor. Certainly, the strategic balance cannot be insulated from the political environment. Congressional pressure appears to have hastened the President's decision to depart from Mr. McNamara's firmly held and explicitly stated position and convictions.

The implications for the United States' allies in both Europe and Asia of the US decision to begin the deployment of a "thin" ABM system are subject to a variety of interpretations. In the Far East, the expressed US concern over the Chinese Communist nuclear capabilities may enhance Peking's potential for blackmail. This would particularly be the case if the US were unable or unwilling to neutralize this potential by iron-clad commitments to Japan, the Philippines, and other Asian countries whom the United States nuclear offensive umbrella now protects against nuclear blackmail, both Chinese and Soviet. The implementation of such commitments might include the development of either a land-based or seaborne antiballistic missile system, which could be deployed *before* Chinese Communist strategic capabilities will reach significant proportions.

The Case of Western Europe

The case of Western Europe differs markedly from that of the Far East. Western Europe has been under the Soviet nuclear gun for over ten years. The realities of the situation could be glossed over as long as the net US-Soviet strategic equation decisively favored the United States. This situation no longer obtains. The security of Western Europe is now much more delicately balanced. Furthermore, the Soviet deployment of an ABM system, accompanied by the US decision to build its own, could make Western Europe an undefended no-man's land between the two nuclear giants. If this unpleasant condition develops and its implications sink into the minds of the Europeans, the possibility of a fundamental rupture in the NATO alliance could become a reality. In order to escape from its hostage predicament, Western Europe might attempt to sever its links with the United States in order to assume a position of neutrality guaranteed by the Soviet Union. In this event, all of Western Europe would be turned into a political "Austria," and the Soviet goal of eliminating American influence from Europe would be achieved.

Another and less dismal course might be followed: The United States would explore with its NATO allies the possibility of developing a NATO-wide ABM system. This plan would require that the United States share with its allies the development of an ABM defense serving the entire community on the basis of cooperative research, funding, and deployment.

It is conceivable, but not very likely, that the US and Soviet acquisition of ABM systems might stimulate the development of a European deterrent against both the superpowers. At this stage, however, a European ABM could be developed for deployment only by the closest kind of US-European cooperation. The problem of warhead control, in order to make certain that the system was solely defensive in character, could

be met. This should impose no great technological difficulty.

The ABM, or, rather, the common effort to build and man it, could be a means of improving alliance cohesion. The European defense would have to be a heavy, tight defense, in which area coverage installations that might serve the United States and the Soviet Union would not be at all practical. Furthermore, the range of threat to Western Europe, *i.e.*, fighter bombers and long- and short-range missiles, covers a wider spectrum than the threat to the United States. Consequently, the ABM would not close all the gaps and probably would have to be accompanied by an improved air defense system as well as the adoption of civil defense measures.

Assuming that the will and the means are equal to the decisions to deploy, extremely difficult scientific and technological obstacles would have to be overcome. Yet, the heart of the matter is that technological cooperation on a project of this magnitude would benefit both the United States and Western Europe. The United States would benefit from the existence of European-sited radar acquisition systems. The Europeans would gain by participating in exploration of the most advanced of all modern technologies. The configuration of an antiballistic missile contrasts with that of an ICBM in roughly the same manner as the design of a Mack truck contrasts with that of a fine watch. In the process of a fruitful collaboration in Atlantic defense, Western unity and purpose would once more be restored.

The Choices We Face

Having made the decision to deploy a light or "thin" ABM, the question now facing the United States is, where do we go from here? Should we discuss with our allies—first with those in Europe and subsequently with those in Asia—the initiation of a cooperative venture in missile defense?

At this point in time, the course of wisdom appears to be to deploy as rapidly as possible the "thin" ABM system. This system should provide additional protection for our own offensive missiles in the critical years that lie ahead. Simultaneously, we should study the feasibility and desirability of the eventual defense of our urban complexes. These studies would benefit from the experience gained by the acquisition of an operational ABM system, however "thin" its deployment.

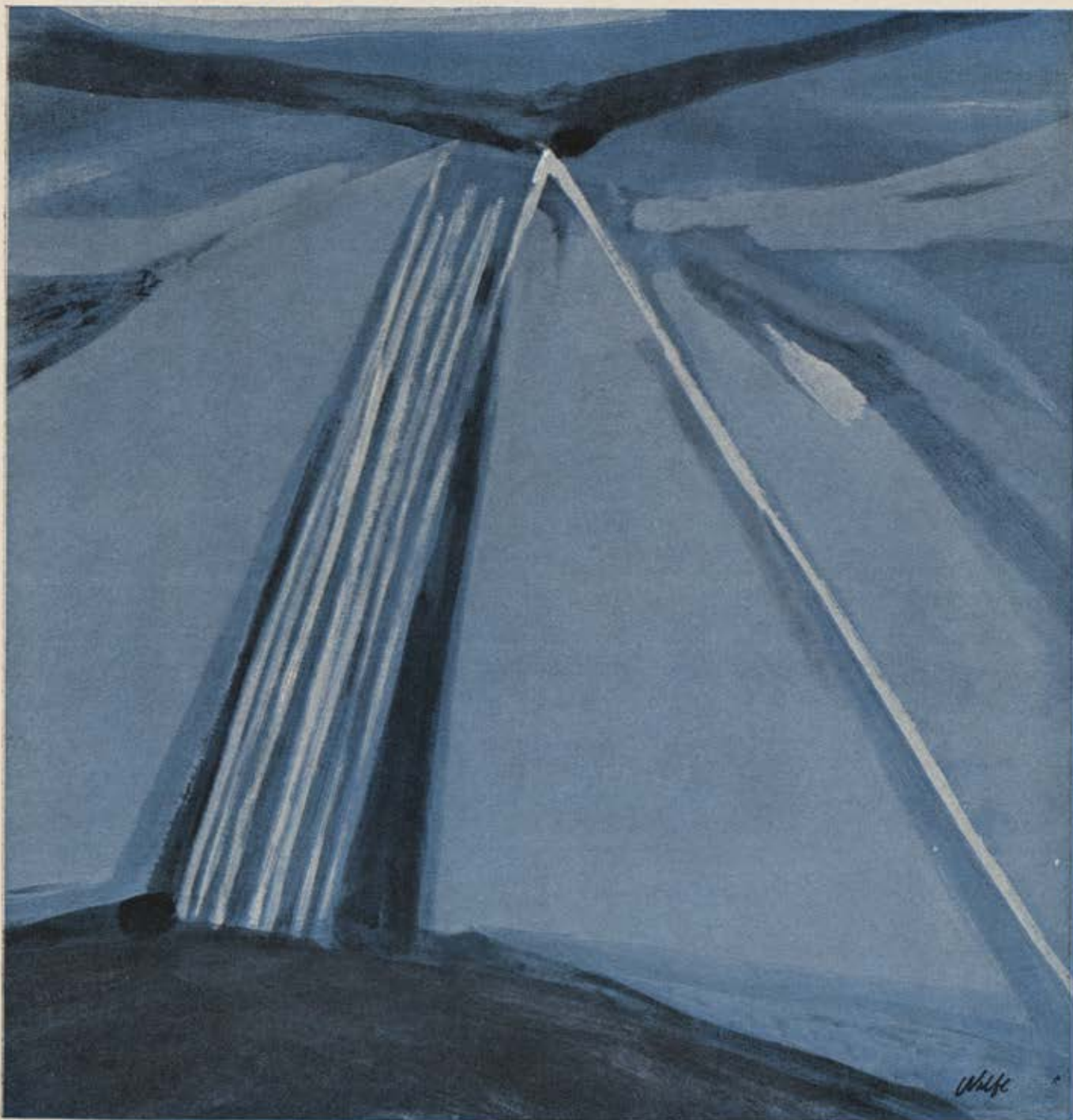
In addition, new technological developments may permit a type of urban defense vastly superior to that currently conceivable. With the least possible delay, the NATO Council and the military committee of NATO should become forums for genuine alliance discussions concerning the political desirability on the one hand, and the technological feasibility on the other hand, of a European ABM. Such a joint North American and Western European endeavor could put teeth into the NATO pledge that "an attack against one is an attack against all." As a matter of elementary prudence, the credibility of this pledge must be made impregnable to doubt—lest it be put to a test.—END

Communicate clear as a Bell

... by tropo-radio, between points 35 to 150 miles apart — common distances in modern battle areas. AN/TRC-104 is an ultra-reliable, lightweight, troposcatter radio system developed by Bell Aerosystems for the U.S. Air Force. Weighing less than 500 pounds, the complete terminal equipment can be set up anywhere by a small crew in less than an hour. The channels available can handle voice or digital data and simultaneous transmission and reception. The 104 achieved its design goals and in field tests demonstrated its increased reliability, reduced size and weight. This is another example of clear thinking by the scientists and engineers of Bell.

BELL AEROSYSTEMS — A **Textron** COMPANY

Buffalo, New York



The Medal of Honor

Two Air Force pilots have been awarded the Medal of Honor for heroic action during the air war in Vietnam. One, a forward air controller flying an O-1 Bird Dog, gave his life that his comrades might live. The other, an F-105 pilot, without regard for his own safety attacked and destroyed a heavily defended enemy missile site . . .

'Above and Beyond the Call of Duty'

By Flint DuPre

MEDALS of Honor, one of them a posthumous award, went last month to two Air Force officers for courageous, selfless action in the Vietnam War.

The most recent Air Force recipients of the coveted Medal of Honor are Capt. Hilliard A. Wilbanks, a forward air controller who protected a South Vietnamese Army battalion at the cost of his own life; and Maj. Merlyn H. Dethlefsen, an F-105 pilot whose repeated and persistent attacks destroyed a key North Vietnam surface-to-air missile (SAM) site.

Captain Wilbanks was honored posthumously on January 25 when his Medal of Honor was presented to his widow by Secretary of the Air Force Harold Brown at a ceremony in the Pentagon. Major Dethlefsen received his Medal from President Johnson at the White House on February 1.

Captain Wilbanks was on his 488th combat mission in his O-1 Bird Dog lightplane on February 24, 1967, as a forward air controller providing aerial reconnais-

sance near Dalat in the Lam Dong Province in South Vietnam. Knowing the terrain and the enemy well, he discovered a large hostile force poised to ambush the advancing South Vietnamese Army Ranger battalion and its American advisers.

Realizing that nearby US armed helicopters had used up their ammunition, Wilbanks flew his own relatively defenseless lightplane on a series of low passes against the enemy to disrupt their tactics. He repeatedly fired at the enemy with an M-16 rifle, shooting through an open window in his cockpit. His daring attack caused some casualties and threw the Viet Cong off balance, enabling the friendly forces to pull back from their exposed position and saving many lives. Captain Wilbanks himself was mortally wounded during the attack and crashed with his bullet-riddled plane.

In representing President Johnson in presentation of the nation's highest award to Mrs. Rosemary Wilbanks, Secretary Brown said, "Captain Wilbanks' self-

The late Capt. Hilliard A. Wilbanks, killed February 24, 1967, when his O-1 Bird Dog crashed as he was disrupting a Viet Cong attack on friendly forces.



Maj. Merlyn H. Dethlefsen, an F-105 pilot who, on March 10, 1967, under heavy enemy attack, destroyed a SAM complex in North Vietnam.





USAF Chief of Staff, Gen. J. P. McConnell, shows Medal of Honor to children of Capt. Hilliard Wilbanks, Paula and Tommy, after Pentagon ceremony at which AF Secretary Harold Brown, left, presented the award to Mrs. Wilbanks.

less act was witnessed by hundreds of men. . . . His comrades and his country will always remember his heroism."

Gen. John P. McConnell, Chief of Staff of the Air Force, also attended the ceremony and praised Captain Wilbanks' singular act of courage in saving his comrades in combat.

Major Dethlefsen earned his Medal for action on March 10, 1967, in the smoke and fire of a SAM site in heavily defended North Vietnam, where the Air Force pilot had flown his fighter on a suppression mission from a base in Thailand. Purpose of the attack by the four F-105s was to destroy key defenses protecting the Thai Nguyen steel works, about fifty miles north of Hanoi, and enable a formation of strike aircraft to neutralize one of North Vietnam's vital war industries.

On the initial attack the flight leader of the F-105s was shot down, and his wingman had to withdraw his own battle-damaged plane. Major Dethlefsen took charge. He led a second attack on the missile and gun emplacement just as MIG-21 enemy planes pressed in to intercept him and the fourth member of the original flight, who was also doing everything he could to carry out the mission assignment. Dethlefsen evaded the MIGs by flying into the heavy flak thrown up by antiaircraft artillery. He continued to drop his general-purpose bombs and fire his 20-mm cannon, and the SAM site quickly became obscured by dense smoke and dust.

At this point Major Dethlefsen made a decision that separates Medal of Honor men from those who earn

lesser awards. He elected to go after the missile site in a diving attack from above and down to almost ground level. As he sought to see the site through the rising dust, a second group of MIG-21s pressed in on him. He eluded them, located the site, dive-bombed it, and then returned for a second attack, strafing it with his cannon. He flew through a hailstorm of small arms and automatic weapons fire and left the SAM complex shrouded in secondary fires.

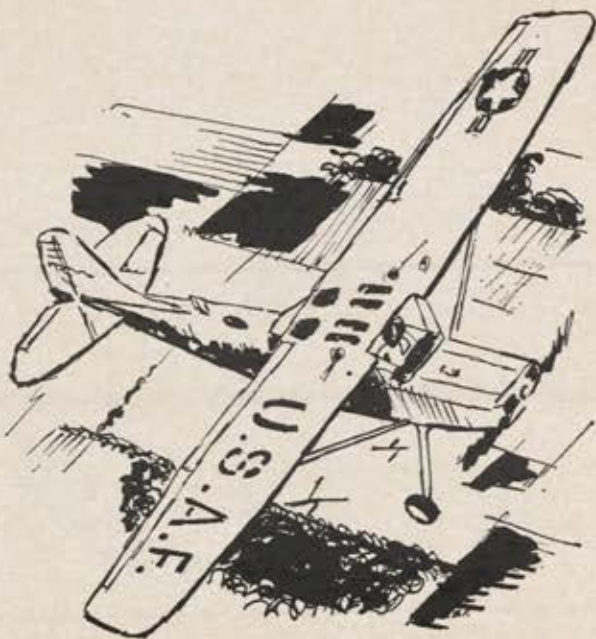
Major Dethlefsen had been attacking, or was under attack himself, for more than ten minutes while flying a plane that by now was heavily damaged. He was outnumbered by the MIGs. Only when there appeared to be no more damage he could inflict on the enemy did he turn his plane for home. He had shown courageous heroism, superior flying skill, and fierce determination to eliminate a key SAM site and enable USAF fighter-bombers to strike their target in the area.

In presenting him the Medal of Honor, President Johnson praised Major Dethlefsen for his act of heroism.

Major Dethlefsen completed his Far East tour and now is assigned to Vance AFB, Okla., as an instructor pilot, where he imparts to others some of the knowledge he gained in combat in Vietnam. Born at Greenville, Iowa, thirty-three years ago, he attended the University of Omaha and entered the Air Force's flying training program in 1953. He served as a fighter pilot in Germany before assignment in Thailand in October 1966. His other combat awards include the DFC and ten Air Medals. He is married and has two children.

Captain Wilbanks was born at Cornelia, Ga., in July 1933 and entered service in 1950 as an air policeman. He became an aviation cadet in 1954 and earned his wings at Laredo AFB, Tex. He served in Alaska and at Nellis AFB, Nev., before reaching Vietnam in April 1966. Captain Wilbanks earned the DFC and

(Continued on following page)





Maj. Merlyn H. Dethlefsen, right, and his children, Julie and Jeffrey, look on as President Johnson presents to Major Dethlefsen's wife Jorga the citation accompanying the Medal of Honor. Major Dethlefsen received his Medal at White House ceremony on February 1.

nineteen Air Medals in combat before his last heroic act. Besides his wife, he is survived by four children, who include twin babies.

This brings to three the number of Medals of Honor presented so far to USAF men for action in Vietnam, compared with four such awards during the Korean War.

Maj. Bernard F. Fisher, first Air Force man to be so honored in Vietnam, for saving a fellow pilot in

March 1966, received his Medal from President Johnson in a White House ceremony on January 19, 1967 (see *AF/SD*, March '67 issue).

The names of Wilbanks and Dethlefsen, along with that of Major Fisher, are added to a list of illustrious airmen who are Medal of Honor recipients dating back to World War I. Four men of USAF's predecessor service received the Medal then, including this nation's top WW I ace, Capt. Eddie Rickenbacker, and the celebrated "balloon-buster," Lt. Frank Luke.

Thirty-eight men of the AAF were so honored in World War II, among them Gen. Jimmy Doolittle for his epochal carrier-based attack on Tokyo; Maj. Dick Bong, top American ace of all wars with forty kills; Gen. Leon Johnson, Col. John "Killer" Kane, and others for the Ploesti oil field attacks. The Korean War produced four Air Force winners, all posthumous.

Two other Air Force men received special Congressional Medals of Honor in peacetime: Capt. Charles Lindbergh for his New York-to-Paris solo flight in 1927, and Gen. Billy Mitchell for his pioneering service to military aviation. (See "USAF and the Medal of Honor," *AF/SD*, March '67.) All of these, and the three Vietnamese War winners, bring the total airmen recipients to fifty-one.

Sometime in April, according to present plans, Pentagon visitors will be able to read the names of Wilbanks, Dethlefsen, and Fisher, and all other Medal of Honor recipients, on wall panels in the Hall of Heroes shrine now being constructed in A Ring on the second floor, corridor seven. Approximately 3,500 men have earned this honor in twenty-three separate major battles, dating back to the Civil War, when the Medal was first authorized in 1862. The Hall of Heroes will be officially dedicated with appropriate ceremonies befitting the courage and valor displayed by those to be honored.—END



***Hycon's new
KA-74 Cartridge-Loading
Camera...***

***Selected by the U.S. Navy
for the P-3C
Anti-Submarine Warfare
Program***



hycon

700 ROYAL OAKS DRIVE
MONROVIA, CALIFORNIA 91016
(213) 359-8216

In prospect is a satellite reconnaissance system that holds more real promise for attaining a workable world peace than any development in history. Soon technology will allow the major powers to keep almost constant watch on most important military activity on the ground, in the air, and under the sea. If the United States uses its technical muscle in space, this nation could achieve "Open Skies," as advocated by President Eisenhower, but with greater payoffs in stability, peace, and goodwill than Mr. Eisenhower dared hope . . .

NEW VISTAS IN RECONNAISSANCE FROM SPACE

By J. S. Butz, Jr.

TECHNICAL EDITOR, AIR FORCE/SPACE DIGEST

Illustrations by Gordon Phillips

SOMETIME in the late 1970s, the technical revolution should be able to produce a scene for which few Americans are prepared.

Visualize, if you will, groups of US officers and their allies in briefing theaters on several continents awaiting the first global operation, the "world premiere" of the USAF's new real-time reconnaissance system. All are watching the same presentation at the same time.

The first subject is the Soviet Army's spring maneuvers in Eastern Europe. It begins with a wide-angle TV shot of East Germany, Poland, and the south Baltic coast. The location of major units are superimposed in red.

The point which the briefing officer stresses is the outstanding mobility being demonstrated by the Red Army. He switches to a closer view of the Carpathian foothills in southern Poland and flashes a "live" shot of a firing battery of four mobile, intermediate-range missile launchers, which are assembling in loose convoy file after delivering a simulated salvo.

The image on the screen is a composite made from signals from several sensors operating in the visual, infrared, and radar portions of the electromagnetic spectrum. A technician adjusts the colors so that the grasses are neutral, the trees various shades of orange, the dirt roads green, and the items of immediate interest—the vehicles of the convoy—a bright and easily visible red. The result is a better view than one could get from 10,000 feet in an airplane.

By punching an instruction to the computer file, the briefing officer shows a taped rerun of this battery's activities for the twelve hours since the start of the maneuvers. The unit had been in almost constant motion covering a ground distance of more than 300 miles, on roads and off. They had fired three salvos, one with their original issue of missiles, one from a prepositioned stock, and one that was flown in by STOL transports. Aircraft from the opposing force had been in their area several times, and twice they had made large semicircular detours around simulated nuclear-impact areas.

A new briefer switches to Soviet naval operations in the Arctic Ocean and the northern tip of the Norwegian Sea. His presentation involves combined air, surface, and undersea blocking action to deny the area to submarines from other powers.

The same "false-color" techniques are employed to highlight the individual activities of interest. The sea is a pale yellow, ice is blue, aircraft paths green, surface ship wakes orange, and submarine wakes red.

A quick rerun of the stored images for the previous twenty-four hours leaves no doubt of the exact blocking tactics being employed by the task force, even though it is not possible to track continuously all of the submarines during deep dives.

Final item on the schedule is a look at the largest Red Chinese armored force exercise in several years. The action is taking place at night, but multifrequency radar and radiometers that observe natural radiation

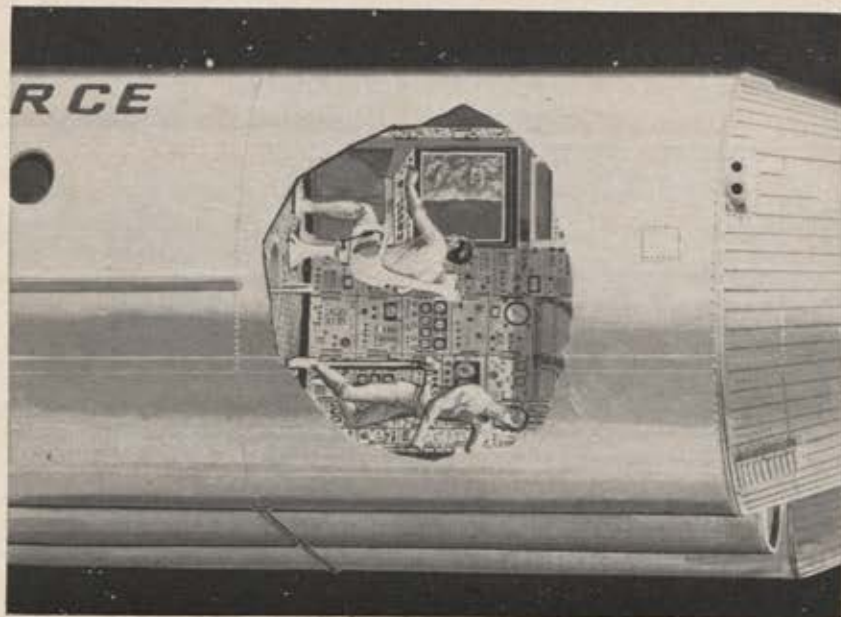
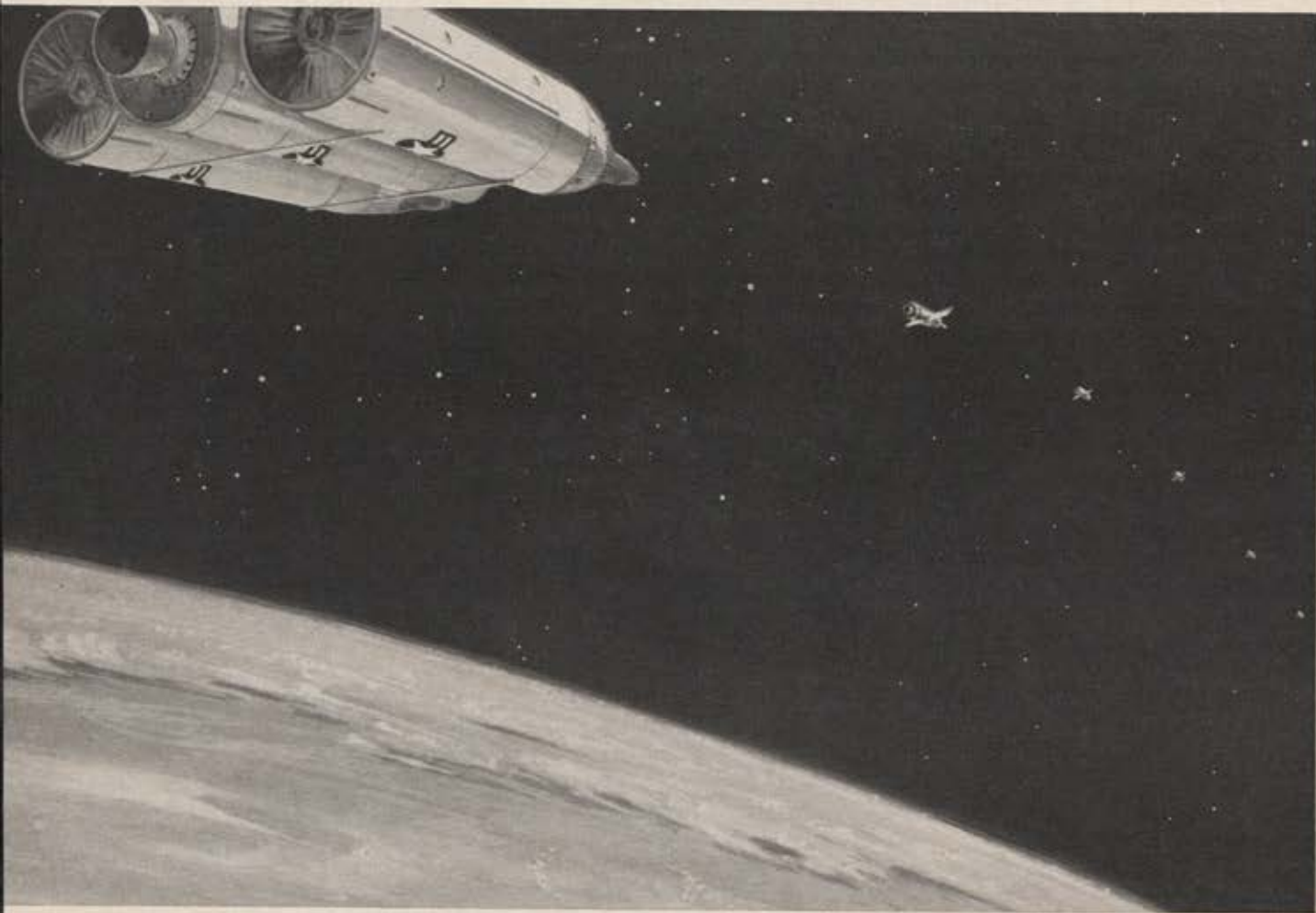
in several millimeter wave bands are used together to provide a real-time picture that is nearly as good as those being sent from the "day" side of the earth. Judicious employment of false color brings out the vehicles of interest.

At the end of this presentation the briefing officer explains that several important points about the Red Chinese operation are still in question. These points, such as positive identification of the mobile, inter-

mediate-range missiles, cannot be settled until weather permits a series of very high resolution visual light photographs to be taken.

Application for United Nations

Consider also, at that same time in the late 1970s, a new phase of United Nations activity. A very large
(Continued on following page)



A fleet of about 100 orbital vehicles could provide continuous "live" reconnaissance over most of globe. The majority would be unmanned. In the artist's conception above, several such vehicles are shown in the distance with solar panels extended. One of the manned stations (probably four or more would be required) is in the foreground. It is formed by joining three MOLs. Crews would use computer-driven display equipment to filter out superfluous data (see left) to reduce transmission volume to ground, and they would be able to repair unmanned satellites to increase lifetime of system. Many new techniques are being proposed; e.g., computers using radar returns from several precisely spaced vehicles (as above) may be able to produce photographic-quality images and show objects on the ground no more than one foot in diameter.

computer facility serves as a depository of reconnaissance information, collecting real-time data from many sources.

Using this facility, the UN publishes an inventory of the major equipment—vehicles, large artillery, aircraft, ships, and missiles—of the armed forces of all nations, *plus* a daily report on the movements of all these forces. Preparations for war in any part of the world would be a matter of immediate public knowledge. Many border violations could be spotted and an undisputable record would be provided in incidents such as the *Pueblo* seizure.

Strictly from the technical point of view it is within reason to aspire to such real-time reconnaissance information for the United Nations, the United States, and all of the world's nations. It probably could be provided by a network of about 100 satellites. The basic components—the sensors, data storage, and data-transmission equipment—are within present capabilities. Most have been built, at least in the experimental hardware stage.

The United States could get such a system into operation for a total outlay far less than that spent to date on strategic missiles. The system could be functioning in the late 1970s. The probability for its success is much greater than that predicted by most scientists for the first ICBM.

Politically, however, the prospects are dim. The atmosphere at the United Nations gives little hope that all governments would agree to constant surveillance by a "big brother" on the side of truth.

Looking at it as a strictly US project does not brighten the picture. The Administration has been reluctant to acknowledge officially the crucial part that satellite reconnaissance already plays in US planning through "weekly type" reports, even though this is an open secret.

And the Administration has shown no urgency about uprating the present system to a continuous real-time model. The key element in such modernizing is the USAF's Manned Orbiting Laboratory (MOL), and MOL has been continually stretched out since it was initiated in December 1963 as a replacement for the defunct Dyna-Soar project. The first unmanned and manned MOL flights originally were scheduled for this year. Now the best guess is 1971.

Washington's Negative Attitude

The negative attitude of official Washington today is ironic, for the concept of unlimited aerial reconnaissance by all nations has received exceptionally wide support in the United States since the 1940s. It has been a favorite of disarmament advocates as well as the military.

President Eisenhower gave it the biggest endorsement in his "Open Skies" proposal to the United Nations thirteen years ago. He declared essentially that peace can only be secured by abolishing secrets and providing the maximum possible information on all military activities.

The immediate objective in Mr. Eisenhower's plan

was to provide an accurate inventory of all armies to reduce the chances of miscalculation by top leaders, end the talk of weapon gaps, and lessen the possibility of wasting resources by overbuilding.

In its ultimate form the plan included the right to conduct reconnaissance at any time, to secure real-time information on the disposition of armies and changes in the pattern of civil activity. Such reconnaissance would greatly lessen the possibility of surprise attack.

American diplomacy has never been more creative and daring than in Mr. Eisenhower's "Open Skies" proposal. Once the Russians scuttled the proposal, American leadership has never been more responsible than when we persisted unilaterally and in secret by putting as much of the plan into operation as the technology of the day would permit. The U-2 airplane and the simple aerial camera of World War II were the main instruments at Mr. Eisenhower's disposal and he used them.

The celebrated incident that grew out of the loss of a U-2 over central Russia is often cited as a cause of breakdown in US-Soviet relations. However, regardless of the bungling in that matter, the threat to peace undoubtedly would have been greater if the US had been forced to deal with the Soviets, during the early years of the ICBM race, without the U-2 information. The chances of top-level miscalculations would have gone up substantially.

Since the 1950s, however, the picture has been completely altered. The need for information is the same, but a torrent of technical improvements, amounting to a bona fide revolution, has greatly expanded the quantity and quality of information that can be gathered through aerial observation.

Much more information can be gathered today from a satellite than could be obtained in World War II with the best cameras and fleets of airplanes operating at any altitude. In World War II it took hours for the pictures to get into the hands of the decision-makers. Today, they can receive live pictures, if they want to.

New Era in Reconnaissance

Three technologies have combined to make the new era in reconnaissance possible.

- **Multispectral Sensors**—The camera now is only one of a broad group of sensors that can make images of natural and man-directed phenomena on the ground, in the atmosphere, and under the sea. These new sensors supplement the visible light camera by "seeing" radiation in portions of the electromagnetic spectrum in which men, and the camera, are blind. When the images from all of these sensors are combined, man can see much more than he ever could with the camera alone.

- **Microelectronics**—Computers are the vital brain of any modern reconnaissance and data-handling system, and microelectronic technology now makes it possible to put computers with massive memories into

(Continued on page 50)

Blast it with sand and blast it with water at hurricane force.

Bump it along in a railroad humping test. And then make it float in 18 inches of water.

What a way to treat a sensitive piece of equipment like a computer. But when it's for the Marines, that's what you do.

That's what UNIVAC® did to its CP-808, heart of the Marine Corps AN/TYA-20 Computer Compatibility Group.

And it passed every test the very first time.

The Marines have ordered six of them for their Marine Tactical Data System to improve command and control capability.

This means front line duty. And there's only one way for a 7 x 7 x 12 foot unit to get there. By helicopter.

Somewhere in Vietnam these ruggedized computers are already at work. They provide command information

to surface-to-air missile units and to interceptor aircraft.

That's important business. But it's only one of the vital tasks UNIVAC systems are doing for the military.

In civilian life it's the same story. UNIVAC in industry. In government. In science and education. In all parts of the world.

UNIVAC

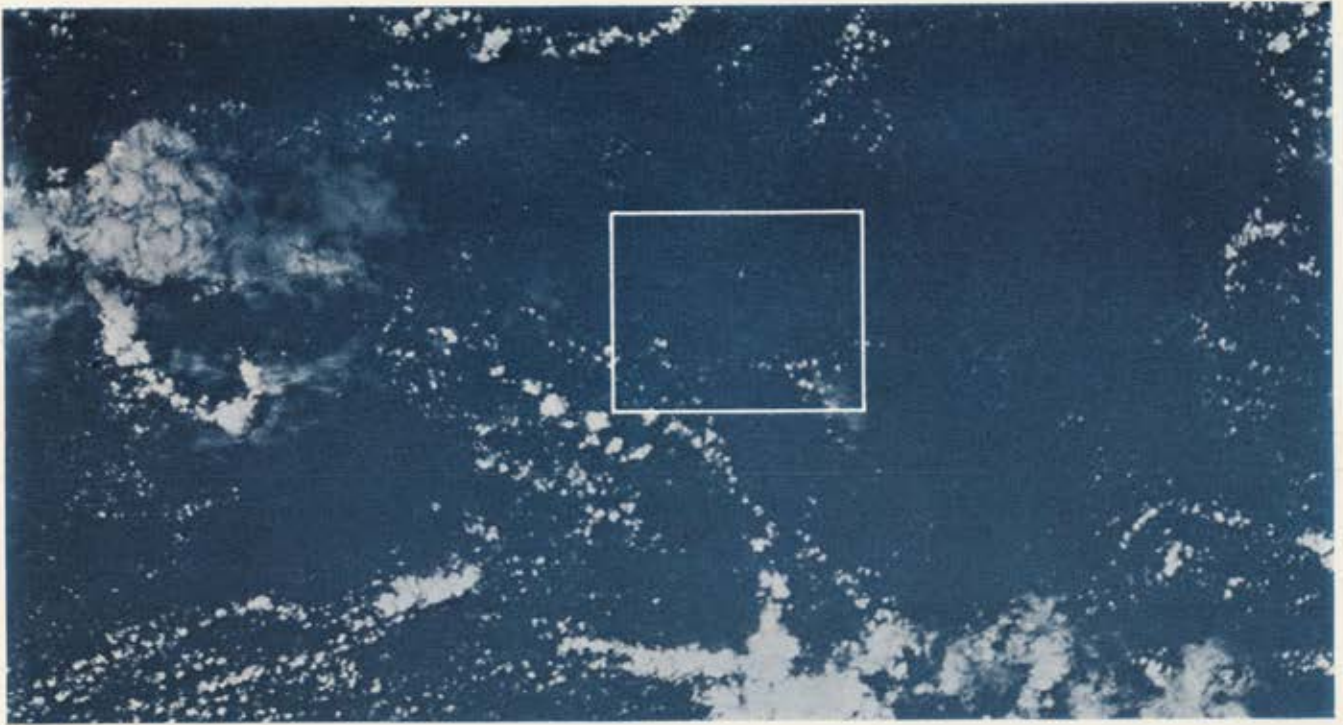
Univac is saving a lot of people a lot of time.

SPERRY RAND

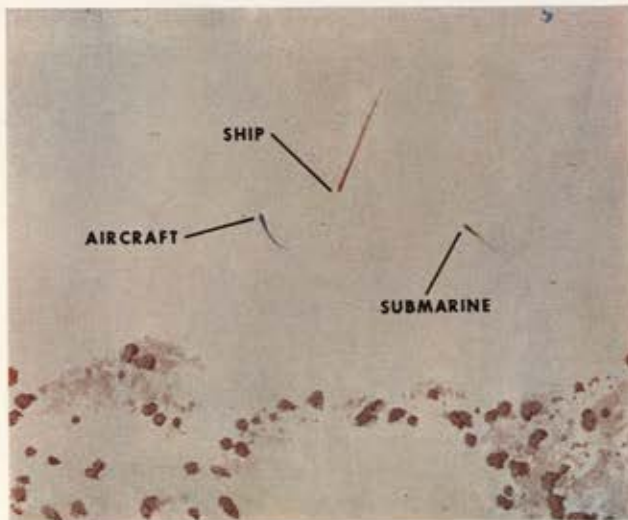
Every once in a while we get carried away.

Give it the old shake, rattle and roll. Drop all 4800 pounds of it and watch it bounce.





△ This photo, taken by Astronauts Gordon Cooper and Pete Conrad during their eight-day Gemini V mission in August 1965, shows that the unaided eye can see moving ships from an altitude of more than 100 miles. A ship's wake is enclosed in the inset. The Astronauts noticed this wake in Pacific waters north of the Hawaiian Islands and recorded the sighting in their logbook before taking the photograph.



◁ The ability of satellite observers to spot activity on, above, and under the sea can be improved greatly by using "false-color" techniques in the projection of images from several sensors. Any conceivable selection of colors can be employed to highlight activity. The technique is illustrated in the artist's conception at left, which is a magnification of the inset area of the Gemini photo above. The sea has been made yellow and the clouds pink.

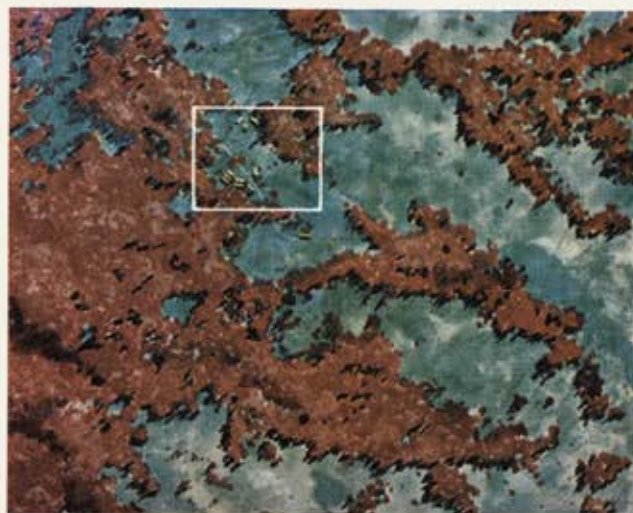
Composite false-color pictures can be made by overlaying radar images and images made in other portions of the electromagnetic spectrum on photos taken in several color bands of visible light. Composite projections such as the one above (a magnification is at right) are within the state of the art. The airplane trace would come from moving-target radar. Nuclear submarine wakes could be detected by existing infrared sensors in the open ocean if the boat were moving at high speed at a depth of 200 feet (about half of its length) or less. The satellite observer could select various color combinations to make certain targets stand out.



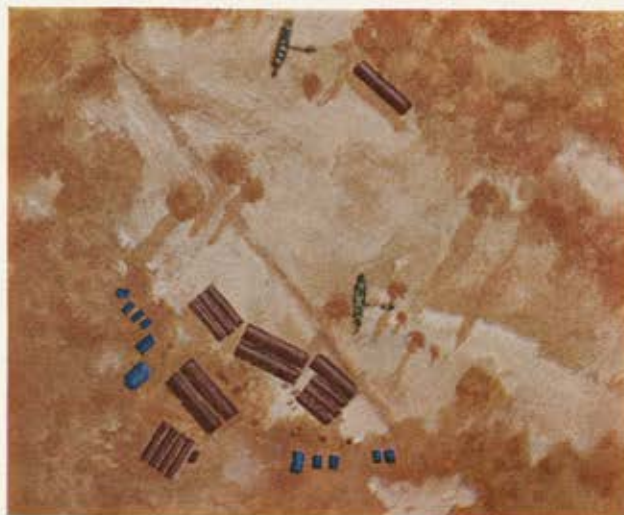
Manned satellite observations of significant activity on the land will be materially improved by false color, multi-image techniques. A typical "raw" input for a multi-image projection is at right.

It is a Westinghouse radar picture, which has better resolution than many World War II camera systems. When several images, each sensitive to different types of radiation, are combined, it is possible to produce composite pictures similar to those shown below in artist's conceptions.

The drawing below depicts a situation in which the observer has elected to magnify the section of terrain in the inset of the image at right, showing trees and heavy vegetation in dark red. A typical field position of a mobile missile unit is illustrated. Large metallic objects, which can be spotted quite well in the infrared and millimeter wave bands, have been given a yellow color.



One possible magnified color presentation of the field position is shown below. Here a long-wave-length radar image has been added so that the cover provided by trees is reduced. These "old-style" radar signals bend in under the trees. Improved electronic techniques now allow these return signals to be used to create an image of a significant percentage of the large objects under the trees. As shown here, the observer can see much of the equipment and buildings in the camp.



Another possible magnification of this missile position is shown at left. The trees have been given an orange cast, the grasses a neutral color, and such heavy equipment as tanks a blue-green or other color. The use of contrasting colors will greatly increase the observer's speed in locating targets and in making accurate counts of large weapons.

Smart bird!

This one speaks the enemy's language. It flies like the enemy's best. It plays leapfrog at 50 feet. It turns on a dime. It hurls its challenge from 50,000 feet or from treetop level. It's a Ryan Firebee and good Air Force and Navy pilots know it—well. They train against it. And before the enemy's threats get rougher, the Firebees get tougher. 3300 Firebees and 20 years prove it. That's Ryan for you, out in front. Because being first is a Ryan tradition.

RYAN

We'd like to tell you more about this smart bird. And about the sophisticated new Supersonic Firebee II, now in flight test. Write Mr. Frank Gard Jameson, Executive Vice President, Ryan Aeronautical Company, Lindbergh Field, San Diego, California 92112.



space with the expectation of months and years of service. This technology of implanting complex electronic circuits in microscopic sizes on silicon wafers has opened the opportunity of squeezing current "room-size" computers into a single drawer while reducing the failure rate 400 percent and the cost by a factor of three. In a space station these small computers will allow rapid, sophisticated treatment of data, such as creation of composite, false-color images.

• **High Volume Communication**—Very rapid transmission of images in the form of digital data became possible at radio frequencies during the first decade of the space age. Much larger volumes can be handled in the next five to ten years as efficient optical laser communications become available. However, with proper manipulation and compression of the digital data on board a spacecraft, and with a group of relay satellites, it is possible now to design a reconnaissance system that will continuously deliver real-time pictures to a central ground station. The system would have the capability to cover several large areas of the globe simultaneously.

The Eisenhower Administration

Satellite reconnaissance was set in motion during the Eisenhower Administration. Design studies were made, before and after Sputnik I, of simple and elaborate systems. The first of these Samos vehicles in operation reportedly was simple, carrying camera equipment roughly comparable to that of the U-2.

Success was immediate. Considerable effort has been made to improve the system, and, according to all public reports, the results have been spectacular. A major reason is that new computers allow optical and electromechanical systems to be designed and manufactured with far greater precision than was possible only fifteen years ago. For example, it has been possible to achieve a completely new order of flatness in mirrors. Curvature of lens is held to a tolerance of a few atoms.

This new optical equipment is allowing the satellite today to outshine the U-2 of the 1950s in the quality as well as quantity of its intelligence information. There are strong reasons for believing that orbital cameras now have sufficient resolution to show objects the size of garbage-can tops. Progress in improving resolution has been steady and most of the experts believe it will continue.

In any event, President Johnson is highly pleased with current reconnaissance satellite performance. Last year he said: "They let me know how many missiles the enemy has." He also estimated that this information was worth ten times as much as had been spent on the entire military and civil space efforts, i.e., \$350 to \$450 billion.

The burning question, however, is what will the US do today to ensure that the President in the late 1970s will have a better system than Mr. Johnson's, one as modern as technically possible. That future President may be able to say, "I not only know how

many mobile ICBMs the enemy has, but I know every time he moves one. I not only know how many missile-carrying submarines the enemy has, but I know their location ninety percent of the time."

If such capability is to be available by 1975, the development obviously has to begin in earnest now, in the form of a major program. Furthermore, the basic technology needs to be in hand, now, with no new breakthroughs needed.

No Technical Deficiency

All publicly available signs indicate that there is no technical deficiency. The choice to build or not to build a real-time orbital reconnaissance system is purely a management one.

The general characteristics of the system have been studied extensively. Prevailing opinion sees a need for 100 or more operable satellites in low earth orbits if there is to be about a seventy-five percent chance of getting real-time coverage of every spot on the globe. With such a fleet most areas always would have a satellite above the horizon or one ready to make an appearance within thirty minutes.

The satellite fleet would be primarily unmanned, but a small number of manned stations would increase the efficiency of the system to a substantial degree. One reason is that the crews could serve as a filter and discard large quantities of unnecessary data and reduce the transmission volume to the ground.

A second value of the men would lie in servicing and repair of the unmanned satellites. G. A. Sears of the RAND Corporation, for one, estimates that the total lifetime cost of such a fleet could be cut in half if the unmanned vehicles are brought into the stations for repair. Most of the savings would come by a relaxing of the requirements for very long times between equipment failures.

The unmanned vehicles probably would require maintenance about once a year then, for most of the large items of computer and electronic equipment now in development are self-repairing and have a mean time between disabling failure well over one year.

The unmanned satellites probably would weigh in the neighborhood of 10,000 pounds. They would have a wider variety of sensors than today's Samos vehicles, and they would need a much larger capacity data storage and transmission system. Their power requirements could be handled by a solar-cell system.

The manned vehicles in the system could be based on the MOL configuration. Several MOLs would be needed for each station.

In the principal operational mode the MOL stations would act as a data link between the unmanned vehicles and ground receivers. The MOL crewmen would monitor far more information than they transmitted. The transmission system would be adequate to monitor a few trouble spots almost continuously and to sandwich in occasional data on the rest of the globe.

(Continued on following page)

Sensors

The wide variety of sensors introduced in the past five years have forced many engineers and scientists to review their elementary physics in order to understand what phenomena are important in multispectral reconnaissance. Explanations of the following elementary types have been used during the past year in the introductions of many highly technical papers.

Radiant energy is propagated at the speed of light in a wavelike motion, with wave lengths varying through a tremendously wide "electromagnetic spectrum," from the very long to the very short. Regions in this electromagnetic spectrum are known as "spectral regions" or "spectral bands." Objects may be detected and identified by the degree to which they transmit, reflect, absorb, and re-emit radiant energy in various spectral bands. The objective in multispectral reconnaissance usually is to measure the reflectance and/or emittance of an object.

A critical task in multispectral reconnaissance is to determine the reflectance and emittance "signature" of important objects (to see what they look like) in the various spectral bands. This is a sizable task since all the signatures vary with the time of day and season of the year, because the sun is the major source of all radiant energy.

Both the Air Force and NASA maintain "ground-truth" programs to refine knowledge of the multispectral signatures of important man-made objects and natural phenomena. In effect, they must learn to "recognize" what they "see." This effort will have to be continued for years, because man is just learning to use his new "eyes" in the spectral bands outside of the visible light region.

Visible Light Camera

The conventional camera will have a key place in reconnaissance for the foreseeable future. Its main advantage is the ability to see small objects over long distances. This high resolution comes mainly

from the film and long focal length lens. No apparent limit is in sight for either. Aerial cameras with two- to three-foot focal lengths were big in World War II, models with twenty-foot focal length (see page 56) have been available for more than five years, and it is known that sixty-foot focal lengths are in development. The new cameras and film should be able to photograph objects less than one foot in diameter from an altitude of 150 miles.

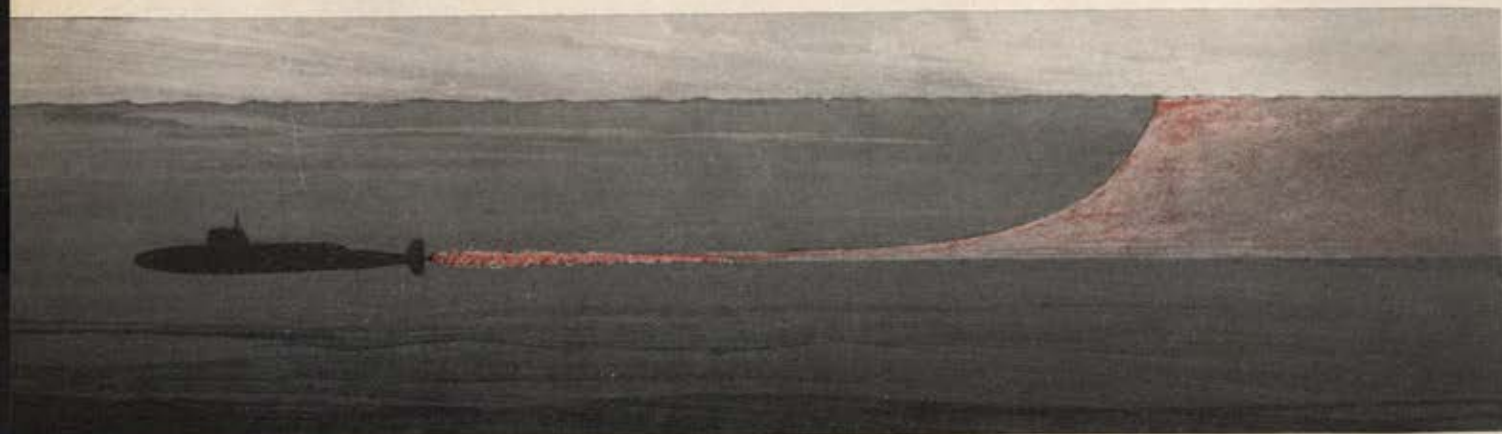
A major development has been multiband photography with as many as nine cameras taking pictures simultaneously, each with film sensitive to a separate band of color in the visible light region. By the use of filters it is possible to separate reflectance from emittance phenomenon. This multiband photography has become an extremely important reconnaissance tool.

Radar

Progress in few technical fields can match that of radar during the past ten years. Ground resolution is improving rapidly, the size of the equipment is shrinking, power requirements are likewise shrinking, and the antenna systems have been transformed from cumbersome, swinging dishes into simple fixed surfaces that can easily be integrated into the side of an aircraft or space vehicle.

Five years ago most unclassified technical papers talked of orbital radar resolutions of from thirty-five to fifty feet. Today, there is open discussion of systems that can see objects measuring six feet across. To reduce complexity and power requirements in a practical orbital system the resolution probably would be degraded somewhat, but not critically.

The improvement in performance has come about in several ways. One is called the "synthetic aperture" technique, in which radar return signals are stored (for fractions of a second) and processed to produce an image. Many pulses are used to create this synthetic aperture, which is many times longer than the actual physical antenna.



Infrared instruments can detect wakes of whales, large schools of fish, and submerged submarines, even from orbital altitudes. Hot coolant water from the submarine's powerplant, and the bubbles from its screw create a large area of disturbed water that wells up behind the boat (red area). The satellite instruments can detect an upwelling only one degree F. hotter than the ocean surface. In the drawing, the submarine is at 200 feet (half its length) and probably would have to go well below one boat length to escape detection. Nuclear subs have the biggest cooling and detection problem of all submarines.



Resolution that can be expected from satellite reconnaissance is illustrated above in these two images made at the same time. The upper one is a visible light photograph, which, upon magnification, shows the trunks of small trees. A number of camp fires (bright spots) are visible in the "thermal" infrared image below it. The two can be combined to immediately show the important information in each. Both are from a U. of Calif. project which produced images to show foresters data expected from satellites.

Other systems make use of multifrequency pulses, or signals that are polarized in a specific direction. And there are focused, semifocused, and unfocused synthetic apertures. Current experimentation is showing that these systems can provide an immense amount of data on natural resources and man-directed activities that cannot be gathered by visual light cameras.

A very important capacity of long wave-length radar is that it can "strip" away a significant percentage of vegetation in forest areas to reveal the features of underlying rock formations and/or such objects as vehicles.

The original appeal of radar—its ability to provide images at night and under almost any weather conditions—is being greatly enhanced.

Infrared

Two bands of radiation in the infrared region can pass through the atmosphere without significant absorption of their energy. Consequently, these two bands are called "windows," and they are the ones of interest in aerial reconnaissance.

One window is the "photographic infrared" from 0.4 to 1.0 micron, which is a slightly higher wave length than visible light. Multiband visible light photography usually includes film that is sensitive in this infrared band, where reflectance is very high and thermal emission very low.

The other window is called the "thermal infrared," and it covers the 8-14 micron band. Thermal emission here is very high and reflectance very low. An image cannot be formed in this region in the conventional

photographic manner by exposing a halide film to a single flash of light. Here the radiation is sensed by a detector element, which transforms it into electrical impulses, which in turn activate a light source that sweeps across a photo film to produce an image.

Considerable publicity has been given to the fact that infrared techniques can reveal diseased plants, polluted water, the pressure and temperature at various altitudes in the atmosphere, hot objects such as a running truck motor, and a wide variety of other items of interest to scientists and military men.

One point of extreme military importance has not been given wide publicity although it has been discussed at scientific meetings to a considerable degree. This point is that the first rudimentary experiments with infrared devices over the ocean have shown that they have a significant capacity for detecting submerged submarines.

The main reason for this capacity is that these state of the art devices can measure temperature with an accuracy of one degree Fahrenheit or less from orbit. They can "see," with high accuracy, hot spots, upwelling of warm water, cold currents, or any other temperature discontinuities in the ocean's surface.

Nuclear submarines especially are vulnerable to this sort of detection because to cool their reactors they must continuously heat large volumes of sea water. The bubbles in a submerged wake also produce phenomena that can be measured.

One of the first extensive open discussions of experiments of this type took place at a NASA conference at Woods Hole, Mass., in 1964. T. J. Walker of the Scripps Institute of Oceanography, University of California, talked of airplane flights in which an infrared instrument was used to detect whales and porpoises by their underwater wakes. He showed photographs of these wakes, adding, "They are interrupted frequently by the diving and surfacing of the animals."

George L. Clarke of Harvard University concluded the report of his experiments with the statement that, "instruments in the air should be able to detect the movement of schools of fish, large animals, or underwater craft by means of the luminescence produced by the disturbance of the water."

A panel of sixteen eminent marine biologists making satellite experiment recommendations to NASA at this conference included the following statement in their report: "Bioluminescence would seem to be measurable and could help to locate large moving animals and moving fish schools (also submarines, the record of which should be distinguished if possible from luminescence produced by whales, fish schools, etc.)."

The detection of undersea activity is in its infancy, and it is probable that infrared will be only one of the radiation bands of ultimate interest. The sea has different characteristics from the solid earth. Its surface not only reflects and emits radiant energy but its depths are transparent to many more wave lengths.

In Washington, semiofficial recognition has been
(Continued on following page)



Image at left shows the clear "signature" of a hot motor in the infrared band. The motor in the car on the right is operating at normal temperature. The one on the left is cool.

given to this detection threat. A group of retired admirals reached the obvious conclusion that a new generation of deep-diving boats will be needed if the US is to continue to enjoy a relatively secure retaliatory force of missile-launching submarines.

The group, headed by Adm. Robert L. Dennison, USN (Ret.), took part in the preparation of a report last year for the House Armed Services Committee. The report said, "Changes in surveillance of the seas almost certainly will produce the need for boats that can operate at vastly greater depths. . . . New passive sensors which can observe radiation in all portions of the electromagnetic spectrum may, in the future, enable reconnaissance satellites to 'see' submarines operating at current depths."

Millimeter Waves and Ultraviolet

Transmission and detection of radiation is possible in many portions of the spectrum other than visible light, infrared, and radio and radar frequencies. One broad band of new importance is between infrared and radar and involves millimeter wave lengths. Radiometers (passive devices similar in function to a radio receiver) detect millimeter waves being reflected and emitted from objects. These radiometers can be used as the sensing element in an image-forming system.

A main advantage of millimeter wave devices is that they fill in a "blind spot" in the infrared band. Infrared does not clearly show objects that have about the same temperature as their background, while they often can be seen in the millimeter band. Combining the two images greatly increases the amount of information that can be obtained.

Equipment also is available for transmission as well as reception of millimeter waves. It can be used for high volume communication and to perform the function of radar with very high resolution and good weather-penetration capabilities.

Ultraviolet detectors also are being used to determine what can be seen from high altitude in this band which has slightly higher frequency than visible light. One published result of this experimentation is that many rock and soil characteristics can be determined very accurately with these instruments.

Computer Display

Interpretation of reconnaissance information also has come a long way in the past few years. It is

possible with computers to combine several images of a ground scene, and to treat this composite image with color so that selected features appear to "jump out" at the human observer.

The importance of such techniques in multispectral reconnaissance can't be overemphasized, regardless of whether the observer is on the ground or in the air. It might take him hours to separately check several black-and-white images from different spectral bands and assemble the information he could get in a few minutes using a composite, false-color image.

An unclassified device of this type is being developed at the University of Kansas. In their technical papers, the men involved have described the system as having flying spot scanners which transform a photograph into a series of electrical impulses. These are introduced into a matrix which "can combine them in any way desired to present the pictorial information on a color television tube. . . . Although straight color combination helps the observer, additional operations can be performed on the images which seem to help a great deal more . . . various gray levels on different images may be enhanced and presented in different colors . . . [objects] having a distinctive signature may be clearly identified."

Illustrations of the output of this device, as might be experienced in military problems, are shown on pages 50 and 51.

Management

The military value of a real-time reconnaissance system with global range is beyond question. Its value in antisubmarine warfare alone is enough to warrant its development.

With a creative extension of the "Open Skies" concept, this system also could be an important diplomatic and political asset.

Technically, there is little doubt that both the US and the USSR could begin the project now and have an operational system in being within ten years. There is small evidence that the US is really beginning. And, of course, about the Soviets, we simply don't know. Which makes the point.—END



Itek lens above is considered obsolete in the optics business because it is more than five years old. It has a 20-foot focal length folded inside its 45-inch length and can photograph objects as small as one foot wide at a distance of 100 miles.

The US airlines industry, largest and best equipped in the world, represents a vital national resource, which provides broad augmentation of the military and especially strategic airlift capability. Functioning primarily on the basis of voluntary procedures rather than by federal fiat, the partnership of the defense sector and the scheduled and supplemental carriers has accelerated airline growth while reducing the military transport requirement. With more than 2,400 airliners in the inventory, and hundreds more on order, the commercial carriers serve as a vital adjunct to MAC. The flexibility of this partnership was demonstrated last month when the air carriers accomplished the swift transport of 10,500 reinforcements to Vietnam to meet critical needs in the Southeast Asian war. It was a good example of how USAF gets . . .

A Welcome Lift from the Airlines

By Edgar E. Ulsamer

ASSOCIATE EDITOR, AIR FORCE/SPACE DIGEST

THE GEOGRAPHY of the United States and this nation's global commitments make it imperative for the US to maintain a vast and rapidly available airlift capability. This need exists in times of peace as well as war, and to meet it is costly in terms of manpower and equipment. This is why it makes sense for the US to augment its basic military capability with civilian airlift from the airlines to the benefit of both.

This system of airlift augmentation was recommended in May of 1949 by Gen. Laurence S. Kuter, then Commander of the Military Air Transport Command (MATC—now redesignated the Military Airlift Command). General Kuter rejected as a "fantastic expense to the taxpayer" the creation on the one hand of a solely military airlift capability or on the other hand actually "taking over as a government enterprise the operation of civil airlines—a concept foreign to our free-enterprise system." He spelled out instead the requirement for a voluntary "mix" of military and civil aviation.

Now, nearly twenty years later, this has been achieved, with cross-fertilizing effects to both sides. It has multiplied the USAF's strategic airlift capability and at the same time has stimulated the growth of the US airline industry. The result is that each is substantially above the capacity of any other country.

The central operating authority for US strategic airlift is the Military Airlift Command (MAC), whose "in-house" capability was greatly increased when a total

of 224 C-141s came into the operational inventory between 1965 and February 28, 1968.

This capability will further increase, in revolutionary fashion, when the giant Lockheed C-5A enters MAC service next year.

MAC's airlift capability in 1967, according to testimony by former Secretary of Defense Robert McNamara, was four times that of the 1961 level. In 1972, with all currently ordered C-5As delivered, this capability will be ten times that of 1961, Mr. McNamara stated.

Working in concert with the uniformed component of the military airlift is the world's largest and best-equipped commercial air transport industry. A flexible mechanism has been created to balance the degree of the civilian involvement against any given strategic requirement. While the means exist to proceed otherwise, the cooperation between the defense sector and the airlines industry continues to be voluntary—and enthusiastic.

Two government agencies have principal responsibility over the augmentation of military airlift through commercial channels.

- The Secretary of the Air Force, with the Military Airlift Command acting as the executive agency, has "single-manager responsibility" for worldwide augmentation. Long-term contracts form the basis of this type of auxiliary airlift.

- Predominant responsibility for domestic, sched-

(Continued on following page)

A Pan American World Airways jetliner, closely guarded by Air Police, waits at Saigon airport for complement of servicemen bound for Tokyo on five-day R&R (rest and rehabilitation) leave. Started in March of 1966, this program is directed by the US Military Assistance Command, Vietnam (MACV), and enables every serviceman on duty in South Vietnam to take one five-day R&R after six months of duty.



uled, short-term charter operations of commercial carriers in support of the Department of Defense rests with the Military Traffic Management and Terminal Service (MTMTS). This is an agency managed by the Department of the Army but jointly staffed by all military services. MAC maintains technical supervision over MTMTS' charter aircraft.

CRAF, WASP, and SARDA

Detailed and elaborate programs exist to mobilize civil aviation on behalf of national security during

periods of national emergency and all-out war. Foremost in priority is the Civil Reserve Air Fleet (CRAF).

- The CRAF plan was initiated in December 1951. CRAF can be tailored, in steps, to any prevailing crisis level, ranging from routine peacetime augmentation of military airlift to the actual incorporation of the CRAF fleet into the Military Airlift Command. The emergency mechanism of the CRAF plan can be activated by the Secretary of Defense or the President, depending on the crisis level involved (*see box*).

The Secretary of the Air Force is operational manager of CRAF, but this authority is normally delegated

HOW CRAF IS TAILORED TO NEEDS

STAGES	DESCRIPTION	AUTHORITY
Peacetime Operations	Perform airlift service in support of deployed forces.	Executive Director, Single Manager Operating Agency for Airlift Services
Airlift Emergency Stage I	When required to perform airlift services for DoD operations in support of, but not confined to, counterinsurgency activities and localized emergencies.	Secretary of Defense
Airlift Emergency Stage II	When required to perform airlift services for DoD operations in support of, but not confined to, limited wars.	President of the United States
Airlift Emergency Stage III Activation of CRAF	When required to perform airlift services for DoD operations during major military engagements involving US forces (limited or general war).	Declared National Emergency—Secretary of Defense, or in accordance with the conditions of the contracts

Principal program to "mobilize" civil aviation on behalf of national security is CRAF (Civil Reserve Air Fleet), initiated in 1951 at the behest of the President by the Departments of Defense and Commerce. Last year the new Department of Transportation replaced Commerce as the overseeing civilian authority for this flexible four-stage program.

STRATEGIC AIRLIFT CONTRACTS (FY 1967)

COMMERCIAL CARRIERS	FISCAL '67 MAC CONTRACT
Airlift International	\$51,786,000
Alaska Airlines	6,976,000
American Airlines	15,271,000
Braniff Airways	30,171,000
Capitol Airways	21,567,000
Continental Airlines	65,168,000
Eastern Air Lines	68,000
Flying Tiger Line	65,060,000
Mackey Air Lines	133,000
National Airlines	303,000
Northwest Orient Airlines	48,076,000
Overseas National Airways	7,243,000
Pan American World Airways	94,548,000
Saturn Airways	9,410,000
Seaboard World Airlines	31,537,000
Southern Air Transport	11,192,000
Standard Airways	1,186,000
Trans Caribbean Airways	6,740,000
Trans International Airlines	14,815,000
Trans World Airlines	33,131,000
United Airlines	20,945,000
World Overseas Airways	38,018,000
Zantop Air Transport (Universal)	1,911,000
Common Carriage (Miscellaneous)	10,000
Post Office Department Mail	109,675,000
TOTAL	\$684,940,000

Fiscal Year 1967 saw peak in purchases of services from commercial airlines by Military Airlift Command. The 1968 totals are said to be ten percent lower than last year's.

to MAC and its Commander, in the latter's function as Executive Director, Single Manager—Operating Agency for Airlift Services. Allocation of aircraft to CRAF has to be approved by the Department of Transportation's Office of Emergency Transportation, with the President's Office of Emergency Planning exercising certain overseeing and policy functions.

Currently committed to CRAF on the basis of individual contracts are 419 commercial airliners, representing an insured value of \$2.09 billion. Two hundred and ninety-four of these are jetliners, predominantly 707s and DC-8s in either cargo or passenger configuration. Each aircraft is specifically assigned to one of four CRAF missions—International Cargo, International Personnel, Domestic Service, or Alaska Service.

- The approximately 2,000 airlines in the inventory of the US scheduled and supplemental carriers that are not assigned to CRAF are earmarked for the War Air Service Pattern (WASP). WASP is controlled primarily by the Civil Aeronautics Board and is designed to ensure that essential defense and civilian needs are met in a wartime situation. It is likely that, during high states of emergency, the CRAF allocation would be substantially increased over the current level, leaving fewer aircraft for WASP.

- General aviation's fleet of more than 100,000 aircraft also can be integrated into the defense transportation system through the so-called SARDA (State and

Regional Defense Airlift) program, administered by the Department of Transportation's Federal Aviation Administration.

The importance of civil aviation to defense transportation in general and the United States Air Force in particular is staggering: CRAF, at its present level, can make available 4.2 million ton-miles per hour. It can produce 11.57 million hourly passenger-miles in international passenger service alone.

The WASP fleet represents a value of between \$12 to \$14 billion, depending on what yardstick is applied, and presumably represents more airlift capability than the Department of Defense is likely to require. In addition, CRAF and WASP will gain a steep capability increase as 1,127 new aircraft currently on order and valued at \$8.3 billion come into the inventory of the scheduled US carriers between now and 1971. These aircraft include the Boeing 747 superjet with a capacity roughly equal to that of the C-5A and the "stretched" four-engine McDonnell Douglas DC-8 Sixty series.

While no official dollar evaluation of the general aviation SARDA fleet exists, its 103,000 aircraft represent a value substantially above \$10 billion. The importance of SARDA, in the opinion of defense planners, "can't be overrated in case of a nuclear attack on the United States because these planes are so dispersed, often in remote areas where their survival probability is far above that of the commercial fleet located principally in potential target areas."

Short of full "mobilization" of the commercial fleet, the US carriers make their services available to MAC and MTMTS through contracts and competitive bids, mainly through the Air Transport Association's military and government transport office.

Secretary of the Air Force Harold Brown commented to AIR FORCE/SPACE DIGEST on the current contributions of the airlines to national defense:

"Since MAC contracts with commercial air carriers for the movement of about ninety percent of the passengers and more than thirty-four percent of the air cargo requirements for the Department of Defense, the airline industry plays a vital role in the augmentation of military capability.

"During [calendar year] 1967, commercial carriers airlifted more than 2,100,000 passengers, and more than 189,000 tons of cargo, registering 2.3 billion ton-miles. Of this total, 1.9 billion ton-miles were flown in support of airlift requirements to Southeast Asia. That is a most monumental effort and a magnificent contribution."

During Fiscal Year 1967 the total value of these services (not counting off-duty travel by military personnel) amounted to \$922.2 million.

Of this total, \$685 million represented MAC purchases of worldwide cargo and personnel airlift; \$178 million domestic passenger services; \$45 million was generated by the so-called Logair (mainly USAF-AFLC) and Quicktrans (mainly US Navy-Systems Command) domestic airlift; and \$14.2 million for military airfreight and air-express service. In overseas traffic this amounted to 91.6 percent of the passenger

(Continued on following page)

A WELCOME LIFT FROM THE AIRLINES



A Pan Am DC-6B, at Cam Ranh Bay, South Vietnam, loads airmen for five-day R&R. Airline furnishes this service on a no-profit basis with thirteen DC-6B piston aircraft.

and 38.8 percent of the cargo requirement generated by the armed forces.

In Support of Vietnam

About ninety percent of the military personnel traffic to and from Southeast Asia was furnished under contract by US commercial carriers. The carriers also delivered 177,680 tons of cargo out of the 454,005 tons which made up the Southeast Asia airlift last year. A senior DoD official says of the airlines' performance: "They give us all that we could possibly ask for, and we have come to rely on them almost completely for all personnel airlift. No other country has this national resource to the degree that we do."

Gen. Howell M. Estes, Jr., Commander of the Military Airlift Command, reported to Congress that the Vietnam War requirement exceeds the military airlift capability. Therefore, he said, the Air Force will continue to rely heavily on augmentation by the civil air industry. He added that it is "indeed fortunate that the nation's air carriers have pursued a large-scale modernization program" and that the nation has "an aircraft industry that is a leader in design and is responsive in production." Because of renegotiated MAC contracts, reflecting the more efficient aircraft now in

the airlines' inventory, "the dollar in Fiscal Year 1967 [bought] nine percent more cargo ton-miles and twenty-eight percent more passenger seat-miles than it did in 1965."

DoD officials feel that Fiscal Year 1967 represented a peak year for military airlift with the over-all airlift demand dropping by about ten percent in 1968. This, they say, has reduced the need for commercially furnished military airlift by about the same percentage. They believe, however, that the present level will hold steady in the years ahead, with about ninety percent of all personnel airlift to be furnished by commercial carriers.

Historic Precedent

The military airlift function of the US commercial carriers is rooted in the Civil Aeronautics Act of 1938, which ascribed to the carriers a definite national defense role—to provide immediate support to the Department of Defense, civil defense, and disaster relief agencies in times of national emergency and national calamity. In spite of this foundation in law, the air carriers have always functioned on a voluntary basis. This voluntary responsiveness to national security dates back to World War II when Gen. H. H. Arnold, Commanding General of the Army Air Forces, dissuaded the President from nationalizing the airlines. Between 1942 and 1945 the commercial carriers produced the then staggering total of more than four billion passen-



An American Airlines crew, using this special "Astroloader," can load or unload 90,000 pounds of cargo, arranged in "igloos," in twenty minutes with help of powered rollers inside 707 jet freighter. The payload is US Army materiel.



Appreciative US Army sergeant enjoys "royal treatment" aboard commercial airliner taking him on five-day R&R leave. Troops take R&R in a number of Asian resorts.



Vietnam veterans receive welcome from pretty Pan American World Airways stewardesses on arrival in Hawaii. Taking time out from war through R&R flights on commercial carriers, contracted for by MAC, is unique to Vietnam War.

ger-miles and a billion cargo ton-miles in military airlift. Air Transport Command's Commanding General, Lt. Gen. Harold L. George, characterized as "stupendous" the "contributions made by the commercial carriers during World War II."

The airlines have worked in concert with military authorities during each national crisis that followed. Commercial aviation was a mainstay in the Berlin Airlift, and during the Korean War commercial air carried more than one and a half times the combined volume transported by MATS, the Royal Canadian Air Force, UN military forces, and foreign-flag carriers. During the Cuban crisis, the carriers, through the Air Transport Association, made 400 long-haul aircraft available to the Department of Defense. Almost 25,000 military personnel and more than 50,000 tons of cargo were flown by the airlines to the staging areas in Florida and offshore islands during this crucial period.

In the aftermath of the Cuban crisis the commercial airlines were instrumental in the Cuban prisoner exchange by delivering to Cuba the prisoner exchange ransom of 800,000 pounds of medical supplies valued at \$7.5 million.

During the largest postwar military maneuvers, the Desert Strike Exercise of the US Strike Command in May of 1964 in the Mojave Desert, commercial air carriers transported more than 15,000 combat troops and their field equipment.

The War in Southeast Asia

Today, the commercial carriers are deeply involved in the Southeast Asian war effort.

DoD officials are enthusiastic in their praise of what the airlines and their crews are doing in support of the military effort. Commercial aircraft crews often have to brave Viet Cong fire, yet to date there has not been one single refusal by any crew member to fly such missions. "The pilots have learned to perform aircraft carrier type landings and takeoffs to minimize the danger from Viet Cong small-arms fire. In spite of this, the crews keep volunteering for this duty. Stewardesses with high seniority, which would enable them to take the truly plush intercontinental runs, keep coming back time and again to fly such missions," a DoD logistics expert reports.

MAC's Commander, General Estes, has this comment: "In the United States, which has no nationalized airlines, there is an excellent *voluntary* working relationship between the military airlift system and the civil airline industry. This relationship has been demonstrated again in Vietnam. . . . The fact that a Pan American jet was hit by Viet Cong ground fire on its approach to Saigon shows what may occasionally be expected of our civil crews, and also displays their readiness to respond to the demands of the task."

While commercial aircraft have been damaged slightly by mortar fire on the ground and others have sustained occasional bullet hits in the fuselage, there have been no casualties thus far. In terms of air fare the government gets somewhat of a bargain. It costs

(Continued on following page)

the DoD \$308 for the California-Saigon round trip (about 17,000 miles), compared to nearly \$1,000 for an economy-class regular civilian ticket. The load factor on military flights, of course, is in the 100 percent range, enabling the carriers to maintain low rates and still make an adequate profit.

Pan American World Airways, which contributes more than thirty percent of the worldwide CRAF capability, has nineteen four-engine jetliners assigned to military airlift on a full-time basis. Thirteen additional aircraft and an all-volunteer crew of 500 operate a special no-profit R&R (rest and rehabilitation) airlift from Saigon, Da Nang, and Cam Ranh Bay. Last year more than 300,000 US fighting men were carried to Asian resorts and Hawaii for five-day leaves.

Pan American's Chairman Juan T. Trippe says, "We have been devoting an ever-increasing number of aircraft and manpower to the war effort in Vietnam, and it is with some pride that we can say we are the single largest contributor to the military airlift—an airlift that has no parallel in history."

Similarly, TWA's Senior Vice President, R. M. Dunn, told this reporter:

"TWA is genuinely proud of the important part its aircraft have played and continue to play in the US airborne troopship fleet. From the East Coast long-range TWA jets span the Atlantic regularly with American servicemen and dependents bound to and from assignments in Europe and Africa. From the West Coast a TWA jet airlift daily transports American troops to duty in Vietnam . . . and returns with troops [who] are being rotated to the US."

All carriers incorporate defense transportation con-



Five Pan Am stewardesses who have volunteered for Vietnam duty are shown posing at Da Nang airport, South Vietnam, where they will pick up a planeload of R&R troops. About 500 Pan Am crew members serve in Vietnam.



High-priority US Army fuzes are placed in "igloo" or "A" container for shipment by American Airlines cargo jet. Each such igloo holds 10,000 pounds, or 168 cartons, and eliminates need for marking and stenciling of cartons.

siderations into their route structures. In turn the Department of Defense presents its views and recommendations at route application hearings before the Civil Aeronautics Board.

Eastern Air Lines, for instance, in its current petition for direct East Coast-Hawaii service, made military considerations part of the premise on which its case was based.

Benefits Beyond Revenue

Airline executives freely admit that the cooperation between the commercial carriers and the Department of Defense has been beneficial beyond the revenue derived from these sales. The recent and rapid development of the commercial cargo jet fleet would not have been possible without the catalyzing effect of the military business.

The long-term interaction between commercial and military airlift was previewed by General Estes: "...one can visualize commercial air transport playing a deterrent role somewhat akin to the role of military airlift. Moving technicians, teachers, advisers, machinery, tractors, bulldozers, tools, books, medicines, and other items of self-help—directly and quickly—to the newly emerging areas of the world, they might well prevent those areas from becoming targets of Communist infiltration. In short, 'recipients of aid' could be helped to turn into 'participants in trade'—and any future need for military airlift to rush in with troops and weapons might thus be substantially diminished or, hopefully, eliminated." The US aviation industry is eager and waiting to do the job.—END

New Swedish Fighter-Interceptor

Excellent planning and sound policies on the part of both the Swedish government and its aerospace industry over the years have produced an enviable record of providing the country with the right aerial weapon systems at the right time and at the right price. Latest example is an aerodynamically revolutionary fighter-interceptor with supersonic as well as low-level and STOL capabilities. It's a plane that exactly meets the particular needs of the small defense-oriented nation where . . .

'Viggen' Means Thunderbolt

By Stefan Geisenheyner

AIR FORCE/SPACE DIGEST EDITOR FOR EUROPE

IN THE European aviation world, Sweden's aerospace industry holds an enviable reputation for offering, at both the right price and the right time, aerial weapon systems that fill the requirements of its major customer—the Royal Swedish Air Force (RSAF)—from A to Z.

This reputation is due to extremely careful long-range planning and close cooperation between industry and the Royal Swedish Air Board, the procurement agency of the RSAF.

Since 1947, RSAF procurement has been based on

so-called seven-year plans, which are kept flexible enough to allow for changes in the rapidly changing pertinent technology of today and possible changes in military concepts. This system of long-range procurement, which is strictly adhered to, has given the relatively small Swedish aviation and electronics industry a healthy stability. And this, in turn, permits the tackling of sophisticated projects such as modern and advanced aerial weapon systems.

For instance, long before the advent of the F-86
(Continued on following page)

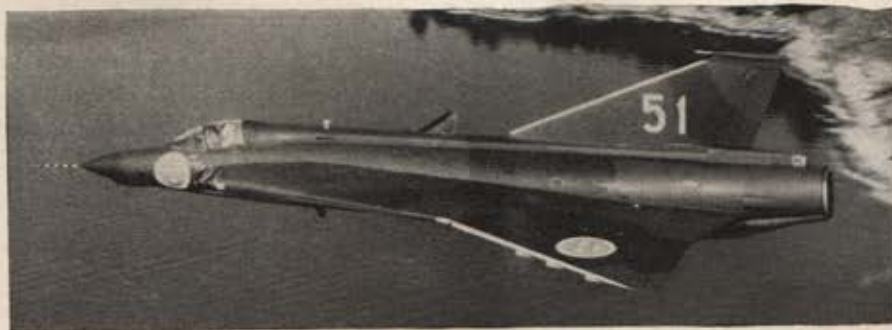


Right on schedule for the replacement of the *Draken* and *Lansen* RSAF aircraft, which will have outlived their usefulness by 1975, will be the new *Viggen*. About 400 are to have been produced by the middle of the next decade. The aircraft has STOL capabilities, it is supersonic, and can be used for interception or close support.

'VIGGEN' MEANS THUNDERBOLT



The SAAB J-29 *Tunnan* (Barrel).



The SAAB J-35 *Draken* (Dragon).

Sweden's AF possessed a jet fighter which could outperform the MIG-15 in every respect. This was the SAAB J-29 *Tunnan* (Barrel), which first flew in 1948 and was still setting world speed records as late as 1955. In that year, as this subsonic interceptor was becoming obsolescent, SAAB's next design, the J-35 *Draken* (Dragon), a Mach 2 interceptor, made its appearance. Today the RSAF flies the *Draken* in fighter and reconnaissance roles. Several wings are equipped with the SAAB A-32 *Lansen* (Lance), a low-level strike aircraft designed to complement the *Draken* capabilities.

Toward the middle of the next decade, both the *Draken* and the *Lansen* will have outlived their operational life. Right on schedule for that day is the replacement of both aircraft, and it is believed that by 1975 the RSAF will be flying about 400 STOL supersonic multipurpose combat planes. Prototypes of the new aircraft are flying successfully today and their performance promises that the RSAF name for the design, *Viggen* (Thunderbolt), was well chosen.

The *Viggen* aerial weapon system, whose technical designation is SAAB System 37, was first presented to the public in March 1967. The aircraft is one of the most advanced weapon systems in existence today. Because of its unusual aerodynamic features, some call it a supersonic biplane. The manufacturer designates it as a flying weapon platform. In plain words, it is a STOL combat aircraft incorporating novel aerodynamic features that allow, in addition to good low-speed characteristics, excellent supersonic performance on the deck and at altitude.

The *Viggen* is designed as a basic flying platform to be built in four versions: ground support, intercept, reconnaissance, and training. It is single-seated, powered by an afterburning Pratt & Whitney JT8D-22 turbofan which was extensively modified by Svenska Flygmotor AB and bears the military designation RMS. The static thrust of the RMS is about 14,000 pounds. The sixteen-ton *Viggen* is designed to fly at Mach 1 plus speeds at ground level and Mach 2 plus at altitude. Main armament consists of air-to-air and air-to-ground missiles, but the plane can also carry a large variety of other weapons. It is capable of short take-off and landing and can operate from runways of about 1,600 feet in length.

The military requirements this aircraft is to fill reflect the geographical location and the military-political situation of Sweden. Few other air forces would be



The SAAB A-32 *Lansen* (Lance).

able to use an unmodified *Viggen* to its fullest advantage. It remains basically a Swedish aircraft built for integration into the unique Swedish defense system. This does not mean, however, that the *Viggen* cannot be modified extensively and tailored to suit the needs of other air forces. A stretched version has been proposed for use in the RAF. Japan's air force could fly the *Viggen* if its range were increased. And with higher payload capacity, other nations might buy the aircraft.

Without any doubt, the SAAB 37 can be given a longer range, a better payload, or a higher speed, but each change would impair one asset of the aircraft that is so vital to the Swedish defense system—the emergency STOL capability. Aside from Switzerland and possibly Israel, no other nation features the kind of integrated national defense system that is obligatory to take full advantage of the *Viggen's* STOL capability.

The Swedish defense system has been thoroughly discussed in a previous issue of AF/SD (November '64). Few changes have taken place since then, and the over-all basic philosophy has not been altered at all. The Swedish defense system makes effective use of every resource without disturbing the economic growth and prosperity of the nation. "Total defense," as it is called in Sweden, is designed to meet any possible form of attack, atomic or conventional, invasion by land or sea, and offensive moves by aircraft or missiles.

Since the nation has a population of only 7,500,000, nearly every Swedish citizen of military age is involved in one way or another in the defense effort. Some become soldiers; others work in the underground weapon factories or in civil defense. The standing armed forces are small, but reservists can be called up on short notice. The weapons, aircraft, ships, tanks, and other

paraphernalia of war are stored in readiness in underground fortresses. Few airfields are openly visible, but many hundreds of road sections all over the country have been structurally strengthened so as to be able to take the landing impacts of supersonic aircraft and allow them to take off again after they have been refueled and rearmed from caches placed along the roadside. The local militia and reservists are trained to service the aircraft.

Under such circumstances, the deployment of STOL aircraft makes good sense. The RSAF has so many road bases available that the targeting problem of the attacker becomes very difficult; also the defense can count on the loyalty of the surrounding population to protect the bases and the aircraft stationed there. This second requirement, in particular, cannot be adequately filled in central Europe, for instance, where the ever-present political unrest would surely lead, in the event of war, to the formation of antigovernment guerrilla units. The defense of a multitude of dispersed bases under such circumstances would become an impossibility, as the war in Vietnam demonstrates. The *Viggen* and its STOL characteristics can be employed to its fullest advantage only in nations where the government can trust its population implicitly.

With the deployment from such road bases in mind, the design of the *Viggen* was begun in 1952, three years before the *Draken*—the aircraft the *Viggen* was supposed to succeed—flew for the first time. In the period from 1952 to 1958, more than 100 different proposals were studied, and after the cancellation of a projected System 36, the preliminary design studies on the 37 *Viggen* began in 1958. In 1961 the operational specifications were approved by the supreme commander of the Swedish forces. It was stressed, however, that the project had to be kept within available resources with regard to both personnel and costs. Actual design work was started during the summer

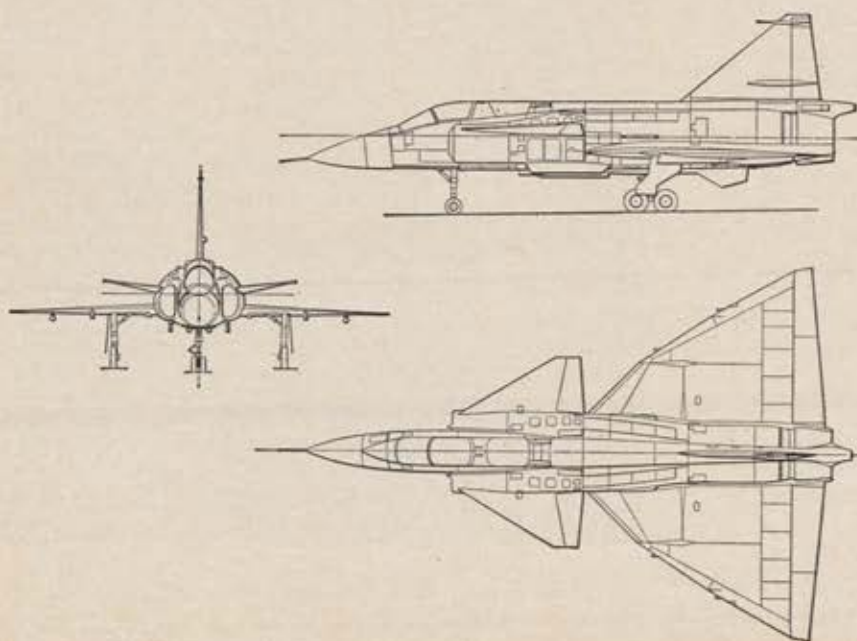
of 1962. Based on wind-tunnel tests, calculations, and preliminary design work, final changes in the aerodynamic configuration were made before the detailed design configuration of the *Viggen* was frozen in May 1963.

In the meantime the procurement office of the RSAF had worked just as smoothly as the design teams. A preliminary government defense budget, as given by the Defense Committee in 1962, had to be used as a basis for the aircraft's procurement allocation estimates since the final decision from the Defense Committee on the *Viggen* program was still outstanding. Finally, in March 1963 the limit costs for a four-year procurement plan spanning from 1963 to 1967 were presented. On the basis of this budget it was decided to develop a high-performance multipurpose aircraft—the *Viggen*—during this period. The Minister of Defense underlined the importance of receiving a sufficiently large number of aircraft for the funds allotted to the venture.

In October 1963, the first detailed cost estimate for the project was presented by SAAB. Unfortunately the costs turned out to be higher than shown in the previous estimates, and the Air Board and SAAB had to initiate a revision of the system requirements and development goals to reduce the costs to the original level. This resulted in a number of modifications, cutting the military capabilities somewhat, but not impairing the original performance figures. Finally, in November 1963, the contract was signed between the Air Board, SAAB, and five subcontractors.

Up to January 1964 it was smooth sailing for the *Viggen* project. Then it hit extremely rough water, and the program was touch and go until April 1965, when the final green light was given. The funding problems had been of such magnitude that SAAB had notified the Air Board that the company would have to cancel

(Continued on following page)



The double-delta wing, now used on the Lockheed SR-71 and YF-12A, was pioneered by SAAB on the *Viggen*'s predecessor, the *Draken*. Continuing its research, the company has come up with a major advance in aerodynamics which it is using on the *Viggen*. The aircraft's canard nose wing and main wing are positioned in a way that almost eliminates stalling, giving the aircraft great maneuverability and STOL capability.



Watching a *Viggen* take off is a spectacular experience since, although it weighs fifteen tons, it will lift off the runway in only 1,300 feet. The STOL capability of the aircraft meets Swedish Royal Air Force dispersal requirements.

the *Viggen* development if firm orders were not received by the middle of 1964. Even the possibility of purchasing foreign aircraft was studied by the Air Board but rejected, since it was found that no other aircraft existed that could fill the RSAF requirements better than the *Viggen*. Furthermore, the price of System 37 was considerably lower than that of any comparable aircraft of non-Swedish production.

The operational requirements for the *Viggen* did not call for an increase of speed, as compared to the *Draken*, but required the low-speed characteristics of the new aircraft to be considerably better, and that the *Viggen* should be able to operate from 1,600-foot runways. Various VTOL designs were contemplated, but detailed studies showed that for the given field length it was much more cost-effective to use aerodynamic high-lift devices rather than lift-thrust engines.

When SAAB started more than twenty years ago to design the J-35 *Draken*, it was confronted with the problem of filling a requirement for an aircraft achieving twice the speed of the fighter's predecessor but with the ability to operate from the existing road base airfields. The solution was the double-delta wing, pioneered by SAAB, which is used today on the *Draken* as well as on the Lockheed SR-71 and YF-12A.

In view of the company's extensive experience with double-delta wings, it decided to embark on an intensive research program centering on increasing the lift of such wings without impairing their good properties at supersonic speeds. At an early stage of the studies, attention was focused on a configuration where the stabilizer is placed in front of the main wing—a canard design. For this configuration, trim is derived by an upward force, compared to the downward and lift-reducing trim of conventional delta designs using elevons. This idea is by no means new. The Wright brothers used it in 1903. The forward canard wing, however, has one drawback which prohibits its use as a high-lift device. It usually stalls well before the main wing, thus defeating its purpose as a low-speed lift-increasing measure.

Extensive wind-tunnel tests conducted by SAAB over a span of several years resulted in the discovery that by positioning the canard nose wing and the

main wing in a certain way, premature stalling of the nose wing can be avoided. This is achieved by an aerodynamic interference phenomenon taking place between the two wings which, however, have to be designed in a definite delta shape. It was subsequently observed that stall does not even take place if the aircraft is flown in angles of attack that are far beyond any conceivable operational flight attitude. This discovery obviously represents a major advance in aerodynamics and will surely find its way into other aircraft designs.

The *Viggen* configuration makes use of this main wing-canard interference effect, and the results are spectacular. During the first press demonstration early in 1967, the prototype *Viggen* lifted off—with a take-off weight of fifteen tons—after a ground run of only 1,300 feet. Landing distance was about the same. SAAB claims that for this particular demonstration only sixty percent of the available power was used, implying that the takeoff distance could be even shorter if desired.

Aside from the unusual aerodynamic configuration, the success of this STOL design can be attributed to the RM8 engine, which has some revolutionary features. Basically the engine is a military version of the P&W JT8D-22 turbofan, which is also known for its application in the Boeing 727 and the DC-9, to name just two examples. This proven engine has been further developed by Svenska Flygmotor AB (SFA) in cooperation with Pratt & Whitney and will be produced in series. The engine in the RM8 version consists of a bypass type compressor, gas generator, and a SFA-designed afterburner. It gives the *Viggen* good fuel economy for long-range flights and, with afterburner, high thrust for takeoff, climb, and acceleration. The afterburner is continuously adjustable within three



Viggen configuration makes use of wing-canard interference effect, which allows aircraft to take off and land at dispersed airfields consisting of reinforced sections of highway.



The *Viggen*, shown here clean, is designed to carry a wide variety of armaments. It has five permanent pylons for external stores, but additional hard points are available.

thrust levels up to 12,000 pounds of static thrust. The afterburner housing is mounted directly on the engine so that both form a single unit that is easy to install and remove.

The short-field requirement made it necessary to provide a thrust reverser, which is located in the afterburner nozzle. This mechanism consists of three lids which seal the jet pipe completely upon actuation of the reverser and direct the jetstream forward through annular slots. These slots serve a double purpose since they are open at subsonic speeds and close automatically upon reaching Mach 1, thus forming a supersonic nozzle. Another unusual feature of this reverser is that the lids close automatically as soon as the wheels of the *Viggen* touch ground. The compression of the landing gear struts actuate the lid-closing mechanism, thereby assuring that the reverser cuts in at the right moment. The braking effect of this device is excellent since the complete gas and airflow is directed forward upon touchdown. No brake parachutes are installed, nor are they necessary.

The engine and its reverser, however, do not alone account for the short-landing capability of the *Viggen*. A unique and ingenious system was evolved to reduce the landing distance to less than 1,600 feet. A normal flared touchdown followed by conventional braking would require at least 4,500 feet, of which 1,800 feet would accommodate touchdown scatter and 2,700 feet the braking distance. With the thrust reverser, the braking distance is reduced to 1,300 feet, adding up, with the touchdown scatter, to a total landing distance of 3,100 feet.

With a fitted head-up display, the adoption of a no-flare carrier-type landing technique, and automatic throttling, the pilot can direct the *Viggen* during landing to a precise spot and thereby reduce the touchdown area from 1,800 feet to practically zero. SAAB assumes that a touchdown scatter of 300 feet should be allowed to the pilot. By adding the braking distance of 1,300 feet and the 300-foot-long touchdown area, the grand total of 1,600 feet, the landing distance of the *Viggen*, emerges.

The heart of System 37 *Viggen* is the CK37 airborne digital computer. It has made the *Viggen* a highly automated aircraft and relieves the pilot of many functions, thus enabling him to concentrate on his combat

mission. Some of the major tasks of the computer are:

Routing of signal input and output; fully automatic navigation with display to pilot giving range and bearing to desired reference points; fire-control computations and radar sighting; ballistic computations for toss bombing, etc.; display of steering information to the pilot; computation and display of flying time remaining with the available fuel; transmission of necessary data to ground control stations; functional testing of associated electronic equipment of the aircraft; and finally, continuous self-checking operations.

In performing these tasks, the CK37 forms an integral part of the weapon system both in the air and during ground preparation for a mission. Special programs for the computer are available for maintenance of the aircraft where it will perform functional checks, trouble-shooting, and performance measurements, thus greatly simplifying the demands put on the ground crew during turnaround operations.

The *Viggen* is designed to carry a wide variety of armaments. Five permanent pylons for external stores are fitted, but additional hard points for bomb storage are available under the wing. Only the ventral pylon is equipped for an external fuel tank. The standard armament in RSAF service would include the Swedish air-to-ground missiles RB 304 and RB 305 and license-produced air-to-air missiles of the Sidewinder and Falcon type. Gun pods, bombs, and rocket pods may be fitted if the mission requires it.

The 37 *Viggen* flew for the first time on February 8, 1967. This flight initiated a comprehensive flight-test period. Extensive investigations of all aircraft functions under operating conditions will be made to assure compliance with the RSAF specifications. On March 20, 1967, Sweden's Defense Minister, Sven Anderson, announced the decision of the Swedish government to order an initial quantity of 100 SAAB *Viggen* in the ground-support version, AJ-37. The first production aircraft will be delivered in 1971.

The System 37 *Viggen* continues the unbroken line of Swedish-designed and -built weapon systems flown by the RSAF since 1948. These past twenty years have demonstrated that even a small nation is capable of constructing sophisticated weapons if the financial and military long-range planning is based on a sound philosophy and a healthy economy.—END



After its first flight on February 8, 1967, the *Viggen* began a comprehensive test period before the first production aircraft is delivered to the Swedish Air Force in 1971.

America can no longer afford its idealistic antimilitary attitudes. Technology has reduced to practically nothing the time and distance factors that in two previous wars permitted us to prepare ourselves. Today we must be ready to meet any threat immediately. This can be done only if our military establishment is made up of the best human resources we have. If we are to maintain our position of world leadership, we must respect our men in uniform and support them—financially and morally . . .

A MILITARY CAREER

Is That a Job for an American Boy?

By Murray Green

MYRON COHEN, master storyteller, describes the three women in a Miami cabana who interrupted their gin-rummy game long enough to talk about their respective offspring. The first bragged about her son, an eminent brain surgeon earning \$50,000 a year. The second boasted of her lawyer son, associated with a Wall Street firm and netting \$100,000 a year. The third confessed that her son was a rabbi making only \$7,000 a year.

The others turned to her in dismay: "Is *that* a job for a Jewish boy?"

One may ask, with the same sense of incongruity, is a military career a job for an American boy? The war in South Vietnam has nurtured an idea latent in the American psychology—that a military career is a mediocre choice for an ambitious and talented young man. This idea expresses several current beliefs. The first is that since war is essentially destructive, the best people are attracted to more positive endeavors, or "doing good." The Peace Corps, civil rights, urban problems—all have attracted their share of dedicated young people. The second, almost contradictorily, holds that a military career is out of phase with a prevailing emphasis on commercial values and business success. Third, and not least, is the notion that a young man's voluntary entry into the military profession is partly motivated by his desire to avoid the competitive realities of civil society.

Are these perceptions grounded in fact? A wide sampling of opinion taken a few years back placed the prestige of the officer in the armed services not only well below that of the physician, college professor, and scientist, but below that of the public school teacher. More recently, in 1965, a poll taken among

450 freshmen at Antioch College in Ohio showed Gandhi, Schweitzer, and Einstein as leading the list of the ten "most admired" human beings of the twentieth century. Not one military leader was among the first ten selections. Not even Generals Eisenhower, MacArthur, Marshall, or Pershing made the list. Each of these distinguished military leaders helped our democratic institutions to survive, ironically permitting the students the free choice to ignore them.

We seem to be passing through an "Age of Anti-heroes," perhaps an aggravated manifestation of anti-militarism deeply rooted in our institutions. That tradition found its way prominently into the Declaration of Independence and into the Constitution itself, and I would not quarrel with it, for the unquestioned supremacy of civilian authority in our government has made possible our present free society with all its benefits. But we have gone too far in downgrading our military institutions, and we have paid a price in lives and in material possessions, especially in the two world wars of this century.

In December 1941, on the eve of Pearl Harbor, Professor Pendleton Herring, a Harvard political scientist, deplored a dangerous public attitude which relegated the military profession to an inferior role in American society. During the two decades following World War I, he wrote, relatively few military families had carried on the tradition of service in the Army and Navy. And so, when President Roosevelt called for a supreme national effort to rebuke the Axis for that "day of infamy," the United States found itself unprepared in trained manpower, along with the obvious lack of arms and equipment.

We helped to win two world wars, thanks to a mea-



While many young people, although by no means all, denigrate the military and even demonstrate against presence of recruiters on campus, there is still plenty to be proud of in the military tradition, symbolized here by all-service honors on Veterans Day paid to American fighting men of all wars. This quartet represented the US noncom ranks.

sure of time to get ready, provided by gallant allies; and two oceans of space, afforded by nature. Both advantages have since melted before the impatient heat of military technology. After V-J Day, undaunted by the illogic of returning once again to "normalcy," we dismantled our wartime capability. But today, dubious thanks to the cold war and to periods of aggression alternately sponsored by Moscow and Peking, our national defense is sound. America may be better prepared to meet its obligations than at any time previously in our history, in the absence of a declared state of war.

This defense preparation has been accompanied by important strides to establish a sounder basis for recognizing the military career as an honored profession. Frankly, we still have some way to go. I am mindful of a national cross section of college campus opinion published not long ago in *Newsweek*. Thousands of college students were plumbed as to their respect for the main institutional pillars of our society. "Justice," "Medicine," "Teaching," "The Church," among many others, showed up well ahead of "The Military." In fact, sixty percent reported "Only Some" or "Hardly Any" confidence in the military establishment. Now, students are demonstrating on some campuses against the presence of military and defense industry recruiters.

And so, those in the Department of Defense who share the responsibility for military-career planning still have their work cut out.

It would be something less than candor to ignore the war in South Vietnam as a current divisive factor in our present national attitude. Some Americans may not feel their personal safety to be threatened by Vietnam, but intellectually they know well that America's responsibilities are those it once shirked by rejecting membership in the League of Nations. Now, nearly a half century later, the fortunes of war, the evolution of Western civilization, and the multirevolution in weapons technology have combined to catapult the US into leadership of the Western world. We did not seek that leadership. In some respects—a psychological residue from General Washington's "Farewell," which was addressed to an introspective and struggling young America—we are still unprepared for it.

The present military commitments assumed in our maturity dwarf those of European nations which carried the burden in centuries past. General military commitments narrow down to specific obligations of dollars, technical know-how, and mostly human lives.

One may regard the sanctity of human life as an unqualified absolute, but I prefer John Stuart Mill's view of war, expressed just a century ago, which in its essence is more rational and, I believe, more civilized:

War is an ugly thing, but not the ugliest of things: the decayed and degraded state of moral and patriotic feeling which thinks nothing worth a war is worse. . . . A man who has nothing which he is willing to fight for, nothing he cares more about than he does about personal safety, is a miserable creature, who has no chance of being free, unless made and kept so by the exertions of better men than himself.

Those exertions include treaties with some forty nations and military assistance pacts with still others. We have pledged our support to the United Nations. We assumed heavy burdens in regional organizations, such as the North Atlantic Treaty Organization (NATO), the Southeast Asia Treaty Organization (SEATO), the Organization of American States (OAS), and the Australia-New Zealand-US Treaty (ANZUS).

It takes manpower to meet those obligations—3.3 million Americans in uniform at this time. Of this number, 1.5 million are stationed at sea or beyond our territorial borders. How do we keep this number of skilled, dedicated men on the job? The quick answer, of course, is to pay them enough. To be compensated for a fair day's work by a fair day's pay has always been a benchmark of enlightened capitalism. This may still be true in the private sector of our economy, but something gets lost in the translation into the public sector, especially if one has chosen the military profession or, if, in the case of many recruits, it has chosen him.

While the American economy has grown rapidly and the average citizen has enjoyed the fruits of this growth, the young military man has not benefited to the same degree. This is especially important in the lower enlisted and commissioned grades when a young man debates his future career alternatives.

Actually, the disparity between civilian and military compensation may be smaller than it appears to the
(Continued on following page)

The finest in military traditions is carried on at the military academies, youngest of which is the Air Force Academy at Colorado Springs, Colo. (right). Too many uninformed critics think of the academies as spit-and-polish centers operating with little relation to modern realities. The opposite is true. The academies are closely attuned to today's requirement for well-rounded military officers.



general public or to the uniformed men themselves. But so long as this general attitude prevails, the pay issue will have a negative motivational effect on recruitment and retention.

To narrow the disparity further, the Uniformed Service Pay Act of 1967, retroactive to October 1967, increased take-home pay by an average of 4.5 percent, but it did not increase or bring to the surface quarters and allowances, part of the "invisible" military pay which must be taken into account.

Hopefully, reality and appearance will be brought into better balance by legislative proposals to be offered to the Congress in the current session. Outgoing Defense Secretary McNamara has frankly stated: "Any compensation system that is so complex that the people being compensated do not understand it, and in some cases the employers do not understand it, is a poor compensation system."

The DoD has its work cut out for it, first, to improve the dollar amount of military pay to make it more competitive with the civilian sector of our society; and second, to improve the visibility of that pay so that the military member and those with whom he comes into contact are realistically aware of it. For example, a survey conducted by the Louis Harris organization of 500 former military personnel who recently completed their first tour disclosed an underestimation of military income of almost twenty-five percent. As a check on these results, banks and lending institutions in the Washington, D. C., area were found to underestimate the pay of lower-grade enlisted personnel by more than half.

Across the ideological ramparts, we could learn a thing or two from the Soviet Union about the incentive system that has been our middle name. Military pay scales for officers and career enlisted men of the Soviet armed forces compare favorably with those of the civilian sector of the Soviet economy. A captain in

the normal grade structure might receive 2,100 rubles (the official rate of exchange is one ruble to \$1.11) annually when additional allowances and benefits are taken into account. His over-all compensation is about the same as that of a Soviet engineer, who is perched comfortably up in the Soviet social and economic hierarchy.

The Soviets effectively utilize another incentive, which also warrants attention. Pay scales depend not only on grade, but on duty assignment. An Army captain receives seventy rubles a month grade pay. But if he is a company commander, he receives an additional ninety rubles. Similarly, career enlisted men are paid according to the post they fill. An unassigned sergeant retains his grade but receives the pay of a private. On the other hand, if he is assigned to an officer's slot, his pay is equivalent to the commissioned grade he fills.

A Soviet technician receives the pay of a specialist. For example, a driver-mechanic in a tank unit receives extra pay in relation to grade. Career enlisted men receive longevity, hardship, and hazardous-duty pay. They also receive bonuses for outstanding achievement and reenlistment.

Moreover, pay raises for military personnel may be included in the fifteen percent increase announced for the Soviet defense budget for 1968. Although the published version of the new Soviet Universal Military Service law contains no explicit provision to increase pay for career military personnel, a commentary on the law on January 4, 1968, in *Red Star* by Marshal Zakharov, Chief of the General Staff, said that "a whole series of measures is now being taken . . . to improve the material and legal position" of career military personnel. Even without an increase, these personnel would be receiving more than ninety percent of the total Soviet military pay, since conscripts get only nominal pay.

Financial reward for achievement is not nearly so widely recognized by the US armed services. In the Air Force, 73,000 highly skilled airmen (about ten percent of the total strength) are receiving monthly "proficiency pay" of \$30 (P-1 rate) or \$60 (P-2 rate). Secretary McNamara authorized a further increase to 87,000 airmen eligible to receive "pro" pay by next June. This authorization will be utilized in seeking to retain personnel holding the crew chief, flight chief, or line chief ratings—so critical in the Vietnam emergency.

These statistics should not be interpreted to make invidious comparisons between the US DoD and the Soviet Ministry of Defense. They are reflections of general public attitudes in each country toward its military establishment. For example, nearly every military medal awarded in the USSR carries with it economic benefits such as free subway and train rides, and lower prices at various stores for certain commodities.

America is not psychologically attuned toward this type of incentive. We used to add the munificent sum of \$2 to the monthly paycheck of a Congressional Medal of Honor winner while he was on active duty, but that practice was discontinued in 1949. However, a Medal of Honor recipient is eligible at the age of fifty, on his own application, to a special pension of \$100 per month.

In any event, I do not for a moment suggest that we adopt bodily the Soviet military pay structure. Their concept of relating pay scales to duty assignment along with grade may, upon reflection, have a built-in quotient of chaos. A military man would not know from year to year, or even month to month, whether his pay might be raised or cut by half or more.

But there is a point of useful comparison between military and civilian pay scales in the Soviet Union that needs more visibility in our society. I think Congressman Mendel Rivers, Chairman of the House Armed Services Committee, stated the issue quite well last April: "The members of the armed services are entitled to a standard of living as good as the standard of living they are defending."

Having accepted this axiom, it is still possible to argue that the motivational influence of pay can be overdone. Four years ago, the late David Boroff wrote a controversial series for *Harper's* magazine on the service academies. Professor Boroff lumped pay and prestige together as the *sine qua non* of the American way of life for the military man. The danger in this approach is that it leads to an easy assumption that money will solve everything.

I am aware that a substantial percentage of Air Force men who leave the service before retirement cite inadequate pay as being at the root of their sometimes troubled decision. However, it has been my experience that men at the crossroads of career planning give reasons that may be irrelevant to the real basis of their decision.

One of the vital human needs is fulfillment in work. Most men are by nature purposive beings. This driving force is less apparent because it tends to remain just

below the surface of our consciousness. While achieving fulfillment in work may *dominate* relatively few people, it *influences* almost all of us. To unleash this need on a broad scale, it seems to me, is what manpower research is all about.

Last May the Air Force held a servicewide "Career Motivation Conference" at TAC Headquarters, Langley AFB, Va. The spirited exchanges of views among the commands represented at that meeting will help refine research techniques that bring more quickly to the surface those features of military life which (1) stimulate career service, or (2) create the greatest dissatisfaction.

The answers distilled from three days of discussion surprisingly did not center on pay, promotion, housing, fringe benefits, allowances, retirement, or tax advantages. A consensus, based on many in-depth interviews, suggested that Air Force personnel are strongly motivated by essentially the same factors that impel workers in private industry: achievement, recognition, interest in their work, and job responsibilities.

If a job performed between 8:00 a.m. and 5:00 p.m. is something one merely gets paid for, it is distinct and separate from his life, something he can measure objectively in comparison to doing the same work, or other work, as a civilian. When there is no marked professional incentive to stay on the job, only then do pay and other material rewards become the controlling considerations. But if work brings a sense of professional achievement, the individual becomes more and more involved, often leading to total commitment.

Any work, to an artisan or an artist, may become a profession if man's rewards are fair and the quality of skill he must acquire is of a high order. John W. Gardner, the former Secretary of Health, Education and Welfare, has observed:

The society which scorns excellence in plumbing because plumbing is a humble activity, and tolerates shoddiness in philosophy because philosophy is an exalted activity, will have neither good plumbing nor good philosophy. Neither its pipes nor its theories will hold water.

Can the US Air Force carry out its vital mission unless each man in it is imbued with a deep sense of belonging and a sense of accomplishment? Can a nation last when competent people take no pride in their effort? Our nation will not survive the challenge of totalitarianism unless everyone, from philosopher to plumber, from colonel to cadet, can look upon his work as something more than a job. Otherwise, each man's effort fails to match what his own life and his own talents are capable of offering. Collectively, our democratic society will fall short to the degree that each man does not fulfill the potential in his own talents.

It is a cliché—but nevertheless true, as most clichés are—that people are our most valuable asset. People also are our most complex asset. They vary intellectually and physically, but the simplest man is far more complex than our most sophisticated weapon or machine.

(Continued on following page)



In an age of antiheroes there are still heroes. This AF forward air controller, Lt. Alexander Zakrzewski, Jr., has played key roles in some of toughest combat situations in Vietnam, and earned a collection of coveted decorations.

The performance of a machine is set by design limitations, determined by inexorable physical laws. Man recognizes no such limitations to his potential achievement. We cannot improve the range and accuracy of a missile by a factor of two or by four merely by managing it more effectively. But one may increase the productivity of a man manifold by education, training, motivation, leadership—the elements that make up good management.

In career management, a problem difficult to solve is the need for periodic rotation of personnel in duty assignments. Considering the organization's effectiveness and the individual's professional satisfaction, should we limit the rotation of nonrated officers to duty within one career field? Secretary McNamara asked the services for guidelines: Where do we establish a balance between producing specialists and the generalists to fill top-level command and staff positions?

Logic not born of military experience argues for sharp curtailment of rotational assignments on the grounds that a specialist in one field may take a year or more to learn a new job outside that field. By the time he acquires professional competence in one area, the military careerist is almost ready for reassignment.

But whenever I'm ready to yield intellectually to arguments that a man should stay in one job for ten years, if necessary, to achieve a degree of expertise, my mind's eye takes me back to Alec Guinness, the British engineer-colonel in the motion picture "The Bridge on the River Kwai." His pride in the bridge-

building specialty for which he had been trained was so intense that he was unable to relate his actions to the military mission of the British Army until the moment of his death. While his was a dramatic instance of overspecialization, it points up the dangers of swinging the pendulum in the other direction from the liberal rotation policy we have followed up to now.

Ideally we need officer and airman specialists who are broad-gauged, who see the scope of their job within the generous context of many Air Force missions. They must know how to relate verifiable evidence from other disciplines to their own areas of competence. There can be only limited effectiveness unless one understands relationships between disciplines. Very few problems in or out of the military service are so obliging as to fall graciously within the limits of narrow specialization.

Rotation is just one of the personnel problems which needs exploration in depth. We should also look into problems of image and identification, and of a category of motivational factors which come under a heading loosely described as psychic income. We should review previously accepted ideas in educational technology to determine whether procedures and systems originally instituted during World War II are valid today.

A generation ago, the Army Air Corps was expanded from 26,500 officers and airmen at the start of World War II in September 1939 to 2,411,000 at its peak, four and a half years later, a fantastic increase by a factor of ninety-one. Personnel recruitment, training, and retention today is a job of totally different dimensions. The danger is less identifiable. Somehow, Kosygin and Mao Tse-tung seem less menacing than Hitler and Tojo were. But in the long pull the danger may be greater.

We must never go back to the stereotyped Minuteman image of calling our manpower for limited service to turn back the immediate threat, then beating our swords back into plowshares. We shall need our "Minutemen" for twenty years or more. And we shall not succeed in getting a reasonable proportion of the most qualified young Americans unless we do two things: first, engender a measure of confidence and support from a wider segment of public opinion in the integrity and purposes of the Defense establishment; and second, take more definitive steps in career planning to upgrade the professional motivation, pay, and prestige of the uniformed men who stand guard.

To maintain a position of leadership in the Western world, we shall have to revise our outlook. Americans must come to accept, and occasionally applaud, a concept once alien to our psyches—that a military career is definitely a job for any American boy!—END

Murray Green is a civilian aide in the Office of the Secretary of the Air Force. After World War II service as a carrier-based naval officer, he joined the Air Force Reserve and now is a colonel in Intelligence. He earned a B.S.S. degree and an M.S. at the City College of New York and his Ph.D. in history and international relations at American University, Washington, D. C. His byline has appeared frequently in AIR FORCE/SPACE DIGEST.



**IEC
is in
range...**

When a designer-builder of data acquisition systems has demonstrated their capability during eleven years as the Navy's prime contractor for Fleet Ballistic Missile Test Instrumentation, shouldn't they make a substantial contribution to untangling S-band-range telemetry?

In handling the data stampede in today's range telemetry, there is no substitute for experience. Ours is based on an award-winning record, solving the problems of multi-channel S-band telemetry at mega-bit data rates on the Polaris/Poseidon Program. If we can handle a bird out of water, we can handle one in the sand. Ask to see our credentials.



INTERSTATE ELECTRONICS CORPORATION
707 EAST VERMONT AVE., ANAHEIM, CALIF. 92803

Regional Offices:

Atlanta, Georgia • Dayton, Ohio • Los Angeles • Washington, D.C.

SUBSIDIARY OF "AUTOMATIC" SPRINKLER CORPORATION OF AMERICA



What to take to the Air Force Association— 22nd National Convention, Atlanta, April 2-5

Give us the order and we'll have your jet warmed up and ready to help you get to the big doings. We'll pick you up in California or the mid-West. Arrange fast, easy service to Atlanta. Feed you beautifully. Take $\frac{1}{3}$ off your wife's fare in Jet Coach. And treat you like you owned the airline. Ask Mr. Information (your travel agent) or call TWA.

up up and away 

StarStream
WORLDWIDE SERVICE

Twenty-five Years Ago...

A quarter century ago American forces were gathering in Alaska in preparation for a campaign to throw the Japanese invaders off the Aleutian islands of Kiska and Attu. The year before, as a diversionary action during the Battle of Midway, the Japanese had struck the US base at Dutch Harbor and made good their landings on the outermost islands of the Aleutian chain, posing a threat to the Alaskan mainland. It was a long-ago war in a hostile part of the world where weather proved a greater opponent than the enemy...

The Forgotten War in the Aleutians

By Col. C. V. Glines, USAF

REAR Adm. Kakuji Kakuta paced nervously back and forth in his cabin aboard his flagship, the carrier *Junyo*. His cabin clock chimed midnight. He paused at his desk, flipped over the calendar to the new day: "June 3, 1942." It was to be a significant date in both American and Japanese military history.

Kakuta was commanding a task force made up of the carriers *Junyo* and *Ryujo*, the heavy cruisers *Takao* and *Maya*, an oiler, and three destroyers. His force was cruising 180 miles south of the US Navy installation at Dutch Harbor, on Unalaska Island, the main US military outpost in the Aleutian Islands chain. His mission: To attack shipping, planes, and shore installations at Dutch Harbor. The purpose: To create a diversion for the planned Japanese invasion of Midway Island, 1,400 miles away to the southwest, set for the next day, June 4.

Japan's master plan for the Pacific did not at that time include an actual invasion of the Alaskan mainland. After his initial attack, Kakuta was to fall back to support the occupation of the western Aleutians, to block future American attacks against Japan. Since the Doolittle raid on Tokyo six weeks earlier, Japanese militarists had known they must destroy the American air and naval strength they had missed at Pearl Harbor if they were to continue their conquest of the eastern half of the world.

Admiral Kakuta was tense. High winds swept the *Junyo's* deck. Rain pounded against the bulkheads. Green water swept both carriers as they pitched and lumbered through the night. Deck crews could hardly

keep their balance as they scurried about readying the planes for their first mission against an installation on American soil since Pearl Harbor.

At 0430 hours, Kakuta went to the bridge and nodded to his air operations officer. Seconds later, bombers and fighters roared off both carriers and headed for Dutch Harbor. At 0545, the first wave of fighters swept out of the fog over Fort Mears and the nearby naval base. Although the Japanese pilots had the advantage of surprise, they made only one strafing run and did little damage. Ten minutes later, four waves of bombers attacked, destroying barracks and killing some twenty-five men. The bombers withdrew through the fog, confident that they had achieved all they had hoped for.

But this time American military planners had not been caught as completely off guard as at Pearl Harbor. Since the early 1920s, men like Generals Bennie Foulois, Billy Mitchell, and Mason Patrick of the Army Air Corps had been calling attention to the strategic importance of Alaska and to its vulnerability to attack from the west. Construction of an air base in Alaska had been authorized in 1935, but no funds were available until 1939. That year, construction began on a cold-weather experimental station at Fairbanks and a major operational base outside the growing city of Anchorage. The Civil Aeronautics Administration began an extensive development program, which included preparation of emergency landing fields and radio aids to navigation.

In addition, fields were to be built in Canada, linking
(Continued on following page)

THE FORGOTTEN WAR IN THE ALEUTIANS

The Aleutians, strung out from the Alaskan mainland, were the scene of a near-forgotten part of World War II. In June 1942 the Japanese struck Dutch Harbor and landed on Kiska and Attu Islands. They remained on the islands, under frequent attack by elements of the Eleventh Air Force, until driven out in 1943.



the continental US with Alaska. Further in the future, since the Air Corps had been given responsibility for the air defense of the naval base at Dutch Harbor, fields were planned along the Aleutian chain as far west as Umnak (*see map*). When the war broke out, preparations were still incomplete in Alaska, and the Arctic winter had already begun. The previous summer, however, fields had been rushed to completion at Fairbanks, Nome, Anchorage, Kodiak, and Yakutat. A few personnel were at each place when the news of Pearl Harbor came in. The total air strength in Alaska consisted of twelve B-18s and twenty P-36s.

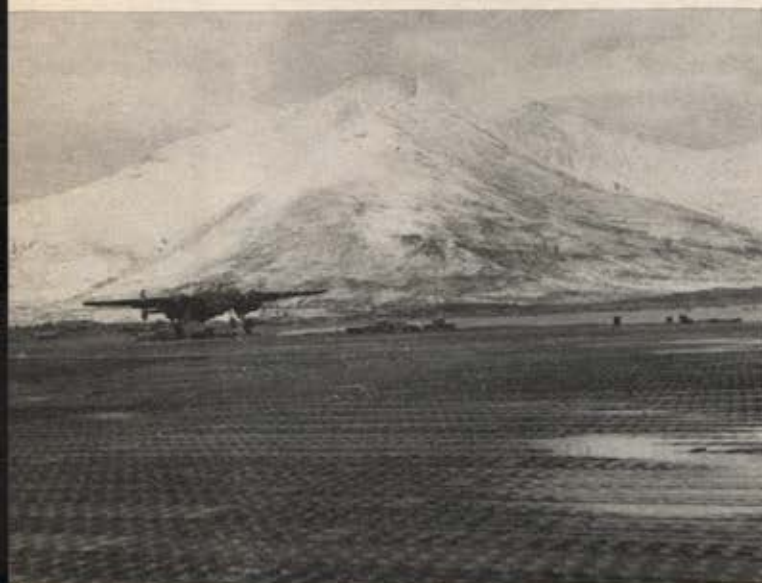
The decision to build an airstrip on Umnak Island,

just west of Unalaska Island, for the protection of Dutch Harbor had been a sound one. After the attack on Pearl Harbor, Gen. H. H. "Hap" Arnold informed President Roosevelt that a similar raid could be made on Alaska "at any moment." He predicted that the Japanese would probably try to seize bases in Alaska and use them as stepping-stones for attacks on the United States.

Additional bombardment and fighter units were immediately ordered to Alaska, but it was weeks before the planes could be winterized and flown to Fairbanks. By January 25, only thirteen fighters of the first scheduled twenty-five had arrived; five had crashed or been wrecked beyond repair. In almost all cases, weather was to blame for the losses. To the Americans, weather was to prove a deadlier enemy than the Japanese.

Since construction at Umnak Island had a high priority, work began under a blanket of secrecy unique to Alaskans. Dummy corporations were formed; the base at Umnak was masked under the code name "Blair Packing Co.," but instead of cannery and fishing equipment, the machinery offloaded consisted of bulldozers, scrapers, and graders. Another dummy corporation was formed for CAA construction of a field at Cold Bay under the name of "Saxton and Co." Both were organized under a holding corporation known as the "Consolidated Packing Co."—really the Alaska Defense Command.

Heroic progress had been made by June 1, 1942, even despite terrible weather, and the Japanese never suspected there was any US military force west of Dutch Harbor. On Umnak, pierced steel planking had been used to make a runway 5,000 feet long, and the first plane, a C-47 Gooney Bird, had landed on it on March 31. The first combat planes—P-40s—arrived on May 23, and the Alaskan area received the status of a numbered air force—the Eleventh Air Force—under the command of Brig. Gen. William O. Butler. Never had Alaska seen more planes. In the theater there were



The look of the air war in Alaska. Here a North American B-25 Mitchell medium bomber, like those Doolittle's raiders flew from the *Hornet*, takes off from its base in the Aleutians, against background of snow-covered mountains.

P-38s, P-39s, P-40s, B-17s, B-24s, and B-26s, plus a mixed bag of cargo and utility aircraft to handle resupply and personnel airlift.

By June 3, twelve P-40s, six B-26s, six PBVs, two B-18s, six B-17s, and one LB-30 had reached Umnak—the base that the enemy still didn't know existed. The first B-17 pilot to land at Umnak, Capt. Russell A. Cone, reported that landing on the porous volcanic soil was "like sitting down on an innerspring mattress." Fighter pilots likened it to trying to land their ground-looping-prone P-40s on a trampoline. But they all got down safely, and then began the battle for survival in the sea of mud—and waiting for missions.

When the word flashed to Umnak that Dutch Harbor was under attack, all flyable P-40s were sent up to search for the Japanese task force. Lacking radar and with no clue to the location of the enemy carriers, the P-40s could do nothing but patrol as far as their fuel would let them and hope that luck and the weather would reveal some trace of the enemy.

While the planes from the *Junyo* and the *Ryujo* were attacking Dutch Harbor, four seaplanes from the cruisers *Takao* and *Maya* were sent to reconnoiter other nearby islands. Two blundered into the Umnak area, unaware of the existence of the airstrip there or the P-40s up and spoiling for a fight. Lts. John B. Murphy and Jacob W. Dixon of the 11th Squadron were patrolling in a flight of four southeast of Umnak when they sighted the lumbering enemy seaplanes. Murphy peeled off with Dixon following while the other planes flew top cover. The two pilots got into attacking position behind the unsuspecting floatplanes and blasted away. One enemy went down in flames into Umnak Pass right at the end of the runway while the other, badly damaged, eluded the P-40s and flew off into the fog. It later crashed into the sea near its cruiser; there were no survivors.

As the Japanese who had raided Dutch Harbor were returning jubilantly to their carriers, one of the fighters made a forced landing on Akutan Island. Thus, only three Japanese planes were lost to the day's operation. Fortunately, however, the enemy still did not know about the strip at Umnak, although two of their planes had been lost because of the American fighters there.

Admiral Kakuta wanted to resume the attack on Dutch Harbor the next day, the same day that the Japanese were to attack Midway. By this time, it was hoped that the previous day's attack would have caused Admiral Nimitz to send an American naval task force racing to the rescue and thus divert his strength away from the Midway operation. But Nimitz did not fall into the trap. The Japanese code had been broken, and the attack on Midway was no surprise. The Americans had not only known of the impending attack on Midway but also knew that a diversionary thrust would be undertaken against the Aleutians.

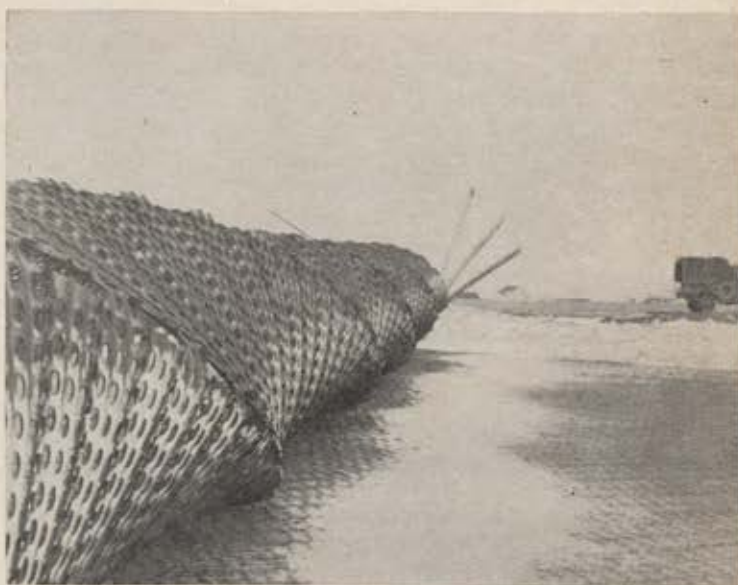
June 4 was another rainy day and forward visibility was less than a mile. Kakuta spent most of the day in his cabin pacing back and forth, waiting for the weather to break. When afternoon came and there seemed no hope for improvement, he ordered his air officer to choose the most experienced pilots aboard

the two carriers and order them into the air regardless of the weather. As a result, fifteen fighters and seventeen bombers roared off the decks. At precisely 1800 hours, ten of the fighters lined up on the naval station at Dutch Harbor and, with guns blazing, made a strafing run through the building area. Eleven dive bombers followed and dropped their eggs into fuel tanks and the hull of the *Northwestern*, a station ship being used as a barracks. Twenty minutes later, three more bombers attacked but scored no hits. Then five more dive bombers swooped down. This time a direct hit was scored on an anti-aircraft emplacement, and four sailors were instantly killed.

As the enemy planes withdrew, their luck was not as good as it had been the day before. The *Junyo's* planes had selected the west end of Unalaska Island as a rally point, thinking it completely safe because they were still unaware of the Umnak strip. But eight P-40s of the 11th Fighter Squadron were waiting. Within five minutes, Lieutenants Chancellor, Dale, White, and J. J. Cape had each scored a victory, and two Japanese dive bombers and two fighters were down. Minutes later, however, Lieutenant Cape had a Zeke on his tail and went down to his death. Another P-40 crashed on the island, but its pilot, Lt. Winfield E. McIntyre, later walked into camp.

The enemy suffered still another loss as a bomber from the *Junyo* failed to find its carrier and was never seen again. On the morning of June 4, as Admiral Kakuta was agonizing over the weather, an American PBV of Navy Patrol Wing 4, piloted by Lt. Marshall C. Freerks, reported contact with three enemy vessels at a point about 160 miles southwest of Umnak. When his report reached home base, six B-17s and a single LB-30 left Kodiak, refueled at Cold Bay, and were sent out to prowl through the fog and mist. B-26s from

(Continued on page 80)



Weather was a worse enemy than the Japanese. Howling Aleutian winds rolled up some eight tons—3,500 square feet—of this pierced-steel matting from the frozen, snow-covered hardstand at the edge of one of the US runways.





ALL FOR ONE CREW:

A system that lets the astronauts take personal, precise control of Apollo.

A unique feature of Apollo's stabilization and control system is that it can be operated both automatically and manually. The astronauts can "fly" Apollo at their own discretion or rely on their automatic stabilization system.

Three important elements of this system are:
... a 3-axis rotation control stick that enables the astronauts to control the roll, pitch, and yaw orientation of the spacecraft.

... a translation control that will direct the movement of the spacecraft along any axis for docking or rendezvousing operations.

... a flight director attitude indicator that will give the crew constant visual reference of the spacecraft's attitude ... help keep them on target.

After our successful experiences on Gemini and Surveyor, we are excited to be part of the NASA-Apollo team working toward the greatest technological event in the history of man.

Honeywell is ready to work with you—also—to continue pushing back the frontiers of space—to build equipment that works, to build it fast, to build it in the quantity you need.

And with one goal uppermost in mind: more effective men in space.

Honeywell

helps make spacemen more effective



A train of US bombs drops on Japanese-held territory in the Aleutians as part of the continuing air campaign waged by Eleventh Air Force after the enemy seized Kiska and Attu. Photo shows how Japanese tried to carve airstrip from the rough terrain.

Elmendorf Field near Anchorage were also searching the vast ocean area south of the chain.

Hours went by, but the enemy task force was not sighted again. Finally, one B-26 pilot, Lt. George W. Thornbrough, separated from his flight mates because of poor visibility, found the enemy force and made a torpedo run on the *Ryujo*. But in his eagerness, his torpedo went over the target and failed to explode. Furious, Thornbrough returned to Cold Bay, rearmed, refueled, and took off to try again. Hours later, he radioed that he was "on top" somewhere near Cold Bay but was unable to find the enemy a second time. Then no more was heard from Thornbrough. The Aleutian fog took its toll. Weeks later, his plane was found against a mountainside east of Fort Randall.

About the time that the Japanese planes were attacking Dutch Harbor the second time, B-17s piloted by Lt. Thomas F. Mansfield and Capt. Jack L. Marks finally located the enemy task force. Marks decided to pull up into the overcast and drop his bombs blindly. Mansfield elected to make a low-level attack and bored in toward the cruiser *Takao*. Neither bomber succeeded in its mission. Marks's bombs missed completely, and Mansfield's plane fell before a withering fire from the *Takao*'s gunners. One survivor of his plane was rescued by the Japanese and spent the rest of the war in prison.

The B-26s did not have long to wait for their turn in combat. Although Marks's bombs had missed, his radio operator reported the exact position of the task force for the first time. With visibility less than three miles, five B-26s roared off the steel spring matting of Umnak, and three of them located the force. Two torpedoes were launched, but there were no hits. The enemy carriers recovered their surviving planes, and the task force faded away into the Aleutian weather.

The loss for the Americans in this latest attack was light compared with other battle fronts. Forty-three men died defending Dutch Harbor, some buildings were destroyed, 22,000 gallons of fuel went up in flames, and about fifty men earned the Purple Heart. Two P-40s and a B-17 were lost in combat. However, as was to be so typical in later Alaskan operations,

four other planes were lost due to weather or bad landings on the hastily prepared strips.

The enemy had achieved his purpose with the two separate attacks on Dutch Harbor. His losses were negligible—no ships had been hit and the way was opened up for landings on the outer Aleutian Islands at Kiska and Attu as planned. Kakuta retired to a point 600 miles south of Kiska and awaited the arrival of three additional carriers, the *Zuiho*, *Kongo*, and the *Haruna*, the latter two to arrive from Midway. Together these forces were to screen a landing party of more than 1,200 men who were to land on Kiska on June 6. Although the operation was nearly canceled because of the outcome of the Battle of Midway, Kiska Island was occupied on June 6 and Attu, westernmost island of the chain, the next day.

Historians now generally agree that the Battle of Midway marked the turning point of the war in the Pacific. Four of Admiral Yamamoto's carriers were sent to the bottom, along with a heavy cruiser, and a total of 322 Japanese planes either were destroyed or failed to return from their missions. American losses were the aircraft carrier *Yorktown*, one destroyer, and 147 planes. The Rising Sun of Japan had reached its zenith in the Pacific sky.

The island of Kiska, far out along the island chain, supported a small US naval station and weather-reporting station. When the Japanese stormed ashore, the US naval detachment, a lieutenant and ten men, had no choice but surrender, and the Japanese had the island to themselves. On Attu, an elderly American schoolteacher saw the Japanese landing along the beach and immediately committed suicide. His wife attempted to follow suit. She recovered, however, under Japanese care and, along with the entire Aleut population of the village at Chichagof Harbor, was taken to Hokkaido, Japan, and interned for the duration.

Proof that the Japanese had further plans in the Aleutians was given after the war by Lt. Gen. Hideichi Higuda, commander of the Japanese Northern Army. He told interrogators that they had a threefold objective: To break up any offensive action the Ameri-

(Continued on page 83)



P-39 Airacobras and P-40 Warhawks are among the fighters on the hardstand of this airstrip on Adak Island. American forces landed on Adak on August 30, 1942, and hastily built this strip, westernmost US base until Amchitka was taken.

If security forces came running every time he wandered into a missile site, we'd be in a lot of trouble.

Not that our security systems don't detect prairie dogs. On the contrary. Some of them are so sophisticated, they'll even detect a mouse. But, he'd have to put on a man-size performance before the alarm goes off.

But, should a human intrude—whether walking, running, or crawling—the alarm triggers immediately.

Here's how it works.

If something (human or beast) gets between the transmitter and receiver, it causes a new signal of its own which is analyzed for speed, size, density.

If the equipment decides an intrusion has occurred, it sounds an alarm at a monitoring station—all in less than a second.

But we know that one system can't solve all problems. So we

committed ourselves to experimenting with various approaches using universal components that meet all military specs with slight modifications and large cost savings.

Now we can design systems tailor-made to your needs, using geomagnetic, electro-optical, seismic, acoustic, infrared, ultrasonic, or RF detection techniques.

We've been keeping intruders out of Atlas, Titan and Minuteman Missile sites for years.

We also keep people in. One of our systems solved a security problem at a federal prison.

So whatever your problem.

Out or in. We can solve it.

Sylvania Electronic Systems, 40 Sylvan Road, Waltham, Massachusetts 02154.



SYLVANIA
A DIVISION OF
GENERAL TELEPHONE & ELECTRONICS

"Move at night."

Mao Tse-tung on Guerrilla Warfare



Decades of insurgency and counterinsurgency have proven the fact: darkness is the number one weapon of the guerrilla fighter. Our job? Give our troops the overwhelming advantage of literally seeing at night. Electro-Optical Systems, a Xerox Company, has done it. Both weapon- and vehicle-mounted light amplification devices using natural light from moon, stars or merely sky glow afford enormous advantages over low light level television or IR raster scanning.

These devices deliver a higher data rate format, wider dynamic range, simpler support and maintenance and higher reliability. And they are available in large quantities. Now, EOS search-light illuminator packages provide light where and when and in the quantity needed. A hand-held, three-and-a-half pound (less batteries) unit delivers 3 million peak beam candlepower over a 1000 yard range. A 1 KW unit in a 15-inch cube package produces 70 million peak beam candlepower. There are systems

which can light up entire villages. 20 KW airborne units are capable of illuminating areas measured in square miles to reading intensity. Hand-held or vehicle-mounted. Ground or air. Visible, infrared or image intensification. EOS provides them all in quantity. For further information, contact EOS. And, to give you further insight into the tactics of insurgency, get your free copy of *Mao Tse-tung on Guerrilla Warfare*, merely by writing Electro-Optical Systems, Inc., a Xerox Company, Pasadena, California 91107.

cans might contemplate against Japan by way of the Aleutians; to set up a barrier between the US and Russia in case Russia entered the war against Japan; and to begin building advance bases for future offensive actions. In the months following the June landings, about 1,200 enemy troops occupied Attu, and about 1,800 held Kiska.

As reports came in confirming the Japanese occupation of Kiska and Attu, American land, sea, and air strategists were working on a plan to drive the invaders off American soil. On August 30, American ground troops landed on Adak Island, 250 miles east of Kiska. An airfield—code named Fireplace—was hastily built, and as early as September 11 planes attacking Kiska from Umnak were able to land at Adak on the return trip. On September 14, the first coordinated and fighter-supported bombing mission took off from Adak.

The results of this attempt to dislodge the enemy by means of airpower were not great, and to the men involved it was a war made even more grim because of the weather. Alaskan weather, among the worst in the world, is characterized by the williwaw, a wind of hurricane velocity that sweeps down from the naked hills along the frozen fringe of the Aleutians. Though high winds and fog are an unusual combination elsewhere in the world, they frequently persist together along the island chain. But wind or no wind, there is always fog, mist, low overcast, icing, and turbulence to plague airmen.

The first use of Adak as a bombing base by the Eleventh Air Force was reckoned a success. The leader of the mission, Col. William O. Earecksen, transmitted a twenty-five-word strike report to his base at Adak. He ended with what may have been the understatement of the Aleutian war: "Japanese very annoyed."

This annoyance was followed by many more attacks, and throughout the winter of 1942-1943 Eleventh Air Force aircraft hammered Kiska and Attu whenever possible. Meanwhile, other bases in the chain were established and improved. On January 11, 1943, American troops landed on Amchitka Island, only seventy-five miles from Kiska, and built a field there from which fighters were operating a month later. By March, both medium and heavy bombers were able to make the flight from Amchitka to Kiska whenever weather permitted.

As the air elements of the Alaskan Command were reaching out for the enemy, plans were being made for amphibious operations to retake Kiska and Attu. With Army and Navy aircraft bombing when the weather was good, Navy cruisers and destroyers slipped in close to the fog-drenched islands at every opportunity to shell dug-in enemy positions. Sometimes as many as six or seven times a day, the American bombing, shelling, and strafing was carried out. Under this continual reminder of the American presence, the Japanese found it almost impossible to repair damage, much less complete new airfields. The enemy commanders sent out frantic calls for reinforcements.

Late in March 1943, a Japanese naval force sailed from Paramushiro toward Attu to strengthen the forces



American troops landed on Amchitka in January 1943. A month later fighters were operating from the new airstrip, and by March medium and heavy bombers were striking Kiska. Here trucks haul sand for runway foundations.

there. Such an attempt had been anticipated, and a small US naval force, outnumbered two to one, was lying in wait. The result was the only sea battle fought in Aleutian waters during the war. It became known as the Battle of the Komandorski Islands and was decisively in favor of the Americans. The Japanese withdrew, leaving their comrades stranded on Attu and Kiska without badly needed replacements, equipment, or supplies.

Although Kiska was the first objective of the American planners, they soon focused on the much easier target of Attu. Not only was it held by a smaller garrison, therefore requiring fewer American troops to capture it, but, once taken, Attu would put the American forces in a better blocking position between Kiska and Japan. Thus Attu became a primary objective of the American effort.

By the spring of 1943, the planning for an amphibious invasion was complete. D-Day was to be May 11. Two separate landings were planned—one at Massacre Bay, south of the Japanese airfield, and the other to the north, near Holtz Bay. The US 7th Infantry Division was assigned the task of conquering the Japanese who were entrenched on Attu. To do this they first had to conquer the uncertain terrain.

Early in the morning of May 11, Col. Frank L. Culin and Aleut members of the Alaska Scout Detachment paddled ashore at Massacre Bay, followed later by reconnaissance troops, and then assault troops. To the north at Holtz Bay, heavy fog prevented any landings until later in the afternoon. Fortunately, neither invading force was opposed on the beaches. By nightfall, close to 4,000 assault troops were ashore and dug in.

Col. Yasuyo Yamazaki, the Japanese commander on Attu, made no attempt to block either landing force with his small garrison. Instead, he decided his best strategy would be to blockade the valley connecting Massacre and Holtz Bays. He realized, however, that he had no real hope of successfully driving the vastly superior American assault force off the island, and be-

(Continued on following page)

gan burning his classified papers while preparing to exact a stiff price from the attackers.

Once the Americans made contact with the Japanese defenders, the advance slowed. Despite heavy naval bombardment, repeated attacks by aircraft, and dogged infantry rushes, the Americans gained only 4,000 yards during their first forty-eight hours ashore. The Japanese delaying tactics were working, but more important was the heavy fog that cut visibility to less than 100 feet.

But the determined American infantry assaults finally paid off, and the enemy soldiers were flushed out of their fortified caves and foxholes and pushed back. Between May 19 and 25, Yamazaki's troops, fighting for every inch of ground, finally withdrew into a fish-hook-shaped ridge between Chichagof Harbor and Sarana Bay.

The campaign's climax came at dawn on May 29. Faced with the alternative of being rooted from his entrenched position or gambling everything on a counterattack, Yamazaki decided on a banzai charge. At first light, a thousand shrieking Japanese charged straight into the American positions. Using everything from automatic weapons to bayonets tied to sticks, the enemy soldiers crashed through the surprised American lines, overran the command post, and dashed into the medical station to hack at the wounded before sweeping headlong toward the Massacre-Sarana Pass.

At this point, a mixture of engineer and support troops, with only ten minutes' warning, threw up a hastily organized defense position. On these rear-echelon troops fell the brunt of the banzai charge, and in a desperate hand-to-hand combat they managed to blunt the attack. Scattered groups of Japanese fought through to the pass before being halted, but the counterattack had failed.

For the rest of the day, isolated pockets of die-hard enemy troops fought on. Some preferring suicide to death in battle or surrender took their own lives behind the lines. All organized resistance ceased the next



This rubble resulted from US bombing of Kiska. Wreckage was all the Japanese left on the island. After US forces recaptured Attu and as the joint American-Canadian invasion of Kiska was being planned, the Japanese pulled out.

day. Some mopping up was needed, but for all practical purposes the island of Attu was in American hands from May 30 on.

In contrast to the Attu campaign, the combined US-Canadian amphibious operation against Kiska proved to be easy. Undetected by American reconnaissance planes and ships, the Japanese had pulled their forces out from the tiny island on July 28, a fact that remained a secret from American intelligence for three whole weeks. When the Allied assault troops stormed ashore on August 15, the only living thing they found on the island was a dog that greeted the Americans with happily wagging tail.

The evacuation of the Japanese had been a brilliant maneuver made possible by the vagaries of the Aleutian weather. Fewer than 10,000 Japanese troops had tied up about 100,000 American and Canadian troops, a formidable naval task force, and the Eleventh Air Force with its RCAF counterpart for over a year. But the enemy had lost valuable weapons, supplies, and equipment plus a total of three cruisers, six destroyers, six submarines, and nine supply ships and all their planes in the process. And they had lost something else. They had given up their foothold on American soil and had "lost face" in so doing, which was a far greater defeat in the minds of the Japanese militarists.

In the rush of events on the other battle fronts, the war in the Aleutians was soon forgotten. With Attu and Kiska, the two tiny islands on the end of the Aleutian chain, now back in American hands, the Japanese outer perimeter was rolled back to the Kuriles. An air campaign against those islands began in July 1943 and continued until the end of the war. The threat to Alaska was gone and never returned.—END



Japanese installations are clearly visible at Attu village on the shore of Chichagof Harbor in this prestrike photo. American infantrymen landed on Attu on May 11, 1943, and after hard fighting had secured the island by May 30.

The author, Col. C. V. Glines, is Chief of Public Affairs, Alaskan Command. The author of many books, among them *Grand Old Lady* (the history of the C-47) and *The Compact History of the United States Air Force*, his byline appears regularly in *AF/SD*, most recently with the article "The Day Doolittle Hit Tokyo," in the April '67 issue. Before his present assignment, Colonel Glines was Chief of the Magazine and Book Branch in the Office of Information, Hq. USAF. His retirement is scheduled for next summer.

THE SPACE AGE IN PERSPECTIVE

- Technology •Education
- Science and Public Policy



SPACE

DIGEST

VOLUME 11, NUMBER 3 • MARCH 1968

Speaking of Space

By William Leavitt87

While war rages in Asia, the dollar is besieged around the world, and domestic strife threatens at home, NASA's Mr. Webb defends a policy of having two expensive space-station programs, one civilian, the other military. It doesn't make sense.

Yankee Enterprise for Ancient Greece

By Harold H. Brayman92

Litton, a major aerospace and systems firm, will use systems analysis for nation-building, under a contract with the Greek government. The idea is to breathe vibrant economic life into such areas as Crete and the Western Peloponnesus.

USAF's OTS: Texas Training Ground for USAF Leaders

By Col. Donald J. Ferris, USAF96

Less heralded than Air Force ROTC or the Air Force Academy, Air Training Command's Officer Training School at Lackland AFB, Tex., has proved an important source of junior officers. It's also the one route enlisted men can take to commissioned status.

Poseidon

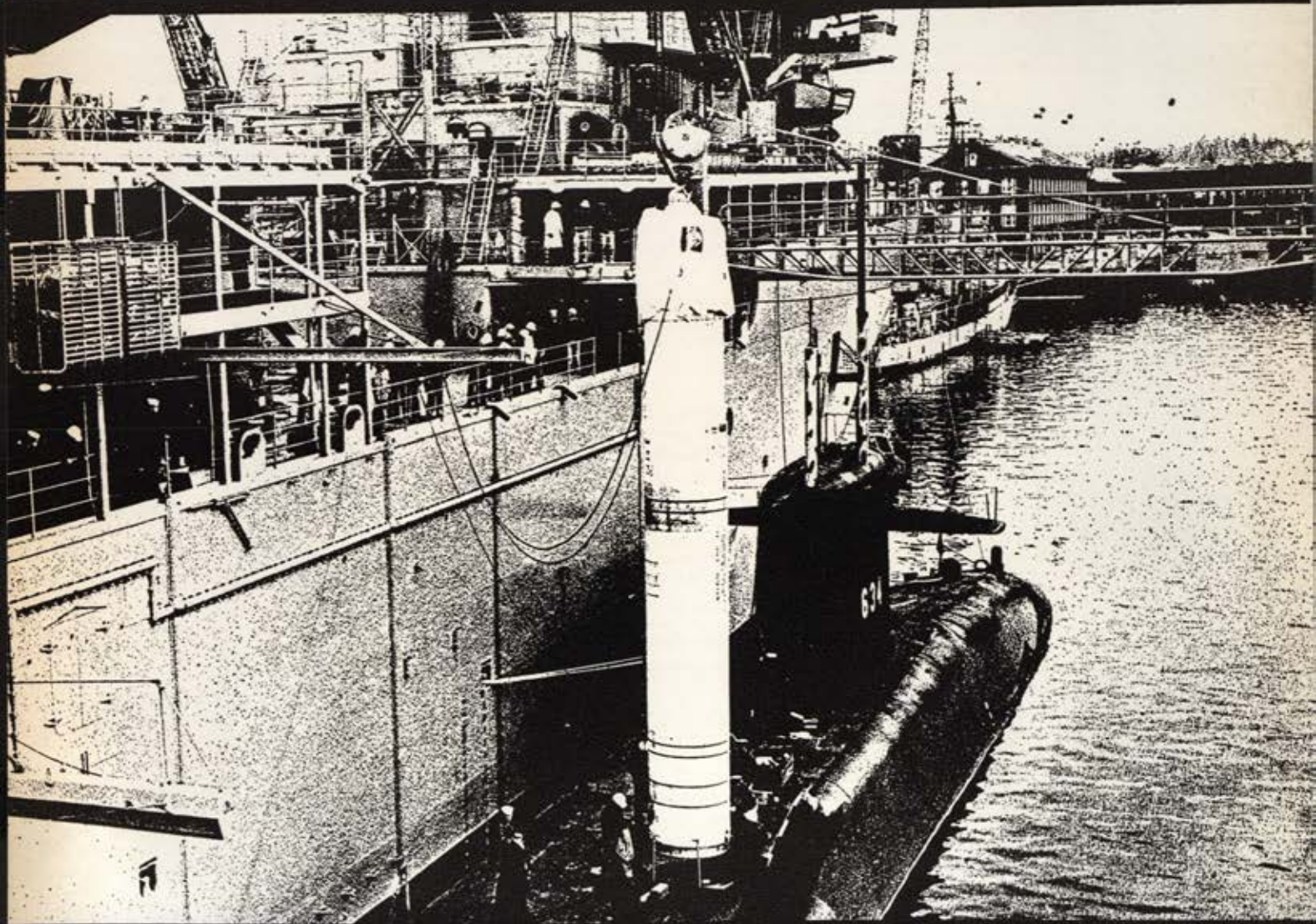
There are over 10,000 contractors, manufacturers and suppliers involved in producing a fleet ballistic missile system. There is one company, responsible only to the Navy, for integrating the fleet ballistic missile system. That company is Vitro. The job is called systems engineering support.

Vitro provides the project manager with a continuous technical audit throughout the develop-

ment, test and operation of the system. It involves cost/effectiveness studies and interface trade-offs as they affect the integration of all the systems and sub-systems. And, because Vitro will not supply production hardware on projects where it has systems engineering responsibility, it can perform this function with arm's length objectivity. Vitro Laboratories, 14000 Georgia Avenue, Silver Spring, Maryland 20910.

Vitro

**URNS SCIENCE
INTO SERVICE**



**SYSTEMS
SUPPORT**

In the face of mounting fiscal crisis occasioned by the war abroad, there seems little justification for development of both military and civilian orbiting laboratories. Yet Mr. Webb of NASA continues to argue for just such a policy. Sooner or later, he and the Administration must face up to setting wartime priorities for the space program . . .

No Time for Business as Usual in Space

BY WILLIAM LEAVITT

Senior Editor/Science and Education

THE thing about National Aeronautics and Space Administration chief James E. Webb is his irrepressibility. His agency is sorely beset. There is no doubt that the combination of Vietnam War money pressures, a run of bad luck that started with the 1967 Apollo fire disaster and ended with congressional excoriation of NASA in the Senate space committee's recently released report on the disaster, and public apathy over what used to be called the space race have sharply reduced NASA's once sizable power in an Administration that is pressed almost to the limit in its efforts to prosecute war abroad, protect the dollar around the world, and maintain order at home.

We don't believe in kicking people or agencies when they are down. But some comment seems justified after the ordeal of a Saturday afternoon spent listening to NASA's explanation of its Fiscal 1969 budget request. Not surprisingly, NASA's new budget request for the coming fiscal year, amounting to some \$4.37 billion in new obligational authority, is the smallest in the last five years. Vietnam is the reason, even though it is also true that for the most part the peak in spending for the Apollo moon-landing program has been passed. (Apollo costs rose sharply, to the tune of some \$75 million for alterations in the Apollo hardware required after the January 1967 tragedy, and up to \$410 million in terms of the cost of the stretch-out of the program caused by the disaster.)

Principal casualties in the proposed new NASA budget are the unmanned Voyager exploration of Mars and the 200,000-pound-thrust Nerva-2 nuclear rocket NASA had hoped to use for deep-space exploration. NASA is proposing substitute programs costing less. To replace the Voyager program, NASA is asking for two Mariner-type probes to Mars in 1971, to be boosted by the Air Force's Titan III rocket, and two more of the same in 1973. The latter would drop fairly crude lander probes that would analyze the Martian soil and perform other experiments. For the Nerva-2 nuclear rocket, NASA would substitute the less powerful Nerva-1 nuclear booster with a thrust of some 75,000 pounds.

In the proposed NASA Fiscal 1969 budget there are some \$400 million earmarked for the Apollo Applications project, NASA's follow-on to the Apollo moon-landing program. A healthy piece of that funding would go for development of the Saturn-1 Orbital Workshop, NASA's first manned "space station." The Saturn-1 Workshop is based on the idea of using an empty Saturn S-4-B stage of the Saturn-5 booster to house NASA astronauts in orbit for month-long missions in 1970. It would, according to NASA, be the forerunner of a more advanced Saturn-5 Orbital Workshop to be used for manned astronomical operations and other purposes. There's no question that Orbital Workshop is an ingenious idea. But in a period when programs of all sorts, many of them worthy ones, are being truncated throughout the federal government, it is valid to ask



—Wide World Photos

NASA officials testifying before Senate space committee in the wake of January 1967 Apollo fire included (left to right) then Deputy Administrator, Dr. Robert Seamans, Jr.; Administrator James E. Webb; manned space-flight chief, Dr. George Mueller; and Apollo program director, Maj. Gen. Samuel C. Phillips, USAF. Senate report has sharply criticized NASA for complacency that led to the tragedy.

whether Orbital Workshop is absolutely necessary. The question becomes even more pertinent in view of the fact that, in the large, it is duplicative of the Air Force's Manned Orbiting Laboratory (MOL) project for which some \$600 million is being asked in the same budget.

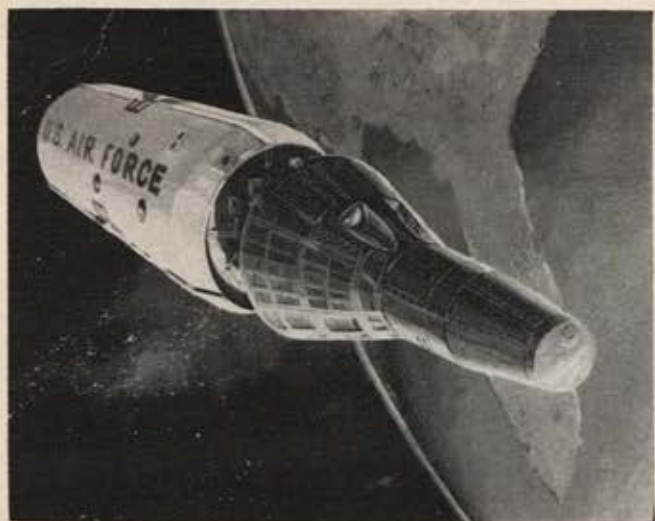
One reporter asked Mr. Webb about this at the lengthy Saturday afternoon briefing at NASA's Washington headquarters.

The dialogue went like this:

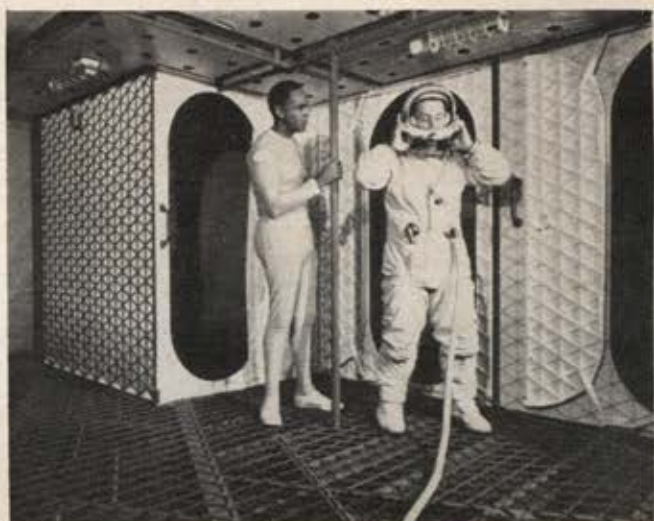
REPORTER: . . . In view of the current constraints which obviously are very strong for both the Defense Department and NASA and every other agency . . . could you speculate on what congressional reaction

might be to requests for \$400 million-odd for Apollo Applications and a similar request for MOL in the same approximate time frame [when there are] very large amounts of, to use Mr. McNamara's phrase, commonality, at least in the Orbital Workshop phase?

MR. WEBB: Well, about the only commonality is the man, plus the requirement to keep the man alive and find out more about what he can do in the case of MOL for military purposes. There is no real commonality with respect to the onward thrusting development of a capability that astronomers will want to use and the ultimate thrusting capability that the military services believe they need and want to experiment with.



Already far behind original schedule is USAF's Manned Orbiting Laboratory, which would orbit military astronauts to study potential of manned reconnaissance in the 1970s.



Critics point out that NASA's planned Saturn-I Orbital Workshop, shown here in a mockup, would provide about the same capability as AF MOL. They urge a unified program.

"I think," Mr. Webb went on, "that the Armed Services Committees and the Appropriations Committees will examine the MOL program in the light of the justification made by the military services, and I believe they will approve it without any serious question, because I think the need for [the military] services to accomplish this work is quite clear. Certainly if I were a member of those committees I would do that."

"Now with respect to the projections [of] Saturn-5 Workshop that continues to move ahead using perhaps one of the Saturn-5s that we will have remaining after the Apollo program is an eminently sensible thing to do for the development of a whole range of capability that the MOL is not in any way capable of doing. So I believe our committees and the appropriation committee will want to support that [too]."

Mr. Webb went on further: "The President's policy is to ask for very limited funding in 1968 and 1969. From my standpoint as Administrator and from the standpoint of those interested in manned spaceflight . . . we do here have a very excellent way to present for thorough debate and consideration the fact that with the Saturn-5 you can put up a Saturn-5 Workshop that has a lot of value. The amount of money being asked for is small."

We will spare the reader the final paragraph of Mr. Webb's lengthy answer because it does little more than add to the fog.

What did Mr. Webb's answer mean? We're not sure, but it is clear that:

(1) He evaded the basic question about the duplication inherent in having both the MOL and the early, Saturn-1, Orbital Workshop at large cost in the same general period.

(2) He confused the basic, primitive Orbital Workshop that would use the empty Saturn S-4-B stage with the later, larger, follow-on full-scale Saturn-5 Orbital Workshop, which is another animal and which would come on several years later—in his own words, "say in 1973."

(3) He just isn't willing to consider the possibility—although Congress may yet force him to do so—of a joint military-NASA space station development program, at least in this period of austerity.

In other words, despite tight money, an ongoing war, trouble all over the lot, it is imperative still, in Mr. Webb's view, that NASA proceed with its Orbital Workshop program while at the same time the Air Force proceeds with its MOL program, with both projects offering about the same orbital manned capability in about the same period.

Mr. Webb was asked specifically at the press briefing about the possibility of NASA working with the Defense Department on what would amount to a single manned orbital program that could meet both agencies' needs.

That dialogue went like this:

REPORTER: Mr. Webb, are you conducting any conversations with the Defense Department about combining NASA [and Defense efforts] in the MOL program?

MR. WEBB: Not in those terms, because the Manned Orbital Laboratory of the Department of Defense is a specific project operated by them to determine how effectively men can serve military purposes [in space].

Now we are in very close association with them in the plans and to some extent in the execution, and we have brought some of their people into our activities for assimilation of our experience. . . .

"Our plan is to produce a capability of a rather primitive sort, something like an Antarctic base flown on the Saturn-5, which can be used for any national purpose and without trying to identify really, specifically, and detailed, all of the missions that such a thing might accomplish."

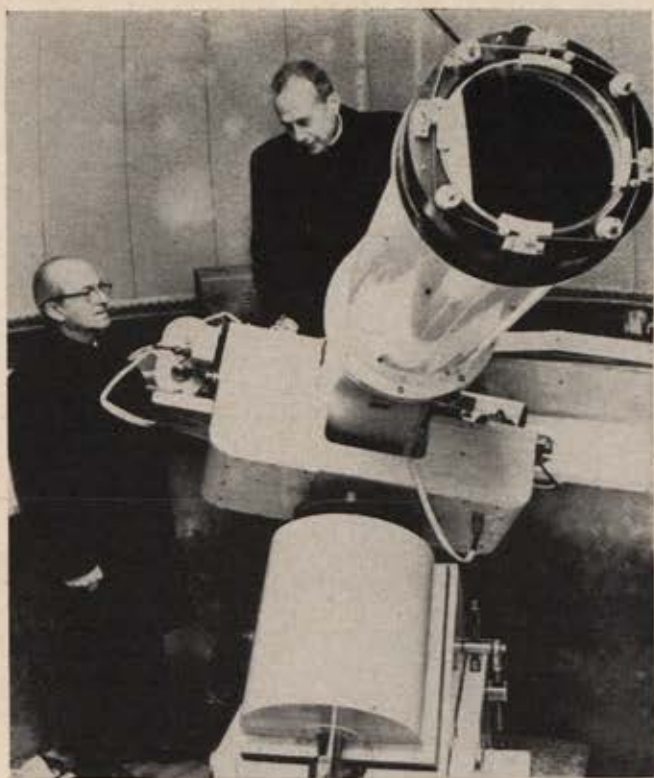
"We are in close association with the scientists as well as the military authorities to see what equipment should be carried, what should be attached to this Saturn-5 Workshop, [what] should be tethered to it, and how in fact, with the ability to live and survive in space, can they make that capability most useful. And there is no reason, if it has that usefulness, [why] you couldn't put up two of them and keep the civilian and military program separated."

It gets very confusing, listening to Mr. Webb, as to whether he is talking about the first-generation Orbital Workshop or the fancier and later Saturn-5 Workshop. But not so confusing as to muddy the fact that Mr. Webb, speaking for NASA, continues to proclaim the need—in this dreary era of multibillion-dollar expenditure for war in Asia—for two space station programs.

One commentator in Washington has gone so far as to describe this as a "crime," a hyperbolic remark perhaps, but not so very far from the mark. There is simply no reason for the current policy except inertia and the Administration's unwillingness to date to look closely at an inexcusably duplicative situation.



The new Deputy Administrator of NASA, replacing Dr. Seamans, is Dr. Thomas O. Paine, a metallurgist who had headed G.E.'s TEMPO "think-tank" at Santa Barbara, Calif.



Manila Observatory's Fr. R. A. Miller and Dr. Adolph Razdow of Razdow Labs, Newark, N. J., check automated solar telescope, to be part of USAF solar-flare network.

Certainly there are jobs at stake, and there is no doubt that cutbacks in the space program have had a serious effect on the teams that have been built up in industry to execute the over-all NASA program. But in wartime, it is simply wasteful to do the same thing twice, if the duplication can reasonably be avoided. Certainly, we need manned orbital capability for military, scientific, and commercial purposes. Nor should we forget that the war will someday be over and that we will want to reaccelerate our space program all across the board. But if we need space-station capability, there is no reason why joint military-NASA teams cannot work together to produce it with a single, multipurpose set of hardware. Military missions can be operated separately to assure priority and security, while scientific and commercial experiments ranging from astronomy to earth-resource observation can be set up on schedules that would meet the requirements of whatever agency might be involved.

Those who have advocated this kind of unity of purpose in the past have been accused of oversimplification or of overlooking the legal separations of the military and civil space programs. Yet this separation, since the very establishment of NASA, has, for the most part, been a kind of fiction. Military officers have served as astronauts, there has been considerable interchange of technical and management personnel between the military and NASA, even as Mr. Webb points out, and NASA has used military boosters adapted for its missions.

We hear a great deal about credibility gaps these days. It is no disservice to NASA or Mr. Webb to sug-

gest that the agency's insistence on carrying through a multimillion-dollar early-space-station project while at the same time the Defense Department plans to do virtually the same thing, also at huge cost, is stretching the gap to unbridgeable dimensions.

Space Capsules

Some space-age educational thinking from an educator to Congress: DR. LEON M. LESSINGER, Superintendent of the San Mateo, Calif., Union High School District and also President of the Aerospace Education Foundation, an affiliate of the Air Force Association, recently told a House education subcommittee hearing that student unrest could be allayed by giving classroom credits to young people who take on side jobs like tutoring, or working in hospitals, orphanages, and on playgrounds.

Dr. Lessinger told congressmen who were examining proposals to upgrade vocational education that student unrest is becoming "a powerful factor in education. It shows itself not only in the belief of many students that school is not relevant to their lives but also in the student demonstrations, strikes, odd ways of dressing, violations of moral codes, and other methods of protest which act out this feeling." The prime reason for the unrest, he said, is change, "change in business, in clothes, in morals, in science, in religion, and in education."

Dr. Lessinger suggested creation of a "service curriculum" that would allow students to take part in school and community life through a whole range of community assignments, which would include programs planned by the students themselves. "There is little need for pay," he said, "but school credits should be given and attention paid to appropriate awards. This service experience should be coordinated with special courses designed to train students in specific ways to be useful."

* * *

The ELECTRONIC INDUSTRIES ASSOCIATION is planning a special program in conjunction with the Defense Department's Project Transition (AIR FORCE/SPACE



AF Systems Command will launch two defense communications satellites for Britain into synchronous equatorial orbit. Philco-Ford will build the comsats, similar to type US uses.



This is the heart of a satellite, a little damper that helps keep satellite in a fixed position relative to the earth. It's the core of a Philco-Ford-built Naval Research Lab satellite.

DIGEST, January '68) effort to provide vocational counseling and training opportunities to enlisted men prior to their discharges from service. The Association's Service Technician Development Program, an operation of EIA's Consumer Product Division, will conduct a pilot training program in Chicago for Army and Navy short-timers in the field of consumer electronic product repair. STDP Director of Education and Training, RICHARD W. TINNELL, says that once the Chicago program gets under way, expansion of the training program to military bases in New Jersey, Virginia, North Carolina, Texas, California, Indiana, and Kentucky will be considered. The importance of such programs is suggested by the fact that according to the US Veterans Administration, Vietnam veterans are now finishing up military service and returning home at a rate of some 70,000 a month.

* * *

We had barely recorded for posterity our tongue-in-cheek predictions for the aerospace year 1968, including a forecast that Red China would announce development of a supersonic transport powered by the thought of Mao Tse-tung, when the New York Times Hong Kong correspondent, Tillman Durdin, filed a story headlined CHINESE PILOTS GUIDED BY THE THOUGHTS OF MAO. Quoting an article in the Shanghai newspaper, *Chiehfang Chun Pao*, Durdin reported that training for Red Chinese pilots has been cut from the several years required under Soviet-style procedures to what the Chinese paper said was less than a year, using a system

based on Chairman Mao's thoughts. Pilots were quoted in the Chinese paper as believing that Chairman Mao's thoughts surpassed compasses and radar as navigational tools. "With Mao Tse-tung's thoughts in our minds, we can tell exactly where we are heading, even in dense fog," the Communist gazette quoted Red pilots as claiming.

* * *

There may well be all sorts of pressures on spending all across the board—a direct consequence of the multi-billion dollar price of the Vietnam War—but research and development outlays during 1968 are nevertheless expected to reach a total of some \$26.5 billion, according to projections by BATTELLE MEMORIAL INSTITUTE, a leading industrial research group headquartered at Columbus, Ohio. This would amount to an increase, Battelle said, of some \$700 million, or 3.3 percent, over estimated 1967 R&D spending.

"Significantly, for the first time since reliable figures for total R&D became available, it is estimated that for calendar 1968, the increase in federal spending on research in the social sciences will be greater than the increase in physical sciences," Battelle reported.

Battelle said that the switch in emphasis is partly due to a "sharply reduced rate of growth of military, space, and atomic energy research programs, but also in large measure . . . to a national concern with education, health, urban, employment, and welfare problems."

Battelle's breakdown of the 1968 R&D spending: federal government—some \$17.2 billion; industry—some \$8.3 billion; colleges and universities—about \$865 million; other not-for-profit institutions—about \$265 million. By percentage, the college and university R&D spending increase will show the highest rise, 8.8 percent over last year, or a \$70 million increase.

"Since 1965," Battelle pointed out, "the federal share of total R&D expenditures has decreased slightly, and in 1968, it is estimated that federal funds will account for approximately sixty-five percent of the total funds available for R&D. Although industry's share has increased slightly for the past four years . . . Battelle researchers do not foresee a return to industry dominance of research funding which prevailed before the 1940s."

Battelle pointed out, however, that although the federal government is the prime source of research funds, it is industry that continues to perform more than sixty-nine percent of all the research.

Perhaps the most significant aspect of the forecast was the long-range analysis by Battelle which suggested that the rate of increase in R&D spending is retreating downward after the enormous spurt of the 1955-1965 decade.

"Viewed in terms of decades," Battelle said, "R&D expenditures for 1965 to 1975 are expected to grow at about the same rate as the Gross National Product. This would differ from the pattern found in the 1955-65 decade when R&D spending grew at an annual rate of fourteen percent, while there was an annual growth rate of 5.5 percent for the GNP."

The Battelle forecast was prepared by Battelle economists RALPH L. CRAIG and LEONARD LEDERMAN.

For information on availability of the full report, readers should write to Battelle Memorial Institute, 505 King Ave., Columbus, Ohio 43201.—END

Litton, a major aerospace and systems firm, has embarked on a pioneering "nation-building" contract, with plans to use systems analysis and other modern techniques to assist the Greek government in the development of important areas of that ancient land. Here is a special report on . . .

Yankee Enterprise for Ancient Greece

BY HAROLD H. BRAYMAN

EXPERTS at space-age Litton Industries, Inc., are tossing some unusual questions at the company computers: When during the year do brussels sprouts sell at the highest price in German groceries? Can farmers on Crete, where family incomes in certain areas average \$453 a year, afford a \$1,000 prefabricated home? Can a field of artesian wells effectively replace a projected \$80 million dam system?

Resolving such questions will help Litton in its latest for-profit venture in imagination—a contract to advise the Greek government on its economic-development program for the island of Crete and the western portion of the Peloponnesus. Litton men now are scouring these areas for likely projects to suggest to the Greek government, which plans to spend \$300 million there over the next twelve years on roads and other capital projects.

Then Litton will raise about \$500 million on world money markets for investing in these regions. That's a lot of cash for Greece; total foreign investment in Greece in the twelve years that ended in 1965 was \$576.8 million, according to Greek government figures.

President Johnson's [recent] decision to impose tight controls on corporate investment abroad won't hamper the Greek project, Litton officials believe. First Litton had planned to raise most of the \$500 million in Europe, not the United States. Then Greece, considered in Washington as economically underdeveloped, escapes the harsher rules drawn up for the rest of Europe. Too, sympathetic Washington officials have given "informal assurances" they won't impair the Greek program, says Robert M. Allan, Jr., president of Litton International Development Corp., the subsidiary managing the Greek project.

Nor has the recent political turmoil in Greece ham-

Litton International Development Corp.'s President Robert M. Allan, Jr. (left), talks project over with Dr. Costas Thanos, center, now Deputy Governor, Bank of Greece, and the Litton-Greece Managing Director, Gordon O. Pehrson, a systems specialist.





Water is a vital ingredient of national development. This is an aerial view of one of the dams that is expected to provide a reservoir for needed irrigation and for urban use in the western Peloponnesus under development plan.



For thousands of vacationers, stretches of beach like this, scarcely used, could be an exciting attraction. Unused beaches in the western Peloponnesus face the beautiful blue Adriatic and stretch for mile after underdeveloped mile.

pered the project, though it negated any value from Mr. Allan's gracious loss in a sailboat race last year to King Constantine, now in exile. "We're trying not to be political," Mr. Allan explains. "The feasibility study [of the project's potential] was begun four governments ago and finished three governments ago. Two other govern-

ments discussed a contract, and the current government signed it. Everyone has been affirmative."

The project reaches far deeper than the living standards of some Cretan peasants. Litton, the first major American industrial corporation to enter the nation-building business, is testing new approaches toward social and economic problems, using computers to package the problems and solutions. Executives at the company's colonial-style headquarters here talk of adapting these approaches in tackling domestic American problems, such as the deterioration of some cities.

Greece as a Test

So Greece is a test. Charles B. Thornton, Litton's chairman, admitted it last summer when he [briefed] reporters in Europe [on the project].

Already, Litton is scouting for other national customers. The company has run a feasibility study for developing the Alentejo region in southeast Portugal; five Litton officials are negotiating contract terms with Portuguese officials. Litton has discussed similar projects with fourteen other nations. "We must work with nations that have an educated base, like Nicaragua, Ireland, or Indonesia. We're not interested in Africa. I don't see any purpose in applying a complicated regional approach to a \$100,000 project in Africa."

Litton normally moves fast; since the company's incorporation in 1953, it has built sales to an annual \$1.6 billion, half in products not on the market three years ago. Not so in Greece, where not a single foundation has been poured on a Litton-sponsored hotel or plant.

"The Greeks want us to do something immediately, but if anything will kill the project, it will be haste," Mr. Allan argues. "They expect miracles. I received a letter from a man living in an area of Greece where we are not involved. He asked us to move a telephone pole that's in the middle of a street where St. Paul walked. We symbolize change to them."

One delaying factor is the lack of precedent to guide Litton. Other private companies have worked for profit to advise underdeveloped nations. David Lilienthal, former chairman of the Tennessee Valley Authority, heads a small company with contracts in Iran, Colombia, and other nations. But such companies usually are planners, leaving the financing to others.

Litton, with its worldwide operations and financial contacts, will also raise the money. "No one has ever attempted a job of our type before," Mr. Allan adds. "We're going to be a combination investment banker, engineer, troubleshooter, chamber of commerce, and tourist agency. I don't see how we can fail."

The taproot of this business-government cooperation reaches into discussions in recent years among Litton's top men over the question of how the gap between the rich and poor nations affects Litton. "We see the entire world caught up in a rapidly accelerating revolution. The question is what opportunities exist for Litton in participating in this revolution," explains John H. Rubel, a senior vice president [and former Pentagon official].

Two years ago, Mr. Rubel held talks with Greek officials over that country's need "to get cracking on

A principal problem for Crete is water. The search for fresh water never ends. Means have to be found, too, to keep water from being salinated by the nearby Mediterranean.



These beautiful beaches of Crete, near Hagios Nikólaos (St. Nicholas), come down to the sea's bluest water and are a tourist's dream, if only he could find accommodations. At present, there are only about 300 tourist beds available.

its internal development" if it was to join the Common Market in 1984, as planned. After the Greek military took control of the nation early [in 1967], an agreement was completed. The military government "provided the atmosphere in which things can get done," Mr. Allan says. "And they knew what they didn't want. They didn't want more studies out of context, such as a study on how to market one product or where to build one hotel."

'One of the Good Guys'

If the project works, Greece gains a lot. So will Litton. The project makes Litton "one of the good guys of the world," Mr. Allan believes. Resulting publicity of the Litton name helped sell some Litton voting machines in western Europe, he says, and should eventually help sales in Greece and elsewhere of such products as Litton's line of Royal typewriters.

Litton, too, figures to turn a direct profit. The Greek government reimburses Litton for the salaries and expenses of Litton employees on the project, \$1 million [in 1967], then pays Litton an eleven percent fee. Litton also receives a finder's fee of about two percent on all investment money it attracts to Greece.

And problems are basic. One problem, which seems incomprehensible to Americans, is the lack of mortgage lending funds. "There's almost no way to buy a house in Greece because there's practically no way to finance it," Mr. Allan explains. So Litton is discussing possible home-construction plans with World Homes, Inc., an international developer based in Wichita, Kan.

"We've submitted to Litton a plan calling for construction in a city in the Peloponnesus of 300 town-houses to cost \$7,000 each," says James Van Pelt, World Homes president. The units would be financed originally by a stock issue in Europe and the United States, then mortgaged to Greeks at a cost of about \$75 a month for fifteen years, comparable to the cost of renting an apartment there, Mr. Van Pelt says. World Homes also proposes a plan to sell \$1,000 prefabricated four-room homes that a farmer could put together himself, using some local masonry.

A Need for Training

Some programs will involve training. Mr. Allan recalls a problem: "I wanted to catch a boat one afternoon from Crete to Athens. I asked the ticket agent for a schedule. He didn't have one. He told me the boat left sometime in the early evening, and if I went to the wharf and waited, I'd catch it eventually. He had no understanding of how to merchandise. We'll have to get someone to train him."

The major emphasis by the seventy-three Litton employees now working in Greece centers on sixteen tourist, agricultural, and industrial construction projects. "Our primary thrust is to develop tourism. Second, to evolve an approach to agriculture, and third, to assist in attracting private enterprise," Mr. Allan explains. His voice suddenly builds in enthusiasm. "Look at Olympia, where they held the original Olympic games. It could become a major tourist area."



Crete is Greece's largest island, 160 miles long and up to thirty-five miles wide, offering every view in the tourist book. But only about a third of the 60,000 tourists who visit the land each year spend more than six hours ashore on Crete.



Today visitors who do come to Crete can feel proprietary about the miles of beach so few people get to use. But planners are hopeful that, in the future, hotels, marinas, and the like will make Crete's pleasures available to the many.

"Olympia would be excellent for meetings and conventions, and there's a fine beach nearby. There are just a couple of small hotels there now, plus a 600-room hotel on the beach scheduled to open next June. But it takes a day by car to drive to Olympia from Athens, and the only air service lands you eighty or 100 miles away. So to fill any new hotels, we've got to provide better transportation." The only advance so far is the declaration of the area around Olympia as a federal park.

"Strong potential exists for hotels at several spots on Crete," Mr. Allan continues, rising from his antique-style desk to pace around his small office here. He ticks off the glories of Crete, its uncrowded beaches and the lure of the majestic remnants of the Minoan culture that flourished there for 2,000 years. The 160-mile-long island now has one deluxe resort hotel.

An initial project likely will be a resort hotel at Canea, the capital of Crete and location of the island's jet airport. "Investors are interested," Mr. Allan adds.

One prospect might be Litton's new Stouffer Foods subsidiary, which operates seven hotels in the United States and plans to expand abroad. But Litton says it now has no plans for Stouffer hotels in Greece.

Computerized Planning

In its efforts to mesh American know-how with Greek potential, Litton employs a computerized "systems approach" to reshape the Greek economy. This technique, most often associated with Defense Department plans for new weapon systems, seeks first to identify the general need, then isolate the components necessary to fill that need. Not only must the cost of a hotel be run through computers, but the quality and price of transportation access, health facilities, food and water supplies, labor, and other items must be evaluated to determine a hotel's feasibility.

Blipping through Litton computers have been other questions. How best to take advantage of Crete's year-round growing season? What vegetables should be harvested at what time of the year to bring the highest possible profit in northern European groceries? This expands into studies on what combination of vehicles would be used most economically to move fresh produce to the groceries.

Improved agriculture will then bolster demand for fertilizer, farm tools, and crop-handling services, demands that should produce jobs. The only industries now located in Crete and the western Peloponnesus make furniture and paper and press grapes into wine.

A prime concern is the Mesara plain, an east-west area in central Crete where the principal crops now are olives and grapes, and the average annual family income is \$453. Litton has run through its computers information on a variety of potential crops that might do well in Crete. "We've become the world experts on the price of brussels sprouts in Germany. We've examined the costs of building a landing strip on Crete for hauling brussels sprouts, the cost of air transportation, and the size of farms needed for efficient operations. Most farms now are no bigger than this room." Mr. Allan sweeps his arm around his office. "Maybe it won't be brussels sprouts. Maybe it'll be fresh flowers or artichokes."

Wells, Not Dams

Change will require water. Before Litton's arrival, the Greek government planned to build seven dams to hold irrigation water for Mesara farmers. Litton studies indicate the water needs of the plain probably can be met by drilling a system of artesian wells. "And they don't need the fancy concrete ditches that the French are trying to sell them for irrigation," Mr. Allan adds. "Simple mud ditches with wooden gates should prove as effective." Together, these alterations might save ninety percent of the estimated \$80 million cost of a dam system, money to divert into an improved road network on the island.

There are more problems confronting Greece and Litton than just the efficient operation of a particular industry, or farming area. The partners are tampering with the fabric of the existing society, and they know it. "If we're to increase the size and efficiency of farms, some of the people will have to move off the land into villages." Mr. Allan pauses a moment. "Will moving them and giving them new jobs make them happier? We don't know."

That's one question Litton can't program into its computers.—END



The above article appears in AIR FORCE/SPACE DIGEST with special permission from the National Observer, where it was originally published on January 8, 1968. It appears here in slightly condensed form. The author, Harold H. Brayman, is a staff writer for the National Observer. AIR FORCE/SPACE DIGEST wishes to express its appreciation to Litton for the photographs the company kindly supplied to illustrate the article on these pages.

USAF's Officer Training School

Less heralded than Air Force ROTC or the Air Force Academy, Air Training Command's Officer Training School at Lackland AFB, Tex., since its establishment has proved to be an important source of Air Force junior officers and the one route by which enlisted men can reach commissioned status . . .

Texas Training Ground for USAF Leaders

BY COL. DONALD J. FERRIS, USAF

Commander, USAF Officer Training School

IN A WORLD of hot war, cold war, and limited war, the Air Force is continuously faced with a need for quality officer procurement that can be increased or decreased as requirements change. Although excellent officers are produced by the Air Force Reserve Officer Training Corps on the nation's campuses and at the four-year Air Force Academy, there is a strong need, too, for an additional and even more flexible and short-lead-time officer-development program. This is the reason for being of USAF's Officer Training School (OTS) at Lackland AFB, Tex.

OTS was conceived in 1957—based on the conviction of top Air Force commanders that it would be pos-

sible to secure enough qualified college graduates to help fill the commissioned-officer requirements through such a school. The old Officer Candidate School (OCS) was to be replaced. However, the opportunity for enlisted personnel with proven leadership ability to receive a commission remained through the Airman Education and Commissioning Program (AECPP).

The AECPP program provided for up to two years of college education paid for by the Air Force for qualified enlisted personnel who, after receiving their degrees, would go through OTS and be commissioned. The old OCS was almost exclusively NCO-oriented (an applicant had to have at least one year of active military service, and most had four to six years). The new OTS program was geared to the *civilian graduate* with little or no prior military service, except for the AECPP and those active-duty airmen with college degrees. OCS was finally closed in 1963, and OTS became the only commissioning source available for active-duty enlisted personnel.

The idea of OTS is to recruit college graduates who have not received ROTC training but who do possess needed technical skills. These selected individuals receive intensive three-month training, which emphasizes the professional military knowledge and abilities required of all commissioned officers. The graduates then enter into a predetermined training course leading either to flying assignments or to technical support specialties. Those graduates who do not need specialized training are assigned to duty with active Air Force units.

OTS is also the only source of Women in the Air Force (WAF) officers. And it is the only commissioning

Present Commander of the USAF Officer Training School at Lackland AFB, Tex., is Col. Donald J. Ferris, a veteran command pilot with 5,000 hours of time in high-performance aircraft and extensive combat experience in World War II, and during the Korean conflict.





The scene at graduation time at USAF Officer Training School is not unlike what happens when the bars are handed out at the Air Force Academy or West Point or Annapolis. The hats fly into the air, there's a general loud cheer, and the members of the class are glad they made it all the way.

source for the Air National Guard and Inactive Reserve Forces. Also, until 1967 all newly appointed Judge Advocates and Chaplains were sent to OTS for a short course in officer fundamentals before going to their initial active-duty assignments.

Student Profile

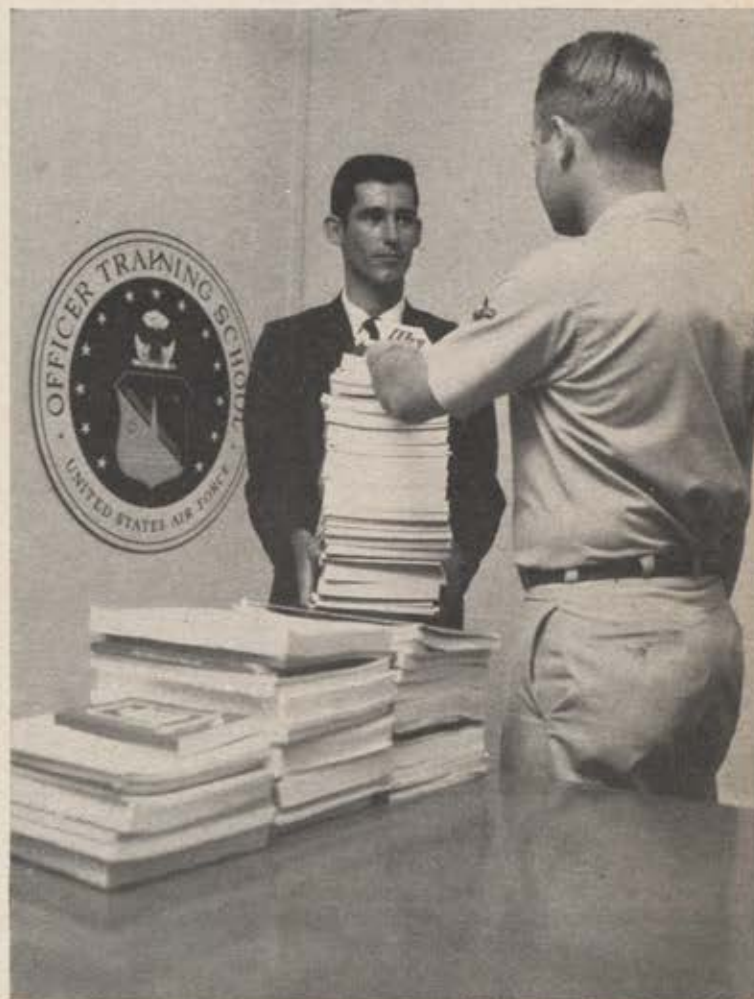
Who is eligible for OTS? An applicant must be at least twenty-one years of age at time of commissioning and not more than thirty-four if as an enlisted man he earned a college degree under the Bootstrap program. If he comes directly from civilian life he must not have reached his thirtieth birthday. The age limit for flying training is twenty-seven. In addition to being a US citizen and a graduate of an accredited college, each trainee must pass a tough physical examination. His character record must be unimpeachable and withstand a thorough security check. He must also score well on tests of officer qualities, verbal ability, mechanical ability, and the like.

The average age of the OTS trainee is twenty-three. A number of students have their master's degree and some have started work on their doctorates. About one

of every five is married prior to coming to OTS, and many are married immediately after commissioning. Approximately eighty percent of the students have had no prior military service.

AECP students make up about eleven percent of the student body, and some seven and a half percent are prior military personnel with degrees achieved either through Bootstrap or completed prior to enlisting in the Air Force. WAF make up about one percent of the student body, and Air National Guard and Inactive Reservists make up half of one percent. Students come from all fifty states. Among OTS students are a number of escapees from behind the Iron Curtain who have become US citizens.

A number of the more than 30,000 graduates of OTS have been newsmakers prior to attending OTS. Such a list would include All-American soccer player Donald Bergh of Trinity College, Hartford, Conn., a member of Class 61-H; David Kirkwood, member of the US Modern Pentathlon Team, Class 63-E; All-American basketball player, 1963-1964, and Rhodes Scholar, Bill Bradley of Princeton University, Class 68-B; and Miss



The training day at OTS is no breeze. It lasts a full sixteen and a half hours and keeps the students burning the midnight oil over the many texts and academic assignments they have to crowd into their schedules. Minds are kept busy coping with a broad range of Air Force instruction.

Nancy Caum, information officer for the United Nations Relief and Works Agency stationed in Beirut, Lebanon, for five years prior to entry in Class 61-F.

Notable is a Korean war orphan, James Choi Sparkman, Class 64-D, who gained national fame by his educational achievements in the United States when, with no formal education until he entered the tenth grade at Grossmont High School, San Francisco, Calif., he became a straight "A" student, was elected high school class president, and won a four-year scholarship to Harvard and a graduate fellowship to Columbia University.

Others include Jay H. Johnson, native of Amarillo, Tex., a nationally ranked trampoline performer who turned down a bid to the 1960 Olympic trials to enter Class 60-H; Micki King, Olympic diving champion, Class 67-D; and Orion B. Whatley, Jr., sports car racer, selected in 1955 as the "Most Promising Driver" in sports car competition, Class 61-A.

Many OTS students have had their bars pinned on by their own fathers. Perhaps the most unusual case was that of Stanley R. Moody, Class 63-G. A native of Uniontown, Pa., and a graduate of West Virginia University, Lieutenant Moody received his first pair of bars from his father, Army MSgt. James R. Moody. The same bars had originally been pinned on Sergeant Moody by Gen. George Patton in a battlefield commission during World War II.

The faculty of Officer Training School is carefully chosen. Each instructor holds at least a baccalaureate degree. Most members either have or are working on their master's degrees and a few are working toward doctorates. A number are rated as Master Instructors in accordance with Air Training Command requirements. OTS desires that each faculty member be in the grade of captain, have at least six years of active commissioned service, and be at least twenty-seven years of age. It is also highly desirable that he have teaching experience and have completed Squadron Officer School. But instructor-candidates with no prior teaching experience

but with high potential may be accepted. Completion of an Academic Instructor Course is required and is either accomplished while on TDY, en route to OTS, or shortly after arrival. A number of instructors are themselves OTS graduates, and their experiences help create rapport with the students.

Curriculum

Every officer is required to have a broad knowledge of the United States Air Force. Such knowledge includes Air Force origins and development, mission or purpose, doctrine, organization, and customs. We call such knowledge fundamental because all officers, regardless of their particular job or specialty, must have this knowledge. To ensure that trainees have the knowledge and skills necessary to be a Junior Officer, the OTS curriculum is divided into nine instruction blocks.

The blocks are interwoven and interdependent with continuity throughout. Each block of instruction builds on and uses the knowledge gained in preceding blocks. These nine blocks are grouped in three general areas:

- **Officer Development**, covering communicative skills, Air Force officer, and Air Force leadership;
- **Informational Studies**, covering career orientation and military justice; and
- **Physical Skills**, covering drill and ceremonies, physical training, marksmanship, and field training.

WAF OTS trainees attend all classes with the male trainees except for physical training and field training. Marksmanship training for WAF is optional. In addition, the WAF have a special course pertaining to personal development of poise, grooming, decorum, and etiquette.

Instructional Methods

Instructional methods at the Officer Training School emphasize student-centered learning. For this reason

The "guided discussion"—designed to encourage students to approach problems logically and with attention to the views of others—is a basic technique of instruction at the school. The Flight Training Officer leads the discussions and counsels the students. WAF trainees attend classes along with the men. Discussion groups are usually made up of from twelve to eighteen OTS trainees.



most learning at the school takes place in small groups. The trainee is actively involved in discussion and problem solving. A variety of instructional methods are used in order to increase the amount of learning and retention by the student.

They include:

- **Guided Discussion**—The guided discussion is the basic teaching and learning technique used in the Officer Training School. The guided discussion emphasizes student-centered learning. Discussion groups are composed of twelve to eighteen trainees and the Flight Training Officer, who is a commissioned officer on the staff of the school. The Flight Training Officer guides and advises the trainees through twelve weeks of training. He is the heart of the school. He introduces the trainees to the Air Force and usually leaves a lasting impression on them.

- **Performance Instruction**—The OTS curriculum requires officer trainees to learn specific mental and physical skills. Each trainee is given ample opportunity to perform all skills after they have been explained and demonstrated. OTS performance skills include Air Force letter writing, public speaking, flight and squadron drill, problem solving, and marksmanship with the .38-caliber pistol.

- **Lecture**—Officer trainees attend mass lectures in each academic block of instruction. All lecturers are specialists within their subject-matter area and use a wide variety of training aids, including slides, movies, and tapes. Typical subjects introduced by lectures are Logical Thinking, The Communist Challenge, Court-Martial Procedures, Role and Function of the Strategic Air Command, Pay and Allowances, Principles of Leadership, Listening Techniques, and Customs and Courtesies.

- **Student-Directed Instruction**—Many of the duties involved in trainee orientation are handled within the trainee organization. The OTS student organization is comparable to a typical Air Force wing. The wing has three groups, with three squadrons per group. All positions of rank from the wing commander (OT colonel) to the assistant flight captain (OT first lieutenant) are filled by upperclassmen who have demonstrated above-average leadership abilities. The responsibilities of each position are similar to the responsibilities of the regular Air Force wing. Trainees in the upper class also instruct the lowerclassmen in housekeeping tasks in and around the quarters area. The first hours of drill instruction are conducted by Trainee Flight Captains.

Training

The typical training day begins with first call at 5:30 a.m. Personal grooming and room cleanup are usually accomplished by 6:00 a.m. After breakfast, students perform community details until 7:30.

From 7:30 a.m. to 4:30 p.m. students attend classes with a one-hour dinner break. After supper the trainees either perform additional work details or attend student activity meetings. The time from 7:30 p.m. to 9:30 p.m. is known as "quiet hours" and is reserved for studying. From 9:30 to 10:30 students prepare for bed and the next day's activities.

It is a strenuous sixteen-and-a-half-hour day with



OTS at Lackland is the only source of WAF officers for the Air Force. The WAF trainees take part in all parades and reviews along with the men. They are housed separately, and their physical training program is specifically designed for them and administered separately from male regimen.

numerous inspections. Students march in flight formation to all activities. They are continuously evaluated from the day they report to the school until they are commissioned. While some of these evaluations are similar to those which they have experienced in civilian schools, Officer Training School evaluations emphasize "total behavior" rather than just academic performance.

The program is not easy—it has to be tough. In just twelve short weeks, sixty training days, OTS must do what the previous twenty-odd years may not have done. Here trainees must develop their potential as leaders. The Air Force officer is subjected to numerous demands on his time, his energy, and his leadership abilities. In order to meet these demands, officers must be trained in many areas. Our goal is to develop and commission dedicated and mature individuals.

Awards

The OTS grading system identifies outstanding trainees. The final officer training grade is a weighted average of all final subject grades. Honors are awarded to the trainees who graduate in first and second place in their classes. In addition, the upper twenty percent of each class are designated Distinguished Graduates and are automatically considered for a commission in the Regular Air Force. Upon graduation the individual's permanent military records will also indicate that he was a Distinguished Graduate of OTS.

Distinguished Graduates of OTS have fared well in competition with ROTC Distinguished Graduates for Regular appointments. Records compiled by Air Training Command show that 93.1 percent of OTS Distinguished Graduates have been selected for Regular appointments in comparison to 90.5 percent of ROTC Distinguished Graduates. In addition, 85.5 percent of OTS Distinguished Graduates selected have accepted Regular appointments as compared to 66.7 percent of ROTC Distinguished Graduates.

The Honor System is a way of life at OTS.

"I will not lie, cheat, or steal, nor will I tolerate among us those who do." This is a simple statement of the Honor Code all officer trainees observe. Since the beginning OTS has had a strong and active Honor System administered by the students. Each squadron has a representative on the Honor Council. An individual accused of an Honor Code violation must be determined guilty by a unanimous vote of the Council.

Those found guilty of violating the Code are usually eliminated from training. Every officer trainee learns the value of honor and the significance that his word is accepted without question. In addition, the Honor Code impresses each student with the value of the unwritten code by which officers of the Air Force conduct themselves.

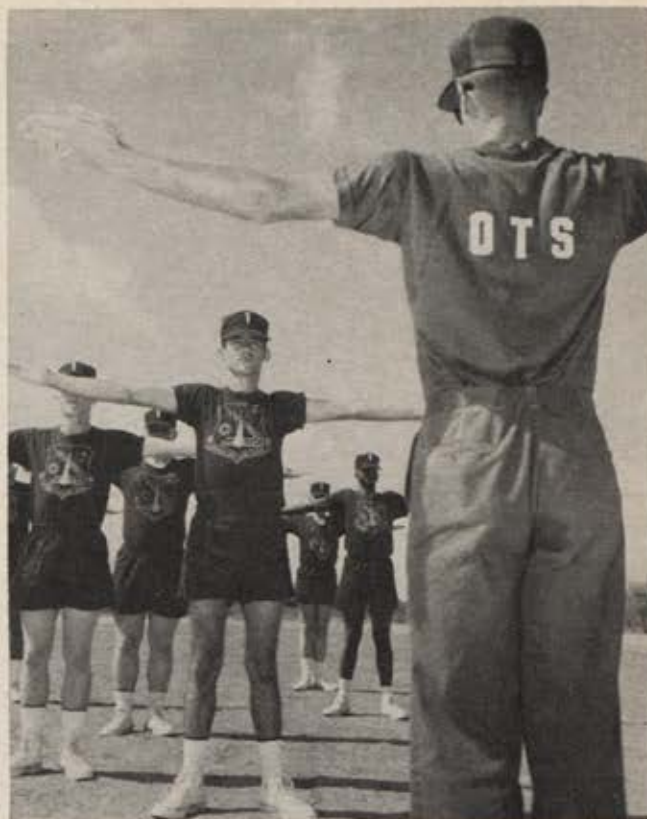
Production

OTS was originally planned to produce 600 new officers each fiscal year. The first year of operation saw 323 graduates. In 1961 OTS graduated 611; in 1962 this figure jumped to 2,267. In 1963 a total of 5,372 second lieutenants graduated, making OTS the largest single source of new officers for the first time in our history. Although the number of graduates dropped to 4,763 in 1964, OTS still produced more officers than the Academy and ROTC combined. The years 1965 and 1966 produced 3,309 and 2,735, respectively, as the need for officers decreased.

In 1967 the OTS production hit an all-time high of 7,894 newly commissioned officers, again making OTS the largest single source. These figures compare with the 450-500 of the Air Force Academy and the 4,500-5,000 of ROTC produced annually. The projected figures for Fiscal Year 1968 are 6,886 graduates, but this figure could be raised again due to the increased needs of the Air Force.

The percentage of eliminees has been a fairly constant twelve percent over the years. Approximately three and a half percent are self-initiated eliminations by trainees who for various reasons do not desire to continue their training. Physical and emotional eliminations account for two and a half percent, and the bulk of eliminations, some six percent, are not recommended for commissioning because of military deficiencies.

Officer Training School graduates are assigned to every level of every command in the Air Force, from the Pentagon down to the most remote sites. A statistical study of the effectiveness of OTS graduates indicates the OTS graduate is equally as effective as his ROTC counterpart. Since its beginning OTS has graduated 30,220 students, and 608 WAF have been sent to the active forces after receiving their training at OTS.



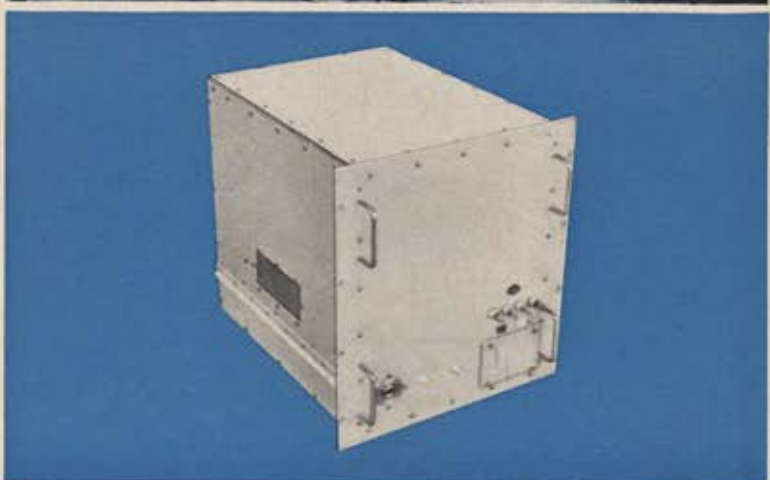
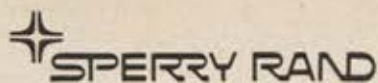
Academics are, of course, vital to the training program at OTS, but students are given plenty of opportunity to limber up flabby muscles, as can be seen from this shot of OTS trainees working up a sweat in the hot Texas sun during phys-ed period. Many a pound is lost during the OTS grind.

In addition to being able to get there "fustest with the mostest," OTS is also the least expensive in providing USAF with a newly commissioned second lieutenant. Moving into 1967, figures published by Air Training Command show the average cost of an OTS graduate to be approximately \$2,453. This compares with the average ROTC cost of \$5,744 and the Air Force Academy cost of \$49,494, which, of course, covers a four-year college education at the Academy.

Short of a full-scale, nationwide mobilization which could conceivably alter the present Air Staff policy of a college-trained Officer Corps, OTS will continue to be a prime, if not the major, source of commissioned officers and the only avenue open to qualified women and enlisted personnel desiring added responsibility. Like a modern-day Minuteman organization—flexible, tough, demanding, yet certain of its need—OTS stands ready to help supply the Air Force with leaders for tomorrow.—END



Colonel Ferris, a command pilot with 5,000 hours of flying time in high-performance aircraft and air combat experience in Europe during World War II and in Korea, is Commander of the USAF Officer Training School at Lackland AFB, Tex. His Air Force service dates back to 1943 when he joined the Army Air Forces as an aviation cadet.



The Navy's AN/USM-247 Versatile Avionic Shop Tester (VAST) system will be able to test and troubleshoot 85% of existing and projected carrier-based avionic systems. It will replace dozens of the specialized testers now required for individual systems. PRD Electronics, Inc., subsidiary of Harris Intertype Corp. — VAST contractor — selected Sperry to provide programmable signal generators for the system.

Sperry's answer was a third-generation series of digitally programmed generators covering a frequency range of 2 to 18 GHz. The Sperry units occupy less than five cubic feet (21" high in 19" rack) and weigh only 140 pounds — a size/weight improvement of about two-thirds over competitively available equipment. They may be programmed either manually or by computer, and they feature a command/execute time of only 15 milliseconds. Commonality of circuitry and components eliminates the need for field alignment in the RF section as equipment under test is changed, and provides for future expansion of the frequency range in either direction.

Sperry equipment for the operational prototype has already been shipped — ahead of schedule.

Since its future includes deployment to aircraft carriers, maintenance shops ashore and other fleet units, VAST opens a new era in electronics testing and trouble-shooting. If you need similar standardization, miniaturization and simplification of test equipment, get more details. Contact your Cain & Co. representative or write Sperry Microwave Electronics Division, P. O. Box 4648, Clearwater, Florida 33518.

SPERRY

MICROWAVE ELECTRONICS DIVISION
CLEARWATER, FLORIDA

**Automatic fault finding is a specialty at Sperry.
(Example: programmable signal generators for VAST—
the Navy's most versatile checkout system.)**

MAC's aeromedical transport fleet will soon get a badly needed shot of jet power when the first McDonnell Douglas C-9A enters the inventory. The result of a combination of USAF and industry engineering skills, the C-9A is a DC-9-30 commercial transport airframe with a custom-built interior which can accomplish domestic aeromedical airlift in half the time of the present propeller-driven fleet, and is suitable for international transport as well . . .

Aeromedical Airlift Joins the Jet Age

By Irving Stone

WEST COAST EDITOR, AIR FORCE/SPACE DIGEST

THE Air Force's aeromedical airlift will be upgraded sharply this fall when the first of a new fleet of specially fitted transports goes into service to provide a new level of integrated efficiency, comfort, and speed.

The new aeromedical transport is the Air Force's twin-jet C-9A, which uses the basic airframe of the McDonnell Douglas DC-9-30 commercial transport. The cabin interior between front and aft bulkheads has been designed from scratch to meet, for the first time, current demands for exacting in-transit requirements of medical services for wounded and sick returning from overseas, military domestic patients, and disaster casualties. The C-9A will be operated by the 375th Aeromedical Wing of the Military Airlift Command in domestic service.

Aeromedical highlights in the C-9A include:

- Integral inclined ramp and stairways.
- Isolated special-care compartment.
- Germ-killing ultraviolet-filter exhaust system.
- Special stanchions with built-in services, and support cantilevers adjustable in small increments for litter spacing.
- Access to litters from all sides.
- Seats with flat-folding backs to serve as leg rests.

The C-9A, its interior, and associated fuselage equipment is being assembled by McDonnell Douglas Corporation's Douglas Aircraft Co., under project management of AFSC's Aeronautical Systems Division, Wright-Patterson AFB, Ohio.

Eight of the C-9As have been ordered by USAF under a



A modification of the McDonnell Douglas Corp.'s DC-9 jetliner, the C-9A aeromedical airlift transport will be able to fulfill the domestic airlift needs of the military services in about half the time of the present prop-driven Military Airlift Command fleet.



Wing and fuselage of first C-9A aeromedical transport are joined at McDonnell Douglas plant in Long Beach, Calif. The twin jet will carry up to forty litter or ambulatory patients, or both, more than 2,000 miles at some 500 mph.

\$28 million contract. The first aircraft is in final assembly. The first flight is scheduled for July, with delivery scheduled for August, to be followed by a one-per-month production rate thereafter. The contract includes options for additional C-9As, and there is a possibility that the aircraft eventually may be deployed with USAF in Europe and in the Pacific area.

Brig. Gen. Harold F. Funsch, Command Surgeon, MAC, is enthusiastic about the dividends the jet-powered C-9A will provide by upgrading sharply the capability of the aeromedical fleet, which now consists of twenty propeller-driven, obsolescent aircraft adapted for medical service—fourteen Convair C-131s and six Douglas C-118s, with airspeeds of less than 300 mph. These aircraft require an estimated nine and a half hours to complete a 1,300-mile mission, with five stops en route. McDonnell Douglas studies indicate that the C-9A will perform the same mission in less than half the time.

General Funsch underscores the self-sufficiency of the C-9A and its capability to handle more critically ill patients. And, as one example, he refers to the controlled humidity in the aircraft as an important service for special patients.

General Funsch points out that people wonder why, after patients are transported in approximately ten hours from Japan to Travis AFB, Calif., via the four-jet Lockheed C-141 adapted for aeromedical service, it sometimes requires as much as three days to get them to their destinations in the US.

The ramifications of the introduction of the C-9A are apparent when the extent of the domestic aeromedical system is considered. It includes, for the continental US, six major feeder areas and ten main interconnecting trunks. Involved are more than 500 airfields and 600 medical facilities.

It's estimated that twelve C-9As could perform the current role of the domestic propeller-driven fleet. Cruise speed of the C-9A—more than 500 mph at 30,000 feet—should do much to simplify patient routing. With a full load of forty litter or ambulatory patients, range would exceed 2,000 nautical miles. Normal utilization of the C-9A in service is expected to be slightly less than five hours per day.

Gross takeoff weight for the C-9A is 108,000 pounds. Wingspan is 93.4 feet, over-all length 119.3 feet. The Pratt & Whitney JT8D-9 powerplants are rated at 14,500 pounds static sea-level thrust. Cabin length between fore and aft bulkheads is seventy-two feet, cabin height is eighty-one inches, floor width is 114 inches.

Configuration for all-ambulatory patients will accommodate forty, seated four abreast at forty-inch pitch. The cabin also may be fitted to carry thirty patients on three-high litter tiers, and this can be increased to forty patients with four-high tiers. A tier of four litters replaces the equivalent of four seats. Mixed arrangements will accommodate various combinations of ambulatory and litter patients. A typical mix would be for twenty ambulatory and eighteen litter patients. Seat backs can be pushed forward to near-horizontal for a patient to support a leg cast.

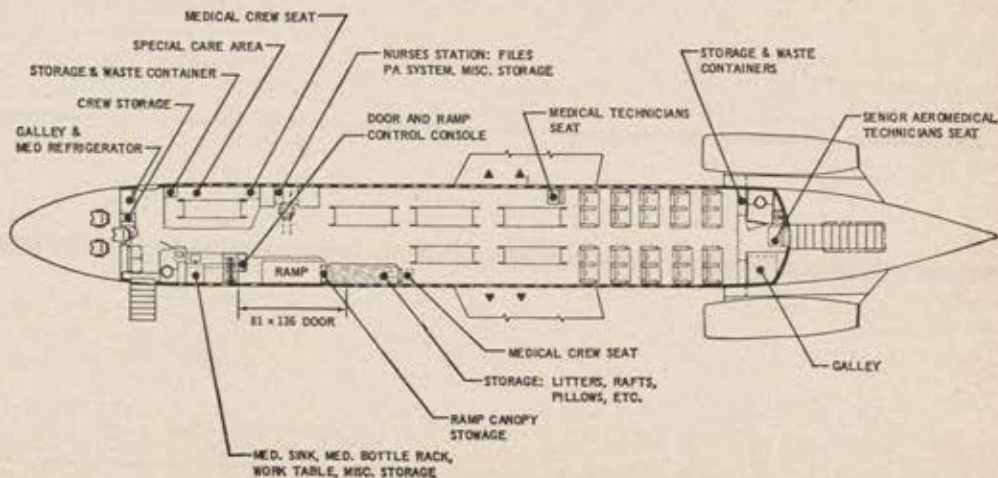
At cabin's right front is a small galley with coffee maker

(Continued on following page)

USAF medical technician, with airman in the role of patient, tests suitability of the special-care compartment equipped with atmosphere controls and ultraviolet lamp on the McDonnell Douglas twin-jet C-9A.



C-9A will house the most advanced mobile medical facilities. Diagram at right shows arrangement of facilities for transporting eighteen litter and twenty ambulatory patients.





Medical Corpsmen load airman acting as litter patient aboard C-9A mockup at McDonnell Douglas plant to demonstrate working of removable stanchions that hold litters in up to four layers. Stanchions incorporate emergency masks, reading lights, ash trays, cold-air outlets, 28-volt outlets, patient call buttons, signal lights, and public-address speakers.

and medical refrigerator. Across the aisle, left front, are a lavatory and a medical work area, including a sink with foot-operated controls; work counter; storage for medicines, hypodermics, and bottles; and a special drawer with cups for individual doses of medicine. A removable, briefcase-size, compartmented drawer can be carried to the base pharmacy for restocking with medicines. Behind the medical work area is a cloak compartment.

All cabin arrangements have a special-care compartment, which incorporates regulations for humidity, temperature, and pressure, independent of other areas of the aircraft. As much as fifty percent relative humidity and pressure differentials equivalent to as little as a barometer measurement of one-half inch of water may be obtained. There is an ultraviolet purifier which decontaminates air exhausted from the special-care compartment before it is blown outside.

The special-care area accommodates three litters and is enclosed and sealed with lead-plastic sides, fitted with two viewing windows—one in the entry flap at the nurse's station at its aft end and another in the side at the aisle. There is a disposal bin so that waste need not be carried outside. A small storage cabinet serves for supplies needed for special-care patients.

Services in special care include four 110-volt alternating-current outlets for medical equipment, and a 28-volt direct-current outlet. There are three therapeutic-oxygen outlets and three suction outlets for respiratory use. Flush female-type adapters in the ceiling provide secure plug-ins to support bottles for plasma and intravenous feeding.

The nurse's station aft of the special-care area has a desk; controls for cabin lighting; public-address system; gauges and controls for therapeutic oxygen, cabin temperatures, and suction; and a call board. There is space for patient records and administrative forms, and a double-locked cabinet for narcotics.

A hand phone connects the nurse with the crew interphone, and she may also communicate with ground stations on radio channels selected by the pilot.

Opposite the nurse's station is the main loading door—eighty-one by 136 inches. The integral loading ramp is fifty-four inches wide. It has handrails and support legs and is covered with a nonskid material, as well as being illuminated. The ramp is angled at only nineteen degrees for loading stretcher cases or wheelchairs. The ramp is electrically operated and folds into the cabin as a compact unit.

There is also a front passenger door with an integral,

electrically operated stair which slides under the cabin floor for storage. Underneath the tail is a ventral stairway which drops to permit concurrent loading of ambulatory patients at the rear while litters are being loaded at the ramp. Aft of the loading ramp is a storage area.

Wide, flat stanchions are erected for head-end supports when litters are to be used. These head-end stanchions also serve as baggage racks for ambulatory patients. The stanchions incorporate the patient utilities—dropout emergency oxygen mask, reading light, ash tray, cold-air outlet, 28-volt outlet, patient call button and its signal light, and public-address speaker. There is also a bracket to accommodate a special light for equipment, if required. The foot-end stanchions are simple channel members which contain only a track for the cantilevers. For storage, the foot-end stanchions are rotated up against the ceiling, above the head-end stanchions, while the latter are used as baggage racks.

The cantilever arms, which attach to the stanchions, are adjustable vertically in one-inch increments to control vertical space between patients and to control the slant at which the patient lies.

Located between litter stations are therapeutic-oxygen outlets, suction outlets, and electrical outlets, available for any litter stack or for the four seats a litter stack would replace.

Ambulatory-patient seats are quickly removable, face aft, and have standard airline features. Seat pitch can also be changed by use of floor tracks. When not in use, seats are stowed in the aircraft's belly compartment.

In the aft end of the cabin, on the left side, is the main galley, which includes a double oven and refrigerator large enough to accommodate the needs of the entire complement of patients. Opposite the galley is a second lavatory.

On the rear bulkhead door is a double seat, primarily for the senior medical attendant, plus a foldaway desk. The attendant has a hand phone for communication with the medical crew or flight crew. Other medical-attendant seats are located midcabin on the right side, on the aft wall of the storage compartment, and on the forward bulkhead adjacent to the crew entrance door.

Selecting an Airbus

As the time approached last month for the US airlines to select either the McDonnell Douglas DC-10 or the Lockheed L-1011 for airbus service, indications were that the

two competitors had designs which were equal technically. Selection, it seemed, would pivot on conditions such as price, deliveries, guarantees, and other contractual factors. Price was expected to be about \$18 million in 1972 dollars, when the aircraft would be in operation.

Selection of an engine, dictated by the airlines, would be fanjets built by either General Electric (CF6/36-2) or Rolls-Royce (RB211-15). Price of the airbus with a Rolls engine would be substantially less than if the aircraft were sold with the General Electric powerplants. The latter would have a bypass ratio of 6.45 and a more than 36,000-pound, sea-level, static-thrust rating. The Rolls engine would have a bypass ratio of 4.87 and about 35,000 pounds of thrust. However, both engines would provide the same thrust at liftoff speed.

It was expected that American Airlines and Eastern Air Lines would be the first to announce orders. American had been given authority to act by its board of directors as long ago as late January. Eastern had been scheduled to defer any action until after its board met on February 27. Douglas or Lockheed was not expected to commit itself to build the airbus unless seventy-five to 100 of the vehicles were ordered.

While no orders had been expected to be placed before March, members of the transport industry were saying early last month that an initial airline order might come as early as mid-February.

Satellite-Control Satellite

Aerospace industry members anticipate that a contract definition phase for a satellite-control satellite will be initiated early in Fiscal 1969 by Air Force's Space and Missile Systems Organization, to follow basic evaluation studies now being performed in parallel by TRW and General Electric.

The satellite's function will be to interrogate other US satellites and transmit information to the continental US in as near to real-time as possible, to avoid delay involved in transmission through ground stations outside the continental US. The system would be particularly applicable for interrogation of satellites in relatively low orbits.

Reentry Vehicles as ABM Targets

Industry proposals for a study to define a reentry vehicle as a target to test the capability of the Army Sentinel System's Spartan antiballistic missile will be submitted to Air



This mockup demonstrates hydraulically operated patient-loading ramp. When not in use hand rails fold down, support legs fold up, and ramp folds by sections into a compact package inside patient-loading door of the C-9A.

Force's Space and Missile Systems Organization on March 19. Atlas, Titan, and Minuteman I will be examined as booster candidates, but surplus Minuteman boosters appear to be favored.

The target vehicle probably would contain penetration aids and a scoring device, and provide thrust to create deviations from the normal ballistic flight path or lift for targeting beyond the normal impact point. Existing ICBM reentry vehicles will be examined to see if they are adaptable for the mission or whether a new target vehicle is required for the test.

Launches would be from Vandenberg AFB, and Johnston Island in the Pacific would be the downrange firing point for the Spartan intercept vehicle.—END

An artist's conception of the newest design of Lockheed's 1011 airbus is shown at right. This is one of the main contenders for the airlines' favor in the present competition for the market. The airlines are expected to make a decision soon as to whether they will choose the Lockheed design or the McDonnell Douglas entry, the DC-10.



Send for FREE Information on AFA's Low-Cost Insurance Programs!

- **MILITARY GROUP LIFE INSURANCE**
(with Equal Basic Coverage for ALL Personnel)
- **CIVILIAN GROUP LIFE INSURANCE**
- **FLIGHT PAY INSURANCE**
- **COMPREHENSIVE ACCIDENT INSURANCE**
(Coverage Up to \$100,000)

MILITARY GROUP LIFE INSURANCE

AFA's low-cost Military Group Life Insurance features *equal coverage*, up to \$20,000, for flying and nonflying personnel at the *same low premium*.

This eliminates the penalty of lower coverage for the man on flying status whose death is caused by illness or ordinary accident.

The accidental death benefit was recently increased to \$12,500—a *substantial increase* in this benefit for every age.

The only exception to these provisions is that a flat sum of \$15,000, regardless of age, will be paid for death caused by aviation accident while the insured is serving as pilot or crew member of the aircraft involved.

AFA Military Group Life Insurance carries no hazardous duty restriction—no waiting period for coverage of personnel assigned to a combat zone. This insurance plan was designed as a service to our members, and we believe we serve best by continuing to offer the broadest possible coverage consistent with safety for all policyholders.

Policyholders may also keep their insurance in force at

the low group rate after they leave the service, and until age 65—provided their coverage has been in effect for at least a twelve-month period prior to their date of separation.

Net cost of insurance has now been reduced by dividend payments for five consecutive years . . . in addition to major benefit increases made in the policy during the same period.

Other benefits include guaranteed conversion privilege, waiver of premium for disability, choice of settlement options, and a choice of convenient payment plans, including payment by allotment for those on active duty.

All Air Force personnel on active duty, in the National Guard, and in the Ready Reserve are eligible to apply for AFA Military Group Life Insurance.

More than 17,500 participants carrying over a quarter of a billion dollars life insurance in force have selected this unique program—truly the best protection available for all service families.

CIVILIAN GROUP LIFE INSURANCE

This program offers AFA's nonmilitary members \$10,000 of needed insurance protection at the lowest cost we know of for any group term coverage which offers equal benefits:

Double Indemnity is a unique feature of this plan, covering almost all accidental deaths, including death caused by aviation accident unless the insured is acting as pilot or crew member of the aircraft at the time of accident.

Coverage may be continued at low group rates to age 65, when it may be converted to any permanent plan of insurance then being offered by the Underwriter. United of Omaha, regardless of the health of the insured person.

The plan also provides many other benefits including waiver of premium for disability, and a choice of convenient settlement options.

Any member of AFA, man or woman, who is not on active duty or in the National Guard or Ready Reserve, and who is between 20 and 60, is eligible to apply except for members who have left military service but still retain AFA Military Group Life Insurance. (Residents of Ohio, New Jersey, Texas, and Wisconsin are not eligible for this group coverage, but may apply for similar coverage at comparable rates.)

Four AFA Group Insurance Plans Help You Provide a Secure Future for Your Family!

Complete Information by Return Mail!
No Cost! No Obligation!

FLIGHT PAY INSURANCE

AFA guaranteed Flight Pay Protection is available to rated personnel on active duty. This insurance protects active-duty members on flying status against loss of their flight-pay income because of injury or illness. Protection is guaranteed even against preexisting illnesses after a policy has been in force for a period of twelve consecutive months.

Grounded policyholders receive monthly payments equal to eighty percent of their flight pay (tax free) for periods

up to two years if grounding is caused by aviation accident and for periods up to one year for grounding caused by illness. Because they are tax free, these payments are essentially the equivalent of full government flight pay, which is taxable income.

The plan assures members of no loss of income if they are returned to flying status within the benefit period. And, if grounding is permanent, they are given sufficient time to adjust their expenses to a lower-income level.

COMPREHENSIVE ACCIDENT INSURANCE

This unique accident insurance coverage, available to all AFA members regardless of age, offers worldwide, full-time protection against all accidents except those involving crew members in aircraft accidents.

It is available in units of \$5,000, to a maximum of \$100,000, and may be purchased for individual protection, or for complete family protection under the popular Family Plan (including all children under age 21)—both at remarkably low rates.

In addition to the basic coverage, policyholders receive an automatic five percent increase in the face value of their coverage each year for the first five years their insurance is in force. There is no extra premium cost for this automatic benefit increase.

Insurance is also provided for nonreimbursed medical expenses of over \$50, up to a maximum of \$500. Under the Family Plan, every family member receives this valuable extra coverage.

**RETURN THIS COUPON
FOR COMPLETE
INFORMATION ON
ANY OR ALL
AFA INSURANCE PLANS**

AIR FORCE ASSOCIATION
Insurance Division

1750 Pennsylvania Ave., N.W.
Washington, D. C. 20006

Without obligation, please send me complete information about the AFA Insurance Program(s) checked at right.

Name _____

Rank or Title _____

Address _____

City _____

State _____ Zip _____

- ☐ Military Group Life Insurance
- ☐ Civilian Group Life Insurance
- ☐ All-Accident Insurance
- ☐ Flight Pay Insurance

3-68



THE BULLETIN BOARD

News and Comment about Air Force People...

By Jackson V. Rambeau

AFA DIRECTOR OF
MILITARY RELATIONS

Dual Compensation

When Congress passed the dual-compensation law in 1964 it very pointedly put in a section which discriminates against retired Regular officers in federal civilian jobs. Under that section, a retired Regular officer, while in federal civilian employment, may receive the first \$2,074 of his retired pay, plus fifty percent of any amount in excess of \$2,074, plus the pay of his civilian position. The \$2,074 figure is based on the current Consumer's Price Index and fluctuates with the cost of living. The law exempts retired Reserve officers and retired enlisted personnel. A clearly stated reason as to why this discriminatory formula was restricted to Regular officers has never been given.

On numerous occasions the Air Force Association has urged the Department of Defense to speak out against this type of treatment for its officers. Now DoD has at last taken a position strongly supporting a change in the law. In a letter to the Chairman of the House Post Office and Civil Service Committee, which was forwarded to the Bureau of the Budget, the Office of the Secretary of Defense summed up the situation:

"In the light of the congressional action to exempt Reserve officers and all enlisted men from the restrictions on receipt of retired pay when employed by the federal government, logic and equity dictate similar treatment of Regular officers. The inconsistency and inequity of the existing restriction is particularly apparent in terms of the following statistics: As of June 30, 1967, there were slightly over 583,000 retired military members on the retired rolls. About eighty-six percent were Reserve officers or enlisted members—and these individuals are not subject to the compensation limitation imposed under 5 U.S.C. 5532. Only the remaining fourteen percent were retired Regular officers—and unquestionably some of these do not fall within the purview of 5 U.S.C. 5532 (i.e., where retirement is based on disability directly resulting from armed conflict or an instrumentality of war during a period of war). Accordingly, the Department of Defense strongly supports H. R. 8957."

A reliable source tells us that the United States Civil Service Commission, an important ally, has told the Bureau of the Budget that it recognizes the discrimination and offers no opposition to a change in the law. In the Commission's letter to the Bureau of the Budget, however, there is no indication that it is prepared to vigorously take on the federal employee unions in order to get the law changed. The unions tried very hard in 1964 to get many more restrictions written into the bill then under consideration. In the intervening years, the unions have grown in size and in influence on Capitol Hill, and overcoming their opposition will be difficult.

The Bureau of the Budget is now trying to measure the climate for favorable action in the Congress. A very real

concern is that Congress just might add more restrictions rather than eliminate any.

Unfortunately, the matter will be referred to the unfriendly Manpower Subcommittee of the House Post Office and Civil Service Committee, which works closely with the employee unions. An offsetting factor, however, is that the chairman of the full committee, Thaddeus J. Dulski (D.-N. Y.), has indicated his willingness to personally introduce the desired legislation if the Bureau of the Budget convinces him that the Administration fully supports the Defense Department position. Because of the prestige a chairman carries with his committee, Mr. Dulski's move could go a long way toward getting favorable action. In summing it up, this writer would say the chances are not good without a strong fight on the part of the Administration, and at the moment we don't see anyone rushing out to do battle on this one. We hope we're wrong. Next month should tell the story.

The Airman-Promotion Puzzle

Almost everyone agrees that there is a direct relationship between the terribly low Air Force first-term retention rates (fifteen to eighteen percent) and the airman promotion system. We have been encouraged over the last few months with the amount of attention the promotion system has been getting within the Congress, the Office of the Secretary of Defense, and the Air Force. After all of this attention some facts are beginning to emerge—some good, some not so good, some not yet clear.

On the plus side is the recent announcement that the Secretary of Defense has approved the Air Force request for FY 1969 of an additional 26,744 top six NCO grades. The Air Force has been trying for years to get OSD to move on this problem, but the whole mess had to be aired before a congressional committee before the department would relent. The new quotas will mean 215,000 NCO promotions in FY 1969, an increase of thirty percent. Mark up quite a victory for the Congress and the Air Force.

Coming up in the good old study stage is the development of a weighted factors system for the use of promotion boards and a possible overhaul of the castigated Airman Performance Rating System. Both areas are badly in need of improvement.

We are concerned, however, that the Air Force still apparently fails to recognize the value to the Air Force and the individual of annual testing as a primary part of a workable promotion system which is understandable to the men. Along this same line Air Force personnel people are still opposed to telling the individual who fails promotion how close he came to making it. They seem to feel it might destroy initiative. There are indications, however, that it would have exactly the opposite effect.

While being critical, we must point out that the Air

Force is earnestly trying many and varied approaches to find solutions to these problems. In the near future, a forty-minute film on the subject will be released to the field. Everybody in the film from Secretary Brown on down honestly tries to explain what is a very complex subject. It is worthy of the serious consideration of all Air Force personnel.

The report of the House Armed Services Subcommittee, which held months of hearings in 1967 on the enlisted promotion systems of all the services, is due to be published about March 1. It will be one of the longest reports ever rendered by Congress and will set off another round of action within OSD and the Air Force.

People Now A Little More Important

In a move which will upgrade the handling of people, Secretary Brown has announced the creation of a new position—Assistant Secretary for Manpower and Reserve Affairs—in the Office of the Secretariat. This is a fallout benefit for the members of the active forces which came out of the Reserve Bill of Rights. The new law specifically established in each service a fourth Assistant Secretary to be used for the administration of people. For the past ten years only the areas of money, materiel, and R&D have been permitted an Assistant Secretary. During Mr. McNamara's tenure the Air Force Association has urged that a fourth Assistant Secretary be approved for manpower, and testified to this effect before the Congress. We are indeed pleased with this development, which should give Air Force personnel a more powerful voice in USAF policy.

The new Assistant Secretary of the Air Force will supervise activities formerly performed within the Office of the Deputy Undersecretary for Manpower. The Office of Deputy Undersecretary for Manpower has been abolished, and Dr. Eugene T. Ferraro, who has occupied that position for almost two years, has been named Acting Assistant Secretary. It is our understanding that this is in line with Dr. Ferraro's wishes, since he had planned to return to private industry sometime later this year. As we went to press, the White House had not formally submitted a nomination to the Senate to fill this position.

Parting Shots

The Air Force has announced the approval of fifty-five more Junior ROTC units in high schools throughout the

country. This will bring the total in September to 120, with a goal of 275 by 1970.

The national pilot study, supposedly being conducted by the Labor Department and financed jointly by the Department of Defense and FAA, has had real difficulty getting off the ground. The project was approved on June 30 of last year. The Labor Department was to have sent questionnaires to all elements of the aviation industry to get the raw material for evaluation. The final report was to have been available by December 15, 1967. Apparently it has taken the Labor Department seven months to agree among themselves on a suitable questionnaire. As we went to press, the questionnaire was still not in the mails. The new target date given by the Labor Department for a report is mid-April this year. We hope.

The Hubbell Military Compensation Study Group report, along with its recommendations for a single salary system, has been approved by the Secretary of Defense.



Aerospace Defense Command pilots receive "Tiger by the Tail" patches when they complete 1,000 flying hours in the F-104 Starfighter, but none has gone as far as this pilot, who looks like he would rather be flying combat, as he catches a tiger by the tail the hard way—with a real tiger.

Indications, however, from both the House and Senate are that it will have very little chance of being enacted into legislation this year.

The National Guard Technician retirement legislation now before the Senate Armed Services Committee is in danger of not being enacted in this short election-year session. Latest reports are that the committee will not get to the bill until May. Delay beyond that point could be serious.

A part of the Air Force's pilot problem, according to some critics in DoD, is caused by the Air Force's insistence that it must have two pilots in both the F-111 and the F-4. Recently, the Air Force reluctantly agreed to conduct a study to determine whether two pilots would be required only on certain types of missions. In his posture statement to the Senate Armed Services Committee, the Secretary of Defense claimed that if the crew size of these two aircraft were reduced, it would save \$400 million over the next five years.

In spite of our many military problems around the world, the Air Force put on a magnificent demonstration of mobility as a result of the *Pueblo* incident. Within hours after the world learned that we had lost the *Pueblo*, more than 200 fighters had been deployed from the United States to airfields in South Korea. This was done without a single accident or incident.

The Air Force Association has urged the Air Force to seek an increase in its number of Regular officers authorized under the law, which is now 69,425. We still have hopes that it will request an increase. We are impressed

(Continued on following page)



Gen. Jacob E. Smart, USAF (Ret.), is welcomed on arrival at Maxwell AFB, Ala., by Lt. Gen. John W. Carpenter, III, Air University Commander. Currently Assistant Administrator for DoD and other agency affairs at NASA, General Smart spoke to the Air War College class of 1968 recently.

with the 1968 Regular officer appointment program, which is an eighty percent increase over FY '67. Regular commissions will be tendered to 9,000 this year, versus 5,000 last year. We think this is a step in the right direction for increasing young officer retention.

The Reserve Associate Unit Program, after being stalled in DoD for almost a year, has finally been approved, and the first unit will be activated at Norton AFB on March 1. Five other Reserve units will be converted to the Associate Unit concept during this fiscal year, but the units have not yet been identified. Apparently because of the objection of many Guardsmen, no units have been designated in the Air National Guard for conversion to Associate Units as yet.

The Night Fighters have changed their name to the American Fighters Association.

The new Office for the Air Force Reserve, which was established by the passage of H. R. 2, is off to a slow start because of inaction within the Senate and conflict within the Air Staff. As we went to press, the Senate had not yet confirmed the appointment of Brig. Gen. Tom Marchbanks, sixty days after President Johnson had nominated him to head this new office. The dispute within the Air Staff over whether the office will replace Continental Air Command is still going on.

On January 25, President Johnson ordered more than 14,000 members of the Air Reserve Forces to extended active duty. They reported by midnight of January 26, with a better than ninety-eight percent response.



—United Press International Photo

Col. Robin Olds (newly nominated for Brig. Gen.), Commandant of Cadets at AF Academy, salutes during ceremony at Colorado Springs at which he received USAF's second highest award, the Air Force Cross, for heroism in Vietnam, where he was credited with shooting down four MIGs.

The President invoked the authority vested in him by the 1967 Defense Department Appropriations Act which provides that "until June 30, 1968, a President may, when he deems it necessary, order to active duty any unit of the Ready Reserve of the armed forces for a period not to exceed twenty-four months." A DoD spokesman stated that the call-up was recommended by the Joint Chiefs of Staff and the Secretary of Defense as "a precautionary measure to strengthen our forces." It was the first time that members of the Air Reserve Forces had been mobilized since the Cuban crisis of October 1962, when the units were retained on active duty for one month.

Last month's order affected 9,343 Air National Guardsmen and 4,855 Air Force Reservists. Among them were five wings and their commanders: Brig. Gens. W. W.

Maj. Gen. Clarence A. Shoop, Commander, California ANG, and Vice President of Hughes Aircraft Co., died of pneumonia on January 27. A longtime AFA supporter and former ANG Council Chairman, General Shoop was a well-known test pilot and industrialist.



Millikan, 113th Tactical Fighter Wing, Andrews AFB, Md.; Walter E. Williams, 140th Tactical Fighter Wing, Buckley AFB, Colo.; Jack H. Owen, 123d Tactical Reconnaissance Wing, Shewmaker ANGB, Ky.; George H. Wilson, 445th Military Airlift Wing (AFRes), Dobbins AFB, Ga.; and Rollin B. Moore, Jr., 349th Military Airlift Wing, Hamilton AFB, Calif.

In addition to the above wings, the following units were activated: ANG tactical fighter groups (F-100s): 113th, Andrews; 177th, Atlantic City, N. J.; 107th, Niagara Falls, N. Y.; 121st, Lockbourne AFB, Ohio; 140th, Buckley, Colo.; 184th, McConnell AFB, Kan.; 185th, Sioux City, Iowa; and 150th, Kirtland AFB, N. M. ANG tactical reconnaissance groups (RF-101s): 123d, Louisville, Ky.; 189th, Little Rock AFB, Ark.; and 152d, Reno, Nev. AFRes military airlift groups (C-124s): 918th, Dobbins AFB, Ga.; 904th, Stewart AFB, N. Y.; 938th, Hamilton AFB, Calif.; 921st, Kelly AFB, Tex.; and 941st, McChord AFB, Wash.

The Air Force Reserve's 305th Aerospace Rescue and Recovery Sq., Selfridge AFB, Mich., also was mobilized. The unit is equipped with the HC-97 "Stratorescuer." The Air Force gained more than 700 pilots in this recall action.

Senior Staff Changes

M/G Royal N. Baker, from Vice Cmdr., 12th AF, TAC, Waco, Tex., to Ass't C/S, Plans, J-5, USMACV, Cholon, Vietnam . . . M/G George S. Boylan, Jr., DCS/Plans, assigned add'l duty as Acting DCS/Ops, Hq. MAC, Scott AFB, Ill. . . . B/G James M. Keck, from Cmdr., 17th Strategic Aerospace Div., SAC, Whiteman AFB, Mo., to DCS/Comptroller, Hq. SAC, Offutt AFB, Neb. . . . B/G Tom E. Marchbanks, from Cmdr., 433d Tactical Airlift Wing, Kelly AFB, Tex., to Chief of Air Force Reserve, Hq. USAF, with promotion to Major General.

PROMOTIONS: To Lieutenant General: Richard P. Klocko.

Air Force Reserve Nominations: To Major General: Frank J. Puerta. To Brigadier General: John W. Bitner, Charles D. Briggs, Jr., John O. Gray, Campbell Y. Jackson, Justin G. Knowlton, Homer I. Lewis, Theodore C. Marrs, Henry J. McNulty, Wendell B. Sell, Farmer S. Smith.

RETIREMENTS: B/G Roscoe C. Crawford, Jr., B/G Frank B. Elliott, B/G Gladwyn E. Pinkston.—END

This Is AFA

The Air Force Association is an independent, nonprofit airpower organization with no personal, political, or commercial axes to grind; established January 26, 1946; incorporated February 4, 1946.

Objectives

• The Association provides an organization through which free men may unite to fulfill the responsibilities imposed by the impact of aerospace technology on modern society; to support armed strength adequate to maintain the security and peace of the United States and the free world; to educate themselves and the public at large in the development of adequate aerospace power for the betterment of all mankind; and to help develop friendly relations among free nations, based on respect for the principles of freedom and equal rights to all mankind.

Membership

Active Members: US citizens who support the aims and objectives of the Air Force Association, and who are not on active duty with any branch of the United States armed forces—\$7 per year.

Service Members (non-voting, non-officeholding): US citizens on extended active duty with any branch of the United States armed forces—\$7 per year.

Cadet Members (non-voting, non-officeholding): US citizens enrolled as Air Force ROTC Cadets, Civil Air Patrol Cadets, or Cadets of the United States Air Force Academy—\$3.50 per year.

Associate Members (non-voting, non-officeholding): Non-US citizens who support the aims and objectives of the Air Force Association whose application for membership meets AFA constitutional requirements—\$7 per year.

Officers and Directors

ROBERT W. SMART, President, Santa Monica, Calif.; **JOSEPH L. HODGES**, Secretary, South Boston, Va.; **JACK B. GROSS**, Treasurer, Harrisburg, Pa.; **JESS LARSON**, Chairman of the Board, Washington, D. C.

DIRECTORS: John R. Allison, Beverly Hills, Calif.; Joseph E. Assaf, Hyde Park, Mass.; John L. Beringer, Jr., Pasadena, Calif.; William R. Berkeley, Redlands, Calif.; Milton Caniff, New York, N. Y.; Vito J. Castellano, Armonk, N. Y.; M. Lee Cordell, Berwyn, Ill.; Edward P. Curtis, Rochester, N. Y.; James H. Doolittle, Los Angeles, Calif.; George M. Douglas, Denver, Colo.; Ken Ellington, Los Angeles, Calif.; A. Paul Fonda, Washington, D. C.; Joe Foss, New York, N. Y.; George D. Hardy, College Heights Estates, Md.; Dale J. Hendry, Boise, Idaho; John P. Henebry, Kenilworth, Ill.; Robert S. Johnson, Woodbury, N. Y.; Arthur F. Kelly, Los Angeles, Calif.; George C. Kenney, New York, N. Y.; Maxwell A. Kriender, New York, N. Y.; Laurence S. Kuter, New York, N. Y.; Thomas G. Lanphier, Jr., San Antonio, Tex.; Curtis E. LeMay, Chatsworth, Calif.; Joseph J. Lingle, Milwaukee, Wis.; Carl J. Long, Pittsburgh, Pa.; Howard T. Markey, Chicago, Ill.; Ronald B. McDonald, San Pedro, Calif.; J. B. Montgomery, Van Nuys, Calif.; Earle N. Parker, Fort Worth, Tex.; Julian B. Rosenthal, New York, N. Y.; Peter J. Schenk, Arlington, Va.; Joe L. Shosid, Fort Worth, Tex.; C. R. Smith, New York, N. Y.; Carl A. Spaatz, Chevy Chase, Md.; William W. Spruance, Wilmington, Del.; Thos. F. Stack, San Francisco, Calif.; Arthur C. Storz, Omaha, Neb.; Harold C. Stuart, Tulsa, Okla.; James M. Trall, Boise, Idaho; Nathan F. Twining, Arlington, Va.; Robert C. Vaughan, San Carlos, Calif.

REGIONAL VICE PRESIDENTS: Walter E. Barrick, Jr., Danville, Va. (Central East); Jack T. Gilstrap, Huntsville, Ala. (South Central); Lloyd Grimm, Omaha, Neb. (Midwest); Martin H. Harris, Winter Park, Fla. (Southeast); Joe F. Lusk, Lexington, Mass. (New England); Nathan H. Mazer, Roy, Utah (Rocky Mountain); Glenn D. Mishler, Akron, Ohio (Great Lakes); Warren B. Murphy, Twin Falls, Idaho (Northwest); Martin M. Ostrow, Beverly Hills, Calif. (Far West); Dick Palen, Edina, Minn. (North Central); J. J. Walden, Jr., Fort Worth, Tex. (Southwest); James W. Wright, Williamsburg, N. Y. (Northeast).

State Contacts

Following each state contact's name and address are the names of the localities in which AFA Chapters are located. Information regarding these Chapters, or any place of AFA's activities within the state, may be obtained from the state contact.

ALABAMA: A. T. Ousley, 715 Cleermont Drive, S. E., Huntsville, phone 539-3222. **BIRMINGHAM, HUNTSVILLE, MOBILE, MONTGOMERY, SELMA.**

ALASKA: Robert Reeve, P. O. Box 3535 ECB, Anchorage, phone 272-9426. **ANCHORAGE, FAIRBANKS, NOME, PALMER.**

ARIZONA: Donald S. Clark, Jr., P. O. Box 2871, Tucson, phone 623-7771. **PHOENIX, TUCSON.**

ARKANSAS: Alexander Harris, 3700 Cantrell Road, Apt. 612, Little Rock, phone MO. 3-1915. **LITTLE ROCK.**

CALIFORNIA: C. A. DeLaney, 1808-A Newport Blvd., Costa Mesa, phone 548-2231. **BURBANK, CHICO, EDWARDS, 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.**

COLORADO: Robert M. Lee, 318 Pine Avenue, Colorado Springs, phone 473-7546. **COLORADO SPRINGS, DENVER, PUEBLO.**

CONNECTICUT: Joseph C. Horne, 28 William Avenue, Torrington, phone HU. 2-6312. **TORRINGTON.**

DELAWARE: Vito A. Panzarino, Greater Wilmington Airport, Bldg. 1504, Wilmington, phone 328-1208. **WILMINGTON.**

FLORIDA: Lester Curl, 217 Surf Road, Box 265, Melbourne Beach, phone 723-8709. **BARTOW, DAYTONA BEACH, FORT LAUDERDALE, EGLIN AFB, MIAMI, ORLANDO, PANAMA CITY, PATRICK AFB, TAMPA.**

GEORGIA: Troup Miller, Jr., 407 Cochran Drive, N. W., Atlanta, phone 255-6573. **ATLANTA, SAVANNAH, WARNER ROBINS.**

HAWAII: Charles M. McCorkle, Queens Tower 130, Honolulu, phone 511-294. **HONOLULU.**

IDAHO: Charles F. Barnes, 1116 South Cole Road, Boise, phone 343-7731, Ext. 63. **BOISE, BURLEY, POCATELLO, RUPERT, TWIN FALLS.**

ILLINOIS: Ludwig Fahrenwald, III, 108 North Ardmore, Villa Park, phone 832-6566. **CHAMPAIGN, CHICAGO, ELMHURST, LA GRANGE, PARK FOREST, PEORIA.**

INDIANA: George L. Hufford, 419 Highland Avenue, New Albany. **INDIANAPOLIS.**

IOWA: Donald Koontz, Simpson College, Indianola, phone 261-2835. **CEDAR RAPIDS, DES MOINES.**

KANSAS: Don C. Ross, 10 Linwood, Eastborough, Wichita, phone MU. 6-6409. **WICHITA.**

KENTUCKY: Ronald M. Peters, 8604 Holston Road, Louisville. **LOUISVILLE.**

LOUISIANA: John E. Miller, 469 Sandefur Street, Shreveport, phone 868-6616. **ALEXANDRIA, BATON ROUGE, BOSSIER CITY, MONROE, NEW ORLEANS, RUSTON, SHREVEPORT.**

MASSACHUSETTS: Hugh P. Simms, Brooks Road, RFD 2, Lincoln. **BOSTON, FLORENCE, LEXINGTON, NORTHAMPTON, PLYMOUTH, RANDOLPH, SAUGUS, TAUNTON, WESTFIELD, WORCESTER.**

MICHIGAN: W. M. Whitney, Jr., 708 Francis Palms Bldg., 2111 Woodward Avenue, Detroit, phone 567-5600. **BATTLE CREEK, DETROIT, FARMINGTON, GRAND RAPIDS, HUNTINGTON WOODS, KALAMAZOO, LANSING, MOUNT CLEMENS, OAK PARK.**

MINNESOTA: Victor Vacanti, 8941 10th Avenue South, Minneapolis, phone TU. 8-4240. **DULUTH, MINNEAPOLIS, ST. PAUL.**

MISSISSIPPI: M. E. Castleman, 5207 Washington Avenue, Gulfport, phone 863-6526. **BILOXI.**

MISSOURI: O. Earl Wilson, 10651 Roanna Court, St. Louis, phone VI. 3-1277. **KANSAS CITY, ST. ANN, ST. LOUIS.**

NEBRASKA: Stanley Mayer, P. O. Box 14252, W. Omaha Station, Omaha, phone 333-8537. **HASTINGS, LINCOLN, OMAHA.**

NEVADA: Barney Rawlings, 2617 Mason Avenue, Las Vegas, phone 735-5111. **LAS VEGAS.**

NEW HAMPSHIRE: Stuart N. Shaines, Northfield—Beech Road, Dover. **PEASE AFB.**

NEW JERSEY: Salvatore Capriglione, 83 Vesey Street, Newark, phone MA. 2-6653. **ATLANTIC CITY, BELLEVILLE, BURLINGTON, CHATHAM, FORT MONMOUTH, JERSEY CITY, MCGUIRE AFB, NEWARK, PATERSON, TRENTON, WALLINGTON.**

NEW MEXICO: William C. Bacon, Rt. 2, Box 162A, Roswell, phone 623-5488. **ALAMAGORDO, ALBUQUERQUE, CLOVIS, ROSWELL.**

NEW YORK: Charles Alexander, 104-07 Union Turnpike, Forest Hills, phone 594-9074. **BINGHAMTON, BUFFALO, ELMIRA, FOREST HILLS, FREEPORT, ITHACA, KEW GARDENS, LAKEWOOD, NEWBURGH, NEW YORK CITY, PATCHOGUE, PLATTSBURGH, ROCHESTER, ROME, STATEN ISLAND, SUNNYSIDE, SYRACUSE, WHITE PLAINS.**

NORTH CAROLINA: Eldon P. Allen, Rt. 1, Box 277, Knightdale, phone 829-3834. **RALEIGH.**

OHIO: George A. Gardner, 620 Rockhill Avenue, Dayton, phone AX. 9-3956. **AKRON, CANTON, CINCINNATI, CLEVELAND, COLUMBUS, DAYTON.**

OKLAHOMA: Lawrence E. Leffler, 2208 N. Key Blvd., Midwest City, phone 732-9843. **ALTUS, ENID, OKLAHOMA CITY, TULSA.**

OREGON: Clayton Gross, 804 Portland Medical Center, Portland, phone 233-0875. **CORVALLIS, PORTLAND.**

PENNSYLVANIA: George W. Crosby, 1905 West 34th Street, Erie, phone 866-3955. **ALLENTOWN, AMBRIDGE, ERIE, HARRISBURG, LEWISTOWN, PHILADELPHIA, PITTSBURGH, WAYNE, YORK.**

RHODE ISLAND: William V. Dube, T. F. Green Airport, Warwick, phone 781-8254. **WARWICK.**

SOUTH CAROLINA: Franklin S. Henley, Rt. 2, Box 83, Charleston Heights, phone 552-2845. **CHARLESTON.**

SOUTH DAKOTA: John S. Davies, 392 S. Lake Drive, Watertown. **BROOKINGS, RAPID CITY, SIOUX FALLS, WATERTOWN.**

TENNESSEE: Howard F. Butler, 6224 Hillsboro Road, Nashville, phone 292-7381. **MEMPHIS, NASHVILLE.**

TEXAS: Sam E. Keith, Jr., P. O. Box 5068, Fort Worth, phone PErshing 8-0321. **ABILENE, AMARILLO, AUSTIN, BIG SPRING, CORPUS CHRISTI, DALLAS, DEL RIO, EL PASO, FORT WORTH, HOUSTON, LUBBOCK, SAN ANGELO, SAN ANTONIO, SHERMAN, WACO, WICHITA FALLS.**

UTAH: Nolan Manfull, P. O. Box 774, Hill AFB, phone 487-0731. **BOUNTIFUL, BRIGHAM CITY, CLEARFIELD, HILL AFB, OGDEN, SALT LAKE CITY, SPRINGVILLE.**

VERMONT: Dana Haskin, Waitsfield. **BURLINGTON.**

VIRGINIA: A. A. West, P. O. Box 1038, Newport News, phone 596-6333. **ARLINGTON, DANVILLE, HAMPTON, LYNCHBURG, NORFOLK, ROANOKE, STAUNTON.**

WASHINGTON: Marvin O. Christman, P. O. Box 6100, Seattle, phone CH. 4-8650. **SEATTLE, SPOKANE, TACOMA.**

WISCONSIN: Kenneth E. Kuenn, 3239 North 81st Street, Wauwatosa, phone 871-3766. **MADISON, MILWAUKEE.**

WYOMING: Merle W. Allen, Veterans Administration Center, Cheyenne, phone 634-1581, Ext. 232. **CHEYENNE.**

AFA Nominees for 1968-69

MEETING in Washington, D. C., on January 20, in conjunction with an AFA Board of Directors meeting, the Air Force Association's Nominating Committee—composed of the Board of Directors and the State Presidents—chose a slate of three National Officers and nineteen Directors (including a nominee for Chairman of the Board). This slate will be presented to the Delegates at the 1968 AFA National Convention to be held in Atlanta, Ga., April 2-5.

ROBERT W. SMART, current AFA President and former Chairman of AFA's Air Reserve Council, was nominated for reelection to the AFA presidency. During World War II, Mr. Smart served in the Pacific. In 1949, he transferred from the Army Reserve to the Air Force Reserve. He is now a retired Air Force Reserve brigadier general. Following his return to civilian life, Mr. Smart was appointed one of the original members of the professional staff of the newly established House Armed Services Committee in January 1947, subsequently serving as its Chief Counsel from 1951 until his retirement from government service in 1963. Mr. Smart is Vice President for Governmental Relations, North American Rockwell Corp., El Segundo, Calif.

For Chairman of the Board, the Committee nominated incumbent Chairman JESS LARSON. In addition to having served during the past year as Chairman of the Board, Mr. Larson served for thirty months as National President and is a former Chairman of AFA's Air Reserve Council. A World War II field artillery officer, he is now a retired Air Force Reserve major general. In civilian life, Mr. Larson has served as Administrator, War Assets Administration; Administrator of the Federal Works Administration; Administrator, General Services Administration; and, with the latter post, was named Administrator of the Defense Materiel Procurement Agency. Mr. Larson is a distinguished lawyer with offices in Washington, D. C.

Incumbent National Treasurer JACK B. GROSS also was nominated for reelection. A prominent Harrisburg, Pa., civic leader and businessman, Mr. Gross is a former Chairman of AFA's Board of Directors and has served seven previous terms as National Treasurer. In 1958 he received the President's Trophy, designating him AFA's "Man of

the Year." He has also received AFA's Gold Membership Card and a Special Citation. He is a colonel in the Air Force Reserve, with a mobilization assignment at Headquarters Command, Bolling AFB.

GLENN D. MISHLER, Akron, Ohio, current Regional Vice President and Chairman of the Organizational Advisory Council, was nominated for the position of Secretary. Mr. Mishler, a Section Head in the Engineering Department of Goodyear Tire & Rubber Co., is a former Squadron and Wing Commander, and has served as Inspector of Elections Chairman at the past several AFA National Conventions.

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, JACK B. GROSS, GEORGE D. HARDY, JOHN P. HENEERY, ROBERT S. JOHNSON, ARTHUR F. KELLY, GEORGE C. KENNEY, THOMAS G. LANPHER, JR., JESS LARSON, CURTIS E. LEMAY, CARL J. LONG, HOWARD T. MARKEY, JOHN B. MONTGOMERY, JULIAN B. ROSENTHAL, PETER J. SCHENK, C. R. SMITH, CARL A. SPAATZ, THOS. F. STACK, ARTHUR C. STORZ, SR., HAROLD C. STUART, JAMES M. TRAIL, and NATHAN F. TWINING.

The eighteen men listed below and shown in the accompanying photos are nominees for 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; member Board of Trustees, Aerospace Education Foundation.

*WILLIAM R. BERKELEY, Redlands, Calif.—AF civilian information officer. Former Squadron Commander; Regional Vice President; National Committee member.

JOHN G. BROSKY, Pittsburgh, Pa.—judge. Former Chapter, State President; National Convention Parliamentarian. Current National Committee member.

*MILTON CANIFF, New York, N. Y.—syndicated cartoonist. Former Chapter President; National Committee member. Current member Board of Trustees, Aerospace Educa-



Smart



Larson



Gross



Mishler



Assaf



Berkeley



Brosky



Caniff



Castellano



Douglas



Fonda



Hendry



Hodges



Kriendler



Kuter



Lingle



Ostrow



Parker



Shosid



Spruance



Vaughan



Weiss

tion Foundation. Arts and Letters Trophy (1953); AFA Citation of Honor (1961); AFA's "Man of the Year" (1965).

*VITO J. CASTELLANO, Armonk, N. Y.—insurance company executive. Former Squadron, Wing Commander; Regional Vice President; National Committee member.

*GEORGE M. DOUGLAS, Denver, Colo.—telephone company executive. Former State President.

*A. PAUL FONDA, Washington, D. C.—industry executive. Former Squadron, Wing Commander; Regional Vice President; National Committee member. Current member Board of Trustees, Aerospace Education Foundation.

*DALE J. HENDRY, Boise, Idaho—federal, state aviation official. Former Squadron, Wing Commander; Regional Vice President. Current National Committee member.

JOSEPH L. HODGES, South Boston, Va.—retail jewelry store executive. Former National Director; Regional Vice President. Current National Secretary; National Committee member.

*MAXWELL A. KRIENDLER, New York, N. Y.—food importer. Former Squadron Commander; member Board of Trustees, Aerospace Education Foundation. Current National Committee member. AFA's "Man of the Year" (1964).

*LAURENCE S. KUTER, New York, N. Y.—airline executive. Former Commander in Chief, North American Air Defense Command; National Committee member; Chairman of the Board of Trustees, Aerospace Education Foundation. Current member Board of Trustees, Aerospace Education Foundation. AFA Citation of Honor.

*JOSEPH J. LINGLE, Milwaukee, Wis.—Air Reserve technician. Former State President. Current National Committee member.

MARTIN M. OSTROW, Beverly Hills, Calif.—attorney. Former Squadron, Wing Commander; National Committee Chairman. Current Regional Vice President, National Committee member.

*EARLE N. PARKER, Fort Worth, Tex.—industrialist. Former Wing Commander; National Committee member; member Board of Trustees, Aerospace Education Foundation. Current Treasurer of Aerospace Education Foundation.

*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's "Man of the Year" (1963).

*WILLIAM W. SPRUANCE, Wilmington, Del.—federal, state aviation official. Former Regional Vice President; National Committee member. Current member Board of Trustees, Aerospace Education Foundation. AFA Citation of Honor; AFA's "Man of the Year" (1966).

*ROBERT C. VAUGHAN, San Carlos, Calif.—sales engineer. Former Squadron, Wing Commander.

SANFORD D. WEISS, Montgomery, Ala.—attorney. Former Chapter, State President; Regional Vice President; National Committee member.

—DON STEELE

CHAPTER OF THE MONTH

Paso del Norte Chapter, Tex., cited for effective programming in support of the AFA mission by contributing to the welfare of US servicemen in Vietnam.

Viewing a portion of the some 660 bundles of paperback books donated by the Sandoval News Service for distribution to US troops in Vietnam and shipped via regular mail channels to Vietnam by AFA's Paso del Norte Chapter of El Paso, Tex., are, from left, Henry Salas, Sales Manager of Sandoval; Chapter Past President Herbert Roth; and Chapter President Lt. Gen. Howard A. Craig, USAF (Ret.).



Gen. Gabriel Disosway, Commander of the Tactical Air Command, was the featured speaker at a recent meeting of the Alamo, Tex., Chapter. General Disosway gave a firsthand report on applications of tactical airpower in the Vietnam War.

More than 500 attended the meeting in the Lackland AFB Officers' Open Mess at which B. L. "Pete" Cockrell was elected to succeed Ben Griffith as Chapter President. Other officers elected were: L. D. Farmer, William S. Guttman, James Gunn, and Mrs. Peggy Vincent, Vice Presidents; Fernando N. Villsana, Secretary; and A. G. Sinclair, Treasurer.

The David D. Terry AFA Chapter of Little Rock, Ark., opened its 1968 activity with a program that was attended by more than 200 members and distinguished business and civic leaders. Held in the Little Rock AFB Officers' Open Mess, the program featured a presentation by Sanford N. McDonnell, President of the McDonnell Aircraft Co., McDonnell Douglas Corp.

A native of Little Rock, Mr. McDonnell, in his "homecoming" appearance, discussed the F-4 Phantom and other weapon systems developed by his company.

During the program, Arkansas' Lieutenant Governor Maurice Britt, a World War II Medal of Honor winner and second most highly decorated veteran of that conflict, made Mr. McDonnell an "Arkansas Traveler," a designation reserved for distinguished visitors to the state.

William L. Terry, brother of the late Air Force career officer for whom the Chapter is named, was elected Chapter President for 1968.

AFA's fourth annual State Presidents' Orientation Meeting was held in Washington, D. C., on January 19, in conjunction with meetings of the Finance Committee, Executive Committee, Organizational Advisory Council, Nominating Committee, and Board of Directors.

Twenty-six of the twenty-eight states with a chartered AFA State Organization were represented at the meeting. AFA Executive Director



Sanford N. McDonnell, center, President, McDonnell Aircraft Co., speaker at a David D. Terry Chapter, Little Rock, Ark., meeting, chats with Lt. Governor Maurice Britt, left, and Col. A. E. Harris, USAF (Ret.), retiring Chapter President.



Col. Lyle Castle, right center, guest speaker, congratulates Civil Air Patrol Cadet 2d Lt. Daniel Zdobinski on receiving the Joseph A. Walker Memorial Flight Scholarship. Also in the photo are Capt. Frank W. Fork, left, Mrs. Marie L. Fork, and Judge John G. Brosky, right (see story below).



At the recent Florida State AFA Convention in Orlando, State President Lester Curl, left, presents Jerome K. Waterman Award to Col. Thomas DeJarnette, Commander, 4756th Air Defense Wing at Tyndall AFB, for outstanding contributions in air defense by a USAF member in Florida.



At reactivation of the H. H. "Iap" Arnold Chapter, Long Island, N. Y., Chapter President Norman G. MacKinnon, left, and speaker Louis W. Davis, right, admire the AFA President's Trophy held by Chapter member Col. Francis S. Gabreski, USAF (Ret.). Chapter received trophy in 1957.

James H. Straubel opened the meeting at the AFA Headquarters offices.

During sessions at the AFA Headquarters and at Washington's Sheraton-Park Hotel, the State Presidents were briefed on the responsibilities and operation of each of the departments within AFA Headquarters.

AFA President Robert W. Smart was the speaker at a luncheon for the State Presidents, and an evening reception honored AFA's Board of Directors and State Presidents. Distinguished Air Force guests at the reception included Dr. Theodore C. Marrs, Deputy for Reserve Forces; Maj. Gen. William Garland, Director, Office of Information; Maj. Gen. Lawrence S. Lightner, Director, Office of Legislative Liaison; Maj. Gen. Milton B. Adams, Commander, Headquarters Command; and Brig. Gen. James F. Hackler, Deputy Director, Office of Information.

State Presidents attending were: Arthur Ousley, Alabama; Robert Reeve, Alaska; C. A. DeLaney, California; Lester Curl, Florida; Troup Miller, Jr., Georgia; Charles F. Barnes, Idaho; Ludwig Fahrenwald III, Illinois; Donald Koontz, Iowa; John E. Miller, Louisiana; Hugh P. Simms, Massachusetts; W. M. Whit-

ney, Jr., Michigan; Victor J. Vacanti, Minnesota.

Also, O. Earl Wilson, Missouri; Stanley Mayer, Nebraska; Salvatore Capriglione, New Jersey; William C. Bacon, New Mexico; Charles Alexander, New York; George A. Gardner, Ohio; Clayton Gross, Oregon; George W. Crosby, Pennsylvania; Sam E. Keith, Jr., Texas; Nolan Manfull, Utah; Alden A. West, Virginia; Marvin O. Christman, Washington; and Kenneth E. Kuenn, Wisconsin.

Colorado State Secretary Parks Deming represented State President Robert M. Lee; Alaska State Organization Director Chuck Burnette also attended the meeting.

AFA's Greater Pittsburgh, Pa., Chapter and the North Hills Cadet Squadron 610, CAP, recently cosponsored a dinner dance saluting the USAF's Twentieth Anniversary.

Col. Lyle Castle, Chairman of the National Board of Civil Air Patrol, was the guest speaker. Greater Pittsburgh Chapter President Ed Gagliardi gave the welcoming remarks, and Judge John G. Brosky, past Pennsylvania State AFA President, served as master of ceremonies.

During the program, Capt. Frank

W. Fork, Commander, North Hills Cadet Squadron, presented the CAP Squadron's Joseph A. Walker Memorial Flight Scholarship to Cadet 2d Lt. Daniel Zdobinski, the Cadet Commander of the CAP unit.

• • •

On a recent trip to Tennessee and Virginia, AFA Board Chairman Jess Larson addressed AFA groups in Nashville and Tullahoma, Tenn., and Richmond, Va.

The first event, a Charter Luncheon for the newly organized Tennessee State AFA Organization and the Middle Tennessee Chapter, was held in the Headquarters auditorium of the Tennessee Air National Guard's 118th Military Airlift Group.

Mr. Larson was the featured speaker, and South Central Regional Vice President Jack Gilstrap installed the State and Chapter officers and presented an AFA Charter to each of the newly organized AFA units.

Newly elected and installed State officers are: Maj. Gen. Howard Butler, ANG (Ret.), President; John Ryan, Vice President; Raymond Jones, Secretary; and Clarence Reynolds, Treasurer. The Chapter's officers are: Samuel Altman, President; King C. Matthews, Vice President; William F. Bell, Secretary; and James L. Delaney, Treasurer.

During the program, William M. Hartnett, Military Affairs Director of the Nashville Area Chamber of Commerce, presented Mr. Larson a scroll designating him a member of the Chamber's "Red Carpet Club."

Alabama State President Art Ousley was a guest at this luncheon and Sgt. Joseph J. Shallcross, Sewart AFB's "Airman of the Year," was a special guest of honor. The more than 200 persons who attended included an excellent representation from the community, Sewart AFB, the Air Force

(Continued on following page)

Is Your Blood Pressure HIGH?

Only your doctor can tell. Now he can **control** most cases with pressure-lowering drugs and new methods of treatment.

But more research is needed to find ways of **preventing** this leading cause of heart attack and stroke.

Your Heart Fund dollars help make this research possible.

GIVE...
so more will live
HEART FUND

Contributed by the Publisher



Dr. William H. Pickering, Director of NASA's Jet Propulsion Laboratory, uses model of the Mariner planetary probe during his presentation at the joint installation dinner sponsored by fourteen AFA Chapters in Southern California.

Reserve, and the Air National Guard.

That evening, Mr. Larson was guest of honor and principal speaker at a reception held in the Officers' Club of the Arnold Engineering Development Center, Tullahoma, Tenn.

Brig. Gen. Gustav Lundquist, Commander of the Center, served as master of ceremonies and hosted the affair that not only served to honor Mr. Larson and his visit to the Center, but served to generate local interest in both the AFA mission and rejuvenate the H. H. Arnold Memorial Chapter.

More than 150 attended, including representatives of the surrounding communities, industry, and Air Force and civilian personnel of the Center.

South Central Regional Vice Pres-

ident Jack Gilstrap and Alabama State President Art Ousley were special guests.

The next evening, Mr. Larson attended the Charter Night Reception of the newly organized Richmond, Va., Chapter. Following his remarks on the objectives of AFA, Mr. Larson installed the newly elected officers and presented the AFA Charter.

Central East Regional Vice President Walter Barrick served as master of ceremonies. Ray Ricketts, organizer of the Chapter, conducted the business portion of the meeting.

Howard L. Huggett, Ronson Hydraulic Units, Charlotte, N. C., was the principal speaker. Mr. Huggett gave an enlightening presentation on "Man and His Relationship to Space."

Officers of AFA's Florida West Coast Chapter pose with their guest speaker, Col. Robin Olds, center, now Commandant of Cadets at the Air Force Academy, at January meeting at MacDill AFB. From left, Treasurer Dennis McClendon; Secretary Marion Chadwick; Colonel Olds; President Joseph Martin; and Vice President E. C. Newton.





Taking part in ceremonies inaugurating the Mount Clemens, Mich., Chapter's project of helping the city library build up its aerospace book section were, from left, Chapter officers, Treasurer Pat Fletcher, President Marjorie O. Hunt, and Secretary Dorothy Hyne; Librarian Miriam Altman; Board of Education members Guy Brown and Mrs. Betty Lou Morris; and Board of Education President Alex Walker.



Air Force Academy Cadets from the Akron, Ohio, area who were home on leave for the Christmas holidays and Academy alumni were feted by AFA's Akron Chapter. Attending reception at Akron University were, from left, Cadet William Davis, Akron U. "Angel" Dotty Gasper, Cadet Michael Jackson, and Chapter President Jack Cherry, who is an Air Force Reserve lieutenant colonel and the Air Force Academy liaison officer for the Akron area.

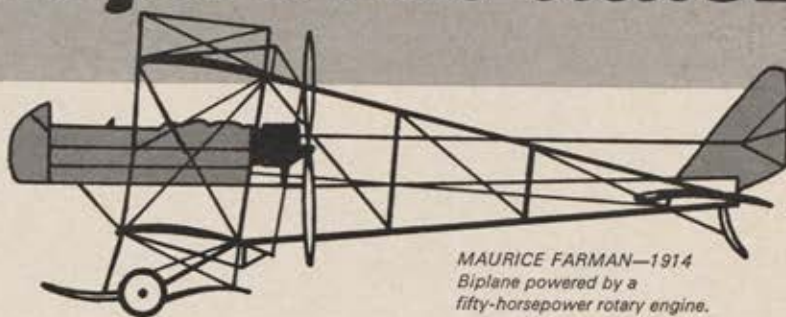
The Chapter's newly elected and installed officers are: Willard G. Plentl, President; N. B. Ceraolo, Vice President; Kenneth A. Rowe, Secretary; and Wilmer L. Goodrich, Jr., Treasurer.

More than 200 attended a recent Installation Dinner Dance hosted by AFA's Pasadena Area, Calif., Chapter at which the newly elected officers of fourteen AFA Chapters located in Southern California were installed.

Dr. William H. Pickering, Director of NASA's Jet Propulsion Laboratory, was the principal speaker. Dr. Pickering gave an audio-visual presentation on "Why Explore the Solar System?"

AIR FORCE Magazine • March 1968

44 years before our time.



MAURICE FARMAN—1914
Biplane powered by a
fifty-horsepower rotary engine.

FLYING WAS A SKYLARK. In 1914, 44 years before Jet Avion was founded in 1958, the Maurice Farman "soared" and the government hadn't decided what to do about the flying "toy."

TODAY: SKYROCKET! Jets, the Navy Convair, the new C-5A, ICBM's. Jet Avion, as a major supplier of FAA-PMA approved jet and reciprocating engine replacement parts, serves leading flag airlines, aerospace companies, military—world-wide and at substantial savings. **JET AVION SERVICES THE WORLD!**

jet Avion

CORP.

950 S.E. 8th ST. | HIALEAH, FLORIDA 33010
TEL: 305-887-2686 • CABLE: JEVION
FAA-APPROVED REPAIR STATION 5028

Maj. Gen. Joseph A. Cunningham, Commander, Twenty-second Air Force (MAC), was Military Host. Pasadena's Vice Mayor Bernard Cooper gave the remarks of welcome, Pasadena Area Chapter President E. William Santelman served as master of ceremonies, and AFA National Director John Beringer, Jr., officiated during the installation ceremonies.

Distinguished guests included Pasadena Mayor Boyd Welin; Brig. Gen. Gilbert L. Curtis, Commander, 63d Military Airlift Wing, Norton AFB; Brig. Gen. George W. Edmonds, Deputy Adjutant General for Air, California National Guard, and Chairman of AFA's Air National Guard Council;

and AFA President Robert W. Smart. Other AFA leaders attending included: National Director William R. Berkeley; Regional Vice Presidents Martin Ostrow (Far West) and Martin Harris (Southeast); and Dr. C. A. DeLaney and Robert Lawson, California State AFA President and Vice President (South), respectively.

Participating Chapters included: Air Harbor, Antelope Valley, Long Beach, Los Angeles, San Fernando Valley, Pasadena Area, Riverside County, Robert H. Goddard, San Bernardino Area, Gen. Leonard E. Thomas, Santa Barbara, Santa Monica, South Bay, and Orange County.

—DON STEELE

Bob Stevens' "There I Was..."

WWII FIGHTER PILOT SURVIVAL GEAR (S.W. PACIFIC)



It's never been much of a treat to bail out of an airplane, but we have to admit that there's been considerable progress in the art of retrieval since the days when a raft was where you stood a good chance of spending the rest of the war...

IF YOU SURVIVED THE CHUTE OPENING SHOCK, A CONVERTED B17 ('DUMBO') MIGHT DROP A WHOLE LIFE BOAT ON YOU--



TODAY IN VIETNAM, TECHNOLOGY HAS MADE RESCUE ALMOST ROUTINE --- ALMOST



Fly a 1970 drone/target control system this year.

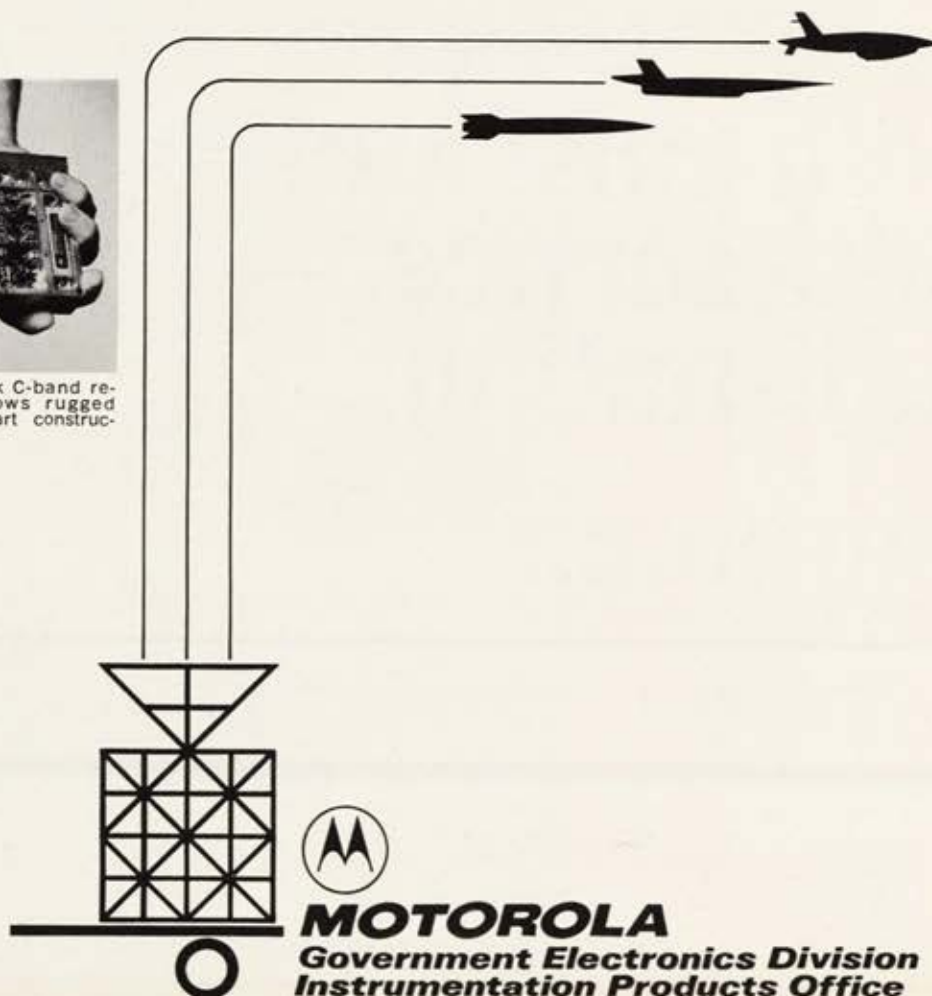
MOBILE INTEGRATED TELEMETRY AND COMMAND TRACKING SYSTEM AT C-BAND (MINTACTS) is a completely integrated and balanced state-of-the-art C-band drone/target control system. It effectively combines the telemetry, command and tracking functions in both the airborne and ground units, and can greatly expand the overall mission capability of both present and future vehicles. *In the air*, a single

receiver/decoder and telemetry encoder/transmitter. *On the ground*, a command encoder and transmitter, control panels, telemetry receiver and decoder, computers, displays, plotting boards, antennas, chairs, coffee cups—the works...all housed in an air transportable van.

For more data on MINTACTS, write 8201 E. McDowell Rd., Scottsdale, Ariz. 85252, or call (602) 947-8181.



The up-link C-band receiver shows rugged state-of-the-art construction.





Multi-mission, multi-service, multi-nation: Phantom.

The F-4 Phantom has a combat-earned reputation as a first-line air superiority fighter, interceptor, reconnaissance aircraft, and fighter-bomber.

This all-weather Mach 2.5 twinjet now serves the U.S. Navy, Marine Corps, and Air Force, and is scheduled to enter service with the U.K. Royal Navy and

Royal Air Force, and the Imperial Iranian Air Force.

Phantom holds all eight time-to-climb records—proof of its ability to reach high-altitude targets quickly. The recently introduced F-4E carries heat-seeking and radar-guided missiles, and a new rapid-fire 20mm cannon in the nose.

Building dependable military

aircraft such as the F-4 and A-4 is a McDonnell Douglas tradition.

Now, we're using our greater-than-ever engineering/manufacturing capability to plan tomorrow's anti-submarine warfare aircraft, air superiority fighters, tactical air weapons systems, and other next-generation aircraft.

MCDONNELL DOUGLAS

